

Codice A1821A

D.D. 27 novembre 2020, n. 3176

Progetto FASTER sul topic "Technologies for first responders (Tecnologie per soccorritori) nell'ambito del Programma Horizon SU-DRS02-2018-2019-2020". Approvazione schema di Accordo con CSI Piemonte. Anni 2020 - 2021 - 2022. CUP J65J18000330006.



ATTO DD 3176/A1821A/2020

DEL 27/11/2020

DETERMINAZIONE DIRIGENZIALE

**A1800A - OPERE PUBBLICHE, DIFESA DEL SUOLO, PROTEZIONE CIVILE,
TRASPORTI E LOGISTICA**

A1821A - Protezione civile

OGGETTO: Progetto FASTER sul topic “Technologies for first responders (Tecnologie per soccorritori) nell’ambito del Programma Horizon SU-DRS02-2018-2019-2020”. Approvazione schema di Accordo con CSI Piemonte. Anni 2020 – 2021 - 2022. CUP J65J18000330006.

Premesso che:

- il Regolamento (UE) 1290/2013 del Parlamento europeo e del Consiglio del 11 dicembre 2013 stabilisce le norme in materia di partecipazione e diffusione nell'ambito del programma quadro di ricerca e innovazione (2014-2020) – Horizon 2020 e che abroga il regolamento (CE) n. 1906/2006;
- il Regolamento (UE) 1291/2013 del Parlamento europeo e del Consiglio del 11 dicembre 2013 istituisce il programma quadro di ricerca e innovazione (2014-2020) – Horizon 2020 e abroga la decisione n. 1982/2006/CE;
- il Programma Horizon 2020 prevede il Work Program Part "Società sicure - Protezione della libertà e della sicurezza dell'Europa" e i suoi cittadini - Call "Security" - SU-DRS02-2018-2019-2020: Topic "Technologies for first responders", Subtopic Open, azione in cui è possibile sviluppare metodiche di aumento della resilienza in quanto elemento fondamentale per consentire alle autorità di adottare misure adeguate in risposta a gravi disastri sia naturali, inclusi eventi estremi legati al clima, che causati dall'uomo;
- l'innovazione per le società resilienti alle catastrofi può attingere da nuove tecnologie, a condizione che siano accessibili, accettate, personalizzate e implementate per i bisogni delle istituzioni e delle strutture operative che operano a supporto di esse;

Con D.G.R. n. 132-7455 del 03/08/2018 la Regione Piemonte ha inteso partecipare, in qualità di partner, al progetto FASTER sulla Call "Security" - SU-DRS02-2018-2019-2020: Topic "Technologies for first responders", Subtopic Open nell’ambito del Programma Horizon SU-DRS02-2018-2019-2020”, per un importo pari a € 150000,00 a favore della Regione Piemonte con

copertura della quota di finanziamento pari al 100% della spesa a carico della Regione;

Per seguire l'attività del progetto FASTER la Regione Piemonte ha individuato la Direzione Opere Pubbliche, Difesa del Suolo, Montagne, Foreste, Protezione Civile, Trasporti e Logistica - Settore Protezione Civile ed Antincendi Boschivi AIB, quale struttura idonea a seguire la realizzazione delle attività previste nonché la sottoscrizione di tutti gli atti amministrativi necessari per l'attuazione;

Considerato che con D.G.R. n. 132-7455 del 03/08/2018, la Regione Piemonte ha indicato come Soggetto attuatore/Parte Terza il CSI Piemonte per l'attuazione del progetto FASTER;

Preso atto che il progetto FASTER (Proposta n. 833507) è stato presentato in data 28/08/2018 dal Capofila ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS (Centre for Research and Technology Hellas - CERTH) con sede a Salonicco, Grecia;

Considerato che la spesa complessiva del progetto FASTER depositato, a valere sul Topic "Technologies for first responders (Tecnologie per soccorritori) - nell'ambito del Programma Horizon SU-DRS02-2018-2019-2020", è risultata essere pari a € 7.315.375,00 (inclusi i fondi extra UE) e di € 6.999.750,00 di soli fondi comunitari, e che il budget finale assegnato alla Regione Piemonte, Settore Protezione Civile e Antincendi Boschivi AIB - A1818B, è stato pari a € 199.000,00 complessivi con copertura della quota di finanziamento pari al 100% della spesa della quota regionale;

Preso atto che:

- l'Executive Agency (Research Executive Agency - Safeguarding Secure Society) ha notificato al capofila ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS (Centre for Research and Technology Hellas - CERTH), in data 23/01/2019, l'approvazione del progetto FASTER per un costo totale di € 7.315.375,00;
- in data 29/03/2019 è stato firmato dalla Commissione Europea il Grant Agreement n. 833507 – FASTER, presentato in data 28/08/2018 dal Capofila ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS (Centre for Research and Technology Hellas – CERTH, con sede a Salonicco, Grecia);
- l'istruttoria condotta dai competenti uffici dell'Unione Europea, ottenute via mail per il tramite del Capofila, ha mosso osservazioni al fatto che la Regione Piemonte, in qualità di partner, avesse computate minori spese rispetto alla Parte terza CSI Piemonte e che pertanto si è dovuto procedere a una rimodulazione, fermo restando le attività progettuali da svolgere, con l'inversione dei ruoli, portando così il CSI Piemonte al ruolo di partner e la Regione Piemonte a divenire Parte terza;

Considerato che a seguito di questa rimodulazione la spesa complessiva CSI Piemonte-Regione Piemonte è rimasta invariata, mentre la sua suddivisione vede assegnata la quota di € 151.500,00 al CSI Piemonte ed € 47.500,00 alla Regione Piemonte;

Vista la D.G.R. n. 13-1332 del 08/05/2020 di modifica della D.G.R. n. 132-7455 del 03/08/2018 "Progetto FASTER sul topic "Technologies for first responders (Tecnologie per soccorritori) nell'ambito del Programma Horizon SU-DRS02-2018-2019-2020". Modifica D.G.R. n. 132- 7455 del 3/08/2018.", di presa d'atto che la spesa complessiva vede assegnata la quota di € 151.500,00 al CSI Piemonte ed € 47.500,00 alla Regione Piemonte;

Preso atto che la quota di € 47.500,00 assegnata alla Regione Piemonte verrà gestita con le stesse modalità di erogazione e rendicontazione riservate ai partner;

Ritenuto necessario stipulare apposito Accordo tra la Regione Piemonte e il CSI Piemonte, per la definizione dei rapporti reciproci a seguito dell'approvazione del progetto;

Ritenuto quindi di approvare lo schema di Accordo tra Regione Piemonte e CSI Piemonte a oggetto "Accordo con la Terza Parte per l'attuazione del progetto FASTER (n. 833507) sul topic "Technologies for first responders (Tecnologie per soccorritori) nell'ambito del Programma Horizon SU-DRS02-2018-2019-2020", allegato alla presente determinazione per farne parte integrante e sostanziale;

Dato atto che il progetto FASTER è stato avviato in data 01/05/2019 e che terminerà in data 30/04/2022;

Preso atto che

- dal 01/01/2020, a seguito della riorganizzazione dell'Ente, la Direzione Opere Pubbliche, Difesa del Suolo, Montagne, Foreste, Protezione Civile, Trasporti e Logistica ha cambiato denominazione diventando Direzione Opere Pubbliche, Difesa del Suolo, Protezione Civile, Trasporti e Logistica
- dal 01/01/2020, a seguito della riorganizzazione dell'Ente, il Settore Protezione Civile ed Antincendi Boschivi AIB ha cambiato denominazione diventando Settore Protezione Civile;
- con D.G.R. n. 8-1261 del 27/04/2020 è stato attribuito l'incarico di responsabile *ad interim* del Settore Protezione Civile all'ing. Gabriella Giunta;
- con nota prot. n. 22915 del 08/05/2020, la dirigente *ad interim* del Settore Protezione Civile, Ing. Gabriella Giunta, è stata delegata dal Dott. Salvatore Martino Femia, Direttore della Direzione Opere Pubbliche, Difesa del Suolo, Protezione Civile, Trasporti e Logistica, a effettuare impegni di spesa sui capitoli inseriti nella missione 11, programma 11.01 associati al codice "A18.21A" del Bilancio regionale e relativamente ai capitoli riferiti ai progetti di cooperazione territoriale, inseriti nella Missione 19, programma 19.02;
- con Determinazione Dirigenziale n. A18-1330 del 19/05/2020 l'attuale Direttore della Direzione Regionale "A1800A – Opere Pubbliche, Difesa del Suolo, Protezione Civile, Trasporti e Logistica", Arch. Salvatore Martino Femia - subentrato al predecessore Arch. Luigi Robino - ha demandato all'Ing. Gabriella Giunta, in qualità di Responsabile *ad interim* del Settore "Protezione Civile A1821A", la sottoscrizione di tutti gli atti amministrativi necessari per l'attuazione, fra gli altri, del progetto FASTER;

Vista:

- la DGR n. 15-991 del 07/02/2020 con la quale si è proceduto a una variazione di bilancio per gli anni 2020-2021 per l'iscrizione dei fondi di provenienza comunitaria finalizzati all'attuazione del progetto FASTER nell'ambito del Programma Horizon SU-DRS02-2018-2019-2020", istituendo i capitoli di bilancio di entrata e di spesa;
- la DGR n. 31-1687 del 17/07/2020 con la quale si è proceduto a una variazione compensativa fra capitoli di entrata relativi al progetto FASTER all'interno del bilancio di previsione finanziario 2020-2022;

Attestata l'avvenuta verifica dell'insussistenza, anche potenziale, di situazioni di conflitto di interesse;

Attestata la regolarità amministrativa del presente atto ai sensi della DGR 1-4046 del 17/10/2016;

Tutto ciò premesso,

LA DIRIGENTE

Richiamati i seguenti riferimenti normativi:

- Visto il D.lgs. n. 165/2001 "Norme generali sull'ordinamento del lavoro alle dipendenze delle amministrazioni pubbliche";
- Vista la L.R. 23/2008 "Disciplina dell'organizzazione degli uffici regionali e disposizioni concernenti la dirigenza e il personale";
- Visto il D.lgs. n. 118/2011 e s.m.i. "Disposizioni in materia di armonizzazione dei sistemi contabili e degli schemi di bilancio delle Regioni, degli enti locali e dei loro organismi, a norma degli articoli 1 e 2 della legge 5 maggio 2009, n. 42";
- Visto il D.lgs. 14/03/2013, n. 33 "Riordino della disciplina riguardante gli obblighi di pubblicità, trasparenza e diffusione informazioni da parte delle pubbliche amministrazioni";
- Vista la D.G.R. n. n. 37-1051 del 21/02/2020 recante "Piano triennale di prevenzione della corruzione (P.T.P.C.) 2020-2022";

DETERMINA

1. di approvare lo schema di Accordo tra Regione Piemonte e CSI Piemonte a oggetto “Accordo con la Terza Parte per l’attuazione del progetto FASTER (n. 833507) sul topic “Technologies for first responders (Tecnologie per soccorritori) nell’ambito del Programma Horizon SU-DRS02-2018-2019-2020”” allegato alla presente determinazione per farne parte integrante e sostanziale;
2. di stabilire che la Regione Piemonte svolgerà le attività di cui allo schema di Accordo nei tempi e con le modalità stabilite nello stesso e di far fronte alla relativa spesa, pari a complessivi € 47.500,00, secondo quanto riportato all’art. 7 “*Modalità di rendicontazione e costi ammissibili*” dell’Accordo.

La presente determinazione è pubblicata sul B.U. della Regione Piemonte, ai sensi dell’art. 61 della L.R. 4 marzo 2015 n. 1 e dell’art. 5 della L.R. 12 ottobre 2010 n. 22 nonché sul sito istituzionale dell’Ente nella sezione “Amministrazione Trasparente” ai sensi dell’art. 23 lett. d) del D.Lgs 14 marzo 2013 n. 33.

Avverso alla presente determinazione è ammesso ricorso giurisdizionale davanti agli organi competenti nei termini di legge.

Estensori:

Franco DE GIGLIO

Maria GIMONDO

LA DIRIGENTE (A1821A - Protezione civile)

Firmato digitalmente da Gabriella Giunta

Si dichiara che sono parte integrante del presente provvedimento gli allegati riportati a seguire ¹, archiviati come file separati dal testo del provvedimento sopra riportato:

1 L'impronta degli allegati rappresentata nel timbro digitale QRCode in elenco è quella dei file pre-esistenti alla firma digitale con cui è stato adottato il provvedimento

1. 20201116_Accordo_CSI_Regione_FASTER_senza_nomi.pdf
2. Grant_Agreement-833507-FASTER.pdf
3. FASTER_ConsortiumAgreement_v0.6_Final.pdf



Allegato



**Accordo con la Terza Parte
per l'attuazione del progetto FASTER
(n. 833507) sul topic "Technologies for first responders
(Tecnologie per soccorritori)
nell'ambito del Programma Horizon SU-DRS02-2018-
2019-2020"**

Tra

Consorzio per il Sistema Informativo (CSI PIEMONTE), con sede in Corso Unione Sovietica, 216 - 10134 – Torino (di seguito indicato come "Beneficiario"), Partita IVA: 01995120019; rappresentato da

di seguito, anche, il Beneficiario

e

Regione Piemonte con sede, ai fini del presente Accordo, presso la sede di corso Marche 79, Torino (di seguito indicata come "Terza Parte"), Codice Fiscale: n. 80087670016, Partita IVA: 02843860012, rappresentata da.....

di seguito, anche, la Terza Parte

congiuntamente Parti

Premesso che

- il Regolamento (UE) 1291/2013 del Parlamento europeo e del Consiglio del 11 dicembre 2013 istituisce il programma quadro di ricerca e innovazione (2014-2020) – Horizon 2020 e abroga la decisione n. 1982/2006/CE;
- il Regolamento (UE) 1290/2013 del Parlamento europeo e del Consiglio del 11 dicembre 2013 stabilisce le norme in materia di partecipazione e diffusione nell'ambito del programma quadro di



- ricerca e innovazione (2014-2020) – Horizon 2020 e che abroga il regolamento (CE) n. 1906/2006;
- il Programma Horizon 2020 prevede il Work Program Part "Società sicure - Protezione della libertà e della sicurezza dell'Europa" e i suoi cittadini - Call "Security" - SU-DRS02-2018-2019-2020: Topic "Technologies for first responders", Subtopic Open, azione in cui è possibile sviluppare metodiche di aumento della resilienza in quanto elemento fondamentale per consentire alle autorità di adottare misure adeguate in risposta a gravi disastri, sia naturali, inclusi eventi estremi legati al clima, che causati dall'uomo;
 - il progetto FASTER (First responder Advanced technologies for Safe and efficient Emergency Response, n. 833507, di seguito il Progetto) è stato presentato in data 28/08/2018 dal Capofila, anche per conto degli altri partner, tra cui il Beneficiario, ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS (Centre for Research and Technology Hellas - CERTH) con sede a Salonicco, Grecia;
 - il Beneficiario, unitamente ad altri enti con Capofila **ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS (CERTH)**, ha stipulato in data 29/03/2019 il contratto n. **833507** (di seguito indicato quale "Grant Agreement" o GA) con la Commissione Europea (di seguito, anche Commissione o CE), per lo svolgimento del Progetto:
 - secondo le previsioni di cui all'art 14 Model Grant Agreement V5.2 – 29 Giugno 2019 (AMGA), possono operare nel Progetto anche "Linked Third Party", ovvero qualsiasi soggetto giuridico che abbia un legame legale con il beneficiario, che implichi una collaborazione non limitata all'azione del progetto (vedi nota 31 del AMGA);
 - Regione Piemonte è ente pubblico consorziato al CSI-Piemonte, a quest'ultimo connesso da rapporto riconducibile alla categoria delle relazioni *in house*; in particolare, CSI è ente *in house* strumentale della Regione Piemonte, che esercita il cd. "controllo analogo" sul Consorzio e che usufruisce di servizi acquisiti in base ad una Convenzione predefinita; in altri termini, CSI e Regione Piemonte si pongono in rapporto di stabile e pre-esistente relazione, tale da giustificare il ruolo nel presente contesto di "Linked Third Party di una rispetto all'altra;



- in ragione delle competenze e delle esperienze di Regione Piemonte, quest'ultima è idonea a fornire un significativo supporto al Beneficiario nel contesto del Progetto in oggetto;
- in ragione di tutto quanto sopra, Regione Piemonte è stata quindi qualificata come Linked Third Party del CSI nel GA (n. **833507**), nonché nel Consortium Agreement (di seguito, CA) sottoscritto tra i Beneficiari, e collaborerà in tale veste alla realizzazione di alcune parti del Progetto, secondo quanto indicato già nell'art. 14 del GA e meglio di seguito precisato;
- quale Terza Parte, come tale debitamente indicata nelle forme e negli atti richiesti, Regione è autorizzata a partecipare al progetto in oggetto, ed è altresì tenuta a rispettarne le relative disposizioni, regole e procedure, nella misura applicabile, nonché ad accettarne le relative responsabilità, manlevando in relativa misura il Beneficiario che sarà nel caso comunque chiamato a rispondere verso la Commissione ed i partner dell'operato della propria Terza Parte;
- in ragione di detto ruolo, come sopra sinteticamente richiamato, e delle attività conseguentemente poste a suo carico, si rende opportuno regolamentare formalmente reciproci obblighi e garanzie tra il Beneficiario e la Terza Parte;

Tutto ciò premesso, le Parti

Convengono e stipulano

quanto segue, con le premesse facenti parte integrante dell'accordo.

Articolo 1. – Oggetto e interpretazione.

1.1. Il presente accordo è finalizzato a definire e precisare reciproci compiti e garanzie tra le Parti, nel contesto delle attività affidate alla Terza Parte nel contesto del Progetto, come meglio precisate negli articoli seguenti; le premesse costituiscono parte integrante dell'accordo stesso;

1.2. Il presente accordo è quindi stipulato anche al fine di consentire l'adempimento delle obbligazioni del Beneficiario nei confronti della Commissione e degli altri beneficiari del Grant Agreement (GA) e



sottoscrittori del Consortium Agreement (CA), ed in quanto tale è funzionalmente collegato e dipendente rispetto ad essi.

1.3. Anche in ragione di quanto precisato al punto precedente, la Terza Parte dichiara di essere a conoscenza del contenuto del GA e suoi allegati e del CA, nonché più in generale della documentazione di cui al successivo art. 2, di averne acquisito una copia e di averli integralmente compresi, impegnandosi al loro rispetto nello svolgimento delle attività oggetto del presente accordo.

Articolo 2. – Normativa applicabile.

2.1. Il presente accordo sarà disciplinato, oltre che dalle disposizioni qui contenute, dal GA e suoi allegati e dal CA, nella misura applicabile, nonché dalle seguenti fonti:

- dalla disciplina comunitaria sulla partecipazione al Programma Horizon 2020, con particolare - ma non esclusivo - riferimento alla regolamentazione relativa alle “Linked Third Party”;
- dalla prassi della Commissione, che interpreta e applica la disciplina di cui al punto precedente, con particolare riguardo al documento AMGA, ultima versione V5.2 e s.m.i.
- dalla normativa italiana ad eventuale integrazione delle precedenti;

che parimenti la Terza Parte dichiara di conoscere ed accettare, vincolandosi al loro rispetto, per quanto di competenza.

In ogni caso prevarranno le disposizioni contenute nelle fonti comunitarie.

Articolo 3. – Durata del contratto.

3.1. Il presente accordo ha inizio il giorno 01/05/2019 e terminerà il giorno 30/04/2022 fatto sempre salvo quanto previsto all’art. 20 del GA con specifico riferimento agli obblighi di rendicontazione e all’art. 22 del GA per quanto riguarda verifiche, reviews e audit.

3.2. Il Beneficiario, in caso di proroga della durata del Grant Agreement, potrà prorogare il presente accordo del tempo necessario, dandone adeguata comunicazione alla Parte terza che si impegna fin d’ora ad accettarla.



Articolo 4. – Oggetto del rapporto.

4.1. La Terza Parte si impegna a collaborare, per le rispettive aree di competenza, con il Beneficiario nelle seguenti attività, indicate nell'Allegato I del Grant Agreement, secondo le modalità e finalità ivi specificate, nel rispetto del gantt di progetto approvato e dei tempi di consegna previsti per i Deliverables a cui la Terza Parte contribuirà, nei limiti del budget e degli effort massimi approvati per la Terza Parte:

- WP3: T3.1 User requirements and use cases; T3.3 Continuous usability and performance analysis.
- WP10: T10.1 Scenario definition and pilot planning; T10.2 End-user training (including methodologies and technologies); T10.3 Pilot preparation and execution in relevant environments (including engagement and field testing); T10.4 Impact Assessment and evaluation for first responders.
- WP11: T11.1 Interactive Dissemination and Communication; T11.3 Project exploitation; T11.5 Policy and recommendations.

Articolo 5. – Obblighi della Terza Parte.

5.1. La Terza parte si obbliga in modo specifico:

- a) a svolgere l'attività di cui al precedente art. 4 con la speciale diligenza richiesta, tenuto conto del particolare contenuto dell'attività e tenendo in considerazione che detta attività è necessaria per adempiere le obbligazioni che nascono dal Grant Agreement;
- b) a predisporre – sotto la propria esclusiva responsabilità - tutta la documentazione necessaria per la rendicontazione dei costi sostenuti; mettendo a disposizione personale competente e dotato delle necessarie autorizzazioni in fase di caricamento dei propri dati di rendicontazione sul Participant Portal del Programma Horizon 2020, ad opera del Beneficiario, al fine di validarne il corretto caricamento per le parti di competenza;
- c) a redigere le relazioni richieste dal Beneficiario sull'attività compiuta entro i termini indicati nel Grant Agreement e suoi allegati; detti termini sono considerati essenziali ai fini del presente accordo;
- d) a rispettare le direttive di massima del Beneficiario emanate per l'attuazione del Progetto, con particolare riferimento alle



fasi descritte nell'Allegato I al Grant Agreement, e per permettere al Beneficiario medesimo di adempiere agli obblighi di rendicontazione e relazione;

e) a mantenere il segreto, anche dopo la fine del presente accordo, sulle informazioni riservate, di cui viene a conoscenza, sia che riguardino il Beneficiario, sia che riguardino i terzi, vincolandosi al rispetto di quanto previsto all'art.36 del GA e alla Section 10 del CA;

f) a comunicare al Beneficiario nel più breve tempo possibile, tutti gli eventi che riguardino il presente accordo e, in modo particolare, quelli che possano compromettere l'esatta esecuzione dell'attività, tra i quali quelli di cui al successivo articolo 6;

g) a sottoporsi, anche dopo la fine del presente accordo, ai controlli della Commissione, della Corte dei Conti, the European Court of Auditors (ECA) and the European Anti-Fraud Office (OLAF), anche rispetto alle previsioni di cui agli artt. 22 e 23 del GA, fornendo tutti i documenti e le informazioni richiesti, permettendo l'accesso nei propri locali e permettendo le ispezioni e verifiche necessarie.

e) La Terza Parte si impegna inoltre ed in ogni caso al diretto rispetto degli Artt. 20, 35, 36, 38, 39 e 46 del GA.;

5.2. Le obbligazioni di cui al comma 5.1 non possono essere trasferite.

5.3 Le disposizioni di cui ai commi precedenti continuano ad applicarsi anche dopo il termine finale del contratto, in quanto ciò sia compatibile con il contenuto di dette obbligazioni.

Articolo 6. – Obblighi del Beneficiario.

6.1. Il Beneficiario si obbliga a rispettare la normativa applicabile al presente accordo e, in modo specifico:

a) a mettere a disposizione della Terza Parte tutte le informazioni necessarie all'esatta esecuzione dell'attività di cui all'art. 4, tenuto fermo l'obbligo di segretezza;

b) a pagare il rimborso nei modi e nelle quantità previste nel successivo art. 7.



Articolo 7. – Modalità di rendicontazione e costi ammissibili.

7.1. La Terza Parte dovrà provvedere ad esporre i costi sostenuti in linea con le previsioni e le regole definite al riguardo nel GA.

7.2 La Terza Parte si impegna a inviare al Beneficiario i propri Financial Statement firmati in originale, nel rispetto dei tempi previsti per le rendicontazioni. Il Beneficiario si impegna a conservare gli originali firmati per tutta la durata specificata all'Art. 18 del GA, impegnandosi a rispettare le relative previsioni nel loro complesso.

A seguito del ricevimento del suddetto Financial Statement, in linea con quanto previsto all'art. 5.3.1, la Terza Parte metterà a disposizione personale competente dotato delle necessarie autorizzazioni funzionale a validare i dati immessi dal Beneficiario, per le parti di competenza.

7.3 Solo a seguito di corretta rendicontazione e relativa approvazione della Commissione, come regolata dall'art. 20 del GA, il Beneficiario provvederà a versare alla Terza Parte i costi ritenuti ammissibili a rimborso; ciò fatta salva la corresponsione dell'importo previsto a titolo di prefinanziamento che avverrà secondo le modalità previste nel GA.

7.4. In nessun caso il Beneficiario sarà tenuto a versare il suddetto rimborso prima di ricevere a sua volta da parte del capofila il rimborso complessivo spettantegli.

7.5 E' fatta salva l'applicazione del successivo art. 8.

7.6 Il budget di progetto della Terza Parte è dettagliato nell'Annex 2 dell'allegato GA. Il piano del rimborso dei costi di progetto è dettagliato nell'art 21 del GA, le tempistiche di rendicontazione sono dettagliate nell'art 20.2 che individua i *reporting periods* che terminano, rispettivamente, al mese 18 e al mese 36. Si precisa che il coordinatore deve inviare il report periodico di avanzamento entro 60 gg dalla data di chiusura di ogni *reporting period*, pertanto la Terza Parte dovrà fornire il proprio report periodico di avanzamento (financial statement) entro 30 gg dalla data di chiusura di ciascun reporting period.

Articolo 8. – Responsabilità della Terza Parte.

8.1. La Terza Parte è responsabile per tutti i danni eventualmente derivanti al Beneficiario dallo svolgimento delle attività di competenza della Terza Parte, come qui specificate. In particolare, la Terza Parte sarà responsabile se, a causa della sua condotta, nonché in ragione



di un adempimento non in linea con quanto previsto all'articolo 4 del presente accordo e/o in ogni caso reputato dalla Commissione non adeguato e/o idoneo, il Beneficiario non sarà in grado di adempiere, totalmente o parzialmente, agli obblighi assunti nel GA, ovvero a quelli assunti nei confronti degli altri partner del Progetto.

8.2 La Terza Parte rimane unica esclusiva responsabile della corretta rendicontazione correlata alle attività affidate e svolte: in particolare la rendicontazione – redatta quindi sotto esclusiva responsabilità della Terza Parte – dovrà essere trasmessa nei tempi prestabiliti e con il dettaglio previsto dai template allegati al GA, al Beneficiario, con cui provvederà all'inoltro formale al Capofila e alla CE, attraverso gli strumenti messi a disposizione dal Participant Portal del Programma Horizon 2020.

8.3 La Terza Parte rimane altresì unica responsabile dell'eventuale restituzione alla Commissione di somme già ottenute a titolo di rimborso e successivamente riconosciute non ammissibili a seguito di controlli svoltisi durante la vita del progetto e/o dopo la sua chiusura, ai sensi degli Artt. 22, 42, 43, 44, 45 del GA.

8.4 La Terza Parte si impegna a conservare la documentazione di supporto alla rendicontazione per i 5 anni successivi al ricevimento del pagamento finale a saldo o per un eventuale periodo superiore, come previsto all'Art. 18 del GA.

8.5. La Terza Parte, altresì, dovrà tenere indenne il Beneficiario dalle pretese di terzi dipendenti e/o correlate alle attività di competenza o comunque generate da proprie condotte, principalmente di dipendenti ed altri ausiliari.

8.6. La Terza Parte risponde in ogni caso del mancato rispetto degli artt. 35, 36, 38, 39 e 46 del GA; in generale, la Terza Parte si impegna a manlevare il Beneficiario da responsabilità che in tutto o in parte possano essergli imputate in ragione del mancato rispetto dei propri doveri, come qui rappresentanti, da parte della Terza Parte medesima.

Articolo 9. – Scioglimento del contratto prima del termine.

9.1 Le condizioni di risoluzione e recesso sono descritte all'interno dell'articolo 3.2 dell'allegato Consortium Agreement.



Articolo 10. – Proprietà industriale e intellettuale.

Rispetto a qualsivoglia materiale e/o risultato suscettibile di tutela secondo la normativa a tutela della proprietà industriale e/o intellettuale (a titolo esemplificativo, qualsivoglia output tangibile o intangibile come dati, layout, lavori preparatori, programmi per elaboratore, etc., di seguito, congiuntamente, materiali/risultati) prodotti dalla Terza parte in relazione e in ragione del presente accordo, anche eventualmente in collaborazione con CSI, esso sarà acquisito in co-titolarità tra le Parti, sempre e comunque nel rispetto di quanto di seguito specificato.

Le Parti in detto caso definiranno un accordo per quanto concerne la ripartizione e le condizioni di esercizio di tale comproprietà, le cui previsioni dovranno sempre e comunque rispettare il Contratto di Servizio, le cui previsioni prevalgono comunque, ovvero permetterne il rispetto da parte del Beneficiario.

La Terza Parte si impegna comunque a rispettare i diritti di accesso di cui all'art. 31 del GA, nonché le previsioni comunque applicabili circa l'accesso e la gestione dei materiali/risultati di cui al suddetto GA; in particolare la Terza Parte si vincola al rispetto degli artt. 26, 27, 28, 29, 30 e 31 del GA in combinato ed integrato disposto con quanto previsto nelle Section 8 e 9 del CA, nell'esercizio di qualsivoglia diritti sui suddetti materiali/risultati, nonché a garantire comunque al Beneficiario il rispetto dei propri obblighi come previsti nel GA e nel CA, anche con riferimento ai materiali/risultati oggetto del presente articolo.

Inoltre, la Terza parte dichiara di conoscere e si impegna a rispettare le previsioni di cui all'art. 23.a del GA.

Articolo 11. – Clausola arbitrale.

11.1. Il Beneficiario e la Terza Parte cercheranno di risolvere in forma bonaria tutte le eventuali controversie relative all'interpretazione e applicazione del presente accordo, nonché delle altre fonti di cui all'art. 2, mediante individuazione di un rappresentante per ciascuna parte al fine di raggiungere una intesa.

Qualora una simile intesa non possa essere raggiunta, o in ogni caso non sia raggiunta entro il termine massimo di sei mesi, le questioni irrisolte saranno devolute all'esclusiva competenza di un arbitro unico, nominato di comune accordo tra le parti o, nel caso di disaccordo, dal Presidente della Camera Arbitrale di Torino.



11.2. L'Arbitro dovrà emettere un lodo, non oltre trenta giorni dall'instaurazione della controversia, e ne dovrà curare il deposito a norma del codice di procedura civile.

Articolo 12 - Registrazione e Spese

12.1 Il presente Accordo è redatto in tre esemplari ed è esente da imposta di bollo ai sensi del D.P.R. n. 642/1972, Allegato B, art.16, e verrà registrato solo in caso d'uso con spese a carico della parte richiedente .

12.2 Il presente Accordo è stipulato mediante scrittura privata in formato elettronico ed apposizione di firma digitale delle Parti.

Articolo 13 - Rinvio

Per quanto non previsto dal presente atto si applicano le norme del Codice Civile.

Per Regione Piemonte

Firmato digitalmente da.....

Per il CSI-Piemonte

Firmato digitalmente da.....

Si accettano in modo specifico le clausole di cui agli articoli:

- Articolo 3. – *Durata del contratto.*
- Articolo 9. – *Scioglimento del contratto prima del termine.*
- Articolo 11. – *Clausola arbitrale.*



Per Regione Piemonte

Firmato digitalmente da.....

Per il CSI-Piemonte

Firmato digitalmente da.....

Si allegano:

Allegato A – Grant Agreement e suoi allegati

Allegato B – Consortium Agreement



EUROPEAN COMMISSION
Research Executive Agency

Director



GRANT AGREEMENT

NUMBER 833507 — FASTER

This **Agreement** ('the Agreement') is **between** the following parties:

on the one part,

the **Research Executive Agency (REA)** ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

represented for the purposes of signature of this Agreement by Head of Unit, Research Executive Agency , Industrial Leadership and Societal Challenges, Safeguarding Secure Society, Angelo MARINO,

and

on the other part,

1. 'the coordinator':

ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS (CERTH), established in CHARILAOU THERMI ROAD 6 KM, THERMI THESSALONIKI 57001, Greece, VAT number: EL099785242, represented for the purposes of signing the Agreement by Athanasios KONSTANDOPOULOS

and the following other beneficiaries, if they sign their 'Accession Form' (see Annex 3 and Article 56):

2. **ENGINEERING - INGEGNERIA INFORMATICA SPA (ENG)**, established in PIAZZALE DELL'AGRICOLTURA 24, ROMA 00144, Italy, VAT number: IT05724831002,

3. **HELLENIC TELECOMMUNICATIONS ORGANIZATION S.A. - OTE AE (ORGANISMOS TILEPIKOINONION TIS ELLADOS OTE AE) (OTE)**, established in KIFISSIAS AVENUE 99, Maroussi - Athens 15124, Greece, VAT number: EL094019245,

4. **DIGINEXT (DXT)**, established in 370 RUE RENE DESCARTES LES HAUTS DE LA DURANNE IMMEUBLES A ET B, AIX EN PROVENCE 13857, France, VAT number: FR70408225845,

5. **Crisiplan B.V. (CPLAN)**, established in Frambozenweg 123, Leiden 2321 KA, Netherlands, VAT number: NL812296692B01,

6. **DRONE HOPPER SL (DH)**, established in C MELENDEZ VALDES 61, MADRID 28015, Spain, VAT number: ESB87375960,

7. **ROBOTNIK AUTOMATION SLL (ROB)**, established in CARRER DE BARCELONA, 3-A. P.I. FUENTE DEL JARRO, PATERNA 46988, Spain, VAT number: ESB97223630,
8. **SYNELIXIS LYSEIS PLIROFORIKIS AUTOMATISMOU & TILEPIKOINONION ANONIMI ETAIRIA (SYN)**, established in FARMAKIDOU 10, CHALKIDA 34100, Greece, VAT number: EL998670366,
9. **INOV INESC INOVACAO - INSTITUTO DE NOVAS TECNOLOGIAS (INOV)**, established in RUA DE ALVES REDOL 9, LISBOA 1000-029, Portugal, VAT number: PT505002892,
10. **FONDAZIONE LINKS - LEADING INNOVATION & KNOWLEDGE FOR SOCIETY (LINKS)**, established in VIA PIER CARLO BOGGIO 61, TORINO 10138, Italy, VAT number: IT11904960017,
11. **KPEOPLE RESEARCH FOUNDATION (KPRF)**, established in CORNERSTONE BUSINESS CENTRE, SUITE 1, LEVEL 2, 16TH SEPTEMBER SQUARE, MOSTA MST 1180, Malta,
12. **KAJAANIN AMMATTIKORKEAKOULU OY (KAMK)**, established in KETUNPOLKU 3, KAJAANI 87100, Finland, VAT number: FI25536004,
13. **VRIJE UNIVERSITEIT BRUSSEL (VUB)**, established in PLEINLAAN 2, BRUSSEL 1050, Belgium, VAT number: BE0449012406,
14. **PANEPISTIMIO DYTIKIS ATTIKIS (UWA)**, established in PETROY RALLI KAI THIVON, AIGALEO 122 44, Greece, VAT number: EL997018536,
15. **AYUNTAMIENTO DE MADRID (ADM-POL)**, established in PLAZA DE LA VILLA 4, MADRID 28005, Spain, VAT number: ESP2807900B,
16. **SERVICIO MADRILENO DE SALUD (SUMMA)**, established in PLAZA CARLOS TRIAS BERTRAN 7, MADRID 28020, Spain, VAT number: ESQ2801221I,
17. **ECOLE NATIONALE SUPERIEURE DES OFFICIERS DE SAPEURS-POMPIERS (ENSOSP) (ENSOSP)**, established in 1070 RUE DU LIEUTENANT PARAYRE, AIX EN PROVENCE 13798, France,
18. **WYZSZA SZKOLA POLICJI W SZCZYTNIENIE (WSPOL)**, established in Marszałka J. Piłsudskiego 111, Szczytno 12-100, Poland,
19. **KAJAANIN KAUPUNKI (KAJ)**, established in POHJOLANKATU 13, KAJAANI 87100, Finland, VAT number: FI02149589,
20. **ELLINIKI OMADA DIASOSIS ATTIKIS (HRTA)**, established in AGONARIDOU 10-12, ATHINA 11744, Greece, VAT number: EL999802992,
21. **MUNICIPIO DE GRANDOLA (MG)**, established in RUA DR JOSE PEREIRA BARRADAS, GRANDOLA 7570 281, Portugal, VAT number: PT506823318,
22. **CONSORZIO PER IL SISTEMA INFORMATIVO (CSI PIEMONTE) (CSIP)**, established in CORSO UNIONE SOVIETICA 216, TORINO 10134, Italy, VAT number: IT01995120019,

23. **KWANSEI GAKUIN EDUCATIONAL FOUNDATION (KGU Japan)**, established in 1-155 UEGAHARA ICHIBAN-CHO, NISHINOMIYA HYOGO 662 8501, Japan, as ‘beneficiary not receiving EU funding’ (see Article 9),

Unless otherwise specified, references to ‘beneficiary’ or ‘beneficiaries’ include the coordinator.

The parties referred to above have agreed to enter into the Agreement under the terms and conditions below.

By signing the Agreement or the Accession Form, the beneficiaries accept the grant and agree to implement it under their own responsibility and in accordance with the Agreement, with all the obligations and conditions it sets out.

The Agreement is composed of:

Terms and Conditions

- Annex 1 Description of the action
- Annex 2 Estimated budget for the action
 - 2a Additional information on the estimated budget
- Annex 3 Accession Forms
- Annex 4 Model for the financial statements
- Annex 5 Model for the certificate on the financial statements
- Annex 6 Model for the certificate on the methodology

TERMS AND CONDITIONS

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CHAPTER 1 GENERAL

ARTICLE 1 — SUBJECT OF THE AGREEMENT

This Agreement sets out the rights and obligations and the terms and conditions applicable to the grant awarded to the beneficiaries for implementing the action set out in Chapter 2.

CHAPTER 2 ACTION

ARTICLE 2 — ACTION TO BE IMPLEMENTED

The grant is awarded for the action entitled ‘**First responder Advanced technologies for Safe and efficient Emergency Response**’ — ‘**FASTER**’ (‘**action**’), as described in Annex 1.

ARTICLE 3 — DURATION AND STARTING DATE OF THE ACTION

The duration of the action will be **36 months** as of the first day of the month following the date the Agreement enters into force (see Article 58) (‘**starting date of the action**’).

ARTICLE 4 — ESTIMATED BUDGET AND BUDGET TRANSFERS

4.1 Estimated budget

The ‘**estimated budget**’ for the action is set out in Annex 2.

It contains the estimated eligible costs and the forms of costs, broken down by beneficiary (and linked third party) and budget category (see Articles 5, 6, and 14). It also shows the estimated costs of the beneficiaries not receiving EU funding (see Article 9).

4.2 Budget transfers

The estimated budget breakdown indicated in Annex 2 may be adjusted — without an amendment (see Article 55) — by transfers of amounts between beneficiaries, budget categories and/or forms of costs set out in Annex 2, if the action is implemented as described in Annex 1.

However, the beneficiaries may not add costs relating to subcontracts not provided for in Annex 1, unless such additional subcontracts are approved by an amendment or in accordance with Article 13.

CHAPTER 3 GRANT

ARTICLE 5 — GRANT AMOUNT, FORM OF GRANT, REIMBURSEMENT RATES AND FORMS OF COSTS

5.1 Maximum grant amount

The ‘**maximum grant amount**’ is **EUR 6 999 750.00** (six million nine hundred and ninety nine thousand seven hundred and fifty EURO).

5.2 Form of grant, reimbursement rates and forms of costs

The grant reimburses **100% of the action's eligible costs** (see Article 6) (**'reimbursement of eligible costs grant'**) (see Annex 2).

The estimated eligible costs of the action are EUR **6 999 750.00** (six million nine hundred and ninety nine thousand seven hundred and fifty EURO).

Eligible costs (see Article 6) must be declared under the following forms (**'forms of costs'**):

(a) for **direct personnel costs**:

- as actually incurred costs (**'actual costs'**) or
- on the basis of an amount per unit calculated by the beneficiary in accordance with its usual cost accounting practices (**'unit costs'**).

Personnel **costs for SME owners or beneficiaries that are natural persons** not receiving a salary (see Article 6.2, Points A.4 and A.5) must be declared on the basis of the amount per unit set out in Annex 2a (**'unit costs'**);

(b) for **direct costs for subcontracting**: as actually incurred costs (**'actual costs'**);

(c) for **direct costs of providing financial support to third parties**: not applicable;

(d) for **other direct costs**:

- for costs of internally invoiced goods and services: on the basis of an amount per unit calculated by the beneficiary in accordance with its usual cost accounting practices (**'unit costs'**);
- for all other costs: as actually incurred costs (**'actual costs'**);

(e) for **indirect costs**: on the basis of a flat-rate applied as set out in Article 6.2, Point E (**'flat-rate costs'**);

(f) **specific cost category(ies)**: not applicable.

5.3 Final grant amount — Calculation

The **'final grant amount'** depends on the actual extent to which the action is implemented in accordance with the Agreement's terms and conditions.

This amount is calculated by the Agency — when the payment of the balance is made (see Article 21.4) — in the following steps:

Step 1 — Application of the reimbursement rates to the eligible costs

Step 2 — Limit to the maximum grant amount

Step 3 — Reduction due to the no-profit rule

Step 4 — Reduction due to substantial errors, irregularities or fraud or serious breach of obligations

5.3.1 Step 1 — Application of the reimbursement rates to the eligible costs

The reimbursement rate(s) (see Article 5.2) are applied to the eligible costs (actual costs, unit costs and flat-rate costs; see Article 6) declared by the beneficiaries and linked third parties (see Article 20) and approved by the Agency (see Article 21).

5.3.2 Step 2 — Limit to the maximum grant amount

If the amount obtained following Step 1 is higher than the maximum grant amount set out in Article 5.1, it will be limited to the latter.

5.3.3 Step 3 — Reduction due to the no-profit rule

The grant must not produce a profit.

‘**Profit**’ means the surplus of the amount obtained following Steps 1 and 2 plus the action’s total receipts, over the action’s total eligible costs.

The ‘**action’s total eligible costs**’ are the consolidated total eligible costs approved by the Agency.

The ‘**action’s total receipts**’ are the consolidated total receipts generated during its duration (see Article 3).

The following are considered **receipts**:

- (a) income generated by the action; if the income is generated from selling equipment or other assets purchased under the Agreement, the receipt is up to the amount declared as eligible under the Agreement;
- (b) financial contributions given by third parties to the beneficiary or to a linked third party specifically to be used for the action, and
- (c) in-kind contributions provided by third parties free of charge and specifically to be used for the action, if they have been declared as eligible costs.

The following are however not considered receipts:

- (a) income generated by exploiting the action’s results (see Article 28);
- (b) financial contributions by third parties, if they may be used to cover costs other than the eligible costs (see Article 6);
- (c) financial contributions by third parties with no obligation to repay any amount unused at the end of the period set out in Article 3.

If there is a profit, it will be deducted from the amount obtained following Steps 1 and 2.

5.3.4 Step 4 — Reduction due to substantial errors, irregularities or fraud or serious breach of obligations — Reduced grant amount — Calculation

If the grant is reduced (see Article 43), the Agency will calculate the reduced grant amount by deducting the amount of the reduction (calculated in proportion to the seriousness of the errors, irregularities or fraud or breach of obligations, in accordance with Article 43.2) from the maximum grant amount set out in Article 5.1.

The final grant amount will be the lower of the following two:

- the amount obtained following Steps 1 to 3 or
- the reduced grant amount following Step 4.

5.4 Revised final grant amount — Calculation

If — after the payment of the balance (in particular, after checks, reviews, audits or investigations; see Article 22) — the Agency rejects costs (see Article 42) or reduces the grant (see Article 43), it will calculate the ‘**revised final grant amount**’ for the beneficiary concerned by the findings.

This amount is calculated by the Agency on the basis of the findings, as follows:

- in case of **rejection of costs**: by applying the reimbursement rate to the revised eligible costs approved by the Agency for the beneficiary concerned;
- in case of **reduction of the grant**: by calculating the concerned beneficiary’s share in the grant amount reduced in proportion to the seriousness of the errors, irregularities or fraud or breach of obligations (see Article 43.2).

In case of **rejection of costs and reduction of the grant**, the revised final grant amount for the beneficiary concerned will be the lower of the two amounts above.

ARTICLE 6 — ELIGIBLE AND INELIGIBLE COSTS

6.1 General conditions for costs to be eligible

‘**Eligible costs**’ are costs that meet the following criteria:

(a) for **actual costs**:

- (i) they must be actually incurred by the beneficiary;
- (ii) they must be incurred in the period set out in Article 3, with the exception of costs relating to the submission of the periodic report for the last reporting period and the final report (see Article 20);
- (iii) they must be indicated in the estimated budget set out in Annex 2;
- (iv) they must be incurred in connection with the action as described in Annex 1 and necessary for its implementation;
- (v) they must be identifiable and verifiable, in particular recorded in the beneficiary’s accounts in accordance with the accounting standards applicable in the country where the beneficiary is established and with the beneficiary’s usual cost accounting practices;

- (vi) they must comply with the applicable national law on taxes, labour and social security, and
- (vii) they must be reasonable, justified and must comply with the principle of sound financial management, in particular regarding economy and efficiency;

(b) for **unit costs**:

- (i) they must be calculated as follows:

{amounts per unit set out in Annex 2a or calculated by the beneficiary in accordance with its usual cost accounting practices (see Article 6.2, Point A and Article 6.2.D.5)

multiplied by

the number of actual units};

- (ii) the number of actual units must comply with the following conditions:

- the units must be actually used or produced in the period set out in Article 3;
- the units must be necessary for implementing the action or produced by it, and
- the number of units must be identifiable and verifiable, in particular supported by records and documentation (see Article 18);

(c) for **flat-rate costs**:

- (i) they must be calculated by applying the flat-rate set out in Annex 2, and
- (ii) the costs (actual costs or unit costs) to which the flat-rate is applied must comply with the conditions for eligibility set out in this Article.

6.2 Specific conditions for costs to be eligible

Costs are eligible if they comply with the general conditions (see above) and the specific conditions set out below for each of the following budget categories:

- A. direct personnel costs;
- B. direct costs of subcontracting;
- C. not applicable;
- D. other direct costs;
- E. indirect costs;
- F. not applicable.

‘Direct costs’ are costs that are directly linked to the action implementation and can therefore be attributed to it directly. They must not include any indirect costs (see Point E below).

‘Indirect costs’ are costs that are not directly linked to the action implementation and therefore cannot be attributed directly to it.

A. Direct personnel costs

Types of eligible personnel costs

A.1 Personnel costs are eligible, if they are related to personnel working for the beneficiary under an employment contract (or equivalent appointing act) and assigned to the action (**‘costs for employees (or equivalent)’**). They must be limited to salaries (including during parental leave), social security contributions, taxes and other costs included in the **remuneration**, if they arise from national law or the employment contract (or equivalent appointing act).

Beneficiaries that are non-profit legal entities¹ may also declare as personnel costs **additional remuneration** for personnel assigned to the action (including payments on the basis of supplementary contracts regardless of their nature), if:

- (a) it is part of the beneficiary’s usual remuneration practices and is paid in a consistent manner whenever the same kind of work or expertise is required;
- (b) the criteria used to calculate the supplementary payments are objective and generally applied by the beneficiary, regardless of the source of funding used.

‘Additional remuneration’ means any part of the remuneration which exceeds what the person would be paid for time worked in projects funded by national schemes.

Additional remuneration for personnel assigned to the action is eligible up to the following amount:

- (a) if the person works full time and exclusively on the action during the full year: up to EUR 8 000;
- (b) if the person works exclusively on the action but not full-time or not for the full year: up to the corresponding pro-rata amount of EUR 8 000, or
- (c) if the person does not work exclusively on the action: up to a pro-rata amount calculated as follows:
 - {EUR 8 000
 - divided by
 - the number of annual productive hours (see below)},
 - multiplied by
 - the number of hours that the person has worked on the action during the year}.

A.2 The **costs for natural persons working under a direct contract** with the beneficiary other than an employment contract are eligible personnel costs, if:

- (a) the person works under conditions similar to those of an employee (in particular regarding the way the work is organised, the tasks that are performed and the premises where they are performed);
- (b) the result of the work carried out belongs to the beneficiary (unless exceptionally agreed otherwise), and

¹ For the definition, see Article 2.1(14) of the Rules for Participation Regulation No 1290/2013: **‘non-profit legal entity’** means a legal entity which by its legal form is non-profit-making or which has a legal or statutory obligation not to distribute profits to its shareholders or individual members.

- (c) the costs are not significantly different from those for personnel performing similar tasks under an employment contract with the beneficiary.

A.3 The **costs of personnel seconded by a third party against payment** are eligible personnel costs, if the conditions in Article 11.1 are met.

A.4 **Costs of owners** of beneficiaries that are small and medium-sized enterprises (**'SME owners'**) who are working on the action and who do not receive a salary are eligible personnel costs, if they correspond to the amount per unit set out in Annex 2a multiplied by the number of actual hours worked on the action.

A.5 **Costs of 'beneficiaries that are natural persons'** not receiving a salary are eligible personnel costs, if they correspond to the amount per unit set out in Annex 2a multiplied by the number of actual hours worked on the action.

Calculation

Personnel costs must be calculated by the beneficiaries as follows:

{hourly rate
multiplied by
the number of actual hours worked on the action},
plus
for non-profit legal entities: additional remuneration to personnel assigned to the action under the conditions set out above (Point A.1)}.

The number of actual hours declared for a person must be identifiable and verifiable (see Article 18).

The total number of hours declared in EU or Euratom grants, for a person for a year, cannot be higher than the annual productive hours used for the calculations of the hourly rate. Therefore, the maximum number of hours that can be declared for the grant are:

{number of annual productive hours for the year (see below)
minus
total number of hours declared by the beneficiary, for that person in that year, for other EU or Euratom grants}.

The **'hourly rate'** is one of the following:

- (a) for personnel costs declared as **actual costs** (i.e. budget categories A.1, A.2, A.3): the hourly rate is calculated *per full financial year*, as follows:

{actual annual personnel costs (excluding additional remuneration) for the person
divided by
number of annual productive hours}.

using the personnel costs and the number of productive hours for each full financial year covered by the reporting period concerned. If a financial year is not closed at the end of the

reporting period, the beneficiaries must use the hourly rate of the last closed financial year available.

For the ‘number of annual productive hours’, the beneficiaries may choose one of the following:

- (i) ‘fixed number of hours’: 1 720 hours for persons working full time (or corresponding pro-rata for persons not working full time);
- (ii) ‘individual annual productive hours’: the total number of hours worked by the person in the year for the beneficiary, calculated as follows:

{annual workable hours of the person (according to the employment contract, applicable collective labour agreement or national law)

plus

overtime worked

minus

absences (such as sick leave and special leave)}.

‘Annual workable hours’ means the period during which the personnel must be working, at the employer’s disposal and carrying out his/her activity or duties under the employment contract, applicable collective labour agreement or national working time legislation.

If the contract (or applicable collective labour agreement or national working time legislation) does not allow to determine the annual workable hours, this option cannot be used;

- (iii) ‘standard annual productive hours’: the ‘standard number of annual hours’ generally applied by the beneficiary for its personnel in accordance with its usual cost accounting practices. This number must be at least 90% of the ‘standard annual workable hours’.

If there is no applicable reference for the standard annual workable hours, this option cannot be used.

For all options, the actual time spent on **parental leave** by a person assigned to the action may be deducted from the number of annual productive hours.

As an alternative, beneficiaries may calculate the hourly rate *per month*, as follows:

{actual monthly personnel cost (excluding additional remuneration) for the person

divided by

{number of annual productive hours / 12}}}

using the personnel costs for each month and (one twelfth of) the annual productive hours calculated according to either option (i) or (iii) above, i.e.:

- fixed number of hours or
- standard annual productive hours.

Time spent on **parental leave** may not be deducted when calculating the hourly rate per month. However, beneficiaries may declare personnel costs incurred in periods of parental leave in proportion to the time the person worked on the action in that financial year.

If parts of a basic remuneration are generated over a period longer than a month, the beneficiaries may include only the share which is generated in the month (irrespective of the amount actually paid for that month).

Each beneficiary must use only one option (per full financial year or per month) for each full financial year;

(b) for personnel costs declared on the basis of **unit costs** (i.e. budget categories A.1, A.2, A.4, A.5): the hourly rate is one of the following:

- (i) for SME owners or beneficiaries that are natural persons: the hourly rate set out in Annex 2a (see Points A.4 and A.5 above), or
- (ii) for personnel costs declared on the basis of the beneficiary's usual cost accounting practices: the hourly rate calculated by the beneficiary in accordance with its usual cost accounting practices, if:
 - the cost accounting practices used are applied in a consistent manner, based on objective criteria, regardless of the source of funding;
 - the hourly rate is calculated using the actual personnel costs recorded in the beneficiary's accounts, excluding any ineligible cost or costs included in other budget categories.

The actual personnel costs may be adjusted by the beneficiary on the basis of budgeted or estimated elements. Those elements must be relevant for calculating the personnel costs, reasonable and correspond to objective and verifiable information;

and

- the hourly rate is calculated using the number of annual productive hours (see above).

B. Direct costs of subcontracting (including related duties, taxes and charges such as non-deductible value added tax (VAT) paid by the beneficiary) are eligible if the conditions in Article 13.1.1 are met.

C. Direct costs of providing financial support to third parties

Not applicable

D. Other direct costs

D.1 Travel costs and related subsistence allowances (including related duties, taxes and charges such as non-deductible value added tax (VAT) paid by the beneficiary) are eligible if they are in line with the beneficiary's usual practices on travel.

D.2 The depreciation costs of equipment, infrastructure or other assets (new or second-hand) as recorded in the beneficiary's accounts are eligible, if they were purchased in accordance with

Article 10.1.1 and written off in accordance with international accounting standards and the beneficiary's usual accounting practices.

The **costs of renting or leasing** equipment, infrastructure or other assets (including related duties, taxes and charges such as non-deductible value added tax (VAT) paid by the beneficiary) are also eligible, if they do not exceed the depreciation costs of similar equipment, infrastructure or assets and do not include any financing fees.

The costs of equipment, infrastructure or other assets **contributed in-kind against payment** are eligible, if they do not exceed the depreciation costs of similar equipment, infrastructure or assets, do not include any financing fees and if the conditions in Article 11.1 are met.

The only portion of the costs that will be taken into account is that which corresponds to the duration of the action and rate of actual use for the purposes of the action.

D.3 Costs of other goods and services (including related duties, taxes and charges such as non-deductible value added tax (VAT) paid by the beneficiary) are eligible, if they are:

- (a) purchased specifically for the action and in accordance with Article 10.1.1 or
- (b) contributed in kind against payment and in accordance with Article 11.1.

Such goods and services include, for instance, consumables and supplies, dissemination (including open access), protection of results, certificates on the financial statements (if they are required by the Agreement), certificates on the methodology, translations and publications.

D.4 Capitalised and operating costs of 'large research infrastructure'² directly used for the action are eligible, if:

- (a) the value of the large research infrastructure represents at least 75% of the total fixed assets (at historical value in its last closed balance sheet before the date of the signature of the Agreement or as determined on the basis of the rental and leasing costs of the research infrastructure³);
- (b) the beneficiary's methodology for declaring the costs for large research infrastructure has been positively assessed by the Commission ('**ex-ante assessment**');
- (c) the beneficiary declares as direct eligible costs only the portion which corresponds to the duration of the action and the rate of actual use for the purposes of the action, and
- (d) they comply with the conditions as further detailed in the annotations to the H2020 grant agreements.

² '**Large research infrastructure**' means research infrastructure of a total value of at least EUR 20 million, for a beneficiary, calculated as the sum of historical asset values of each individual research infrastructure of that beneficiary, as they appear in its last closed balance sheet before the date of the signature of the Agreement or as determined on the basis of the rental and leasing costs of the research infrastructure.

³ For the definition, see Article 2(6) of the H2020 Framework Programme Regulation No 1291/2013: '**Research infrastructure**' are facilities, resources and services that are used by the research communities to conduct research and foster innovation in their fields. Where relevant, they may be used beyond research, e.g. for education or public services. They include: major scientific equipment (or sets of instruments); knowledge-based resources such as collections, archives or scientific data; e-infrastructures such as data and computing systems and communication networks; and any other infrastructure of a unique nature essential to achieve excellence in research and innovation. Such infrastructures may be 'single-sited', 'virtual' or 'distributed'.

D.5 Costs of internally invoiced goods and services directly used for the action are eligible, if:

- (a) they are declared on the basis of a unit cost calculated in accordance with the beneficiary's usual cost accounting practices;
- (b) the cost accounting practices used are applied in a consistent manner, based on objective criteria, regardless of the source of funding;
- (c) the unit cost is calculated using the actual costs for the good or service recorded in the beneficiary's accounts, excluding any ineligible cost or costs included in other budget categories.

The actual costs may be adjusted by the beneficiary on the basis of budgeted or estimated elements. Those elements must be relevant for calculating the costs, reasonable and correspond to objective and verifiable information;

- (d) the unit cost excludes any costs of items which are not directly linked to the production of the invoiced goods or service.

'Internally invoiced goods and services' means goods or services which are provided by the beneficiary directly for the action and which the beneficiary values on the basis of its usual cost accounting practices.

E. Indirect costs

Indirect costs are eligible if they are declared on the basis of the flat-rate of 25% of the eligible direct costs (see Article 5.2 and Points A to D above), from which are excluded:

- (a) costs of subcontracting and
- (b) costs of in-kind contributions provided by third parties which are not used on the beneficiary's premises;
- (c) not applicable;
- (d) not applicable.

Beneficiaries receiving an operating grant⁴ financed by the EU or Euratom budget cannot declare indirect costs for the period covered by the operating grant, unless they can demonstrate that the operating grant does not cover any costs of the action.

F. Specific cost category(ies)

Not applicable

6.3 Conditions for costs of linked third parties to be eligible

⁴ For the definition, see Article 121(1)(b) of Regulation (EU, Euratom) No 966/2012 of the European Parliament and of the Council of 25 October 2012 on the financial rules applicable to the general budget of the Union and repealing Council Regulation (EC, Euratom) No 1605/2002 ('**Financial Regulation No 966/2012**') (OJ L 218, 26.10.2012, p.1): '**operating grant**' means direct financial contribution, by way of donation, from the budget in order to finance the functioning of a body which pursues an aim of general EU interest or has an objective forming part of and supporting an EU policy.

Costs incurred by linked third parties are eligible if they fulfil — *mutatis mutandis* — the general and specific conditions for eligibility set out in this Article (Article 6.1 and 6.2) and Article 14.1.1.

6.4 Conditions for in-kind contributions provided by third parties free of charge to be eligible

In-kind contributions provided free of charge are eligible direct costs (for the beneficiary or linked third party), if the costs incurred by the third party fulfil — *mutatis mutandis* — the general and specific conditions for eligibility set out in this Article (Article 6.1 and 6.2) and Article 12.1.

6.5 Ineligible costs

‘**Ineligible costs**’ are:

- (a) costs that do not comply with the conditions set out above (Article 6.1 to 6.4), in particular:
 - (i) costs related to return on capital;
 - (ii) debt and debt service charges;
 - (iii) provisions for future losses or debts;
 - (iv) interest owed;
 - (v) doubtful debts;
 - (vi) currency exchange losses;
 - (vii) bank costs charged by the beneficiary’s bank for transfers from the Agency;
 - (viii) excessive or reckless expenditure;
 - (ix) deductible VAT;
 - (x) costs incurred during suspension of the implementation of the action (see Article 49);
- (b) costs declared under another EU or Euratom grant (including grants awarded by a Member State and financed by the EU or Euratom budget and grants awarded by bodies other than the Agency for the purpose of implementing the EU or Euratom budget); in particular, indirect costs if the beneficiary is already receiving an operating grant financed by the EU or Euratom budget in the same period, unless it can demonstrate that the operating grant does not cover any costs of the action.

6.6 Consequences of declaration of ineligible costs

Declared costs that are ineligible will be rejected (see Article 42).

This may also lead to any of the other measures described in Chapter 6.

CHAPTER 4 RIGHTS AND OBLIGATIONS OF THE PARTIES

SECTION 1 RIGHTS AND OBLIGATIONS RELATED TO IMPLEMENTING THE ACTION

ARTICLE 7 — GENERAL OBLIGATION TO PROPERLY IMPLEMENT THE ACTION

7.1 General obligation to properly implement the action

The beneficiaries must implement the action as described in Annex 1 and in compliance with the provisions of the Agreement and all legal obligations under applicable EU, international and national law.

7.2 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 8 — RESOURCES TO IMPLEMENT THE ACTION — THIRD PARTIES INVOLVED IN THE ACTION

The beneficiaries must have the appropriate resources to implement the action.

If it is necessary to implement the action, the beneficiaries may:

- purchase goods, works and services (see Article 10);
- use in-kind contributions provided by third parties against payment (see Article 11);
- use in-kind contributions provided by third parties free of charge (see Article 12);
- call upon subcontractors to implement action tasks described in Annex 1 (see Article 13);
- call upon linked third parties to implement action tasks described in Annex 1 (see Article 14);
- call upon international partners to implement action tasks described in Annex 1 (see Article 14a).

In these cases, the beneficiaries retain sole responsibility towards the Agency and the other beneficiaries for implementing the action.

ARTICLE 9 — IMPLEMENTATION OF ACTION TASKS BY BENEFICIARIES NOT RECEIVING EU FUNDING

9.1 Rules for the implementation of action tasks by beneficiaries not receiving EU funding

Beneficiaries that are not eligible for EU funding (**‘beneficiaries not receiving EU funding’**) must implement the action tasks attributed to them in Annex 1 in accordance with Article 7.1.

Their costs are estimated in Annex 2 but:

- will not be reimbursed and

- will not be taken into account for the calculation of the grant (see Articles 5.2, 5.3 and 5.4, and 21).

Chapter 3, Articles 10 to 15, 18.1.2, 20.3(b), 20.4(b), 20.6, 21, 23a, 26.4, 27.2, 28.1, 28.2, 30.3, 31.5, 40, 42, 43, 44, 47 and 48 do not apply to these beneficiaries.

They will not be subject to financial checks, reviews and audits under Article 22.

Beneficiaries not receiving EU funding may provide in-kind contributions to another beneficiary. In this case, they will be considered as a third party for the purpose of Articles 11 and 12.

9.2 Consequences of non-compliance

If a beneficiary not receiving EU funding breaches any of its obligations under this Article, its participation in the Agreement may be terminated (see Article 50).

Such breaches may also lead to any of the other measures described in Chapter 6 that are applicable to it.

ARTICLE 10 — PURCHASE OF GOODS, WORKS OR SERVICES

10.1 Rules for purchasing goods, works or services

10.1.1 If necessary to implement the action, the beneficiaries may purchase goods, works or services.

The beneficiaries must make such purchases ensuring the best value for money or, if appropriate, the lowest price. In doing so, they must avoid any conflict of interests (see Article 35).

The beneficiaries must ensure that the Agency, the Commission, the European Court of Auditors (ECA) and the European Anti-Fraud Office (OLAF) can exercise their rights under Articles 22 and 23 also towards their contractors.

10.1.2 Beneficiaries that are ‘contracting authorities’ within the meaning of Directive 2004/18/EC⁵ (or 2014/24/EU⁶) or ‘contracting entities’ within the meaning of Directive 2004/17/EC⁷ (or 2014/25/EU⁸) must comply with the applicable national law on public procurement.

10.2 Consequences of non-compliance

If a beneficiary breaches any of its obligations under Article 10.1.1, the costs related to the contract concerned will be ineligible (see Article 6) and will be rejected (see Article 42).

⁵ Directive 2004/18/EC of the European Parliament and of the Council of 31 March 2004 on the coordination of procedures for the award of public work contracts, public supply contracts and public service contracts (OJ L 134, 30.04.2004, p. 114).

⁶ Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014 on public procurement and repealing Directive 2004/18/EC. (OJ L 94, 28.03.2014, p. 65).

⁷ Directive 2004/17/EC of the European Parliament and of the Council of 31 March 2004 coordinating the procurement procedures of entities operating in the water, energy, transport and postal services sectors (OJ L 134, 30.04.2004, p. 1)

⁸ Directive 2014/25/EU of the European Parliament and of the Council of 26 February 2014 on procurement by entities operating in the water, energy, transport and postal services sectors and repealing Directive 2004/17/EC (OJ L 94, 28.03.2014, p. 243).

If a beneficiary breaches any of its obligations under Article 10.1.2, the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 11 — USE OF IN-KIND CONTRIBUTIONS PROVIDED BY THIRD PARTIES AGAINST PAYMENT

11.1 Rules for the use of in-kind contributions against payment

If necessary to implement the action, the beneficiaries may use in-kind contributions provided by third parties against payment.

The beneficiaries may declare costs related to the payment of in-kind contributions as eligible (see Article 6.1 and 6.2), up to the third parties' costs for the seconded persons, contributed equipment, infrastructure or other assets or other contributed goods and services.

The third parties and their contributions must be set out in Annex 1. The Agency may however approve in-kind contributions not set out in Annex 1 without amendment (see Article 55), if:

- they are specifically justified in the periodic technical report and
- their use does not entail changes to the Agreement which would call into question the decision awarding the grant or breach the principle of equal treatment of applicants.

The beneficiaries must ensure that the Agency, the Commission, the European Court of Auditors (ECA) and the European Anti-Fraud Office (OLAF) can exercise their rights under Articles 22 and 23 also towards the third parties.

11.2 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the costs related to the payment of the in-kind contribution will be ineligible (see Article 6) and will be rejected (see Article 42).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 12 — USE OF IN-KIND CONTRIBUTIONS PROVIDED BY THIRD PARTIES FREE OF CHARGE

12.1 Rules for the use of in-kind contributions free of charge

If necessary to implement the action, the beneficiaries may use in-kind contributions provided by third parties free of charge.

The beneficiaries may declare costs incurred by the third parties for the seconded persons, contributed equipment, infrastructure or other assets or other contributed goods and services as eligible in accordance with Article 6.4.

The third parties and their contributions must be set out in Annex 1. The Agency may however approve in-kind contributions not set out in Annex 1 without amendment (see Article 55), if:

- they are specifically justified in the periodic technical report and

- their use does not entail changes to the Agreement which would call into question the decision awarding the grant or breach the principle of equal treatment of applicants.

The beneficiaries must ensure that the Agency, the Commission, the European Court of Auditors (ECA) and the European Anti-Fraud Office (OLAF) can exercise their rights under Articles 22 and 23 also towards the third parties.

12.2 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the costs incurred by the third parties related to the in-kind contribution will be ineligible (see Article 6) and will be rejected (see Article 42).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 13 — IMPLEMENTATION OF ACTION TASKS BY SUBCONTRACTORS

13.1 Rules for subcontracting action tasks

13.1.1 If necessary to implement the action, the beneficiaries may award subcontracts covering the implementation of certain action tasks described in Annex 1.

Subcontracting may cover only a limited part of the action.

The beneficiaries must award the subcontracts ensuring the best value for money or, if appropriate, the lowest price. In doing so, they must avoid any conflict of interests (see Article 35).

The tasks to be implemented and the estimated cost for each subcontract must be set out in Annex 1 and the total estimated costs of subcontracting per beneficiary must be set out in Annex 2. The Agency may however approve subcontracts not set out in Annex 1 and 2 without amendment (see Article 55), if:

- they are specifically justified in the periodic technical report and
- they do not entail changes to the Agreement which would call into question the decision awarding the grant or breach the principle of equal treatment of applicants.

The beneficiaries must ensure that the Agency, the Commission, the European Court of Auditors (ECA) and the European Anti-Fraud Office (OLAF) can exercise their rights under Articles 22 and 23 also towards their subcontractors.

13.1.2 The beneficiaries must ensure that their obligations under Articles 35, 36, 38 and 46 also apply to the subcontractors.

Beneficiaries that are ‘contracting authorities’ within the meaning of Directive 2004/18/EC (or 2014/24/EU) or ‘contracting entities’ within the meaning of Directive 2004/17/EC (or 2014/25/EU) must comply with the applicable national law on public procurement.

13.2 Consequences of non-compliance

If a beneficiary breaches any of its obligations under Article 13.1.1, the costs related to the subcontract concerned will be ineligible (see Article 6) and will be rejected (see Article 42).

If a beneficiary breaches any of its obligations under Article 13.1.2, the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 14 — IMPLEMENTATION OF ACTION TASKS BY LINKED THIRD PARTIES

14.1 Rules for calling upon linked third parties to implement part of the action

14.1.1 The following **affiliated entities**¹⁰ and **third parties with a legal link to a beneficiary**¹¹ (**‘linked third parties’**) may implement the action tasks attributed to them in Annex 1:

- COMUNIDAD DE MADRID (CMFF), affiliated or linked to SUMMA
- ESCUELA ESPANOLA DE SALVAMENTO Y DETECCION CON PERROS (ESDP), affiliated or linked to SUMMA
- FUNDACIÓN PARA LA INVESTIGACIÓN E INNOVACIÓN BIOMÉDICA DE ATENCIÓN PRIMARIA (FIIBAP), affiliated or linked to SUMMA
- REGIONE PIEMONTE (RP), affiliated or linked to CSIP

The linked third parties may declare as eligible the costs they incur for implementing the action tasks in accordance with Article 6.3.

The beneficiaries must ensure that the Agency, the Commission, the European Court of Auditors (ECA) and the European Anti-Fraud Office (OLAF) can exercise their rights under Articles 22 and 23 also towards their linked third parties.

14.1.2 The beneficiaries must ensure that their obligations under Articles 18, 20, 35, 36 and 38 also apply to their linked third parties.

14.2 Consequences of non-compliance

If any obligation under Article 14.1.1 is breached, the costs of the linked third party will be ineligible (see Article 6) and will be rejected (see Article 42).

¹⁰ For the definition see Article 2.1(2) Rules for Participation Regulation No 1290/2013: **‘affiliated entity’** means any legal entity that is:

- under the direct or indirect control of a participant, or
- under the same direct or indirect control as the participant, or
- directly or indirectly controlling a participant.

‘Control’ may take any of the following forms:

- (a) the direct or indirect holding of more than 50% of the nominal value of the issued share capital in the legal entity concerned, or of a majority of the voting rights of the shareholders or associates of that entity;
- (b) the direct or indirect holding, in fact or in law, of decision-making powers in the legal entity concerned.

However the following relationships between legal entities shall not in themselves be deemed to constitute controlling relationships:

- (a) the same public investment corporation, institutional investor or venture-capital company has a direct or indirect holding of more than 50% of the nominal value of the issued share capital or a majority of voting rights of the shareholders or associates;
- (b) the legal entities concerned are owned or supervised by the same public body.

¹¹ **‘Third party with a legal link to a beneficiary’** is any legal entity which has a legal link to the beneficiary implying collaboration that is not limited to the action.

If any obligation under Article 14.1.2 is breached, the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 14a — IMPLEMENTATION OF ACTION TASKS BY INTERNATIONAL PARTNERS

Not applicable

ARTICLE 15 — FINANCIAL SUPPORT TO THIRD PARTIES

15.1 Rules for providing financial support to third parties

Not applicable

15.2 Financial support in the form of prizes

Not applicable

15.3 Consequences of non-compliance

Not applicable

ARTICLE 16 — PROVISION OF TRANS-NATIONAL OR VIRTUAL ACCESS TO RESEARCH INFRASTRUCTURE

16.1 Rules for providing trans-national access to research infrastructure

Not applicable

16.2 Rules for providing virtual access to research infrastructure

Not applicable

16.3 Consequences of non-compliance

Not applicable

SECTION 2 RIGHTS AND OBLIGATIONS RELATED TO THE GRANT ADMINISTRATION

ARTICLE 17 — GENERAL OBLIGATION TO INFORM

17.1 General obligation to provide information upon request

The beneficiaries must provide — during implementation of the action or afterwards and in accordance with Article 41.2 — any information requested in order to verify eligibility of the costs, proper implementation of the action and compliance with any other obligation under the Agreement.

17.2 Obligation to keep information up to date and to inform about events and circumstances likely to affect the Agreement

Each beneficiary must keep information stored in the Participant Portal Beneficiary Register (via the electronic exchange system; see Article 52) up to date, in particular, its name, address, legal representatives, legal form and organisation type.

Each beneficiary must immediately inform the coordinator — which must immediately inform the Agency and the other beneficiaries — of any of the following:

- (a) **events** which are likely to affect significantly or delay the implementation of the action or the EU's financial interests, in particular:
 - (i) changes in its legal, financial, technical, organisational or ownership situation or those of its linked third parties and
 - (ii) changes in the name, address, legal form, organisation type of its linked third parties;
- (b) **circumstances** affecting:
 - (i) the decision to award the grant or
 - (ii) compliance with requirements under the Agreement.

17.3 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 18 — KEEPING RECORDS — SUPPORTING DOCUMENTATION

18.1 Obligation to keep records and other supporting documentation

The beneficiaries must — for a period of five years after the payment of the balance — keep records and other supporting documentation in order to prove the proper implementation of the action and the costs they declare as eligible.

They must make them available upon request (see Article 17) or in the context of checks, reviews, audits or investigations (see Article 22).

If there are on-going checks, reviews, audits, investigations, litigation or other pursuits of claims under the Agreement (including the extension of findings; see Article 22), the beneficiaries must keep the records and other supporting documentation until the end of these procedures.

The beneficiaries must keep the original documents. Digital and digitalised documents are considered originals if they are authorised by the applicable national law. The Agency may accept non-original documents if it considers that they offer a comparable level of assurance.

18.1.1 Records and other supporting documentation on the scientific and technical implementation

The beneficiaries must keep records and other supporting documentation on scientific and technical implementation of the action in line with the accepted standards in the respective field.

18.1.2 Records and other documentation to support the costs declared

The beneficiaries must keep the records and documentation supporting the costs declared, in particular the following:

- (a) for **actual costs**: adequate records and other supporting documentation to prove the costs declared, such as contracts, subcontracts, invoices and accounting records. In addition, the beneficiaries' usual cost accounting practices and internal control procedures must enable direct reconciliation between the amounts declared, the amounts recorded in their accounts and the amounts stated in the supporting documentation;
- (b) for **unit costs**: adequate records and other supporting documentation to prove the number of units declared. Beneficiaries do not need to identify the actual eligible costs covered or to keep or provide supporting documentation (such as accounting statements) to prove the amount per unit.

In addition, **for unit costs calculated in accordance with the beneficiary's usual cost accounting practices**, the beneficiaries must keep adequate records and documentation to prove that the cost accounting practices used comply with the conditions set out in Article 6.2.

The beneficiaries and linked third parties may submit to the Commission, for approval, a certificate (drawn up in accordance with Annex 6) stating that their usual cost accounting practices comply with these conditions (**'certificate on the methodology'**). If the certificate is approved, costs declared in line with this methodology will not be challenged subsequently, unless the beneficiaries have concealed information for the purpose of the approval.

- (c) for **flat-rate costs**: adequate records and other supporting documentation to prove the eligibility of the costs to which the flat-rate is applied. The beneficiaries do not need to identify the costs covered or provide supporting documentation (such as accounting statements) to prove the amount declared at a flat-rate.

In addition, for **personnel costs** (declared as actual costs or on the basis of unit costs), the beneficiaries must keep **time records** for the number of hours declared. The time records must be in writing and approved by the persons working on the action and their supervisors, at least monthly. In the absence of reliable time records of the hours worked on the action, the Agency may accept alternative evidence supporting the number of hours declared, if it considers that it offers an adequate level of assurance.

As an exception, for **persons working exclusively on the action**, there is no need to keep time records, if the beneficiary signs a **declaration** confirming that the persons concerned have worked exclusively on the action.

For costs declared by linked third parties (see Article 14), it is the beneficiary that must keep the originals of the financial statements and the certificates on the financial statements of the linked third parties.

18.2 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, costs insufficiently substantiated

will be ineligible (see Article 6) and will be rejected (see Article 42), and the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 19 — SUBMISSION OF DELIVERABLES

19.1 Obligation to submit deliverables

The coordinator must submit the ‘**deliverables**’ identified in Annex 1, in accordance with the timing and conditions set out in it.

19.2 Consequences of non-compliance

If the coordinator breaches any of its obligations under this Article, the Agency may apply any of the measures described in Chapter 6.

ARTICLE 20 — REPORTING — PAYMENT REQUESTS

20.1 Obligation to submit reports

The coordinator must submit to the Agency (see Article 52) the technical and financial reports set out in this Article. These reports include requests for payment and must be drawn up using the forms and templates provided in the electronic exchange system (see Article 52).

20.2 Reporting periods

The action is divided into the following ‘**reporting periods**’:

- RP1: from month 1 to month 18
- RP2: from month 19 to month 36

20.3 Periodic reports — Requests for interim payments

The coordinator must submit a periodic report within 60 days following the end of each reporting period.

The **periodic report** must include the following:

(a) a ‘**periodic technical report**’ containing:

- (i) an **explanation of the work carried out** by the beneficiaries;
- (ii) an **overview of the progress** towards the objectives of the action, including milestones and deliverables identified in Annex 1.

This report must include explanations justifying the differences between work expected to be carried out in accordance with Annex 1 and that actually carried out.

The report must detail the exploitation and dissemination of the results and — if required in Annex 1 — an updated ‘**plan for the exploitation and dissemination of the results**’.

The report must indicate the communication activities;

- (iii) a **summary** for publication by the Agency;
- (iv) the answers to the ‘**questionnaire**’, covering issues related to the action implementation and the economic and societal impact, notably in the context of the Horizon 2020 key performance indicators and the Horizon 2020 monitoring requirements;

(b) a ‘**periodic financial report**’ containing:

- (i) an ‘**individual financial statement**’ (see Annex 4) from each beneficiary and from each linked third party, for the reporting period concerned.

The individual financial statement must detail the eligible costs (actual costs, unit costs and flat-rate costs; see Article 6) for each budget category (see Annex 2).

The beneficiaries and linked third parties must declare all eligible costs, even if — for actual costs, unit costs and flat-rate costs — they exceed the amounts indicated in the estimated budget (see Annex 2). Amounts which are not declared in the individual financial statement will not be taken into account by the Agency.

If an individual financial statement is not submitted for a reporting period, it may be included in the periodic financial report for the next reporting period.

The individual financial statements of the last reporting period must also detail the **receipts of the action** (see Article 5.3.3).

Each beneficiary and each linked third party must **certify** that:

- the information provided is full, reliable and true;
 - the costs declared are eligible (see Article 6);
 - the costs can be substantiated by adequate records and supporting documentation (see Article 18) that will be produced upon request (see Article 17) or in the context of checks, reviews, audits and investigations (see Article 22), and
 - for the last reporting period: that all the receipts have been declared (see Article 5.3.3);
- (ii) an **explanation of the use of resources** and the information on subcontracting (see Article 13) and in-kind contributions provided by third parties (see Articles 11 and 12) from each beneficiary and from each linked third party, for the reporting period concerned;
 - (iii) not applicable;
 - (iv) a ‘**periodic summary financial statement**’, created automatically by the electronic exchange system, consolidating the individual financial statements for the reporting period concerned and including — except for the last reporting period — the **request for interim payment**.

20.4 Final report — Request for payment of the balance

In addition to the periodic report for the last reporting period, the coordinator must submit the final report within 60 days following the end of the last reporting period.

The **final report** must include the following:

- (a) a ‘**final technical report**’ with a **summary** for publication containing:
 - (i) an overview of the results and their exploitation and dissemination;
 - (ii) the conclusions on the action, and
 - (iii) the socio-economic impact of the action;
- (b) a ‘**final financial report**’ containing:
 - (i) a ‘**final summary financial statement**’, created automatically by the electronic exchange system, consolidating the individual financial statements for all reporting periods and including the **request for payment of the balance** and
 - (ii) a ‘**certificate on the financial statements**’ (drawn up in accordance with Annex 5) for each beneficiary and for each linked third party, if it requests a total contribution of EUR 325 000 or more, as reimbursement of actual costs and unit costs calculated on the basis of its usual cost accounting practices (see Article 5.2 and Article 6.2).

20.5 Information on cumulative expenditure incurred

Not applicable

20.6 Currency for financial statements and conversion into euro

Financial statements must be drafted in euro.

Beneficiaries and linked third parties with accounting established in a currency other than the euro must convert the costs recorded in their accounts into euro, at the average of the daily exchange rates published in the C series of the *Official Journal of the European Union*, calculated over the corresponding reporting period.

If no daily euro exchange rate is published in the *Official Journal of the European Union* for the currency in question, they must be converted at the average of the monthly accounting rates published on the Commission’s website, calculated over the corresponding reporting period.

Beneficiaries and linked third parties with accounting established in euro must convert costs incurred in another currency into euro according to their usual accounting practices.

20.7 Language of reports

All reports (technical and financial reports, including financial statements) must be submitted in the language of the Agreement.

20.8 Consequences of non-compliance

If the reports submitted do not comply with this Article, the Agency may suspend the payment deadline (see Article 47) and apply any of the other measures described in Chapter 6.

If the coordinator breaches its obligation to submit the reports and if it fails to comply with this obligation within 30 days following a written reminder, the Agency may terminate the Agreement (see Article 50) or apply any of the other measures described in Chapter 6.

ARTICLE 21 — PAYMENTS AND PAYMENT ARRANGEMENTS

21.1 Payments to be made

The following payments will be made to the coordinator:

- one **pre-financing payment**;
- one or more **interim payments**, on the basis of the request(s) for interim payment (see Article 20), and
- one **payment of the balance**, on the basis of the request for payment of the balance (see Article 20).

21.2 Pre-financing payment — Amount — Amount retained for the Guarantee Fund

The aim of the pre-financing is to provide the beneficiaries with a float.

It remains the property of the EU until the payment of the balance.

The amount of the pre-financing payment will be EUR **5 599 800.00** (five million five hundred and ninety nine thousand eight hundred EURO).

The Agency will — except if Article 48 applies — make the pre-financing payment to the coordinator within 30 days, either from the entry into force of the Agreement (see Article 58) or from 10 days before the starting date of the action (see Article 3), whichever is the latest.

An amount of EUR **349 987.50** (three hundred and forty nine thousand nine hundred and eighty seven EURO and fifty eurocents), corresponding to 5% of the maximum grant amount (see Article 5.1), is retained by the Agency from the pre-financing payment and transferred into the ‘**Guarantee Fund**’.

21.3 Interim payments — Amount — Calculation

Interim payments reimburse the eligible costs incurred for the implementation of the action during the corresponding reporting periods.

The Agency will pay to the coordinator the amount due as interim payment within 90 days from receiving the periodic report (see Article 20.3), except if Articles 47 or 48 apply.

Payment is subject to the approval of the periodic report. Its approval does not imply recognition of the compliance, authenticity, completeness or correctness of its content.

The **amount due as interim payment** is calculated by the Agency in the following steps:

Step 1 — Application of the reimbursement rates

Step 2 — Limit to 90% of the maximum grant amount

21.3.1 Step 1 — Application of the reimbursement rates

The reimbursement rate(s) (see Article 5.2) are applied to the eligible costs (actual costs, unit costs and flat-rate costs; see Article 6) declared by the beneficiaries and the linked third parties (see Article 20) and approved by the Agency (see above) for the concerned reporting period.

21.3.2 Step 2 — Limit to 90% of the maximum grant amount

The total amount of pre-financing and interim payments must not exceed 90% of the maximum grant amount set out in Article 5.1. The maximum amount for the interim payment will be calculated as follows:

$$\begin{aligned} & \{90\% \text{ of the maximum grant amount (see Article 5.1)} \\ & \text{minus} \\ & \{\text{pre-financing and previous interim payments}\}. \end{aligned}$$

21.4 Payment of the balance — Amount — Calculation — Release of the amount retained for the Guarantee Fund

The payment of the balance reimburses the remaining part of the eligible costs incurred by the beneficiaries for the implementation of the action.

If the total amount of earlier payments is greater than the final grant amount (see Article 5.3), the payment of the balance takes the form of a recovery (see Article 44).

If the total amount of earlier payments is lower than the final grant amount, the Agency will pay the balance within 90 days from receiving the final report (see Article 20.4), except if Articles 47 or 48 apply.

Payment is subject to the approval of the final report. Its approval does not imply recognition of the compliance, authenticity, completeness or correctness of its content.

The **amount due as the balance** is calculated by the Agency by deducting the total amount of pre-financing and interim payments (if any) already made, from the final grant amount determined in accordance with Article 5.3:

$$\begin{aligned} & \{\text{final grant amount (see Article 5.3)} \\ & \text{minus} \\ & \{\text{pre-financing and interim payments (if any) made}\}. \end{aligned}$$

At the payment of the balance, the amount retained for the Guarantee Fund (see above) will be released and:

- if the balance is positive: the amount released will be paid in full to the coordinator together with the amount due as the balance;
- if the balance is negative (payment of the balance taking the form of recovery): it will be deducted from the amount released (see Article 44.1.2). If the resulting amount:

- is positive, it will be paid to the coordinator
- is negative, it will be recovered.

The amount to be paid may however be offset — without the beneficiaries' consent — against any other amount owed by a beneficiary to the Agency, the Commission or another executive agency (under the EU or Euratom budget), up to the maximum EU contribution indicated, for that beneficiary, in the estimated budget (see Annex 2).

21.5 Notification of amounts due

When making payments, the Agency will formally notify to the coordinator the amount due, specifying whether it concerns an interim payment or the payment of the balance.

For the payment of the balance, the notification will also specify the final grant amount.

In the case of reduction of the grant or recovery of undue amounts, the notification will be preceded by the contradictory procedure set out in Articles 43 and 44.

21.6 Currency for payments

The Agency will make all payments in euro.

21.7 Payments to the coordinator — Distribution to the beneficiaries

Payments will be made to the coordinator.

Payments to the coordinator will discharge the Agency from its payment obligation.

The coordinator must distribute the payments between the beneficiaries without unjustified delay.

Pre-financing may however be distributed only:

- (a) if the minimum number of beneficiaries set out in the call for proposals has acceded to the Agreement (see Article 56) and
- (b) to beneficiaries that have acceded to the Agreement (see Article 56).

21.8 Bank account for payments

All payments will be made to the following bank account:

Name of bank: NATIONAL BANK OF GREECE S.A.
Full name of the account holder: ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS CERTH
IBAN code: GR4501102100000021000707345

21.9 Costs of payment transfers

The cost of the payment transfers is borne as follows:

- the Agency bears the cost of transfers charged by its bank;

- the beneficiary bears the cost of transfers charged by its bank;
- the party causing a repetition of a transfer bears all costs of the repeated transfer.

21.10 Date of payment

Payments by the Agency are considered to have been carried out on the date when they are debited to its account.

21.11 Consequences of non-compliance

21.11.1 If the Agency does not pay within the payment deadlines (see above), the beneficiaries are entitled to **late-payment interest** at the rate applied by the European Central Bank (ECB) for its main refinancing operations in euros ('reference rate'), plus three and a half points. The reference rate is the rate in force on the first day of the month in which the payment deadline expires, as published in the C series of the *Official Journal of the European Union*.

If the late-payment interest is lower than or equal to EUR 200, it will be paid to the coordinator only upon request submitted within two months of receiving the late payment.

Late-payment interest is not due if all beneficiaries are EU Member States (including regional and local government authorities or other public bodies acting on behalf of a Member State for the purpose of this Agreement).

Suspension of the payment deadline or payments (see Articles 47 and 48) will not be considered as late payment.

Late-payment interest covers the period running from the day following the due date for payment (see above), up to and including the date of payment.

Late-payment interest is not considered for the purposes of calculating the final grant amount.

21.11.2 If the coordinator breaches any of its obligations under this Article, the grant may be reduced (see Article 43) and the Agreement or the participation of the coordinator may be terminated (see Article 50).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 22 — CHECKS, REVIEWS, AUDITS AND INVESTIGATIONS — EXTENSION OF FINDINGS

22.1 Checks, reviews and audits by the Agency and the Commission

22.1.1 Right to carry out checks

The Agency or the Commission will — during the implementation of the action or afterwards — check the proper implementation of the action and compliance with the obligations under the Agreement, including assessing deliverables and reports.

For this purpose the Agency or the Commission may be assisted by external persons or bodies.

The Agency or the Commission may also request additional information in accordance with Article 17. The Agency or the Commission may request beneficiaries to provide such information to it directly.

Information provided must be accurate, precise and complete and in the format requested, including electronic format.

22.1.2 Right to carry out reviews

The Agency or the Commission may — during the implementation of the action or afterwards — carry out reviews on the proper implementation of the action (including assessment of deliverables and reports), compliance with the obligations under the Agreement and continued scientific or technological relevance of the action.

Reviews may be started up to two years after the payment of the balance. They will be formally notified to the coordinator or beneficiary concerned and will be considered to have started on the date of the formal notification.

If the review is carried out on a third party (see Articles 10 to 16), the beneficiary concerned must inform the third party.

The Agency or the Commission may carry out reviews directly (using its own staff) or indirectly (using external persons or bodies appointed to do so). It will inform the coordinator or beneficiary concerned of the identity of the external persons or bodies. They have the right to object to the appointment on grounds of commercial confidentiality.

The coordinator or beneficiary concerned must provide — within the deadline requested — any information and data in addition to deliverables and reports already submitted (including information on the use of resources). The Agency or the Commission may request beneficiaries to provide such information to it directly.

The coordinator or beneficiary concerned may be requested to participate in meetings, including with external experts.

For **on-the-spot** reviews, the beneficiaries must allow access to their sites and premises, including to external persons or bodies, and must ensure that information requested is readily available.

Information provided must be accurate, precise and complete and in the format requested, including electronic format.

On the basis of the review findings, a ‘**review report**’ will be drawn up.

The Agency or the Commission will formally notify the review report to the coordinator or beneficiary concerned, which has 30 days to formally notify observations (‘**contradictory review procedure**’).

Reviews (including review reports) are in the language of the Agreement.

22.1.3 Right to carry out audits

The Agency or the Commission may — during the implementation of the action or afterwards — carry out audits on the proper implementation of the action and compliance with the obligations under the Agreement.

Audits may be started up to two years after the payment of the balance. They will be formally notified

to the coordinator or beneficiary concerned and will be considered to have started on the date of the formal notification.

If the audit is carried out on a third party (see Articles 10 to 16), the beneficiary concerned must inform the third party.

The Agency or the Commission may carry out audits directly (using its own staff) or indirectly (using external persons or bodies appointed to do so). It will inform the coordinator or beneficiary concerned of the identity of the external persons or bodies. They have the right to object to the appointment on grounds of commercial confidentiality.

The coordinator or beneficiary concerned must provide — within the deadline requested — any information (including complete accounts, individual salary statements or other personal data) to verify compliance with the Agreement. The Agency or the Commission may request beneficiaries to provide such information to it directly.

For **on-the-spot** audits, the beneficiaries must allow access to their sites and premises, including to external persons or bodies, and must ensure that information requested is readily available.

Information provided must be accurate, precise and complete and in the format requested, including electronic format.

On the basis of the audit findings, a '**draft audit report**' will be drawn up.

The Agency or the Commission will formally notify the draft audit report to the coordinator or beneficiary concerned, which has 30 days to formally notify observations ('**contradictory audit procedure**'). This period may be extended by the Agency or the Commission in justified cases.

The '**final audit report**' will take into account observations by the coordinator or beneficiary concerned. The report will be formally notified to it.

Audits (including audit reports) are in the language of the Agreement.

The Agency or the Commission may also access the beneficiaries' statutory records for the periodical assessment of unit costs or flat-rate amounts.

22.2 Investigations by the European Anti-Fraud Office (OLAF)

Under Regulations No 883/2013¹⁶ and No 2185/96¹⁷ (and in accordance with their provisions and procedures), the European Anti-Fraud Office (OLAF) may — at any moment during implementation of the action or afterwards — carry out investigations, including on-the-spot checks and inspections, to establish whether there has been fraud, corruption or any other illegal activity affecting the financial interests of the EU.

¹⁶ Regulation (EU, Euratom) No 883/2013 of the European Parliament and of the Council of 11 September 2013 concerning investigations conducted by the European Anti-Fraud Office (OLAF) and repealing Regulation (EC) No 1073/1999 of the European Parliament and of the Council and Council Regulation (Euratom) No 1074/1999 (OJ L 248, 18.09.2013, p. 1).

¹⁷ Council Regulation (Euratom, EC) No 2185/1996 of 11 November 1996 concerning on-the-spot checks and inspections carried out by the Commission in order to protect the European Communities' financial interests against fraud and other irregularities (OJ L 292, 15.11.1996, p. 2).

22.3 Checks and audits by the European Court of Auditors (ECA)

Under Article 287 of the Treaty on the Functioning of the European Union (TFEU) and Article 161 of the Financial Regulation No 966/2012¹⁸, the European Court of Auditors (ECA) may — at any moment during implementation of the action or afterwards — carry out audits.

The ECA has the right of access for the purpose of checks and audits.

22.4 Checks, reviews, audits and investigations for international organisations

Not applicable

22.5 Consequences of findings in checks, reviews, audits and investigations — Extension of findings

22.5.1 Findings in this grant

Findings in checks, reviews, audits or investigations carried out in the context of this grant may lead to the rejection of ineligible costs (see Article 42), reduction of the grant (see Article 43), recovery of undue amounts (see Article 44) or to any of the other measures described in Chapter 6.

Rejection of costs or reduction of the grant after the payment of the balance will lead to a revised final grant amount (see Article 5.4).

Findings in checks, reviews, audits or investigations may lead to a request for amendment for the modification of Annex 1 (see Article 55).

Checks, reviews, audits or investigations that find systemic or recurrent errors, irregularities, fraud or breach of obligations may also lead to consequences in other EU or Euratom grants awarded under similar conditions (**‘extension of findings from this grant to other grants’**).

Moreover, findings arising from an OLAF investigation may lead to criminal prosecution under national law.

22.5.2 Findings in other grants

The Agency or the Commission may extend findings from other grants to this grant (**‘extension of findings from other grants to this grant’**), if:

- (a) the beneficiary concerned is found, in other EU or Euratom grants awarded under similar conditions, to have committed systemic or recurrent errors, irregularities, fraud or breach of obligations that have a material impact on this grant and
- (b) those findings are formally notified to the beneficiary concerned — together with the list of grants affected by the findings — no later than two years after the payment of the balance of this grant.

The extension of findings may lead to the rejection of costs (see Article 42), reduction of the grant

¹⁸ Regulation (EU, Euratom) No 966/2012 of the European Parliament and of the Council of 25 October 2012 on the financial rules applicable to the general budget of the Union and repealing Council Regulation (EC, Euratom) No 1605/2002 (OJ L 298, 26.10.2012, p. 1).

(see Article 43), recovery of undue amounts (see Article 44), suspension of payments (see Article 48), suspension of the action implementation (see Article 49) or termination (see Article 50).

22.5.3 Procedure

The Agency or the Commission will formally notify the beneficiary concerned the systemic or recurrent errors and its intention to extend these audit findings, together with the list of grants affected.

22.5.3.1 If the findings concern **eligibility of costs**: the formal notification will include:

- (a) an invitation to submit observations on the list of grants affected by the findings;
- (b) the request to submit **revised financial statements** for all grants affected;
- (c) the **correction rate for extrapolation** established by the Agency or the Commission on the basis of the systemic or recurrent errors, to calculate the amounts to be rejected if the beneficiary concerned:
 - (i) considers that the submission of revised financial statements is not possible or practicable or
 - (ii) does not submit revised financial statements.

The beneficiary concerned has 90 days from receiving notification to submit observations, revised financial statements or to propose a duly substantiated **alternative correction method**. This period may be extended by the Agency or the Commission in justified cases.

The Agency or the Commission may then start a rejection procedure in accordance with Article 42, on the basis of:

- the revised financial statements, if approved;
 - the proposed alternative correction method, if accepted
- or
- the initially notified correction rate for extrapolation, if it does not receive any observations or revised financial statements, does not accept the observations or the proposed alternative correction method or does not approve the revised financial statements.

22.5.3.2 If the findings concern **substantial errors, irregularities or fraud or serious breach of obligations**: the formal notification will include:

- (a) an invitation to submit observations on the list of grants affected by the findings and
- (b) the flat-rate the Agency or the Commission intends to apply according to the principle of proportionality.

The beneficiary concerned has 90 days from receiving notification to submit observations or to propose a duly substantiated alternative flat-rate.

The Agency or the Commission may then start a reduction procedure in accordance with Article 43, on the basis of:

- the proposed alternative flat-rate, if accepted

or

- the initially notified flat-rate, if it does not receive any observations or does not accept the observations or the proposed alternative flat-rate.

22.6 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, any insufficiently substantiated costs will be ineligible (see Article 6) and will be rejected (see Article 42).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 23 — EVALUATION OF THE IMPACT OF THE ACTION

23.1 Right to evaluate the impact of the action

The Agency or the Commission may carry out interim and final evaluations of the impact of the action measured against the objective of the EU programme.

Evaluations may be started during implementation of the action and up to five years after the payment of the balance. The evaluation is considered to start on the date of the formal notification to the coordinator or beneficiaries.

The Agency or the Commission may make these evaluations directly (using its own staff) or indirectly (using external bodies or persons it has authorised to do so).

The coordinator or beneficiaries must provide any information relevant to evaluate the impact of the action, including information in electronic format.

23.2 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the Agency may apply the measures described in Chapter 6.

SECTION 3 RIGHTS AND OBLIGATIONS RELATED TO BACKGROUND AND RESULTS

SUBSECTION 1 GENERAL

ARTICLE 23a — MANAGEMENT OF INTELLECTUAL PROPERTY

23a.1 Obligation to take measures to implement the Commission Recommendation on the management of intellectual property in knowledge transfer activities

Beneficiaries that are universities or other public research organisations must take measures to

implement the principles set out in Points 1 and 2 of the Code of Practice annexed to the Commission Recommendation on the management of intellectual property in knowledge transfer activities¹⁹.

This does not change the obligations set out in Subsections 2 and 3 of this Section.

The beneficiaries must ensure that researchers and third parties involved in the action are aware of them.

23a.2 Consequences of non-compliance

If a beneficiary breaches its obligations under this Article, the Agency may apply any of the measures described in Chapter 6.

SUBSECTION 2 RIGHTS AND OBLIGATIONS RELATED TO BACKGROUND

ARTICLE 24 — AGREEMENT ON BACKGROUND

24.1 Agreement on background

The beneficiaries must identify and agree (in writing) on the background for the action (**‘agreement on background’**).

‘Background’ means any data, know-how or information — whatever its form or nature (tangible or intangible), including any rights such as intellectual property rights — that:

- (a) is held by the beneficiaries before they acceded to the Agreement, and
- (b) is needed to implement the action or exploit the results.

24.2 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 25 — ACCESS RIGHTS TO BACKGROUND

25.1 Exercise of access rights — Waiving of access rights — No sub-licensing

To exercise access rights, this must first be requested in writing (**‘request for access’**).

‘Access rights’ means rights to use results or background under the terms and conditions laid down in this Agreement.

Waivers of access rights are not valid unless in writing.

Unless agreed otherwise, access rights do not include the right to sub-license.

¹⁹ Commission Recommendation C(2008) 1329 of 10.4.2008 on the management of intellectual property in knowledge transfer activities and the Code of Practice for universities and other public research institutions attached to this recommendation.

25.2 Access rights for other beneficiaries, for implementing their own tasks under the action

The beneficiaries must give each other access — on a royalty-free basis — to background needed to implement their own tasks under the action, unless the beneficiary that holds the background has — before acceding to the Agreement —:

- (a) informed the other beneficiaries that access to its background is subject to legal restrictions or limits, including those imposed by the rights of third parties (including personnel), or
- (b) agreed with the other beneficiaries that access would not be on a royalty-free basis.

25.3 Access rights for other beneficiaries, for exploiting their own results

The beneficiaries must give each other access — under fair and reasonable conditions — to background needed for exploiting their own results, unless the beneficiary that holds the background has — before acceding to the Agreement — informed the other beneficiaries that access to its background is subject to legal restrictions or limits, including those imposed by the rights of third parties (including personnel).

‘**Fair and reasonable conditions**’ means appropriate conditions, including possible financial terms or royalty-free conditions, taking into account the specific circumstances of the request for access, for example the actual or potential value of the results or background to which access is requested and/or the scope, duration or other characteristics of the exploitation envisaged.

Requests for access may be made — unless agreed otherwise — up to one year after the period set out in Article 3.

25.4 Access rights for affiliated entities

Unless otherwise agreed in the consortium agreement, access to background must also be given — under fair and reasonable conditions (see above; Article 25.3) and unless it is subject to legal restrictions or limits, including those imposed by the rights of third parties (including personnel) — to affiliated entities²⁰ established in an EU Member State or ‘**associated country**’²¹, if this is needed to exploit the results generated by the beneficiaries to which they are affiliated.

Unless agreed otherwise (see above; Article 25.1), the affiliated entity concerned must make the request directly to the beneficiary that holds the background.

Requests for access may be made — unless agreed otherwise — up to one year after the period set out in Article 3.

25.5 Access rights for third parties

Not applicable

25.6 Consequences of non-compliance

²⁰ For the definition, see ‘affiliated entity’ footnote (Article 14.1).

²¹ For the definition, see Article 2.1(3) of the Rules for Participation Regulation No 1290/2013: ‘**associated country**’ means a third country which is party to an international agreement with the Union, as identified in Article 7 of Horizon 2020 Framework Programme Regulation No 1291/2013. Article 7 sets out the conditions for association of non-EU countries to Horizon 2020.

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

SUBSECTION 3 RIGHTS AND OBLIGATIONS RELATED TO RESULTS

ARTICLE 26 — OWNERSHIP OF RESULTS

26.1 Ownership by the beneficiary that generates the results

Results are owned by the beneficiary that generates them.

‘**Results**’ means any (tangible or intangible) output of the action such as data, knowledge or information — whatever its form or nature, whether it can be protected or not — that is generated in the action, as well as any rights attached to it, including intellectual property rights.

26.2 Joint ownership by several beneficiaries

Two or more beneficiaries own results jointly if:

- (a) they have jointly generated them and
- (b) it is not possible to:
 - (i) establish the respective contribution of each beneficiary, or
 - (ii) separate them for the purpose of applying for, obtaining or maintaining their protection (see Article 27).

The joint owners must agree (in writing) on the allocation and terms of exercise of their joint ownership (**‘joint ownership agreement’**), to ensure compliance with their obligations under this Agreement.

Unless otherwise agreed in the joint ownership agreement, each joint owner may grant non-exclusive licences to third parties to exploit jointly-owned results (without any right to sub-license), if the other joint owners are given:

- (a) at least 45 days advance notice and
- (b) fair and reasonable compensation.

Once the results have been generated, joint owners may agree (in writing) to apply another regime than joint ownership (such as, for instance, transfer to a single owner (see Article 30) with access rights for the others).

26.3 Rights of third parties (including personnel)

If third parties (including personnel) may claim rights to the results, the beneficiary concerned must ensure that it complies with its obligations under the Agreement.

If a third party generates results, the beneficiary concerned must obtain all necessary rights (transfer,

licences or other) from the third party, in order to be able to respect its obligations as if those results were generated by the beneficiary itself.

If obtaining the rights is impossible, the beneficiary must refrain from using the third party to generate the results.

26.4 Agency ownership, to protect results

26.4.1 The Agency may — with the consent of the beneficiary concerned — assume ownership of results to protect them, if a beneficiary intends — up to four years after the period set out in Article 3 — to disseminate its results without protecting them, except in any of the following cases:

- (a) the lack of protection is because protecting the results is not possible, reasonable or justified (given the circumstances);
- (b) the lack of protection is because there is a lack of potential for commercial or industrial exploitation, or
- (c) the beneficiary intends to transfer the results to another beneficiary or third party established in an EU Member State or associated country, which will protect them.

Before the results are disseminated and unless any of the cases above under Points (a), (b) or (c) applies, the beneficiary must formally notify the Agency and at the same time inform it of any reasons for refusing consent. The beneficiary may refuse consent only if it can show that its legitimate interests would suffer significant harm.

If the Agency decides to assume ownership, it will formally notify the beneficiary concerned within 45 days of receiving notification.

No dissemination relating to these results may take place before the end of this period or, if the Agency takes a positive decision, until it has taken the necessary steps to protect the results.

26.4.2 The Agency may — with the consent of the beneficiary concerned — assume ownership of results to protect them, if a beneficiary intends — up to four years after the period set out in Article 3 — to stop protecting them or not to seek an extension of protection, except in any of the following cases:

- (a) the protection is stopped because of a lack of potential for commercial or industrial exploitation;
- (b) an extension would not be justified given the circumstances.

A beneficiary that intends to stop protecting results or not seek an extension must — unless any of the cases above under Points (a) or (b) applies — formally notify the Agency at least 60 days before the protection lapses or its extension is no longer possible and at the same time inform it of any reasons for refusing consent. The beneficiary may refuse consent only if it can show that its legitimate interests would suffer significant harm.

If the Agency decides to assume ownership, it will formally notify the beneficiary concerned within 45 days of receiving notification.

26.5 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such breaches may also lead to the any of the other measures described in Chapter 6.

ARTICLE 27 — PROTECTION OF RESULTS — VISIBILITY OF EU FUNDING

27.1 Obligation to protect the results

Each beneficiary must examine the possibility of protecting its results and must adequately protect them — for an appropriate period and with appropriate territorial coverage — if:

- (a) the results can reasonably be expected to be commercially or industrially exploited and
- (b) protecting them is possible, reasonable and justified (given the circumstances).

When deciding on protection, the beneficiary must consider its own legitimate interests and the legitimate interests (especially commercial) of the other beneficiaries.

27.2 Agency ownership, to protect the results

If a beneficiary intends not to protect its results, to stop protecting them or not seek an extension of protection, the Agency may — under certain conditions (see Article 26.4) — assume ownership to ensure their (continued) protection.

27.3 Information on EU funding

Applications for protection of results (including patent applications) filed by or on behalf of a beneficiary must — unless the Agency requests or agrees otherwise or unless it is impossible — include the following:

“The project leading to this application has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 833507”.

27.4 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such a breach may also lead to any of the other measures described in Chapter 6.

ARTICLE 28 — EXPLOITATION OF RESULTS

28.1 Obligation to exploit the results

Each beneficiary must — up to four years after the period set out in Article 3 — take measures aiming to ensure ‘**exploitation**’ of its results (either directly or indirectly, in particular through transfer or licensing; see Article 30) by:

- (a) using them in further research activities (outside the action);
- (b) developing, creating or marketing a product or process;

- (c) creating and providing a service, or
- (d) using them in standardisation activities.

This does not change the security obligations in Article 37, which still apply.

28.2 Results that could contribute to European or international standards — Information on EU funding

If results are incorporated in a standard, the beneficiary concerned must — unless the Agency requests or agrees otherwise or unless it is impossible — ask the standardisation body to include the following statement in (information related to) the standard:

“Results incorporated in this standard received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 833507”.

28.3 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced in accordance with Article 43.

Such a breach may also lead to any of the other measures described in Chapter 6.

ARTICLE 29 — DISSEMINATION OF RESULTS — OPEN ACCESS — VISIBILITY OF EU FUNDING

29.1 Obligation to disseminate results

Unless it goes against their legitimate interests, each beneficiary must — as soon as possible — ‘**disseminate**’ its results by disclosing them to the public by appropriate means (other than those resulting from protecting or exploiting the results), including in scientific publications (in any medium).

This does not change the obligation to protect results in Article 27, the confidentiality obligations in Article 36, the security obligations in Article 37 or the obligations to protect personal data in Article 39, all of which still apply.

A beneficiary that intends to disseminate its results must give advance notice to the other beneficiaries of — unless agreed otherwise — at least 45 days, together with sufficient information on the results it will disseminate.

Any other beneficiary may object within — unless agreed otherwise — 30 days of receiving notification, if it can show that its legitimate interests in relation to the results or background would be significantly harmed. In such cases, the dissemination may not take place unless appropriate steps are taken to safeguard these legitimate interests.

If a beneficiary intends not to protect its results, it may — under certain conditions (see Article 26.4.1) — need to formally notify the Agency before dissemination takes place.

29.2 Open access to scientific publications

Each beneficiary must ensure open access (free of charge online access for any user) to all peer-reviewed scientific publications relating to its results.

In particular, it must:

- (a) as soon as possible and at the latest on publication, deposit a machine-readable electronic copy of the published version or final peer-reviewed manuscript accepted for publication in a repository for scientific publications;

Moreover, the beneficiary must aim to deposit at the same time the research data needed to validate the results presented in the deposited scientific publications.

- (b) ensure open access to the deposited publication — via the repository — at the latest:
- (i) on publication, if an electronic version is available for free via the publisher, or
 - (ii) within six months of publication (twelve months for publications in the social sciences and humanities) in any other case.
- (c) ensure open access — via the repository — to the bibliographic metadata that identify the deposited publication.

The bibliographic metadata must be in a standard format and must include all of the following:

- the terms “European Union (EU)” and “Horizon 2020”;
- the name of the action, acronym and grant number;
- the publication date, and length of embargo period if applicable, and
- a persistent identifier.

29.3 Open access to research data

Regarding the digital research data generated in the action (**‘data’**), the beneficiaries must:

- (a) deposit in a research data repository and take measures to make it possible for third parties to access, mine, exploit, reproduce and disseminate — free of charge for any user — the following:
- (i) the data, including associated metadata, needed to validate the results presented in scientific publications, as soon as possible;
 - (ii) not applicable;
 - (iii) other data, including associated metadata, as specified and within the deadlines laid down in the ‘data management plan’ (see Annex 1);
- (b) provide information — via the repository — about tools and instruments at the disposal of the beneficiaries and necessary for validating the results (and — where possible — provide the tools and instruments themselves).

This does not change the obligation to protect results in Article 27, the confidentiality obligations in

Article 36, the security obligations in Article 37 or the obligations to protect personal data in Article 39, all of which still apply.

As an exception, the beneficiaries do not have to ensure open access to specific parts of their research data under Point (a)(i) and (iii), if the achievement of the action's main objective (as described in Annex 1) would be jeopardised by making those specific parts of the research data openly accessible. In this case, the data management plan must contain the reasons for not giving access.

29.4 Information on EU funding — Obligation and right to use the EU emblem

Unless the Agency requests or agrees otherwise or unless it is impossible, any dissemination of results (in any form, including electronic) must:

- (a) display the EU emblem and
- (b) include the following text:

“This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 833507”.

When displayed together with another logo, the EU emblem must have appropriate prominence.

For the purposes of their obligations under this Article, the beneficiaries may use the EU emblem without first obtaining approval from the Agency.

This does not however give them the right to exclusive use.

Moreover, they may not appropriate the EU emblem or any similar trademark or logo, either by registration or by any other means.

29.5 Disclaimer excluding Agency responsibility

Any dissemination of results must indicate that it reflects only the author's view and that the Agency is not responsible for any use that may be made of the information it contains.

29.6 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such a breach may also lead to any of the other measures described in Chapter 6.

ARTICLE 30 — TRANSFER AND LICENSING OF RESULTS

30.1 Transfer of ownership

Each beneficiary may transfer ownership of its results.

It must however ensure that its obligations under Articles 26.2, 26.4, 27, 28, 29, 30 and 31 also apply to the new owner and that this owner has the obligation to pass them on in any subsequent transfer.

This does not change the security obligations in Article 37, which still apply.

Unless agreed otherwise (in writing) for specifically-identified third parties or unless impossible under applicable EU and national laws on mergers and acquisitions, a beneficiary that intends to transfer ownership of results must give at least 45 days advance notice (or less if agreed in writing) to the other beneficiaries that still have (or still may request) access rights to the results. This notification must include sufficient information on the new owner to enable any beneficiary concerned to assess the effects on its access rights.

Unless agreed otherwise (in writing) for specifically-identified third parties, any other beneficiary may object within 30 days of receiving notification (or less if agreed in writing), if it can show that the transfer would adversely affect its access rights. In this case, the transfer may not take place until agreement has been reached between the beneficiaries concerned.

30.2 Granting licenses

Each beneficiary may grant licences to its results (or otherwise give the right to exploit them), if:

- (a) this does not impede the access rights under Article 31 and
- (b) not applicable.

In addition to Points (a) and (b), exclusive licences for results may be granted only if all the other beneficiaries concerned have waived their access rights (see Article 31.1).

This does not change the dissemination obligations in Article 29 or security obligations in Article 37, which still apply.

30.3 Agency right to object to transfers or licensing

The Agency may — up to four years after the period set out in Article 3 — object to a transfer of ownership or the exclusive licensing of results, if:

- (a) it is to a third party established in a non-EU country not associated with Horizon 2020 and
- (b) the Agency considers that the transfer or licence is not in line with EU interests regarding competitiveness or is inconsistent with ethical principles or security considerations.

A beneficiary that intends to transfer ownership or grant an exclusive licence must formally notify the Agency before the intended transfer or licensing takes place and:

- identify the specific results concerned;
- describe in detail the new owner or licensee and the planned or potential exploitation of the results, and
- include a reasoned assessment of the likely impact of the transfer or licence on EU competitiveness and its consistency with ethical principles and security considerations.

The Agency may request additional information.

If the Agency decides to object to a transfer or exclusive licence, it must formally notify the beneficiary concerned within 60 days of receiving notification (or any additional information it has requested).

No transfer or licensing may take place in the following cases:

- pending the Agency decision, within the period set out above;
- if the Agency objects;
- until the conditions are complied with, if the Agency objection comes with conditions.

30.4 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such a breach may also lead to any of the other measures described in Chapter 6.

ARTICLE 31 — ACCESS RIGHTS TO RESULTS

31.1 Exercise of access rights — Waiving of access rights — No sub-licensing

The conditions set out in Article 25.1 apply.

The obligations set out in this Article do not change the security obligations in Article 37, which still apply.

31.2 Access rights for other beneficiaries, for implementing their own tasks under the action

The beneficiaries must give each other access — on a royalty-free basis — to results needed for implementing their own tasks under the action.

31.3 Access rights for other beneficiaries, for exploiting their own results

The beneficiaries must give each other — under fair and reasonable conditions (see Article 25.3) — access to results needed for exploiting their own results.

Requests for access may be made — unless agreed otherwise — up to one year after the period set out in Article 3.

31.4 Access rights of affiliated entities

Unless agreed otherwise in the consortium agreement, access to results must also be given — under fair and reasonable conditions (Article 25.3) — to affiliated entities established in an EU Member State or associated country, if this is needed for those entities to exploit the results generated by the beneficiaries to which they are affiliated.

Unless agreed otherwise (see above; Article 31.1), the affiliated entity concerned must make any such request directly to the beneficiary that owns the results.

Requests for access may be made — unless agreed otherwise — up to one year after the period set out in Article 3.

31.5 Access rights for the EU institutions, bodies, offices or agencies and EU Member States

The beneficiaries must give access to their results — on a royalty-free basis — to EU institutions,

bodies, offices and agencies as well as EU Member States' national authorities, necessary for developing, implementing or monitoring their policies or programmes in this area.

Such access rights are limited to non-commercial and non-competitive use.

Access is conditional on an agreement to define specific conditions ensuring that:

- (a) the access will be used only for the intended purpose and
- (b) appropriate confidentiality obligations are in place.

The requesting EU Member State or EU institution, body, office or agency must inform all other EU Member States of such a request.

This does not change the security obligations in Article 37, which still apply.

31.6 Access rights for third parties

Not applicable

31.7 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

SECTION 4 OTHER RIGHTS AND OBLIGATIONS

ARTICLE 32 — RECRUITMENT AND WORKING CONDITIONS FOR RESEARCHERS

32.1 Obligation to take measures to implement the European Charter for Researchers and Code of Conduct for the Recruitment of Researchers

The beneficiaries must take all measures to implement the principles set out in the Commission Recommendation on the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers²³, in particular regarding:

- working conditions;
- transparent recruitment processes based on merit, and
- career development.

The beneficiaries must ensure that researchers and third parties involved in the action are aware of them.

32.2 Consequences of non-compliance

²³ Commission Recommendation 2005/251/EC of 11 March 2005 on the European Charter for Researchers and on a Code of Conduct for the Recruitment of Researchers (OJ L 75, 22.3.2005, p. 67).

If a beneficiary breaches its obligations under this Article, the Agency may apply any of the measures described in Chapter 6.

ARTICLE 33 — GENDER EQUALITY

33.1 Obligation to aim for gender equality

The beneficiaries must take all measures to promote equal opportunities between men and women in the implementation of the action. They must aim, to the extent possible, for a gender balance at all levels of personnel assigned to the action, including at supervisory and managerial level.

33.2 Consequences of non-compliance

If a beneficiary breaches its obligations under this Article, the Agency may apply any of the measures described in Chapter 6.

ARTICLE 34 — ETHICS AND RESEARCH INTEGRITY

34.1 Obligation to comply with ethical and research integrity principles

The beneficiaries must carry out the action in compliance with:

- (a) ethical principles (including the highest standards of research integrity)
- and
- (b) applicable international, EU and national law.

Funding will not be granted for activities carried out outside the EU if they are prohibited in all Member States or for activities which destroy human embryos (for example, for obtaining stem cells).

The beneficiaries must ensure that the activities under the action have an exclusive focus on civil applications.

The beneficiaries must ensure that the activities under the action do not:

- (a) aim at human cloning for reproductive purposes;
- (b) intend to modify the genetic heritage of human beings which could make such changes heritable (with the exception of research relating to cancer treatment of the gonads, which may be financed), or
- (c) intend to create human embryos solely for the purpose of research or for the purpose of stem cell procurement, including by means of somatic cell nuclear transfer.

In addition, the beneficiaries must respect the fundamental principle of research integrity — as set out, for instance, in the European Code of Conduct for Research Integrity²⁴.

This implies compliance with the following fundamental principles:

²⁴ European Code of Conduct for Research Integrity of ALLEA (All European Academies)
http://ec.europa.eu/research/participants/data/ref/h2020/other/hi/h2020-ethics_code-of-conduct_en.pdf

- **reliability** in ensuring the quality of research reflected in the design, the methodology, the analysis and the use of resources;
- **honesty** in developing, undertaking, reviewing, reporting and communicating research in a transparent, fair and unbiased way;
- **respect** for colleagues, research participants, society, ecosystems, cultural heritage and the environment;
- **accountability** for the research from idea to publication, for its management and organisation, for training, supervision and mentoring, and for its wider impacts

and means that beneficiaries must ensure that persons carrying out research tasks follow the good research practices and refrain from the research integrity violations described in this Code.

This does not change the other obligations under this Agreement or obligations under applicable international, EU or national law, all of which still apply.

34.2 Activities raising ethical issues

Activities raising ethical issues must comply with the ‘**ethics requirements**’ set out as deliverables in Annex 1.

Before the beginning of an activity raising an ethical issue, each beneficiary must have obtained:

- (a) any ethics committee opinion required under national law and
- (b) any notification or authorisation for activities raising ethical issues required under national and/or European law

needed for implementing the action tasks in question.

The documents must be kept on file and be submitted upon request by the coordinator to the Agency (see Article 52). If they are not in English, they must be submitted together with an English summary, which shows that the action tasks in question are covered and includes the conclusions of the committee or authority concerned (if available).

34.3 Activities involving human embryos or human embryonic stem cells

Activities involving research on human embryos or human embryonic stem cells may be carried out, in addition to Article 34.1, only if:

- they are set out in Annex 1 or
- the coordinator has obtained explicit approval (in writing) from the Agency (see Article 52).

34.4 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43) and the Agreement or participation of the beneficiary may be terminated (see Article 50).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 35 — CONFLICT OF INTERESTS

35.1 Obligation to avoid a conflict of interests

The beneficiaries must take all measures to prevent any situation where the impartial and objective implementation of the action is compromised for reasons involving economic interest, political or national affinity, family or emotional ties or any other shared interest (**‘conflict of interests’**).

They must formally notify to the Agency without delay any situation constituting or likely to lead to a conflict of interests and immediately take all the necessary steps to rectify this situation.

The Agency may verify that the measures taken are appropriate and may require additional measures to be taken by a specified deadline.

35.2 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43) and the Agreement or participation of the beneficiary may be terminated (see Article 50).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 36 — CONFIDENTIALITY

36.1 General obligation to maintain confidentiality

During implementation of the action and for four years after the period set out in Article 3, the parties must keep confidential any data, documents or other material (in any form) that is identified as confidential at the time it is disclosed (**‘confidential information’**).

If a beneficiary requests, the Agency may agree to keep such information confidential for an additional period beyond the initial four years.

If information has been identified as confidential only orally, it will be considered to be confidential only if this is confirmed in writing within 15 days of the oral disclosure.

Unless otherwise agreed between the parties, they may use confidential information only to implement the Agreement.

The beneficiaries may disclose confidential information to their personnel or third parties involved in the action only if they:

- (a) need to know to implement the Agreement and
- (b) are bound by an obligation of confidentiality.

This does not change the security obligations in Article 37, which still apply.

The Agency may disclose confidential information to its staff, other EU institutions and bodies. It may disclose confidential information to third parties, if:

- (a) this is necessary to implement the Agreement or safeguard the EU's financial interests and

(b) the recipients of the information are bound by an obligation of confidentiality.

Under the conditions set out in Article 4 of the Rules for Participation Regulation No 1290/2013²⁵, the Commission must moreover make available information on the results to other EU institutions, bodies, offices or agencies as well as Member States or associated countries.

The confidentiality obligations no longer apply if:

- (a) the disclosing party agrees to release the other party;
- (b) the information was already known by the recipient or is given to him without obligation of confidentiality by a third party that was not bound by any obligation of confidentiality;
- (c) the recipient proves that the information was developed without the use of confidential information;
- (d) the information becomes generally and publicly available, without breaching any confidentiality obligation, or
- (e) the disclosure of the information is required by EU or national law.

36.2 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 37 — SECURITY-RELATED OBLIGATIONS

37.1 Results with a security recommendation

Not applicable

37.2 Classified information

Not applicable

37.3 Activities involving dual-use goods or dangerous materials and substances

Not applicable

37.4 Consequences of non-compliance

Not applicable

ARTICLE 38 — PROMOTING THE ACTION — VISIBILITY OF EU FUNDING

²⁵ Regulation (EU) No 1290/2013 of the European Parliament and of the Council of 11 December 2013 laying down the rules for participation and dissemination in "Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020)" (OJ L 347, 20.12.2013 p.81).

38.1 Communication activities by beneficiaries

38.1.1 Obligation to promote the action and its results

The beneficiaries must promote the action and its results, by providing targeted information to multiple audiences (including the media and the public) in a strategic and effective manner.

This does not change the dissemination obligations in Article 29, the confidentiality obligations in Article 36 or the security obligations in Article 37, all of which still apply.

Before engaging in a communication activity expected to have a major media impact, the beneficiaries must inform the Agency (see Article 52).

38.1.2 Information on EU funding — Obligation and right to use the EU emblem

Unless the Agency requests or agrees otherwise or unless it is impossible, any communication activity related to the action (including in electronic form, via social media, etc.) and any infrastructure, equipment and major results funded by the grant must:

- (a) display the EU emblem and
- (b) include the following text:

For communication activities:

“This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 833507”.

For infrastructure, equipment and major results:

“This [*infrastructure*][*equipment*][*insert type of result*] is part of a project that has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 833507”.

When displayed together with another logo, the EU emblem must have appropriate prominence.

For the purposes of their obligations under this Article, the beneficiaries may use the EU emblem without first obtaining approval from the Agency.

This does not, however, give them the right to exclusive use.

Moreover, they may not appropriate the EU emblem or any similar trademark or logo, either by registration or by any other means.

38.1.3 Disclaimer excluding Agency and Commission responsibility

Any communication activity related to the action must indicate that it reflects only the author's view and that the Agency and the Commission are not responsible for any use that may be made of the information it contains.

38.2 Communication activities by the Agency and the Commission

38.2.1 Right to use beneficiaries’ materials, documents or information

The Agency and the Commission may use, for its communication and publicising activities,

information relating to the action, documents notably summaries for publication and public deliverables as well as any other material, such as pictures or audio-visual material received from any beneficiary (including in electronic form).

This does not change the confidentiality obligations in Article 36 and the security obligations in Article 37, all of which still apply.

If the Agency's or the Commission's use of these materials, documents or information would risk compromising legitimate interests, the beneficiary concerned may request the Agency or the Commission not to use it (see Article 52).

The right to use a beneficiary's materials, documents and information includes:

- (a) **use for its own purposes** (in particular, making them available to persons working for the Agency, the Commission or any other EU institution, body, office or agency or body or institutions in EU Member States; and copying or reproducing them in whole or in part, in unlimited numbers);
- (b) **distribution to the public** (in particular, publication as hard copies and in electronic or digital format, publication on the internet, as a downloadable or non-downloadable file, broadcasting by any channel, public display or presentation, communicating through press information services, or inclusion in widely accessible databases or indexes);
- (c) **editing or redrafting** for communication and publicising activities (including shortening, summarising, inserting other elements (such as meta-data, legends, other graphic, visual, audio or text elements), extracting parts (e.g. audio or video files), dividing into parts, use in a compilation);
- (d) translation;
- (e) giving **access in response to individual requests** under Regulation No 1049/2001²⁷, without the right to reproduce or exploit;
- (f) **storage** in paper, electronic or other form;
- (g) **archiving**, in line with applicable document-management rules, and
- (h) the right to authorise **third parties** to act on its behalf or sub-license the modes of use set out in Points (b), (c), (d) and (f) to third parties if needed for the communication and publicising activities of the Agency or the Commission.

If the right of use is subject to rights of a third party (including personnel of the beneficiary), the beneficiary must ensure that it complies with its obligations under this Agreement (in particular, by obtaining the necessary approval from the third parties concerned).

Where applicable (and if provided by the beneficiaries), the Agency or the Commission will insert the following information:

“© – [year] – [name of the copyright owner]. All rights reserved. Licensed to the Research Executive Agency (REA) and the European Union (EU) under conditions.”

²⁷ Regulation (EC) No 1049/2001 of the European Parliament and of the Council of 30 May 2001 regarding public access to European Parliament, Council and Commission documents, OJ L 145, 31.5.2001, p. 43.

38.3 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 39 — PROCESSING OF PERSONAL DATA

39.1 Processing of personal data by the Agency and the Commission

Any personal data under the Agreement will be processed by the Agency or the Commission under Regulation No 45/2001²⁸ and according to the ‘notifications of the processing operations’ to the Data Protection Officer (DPO) of the Agency or the Commission (publicly accessible in the DPO register).

Such data will be processed by the ‘**data controller**’ of the Agency or the Commission for the purposes of implementing, managing and monitoring the Agreement or protecting the financial interests of the EU or Euratom (including checks, reviews, audits and investigations; see Article 22).

The persons whose personal data are processed have the right to access and correct their own personal data. For this purpose, they must send any queries about the processing of their personal data to the data controller, via the contact point indicated in the privacy statement(s) that are published on the Agency and the Commission websites.

They also have the right to have recourse at any time to the European Data Protection Supervisor (EDPS).

39.2 Processing of personal data by the beneficiaries

The beneficiaries must process personal data under the Agreement in compliance with applicable EU and national law on data protection (including authorisations or notification requirements).

The beneficiaries may grant their personnel access only to data that is strictly necessary for implementing, managing and monitoring the Agreement.

The beneficiaries must inform the personnel whose personal data are collected and processed by the Agency or the Commission. For this purpose, they must provide them with the privacy statement(s) (see above), before transmitting their data to the Agency or the Commission.

39.3 Consequences of non-compliance

If a beneficiary breaches any of its obligations under Article 39.2, the Agency may apply any of the measures described in Chapter 6.

ARTICLE 40 — ASSIGNMENTS OF CLAIMS FOR PAYMENT AGAINST THE AGENCY

The beneficiaries may not assign any of their claims for payment against the Agency to any third

²⁸ Regulation (EC) No 45/2001 of the European Parliament and of the Council of 18 December 2000 on the protection of individuals with regard to the processing of personal data by the Community institutions and bodies and on the free movement of such data (OJ L 8, 12.01.2001, p. 1).

party, except if approved by the Agency on the basis of a reasoned, written request by the coordinator (on behalf of the beneficiary concerned).

If the Agency has not accepted the assignment or the terms of it are not observed, the assignment will have no effect on it.

In no circumstances will an assignment release the beneficiaries from their obligations towards the Agency.

CHAPTER 5 DIVISION OF BENEFICIARIES' ROLES AND RESPONSIBILITIES **— RELATIONSHIP WITH COMPLEMENTARY BENEFICIARIES —** **RELATIONSHIP WITH PARTNERS OF A JOINT ACTION**

ARTICLE 41 — DIVISION OF BENEFICIARIES' ROLES AND RESPONSIBILITIES **— RELATIONSHIP WITH COMPLEMENTARY BENEFICIARIES —** **RELATIONSHIP WITH PARTNERS OF A JOINT ACTION**

41.1 Roles and responsibility towards the Agency

The beneficiaries have full responsibility for implementing the action and complying with the Agreement.

The beneficiaries are jointly and severally liable for the **technical implementation** of the action as described in Annex 1. If a beneficiary fails to implement its part of the action, the other beneficiaries become responsible for implementing this part (without being entitled to any additional EU funding for doing so), unless the Agency expressly relieves them of this obligation.

The **financial responsibility** of each beneficiary is governed by Article 44.

41.2 Internal division of roles and responsibilities

The internal roles and responsibilities of the beneficiaries are divided as follows:

(a) Each **beneficiary** must:

- (i) keep information stored in the Participant Portal Beneficiary Register (via the electronic exchange system) up to date (see Article 17);
- (ii) inform the coordinator immediately of any events or circumstances likely to affect significantly or delay the implementation of the action (see Article 17);
- (iii) submit to the coordinator in good time:
 - individual financial statements for itself and its linked third parties and, if required, certificates on the financial statements (see Article 20);
 - the data needed to draw up the technical reports (see Article 20);
 - ethics committee opinions and notifications or authorisations for activities raising ethical issues (see Article 34);

- any other documents or information required by the Agency or the Commission under the Agreement, unless the Agreement requires the beneficiary to submit this information directly to the Agency or the Commission.

(b) The **coordinator** must:

- (i) monitor that the action is implemented properly (see Article 7);
- (ii) act as the intermediary for all communications between the beneficiaries and the Agency (in particular, providing the Agency with the information described in Article 17), unless the Agreement specifies otherwise;
- (iii) request and review any documents or information required by the Agency and verify their completeness and correctness before passing them on to the Agency;
- (iv) submit the deliverables and reports to the Agency (see Articles 19 and 20);
- (v) ensure that all payments are made to the other beneficiaries without unjustified delay (see Article 21);
- (vi) inform the Agency of the amounts paid to each beneficiary, when required under the Agreement (see Articles 44 and 50) or requested by the Agency.

The coordinator may not delegate or subcontract the above-mentioned tasks to any other beneficiary or third party (including linked third parties).

41.3 Internal arrangements between beneficiaries — Consortium agreement

The beneficiaries must have internal arrangements regarding their operation and co-ordination to ensure that the action is implemented properly. These internal arrangements must be set out in a written ‘**consortium agreement**’ between the beneficiaries, which may cover:

- internal organisation of the consortium;
- management of access to the electronic exchange system;
- distribution of EU funding;
- additional rules on rights and obligations related to background and results (including whether access rights remain or not, if a beneficiary is in breach of its obligations) (see Section 3 of Chapter 4);
- settlement of internal disputes;
- liability, indemnification and confidentiality arrangements between the beneficiaries.

The consortium agreement must not contain any provision contrary to the Agreement.

41.4 Relationship with complementary beneficiaries — Collaboration agreement

Not applicable

41.5 Relationship with partners of a joint action — Coordination agreement

Not applicable

CHAPTER 6 REJECTION OF COSTS — REDUCTION OF THE GRANT — RECOVERY — SANCTIONS — DAMAGES — SUSPENSION — TERMINATION — FORCE MAJEURE

SECTION 1 REJECTION OF COSTS — REDUCTION OF THE GRANT — RECOVERY — SANCTIONS

ARTICLE 42 — REJECTION OF INELIGIBLE COSTS

42.1 Conditions

The Agency will — after **termination of the participation of a beneficiary**, at the time of an **interim payment, at the payment of the balance or afterwards** — reject any costs which are ineligible (see Article 6), in particular following checks, reviews, audits or investigations (see Article 22).

The rejection may also be based on the **extension of findings from other grants to this grant** (see Article 22.5.2).

42.2 Ineligible costs to be rejected — Calculation — Procedure

Ineligible costs will be rejected in full.

If the rejection of costs does not lead to a recovery (see Article 44), the Agency will formally notify the coordinator or beneficiary concerned of the rejection of costs, the amounts and the reasons why (if applicable, together with the notification of amounts due; see Article 21.5). The coordinator or beneficiary concerned may — within 30 days of receiving notification — formally notify the Agency of its disagreement and the reasons why.

If the rejection of costs leads to a recovery, the Agency will follow the contradictory procedure with pre-information letter set out in Article 44.

42.3 Effects

If the Agency rejects costs at the time of an **interim payment or the payment of the balance**, it will deduct them from the total eligible costs declared, for the action, in the periodic or final summary financial statement (see Articles 20.3 and 20.4). It will then calculate the interim payment or payment of the balance as set out in Articles 21.3 or 21.4.

If the Agency rejects costs **after termination of the participation of a beneficiary**, it will deduct them from the costs declared by the beneficiary in the termination report and include the rejection in the calculation after termination (see Article 50.2 and 50.3).

If the Agency — **after an interim payment but before the payment of the balance** — rejects costs declared in a periodic summary financial statement, it will deduct them from the total eligible costs declared, for the action, in the next periodic summary financial statement or in the final summary

financial statement. It will then calculate the interim payment or payment of the balance as set out in Articles 21.3 or 21.4.

If the Agency rejects costs **after the payment of the balance**, it will deduct the amount rejected from the total eligible costs declared, by the beneficiary, in the final summary financial statement. It will then calculate the revised final grant amount as set out in Article 5.4.

ARTICLE 43 — REDUCTION OF THE GRANT

43.1 Conditions

The Agency may — **after termination of the participation of a beneficiary, at the payment of the balance or afterwards** — reduce the grant amount (see Article 5.1), if :

- (a) a beneficiary (or a natural person who has the power to represent or take decisions on its behalf) has committed:
 - (i) substantial errors, irregularities or fraud or
 - (ii) serious breach of obligations under the Agreement or during the award procedure (including improper implementation of the action, submission of false information, failure to provide required information, breach of ethical principles) or
- (b) a beneficiary (or a natural person who has the power to represent or take decision on its behalf) has committed — in other EU or Euratom grants awarded to it under similar conditions — systemic or recurrent errors, irregularities, fraud or serious breach of obligations that have a material impact on this grant (**extension of findings from other grants to this grant**; see Article 22.5.2).

43.2 Amount to be reduced — Calculation — Procedure

The amount of the reduction will be proportionate to the seriousness of the errors, irregularities or fraud or breach of obligations.

Before reduction of the grant, the Agency will formally notify a ‘**pre-information letter**’ to the coordinator or beneficiary concerned:

- informing it of its intention to reduce the grant, the amount it intends to reduce and the reasons why and
- inviting it to submit observations within 30 days of receiving notification.

If the Agency does not receive any observations or decides to pursue reduction despite the observations it has received, it will formally notify **confirmation** of the reduction (if applicable, together with the notification of amounts due; see Article 21).

43.3 Effects

If the Agency reduces the grant **after termination of the participation of a beneficiary**, it will calculate the reduced grant amount for that beneficiary and then determine the amount due to that beneficiary (see Article 50.2 and 50.3).

If the Agency reduces the grant **at the payment of the balance**, it will calculate the reduced grant amount for the action and then determine the amount due as payment of the balance (see Articles 5.3.4 and 21.4).

If the Agency reduces the grant **after the payment of the balance**, it will calculate the revised final grant amount for the beneficiary concerned (see Article 5.4). If the revised final grant amount for the beneficiary concerned is lower than its share of the final grant amount, the Agency will recover the difference (see Article 44).

ARTICLE 44 — RECOVERY OF UNDUE AMOUNTS

44.1 Amount to be recovered — Calculation — Procedure

The Agency will — after **termination of the participation of a beneficiary, at the payment of the balance or afterwards** — claim back any amount that was paid, but is not due under the Agreement.

Each beneficiary's financial responsibility in case of recovery is limited to its own debt (including undue amounts paid by the Agency for costs declared by its linked third parties), except for the amount retained for the Guarantee Fund (see Article 21.4).

44.1.1 Recovery after termination of a beneficiary's participation

If recovery takes place after termination of a beneficiary's participation (including the coordinator), the Agency will claim back the undue amount from the beneficiary concerned, by formally notifying it a debit note (see Article 50.2 and 50.3). This note will specify the amount to be recovered, the terms and the date for payment.

If payment is not made by the date specified in the debit note, the Agency or the Commission will **recover** the amount:

- (a) by '**offsetting**' it — without the beneficiary's consent — against any amounts owed to the beneficiary concerned by the Agency, the Commission or another executive agency (from the EU or Euratom budget).

In exceptional circumstances, to safeguard the EU's financial interests, the Agency or the Commission may offset before the payment date specified in the debit note;

- (b) not applicable;

- (c) by **taking legal action** (see Article 57) or by **adopting an enforceable decision** under Article 299 of the Treaty on the Functioning of the EU (TFEU) and Article 79(2) of the Financial regulation No 966/2012.

If payment is not made by the date specified in the debit note, the amount to be recovered (see above) will be increased by **late-payment interest** at the rate set out in Article 21.11, from the day following the payment date in the debit note, up to and including the date the Agency or the Commission receives full payment of the amount.

Partial payments will be first credited against expenses, charges and late-payment interest and then against the principal.

Bank charges incurred in the recovery process will be borne by the beneficiary, unless Directive 2007/64/EC²⁹ applies.

44.1.2 Recovery at payment of the balance

If the payment of the balance takes the form of a recovery (see Article 21.4), the Agency will formally notify a ‘**pre-information letter**’ to the coordinator:

- informing it of its intention to recover, the amount due as the balance and the reasons why;
- specifying that it intends to deduct the amount to be recovered from the amount retained for the Guarantee Fund;
- requesting the coordinator to submit a report on the distribution of payments to the beneficiaries within 30 days of receiving notification, and
- inviting the coordinator to submit observations within 30 days of receiving notification.

If no observations are submitted or the Agency decides to pursue recovery despite the observations it has received, it will **confirm recovery** (together with the notification of amounts due; see Article 21.5) and:

- pay the difference between the amount to be recovered and the amount retained for the Guarantee Fund, **if the difference is positive** or
- formally notify to the coordinator a **debit note** for the difference between the amount to be recovered and the amount retained for the Guarantee Fund, **if the difference is negative**. This note will also specify the terms and the date for payment.

If the coordinator does not repay the Agency by the date in the debit note and has not submitted the report on the distribution of payments: the Agency or the Commission will **recover** the amount set out in the debit note from the coordinator (see below).

If the coordinator does not repay the Agency by the date in the debit note, but has submitted the report on the distribution of payments: the Agency will:

- (a) identify the beneficiaries for which the amount calculated as follows is negative:

{{{beneficiary’s costs declared in the final summary financial statement and approved by the Agency multiplied by the reimbursement rate set out in Article 5.2 for the beneficiary concerned

plus

its linked third parties’ costs declared in the final summary financial statement and approved by the Agency multiplied by the reimbursement rate set out in Article 5.2 for each linked third party concerned}

divided by

the EU contribution for the action calculated according to Article 5.3.1}

²⁹ Directive 2007/64/EC of the European Parliament and of the Council of 13 November 2007 on payment services in the internal market amending Directives 97/7/EC, 2002/65/EC, 2005/60/EC and 2006/48/EC and repealing Directive 97/5/EC (OJ L 319, 05.12.2007, p. 1).

multiplied by

the final grant amount (see Article 5.3)},

minus

{pre-financing and interim payments received by the beneficiary}.

- (b) formally notify to each beneficiary identified according to point (a) a **debit note** specifying the terms and date for payment. The amount of the debit note is calculated as follows:

{amount calculated according to point (a) for the beneficiary concerned

divided by

the sum of the amounts calculated according to point (a) for all the beneficiaries identified according to point (a)}

multiplied by

the amount set out in the debit note formally notified to the coordinator}.

If payment is not made by the date specified in the debit note, the Agency or the Commission will **recover** the amount:

- (a) by **offsetting** it — without the beneficiary's consent — against any amounts owed to the beneficiary concerned by the Agency, the Commission or another executive agency (from the EU or Euratom budget).

In exceptional circumstances, to safeguard the EU's financial interests, the Agency or the Commission may offset before the payment date specified in the debit note;

- (b) by **drawing on the Guarantee Fund**. The Agency or the Commission will formally notify the beneficiary concerned the debit note on behalf of the Guarantee Fund and recover the amount:

(i) not applicable;

(ii) by **taking legal action** (see Article 57) or by **adopting an enforceable decision** under Article 299 of the Treaty on the Functioning of the EU (TFEU) and Article 79(2) of the Financial Regulation No 966/2012.

If payment is not made by the date in the debit note, the amount to be recovered (see above) will be increased by **late-payment interest** at the rate set out in Article 21.11, from the day following the payment date in the debit note, up to and including the date the Agency or the Commission receives full payment of the amount.

Partial payments will be first credited against expenses, charges and late-payment interest and then against the principal.

Bank charges incurred in the recovery process will be borne by the beneficiary, unless Directive 2007/64/EC applies.

44.1.3 Recovery of amounts after payment of the balance

If, for a beneficiary, the revised final grant amount (see Article 5.4) is lower than its share of the final grant amount, it must repay the difference to the Agency.

The beneficiary's share of the final grant amount is calculated as follows:

$$\left\{ \left\{ \begin{array}{l} \text{beneficiary's costs declared in the final summary financial statement and approved by the Agency} \\ \text{multiplied by the reimbursement rate set out in Article 5.2 for the beneficiary concerned} \end{array} \right\} \right.$$

 plus

$$\left\{ \begin{array}{l} \text{its linked third parties' costs declared in the final summary financial statement and approved by the Agency} \\ \text{multiplied by the reimbursement rate set out in Article 5.2 for each linked third party concerned} \end{array} \right\}$$

 divided by

$$\left\{ \begin{array}{l} \text{the EU contribution for the action calculated according to Article 5.3.1} \\ \text{multiplied by} \\ \text{the final grant amount (see Article 5.3)} \end{array} \right\}.$$

If the coordinator has not distributed amounts received (see Article 21.7), the Agency will also recover these amounts.

The Agency will formally notify a **pre-information letter** to the beneficiary concerned:

- informing it of its intention to recover, the due amount and the reasons why and
- inviting it to submit observations within 30 days of receiving notification.

If no observations are submitted or the Agency decides to pursue recovery despite the observations it has received, it will **confirm** the amount to be recovered and formally notify to the beneficiary concerned a **debit note**. This note will also specify the terms and the date for payment.

If payment is not made by the date specified in the debit note, the Agency or the Commission will **recover** the amount:

- (a) by **offsetting** it — without the beneficiary's consent — against any amounts owed to the beneficiary concerned by the Agency, the Commission or another executive agency (from the EU or Euratom budget).

In exceptional circumstances, to safeguard the EU's financial interests, the Agency or the Commission may offset before the payment date specified in the debit note;

- (b) by **drawing on the Guarantee Fund**. The Agency or the Commission will formally notify the beneficiary concerned the debit note on behalf of the Guarantee Fund and recover the amount:
- (i) not applicable;
 - (ii) by **taking legal action** (see Article 57) or by **adopting an enforceable decision** under Article 299 of the Treaty on the Functioning of the EU (TFEU) and Article 79(2) of the Financial Regulation No 966/2012.

If payment is not made by the date in the debit note, the amount to be recovered (see above) will be increased by **late-payment interest** at the rate set out in Article 21.11, from the day following the date

for payment in the debit note, up to and including the date the Agency or the Commission receives full payment of the amount.

Partial payments will be first credited against expenses, charges and late-payment interest and then against the principal.

Bank charges incurred in the recovery process will be borne by the beneficiary, unless Directive 2007/64/EC applies.

ARTICLE 45 — ADMINISTRATIVE SANCTIONS

In addition to contractual measures, the Agency or the Commission may also adopt administrative sanctions under Articles 106 and 131(4) of the Financial Regulation No 966/2012 (i.e. exclusion from future procurement contracts, grants, prizes and expert contracts and/or financial penalties).

SECTION 2 LIABILITY FOR DAMAGES

ARTICLE 46 — LIABILITY FOR DAMAGES

46.1 Liability of the Agency

The Agency cannot be held liable for any damage caused to the beneficiaries or to third parties as a consequence of implementing the Agreement, including for gross negligence.

The Agency cannot be held liable for any damage caused by any of the beneficiaries or third parties involved in the action, as a consequence of implementing the Agreement.

46.2 Liability of the beneficiaries

Except in case of force majeure (see Article 51), the beneficiaries must compensate the Agency for any damage it sustains as a result of the implementation of the action or because the action was not implemented in full compliance with the Agreement.

SECTION 3 SUSPENSION AND TERMINATION

ARTICLE 47 — SUSPENSION OF PAYMENT DEADLINE

47.1 Conditions

The Agency may — at any moment — suspend the payment deadline (see Article 21.2 to 21.4) if a request for payment (see Article 20) cannot be approved because:

- (a) it does not comply with the provisions of the Agreement (see Article 20);
- (b) the technical or financial reports have not been submitted or are not complete or additional information is needed, or
- (c) there is doubt about the eligibility of the costs declared in the financial statements and additional checks, reviews, audits or investigations are necessary.

47.2 Procedure

The Agency will formally notify the coordinator of the suspension and the reasons why.

The suspension will **take effect** the day notification is sent by the Agency (see Article 52).

If the conditions for suspending the payment deadline are no longer met, the suspension will be **lifted** — and the remaining period will resume.

If the suspension exceeds two months, the coordinator may request the Agency if the suspension will continue.

If the payment deadline has been suspended due to the non-compliance of the technical or financial reports (see Article 20) and the revised report or statement is not submitted or was submitted but is also rejected, the Agency may also terminate the Agreement or the participation of the beneficiary (see Article 50.3.1(l)).

ARTICLE 48 — SUSPENSION OF PAYMENTS

48.1 Conditions

The Agency may — at any moment — suspend payments, in whole or in part and interim payments or the payment of the balance for one or more beneficiaries, if:

- (a) a beneficiary (or a natural person who has the power to represent or take decision on its behalf) has committed or is suspected of having committed:
 - (i) substantial errors, irregularities or fraud or
 - (ii) serious breach of obligations under the Agreement or during the award procedure (including improper implementation of the action, submission of false information, failure to provide required information, breach of ethical principles) or
- (b) a beneficiary (or a natural person who has the power to represent or take decision on its behalf) has committed — in other EU or Euratom grants awarded to it under similar conditions — systemic or recurrent errors, irregularities, fraud or serious breach of obligations that have a material impact on this grant (**extension of findings from other grants to this grant**; see Article 22.5.2).

If payments are suspended for one or more beneficiaries, the Agency will make partial payment(s) for the part(s) not suspended. If suspension concerns the payment of the balance, — once suspension is lifted — the payment or the recovery of the amount(s) concerned will be considered the payment of the balance that closes the action.

48.2 Procedure

Before suspending payments, the Agency will formally notify the coordinator or beneficiary concerned:

- informing it of its intention to suspend payments and the reasons why and
- inviting it to submit observations within 30 days of receiving notification.

If the Agency does not receive observations or decides to pursue the procedure despite the observations it has received, it will formally notify **confirmation** of the suspension. Otherwise, it will formally notify that the suspension procedure is not continued.

The suspension will **take effect** the day the confirmation notification is sent by the Agency.

If the conditions for resuming payments are met, the suspension will be **lifted**. The Agency will formally notify the coordinator or beneficiary concerned.

During the suspension, the periodic report(s) for all reporting periods except the last one (see Article 20.3), must not contain any individual financial statements from the beneficiary concerned and its linked third parties. The coordinator must include them in the next periodic report after the suspension is lifted or — if suspension is not lifted before the end of the action — in the last periodic report.

The beneficiaries may suspend implementation of the action (see Article 49.1) or terminate the Agreement or the participation of the beneficiary concerned (see Article 50.1 and 50.2).

ARTICLE 49 — SUSPENSION OF THE ACTION IMPLEMENTATION

49.1 Suspension of the action implementation, by the beneficiaries

49.1.1 Conditions

The beneficiaries may suspend implementation of the action or any part of it, if exceptional circumstances — in particular *force majeure* (see Article 51) — make implementation impossible or excessively difficult.

49.1.2 Procedure

The coordinator must immediately formally notify to the Agency the suspension (see Article 52), stating:

- the reasons why and
- the expected date of resumption.

The suspension will **take effect** the day this notification is received by the Agency.

Once circumstances allow for implementation to resume, the coordinator must immediately formally notify the Agency and request an **amendment** of the Agreement to set the date on which the action will be resumed, extend the duration of the action and make other changes necessary to adapt the action to the new situation (see Article 55) — unless the Agreement or the participation of a beneficiary has been terminated (see Article 50).

The suspension will be **lifted** with effect from the resumption date set out in the amendment. This date may be before the date on which the amendment enters into force.

Costs incurred during suspension of the action implementation are not eligible (see Article 6).

49.2 Suspension of the action implementation, by the Agency

49.2.1 Conditions

The Agency may suspend implementation of the action or any part of it, if:

- (a) a beneficiary (or a natural person who has the power to represent or take decisions on its behalf) has committed or is suspected of having committed:
 - (i) substantial errors, irregularities or fraud or
 - (ii) serious breach of obligations under the Agreement or during the award procedure (including improper implementation of the action, submission of false information, failure to provide required information, breach of ethical principles);
- (b) a beneficiary (or a natural person who has the power to represent or take decisions on its behalf) has committed — in other EU or Euratom grants awarded to it under similar conditions — systemic or recurrent errors, irregularities, fraud or serious breach of obligations that have a material impact on this grant (**extension of findings from other grants to this grant**; see Article 22.5.2), or
- (c) the action is suspected of having lost its scientific or technological relevance.

49.2.2 Procedure

Before suspending implementation of the action, the Agency will formally notify the coordinator or beneficiary concerned:

- informing it of its intention to suspend the implementation and the reasons why and
- inviting it to submit observations within 30 days of receiving notification.

If the Agency does not receive observations or decides to pursue the procedure despite the observations it has received, it will formally notify **confirmation** of the suspension. Otherwise, it will formally notify that the procedure is not continued.

The suspension will **take effect** five days after confirmation notification is received (or on a later date specified in the notification).

It will be **lifted** if the conditions for resuming implementation of the action are met.

The coordinator or beneficiary concerned will be formally notified of the lifting and the Agreement will be **amended** to set the date on which the action will be resumed, extend the duration of the action and make other changes necessary to adapt the action to the new situation (see Article 55) — unless the Agreement has already been terminated (see Article 50).

The suspension will be lifted with effect from the resumption date set out in the amendment. This date may be before the date on which the amendment enters into force.

Costs incurred during suspension are not eligible (see Article 6).

The beneficiaries may not claim damages due to suspension by the Agency (see Article 46).

Suspension of the action implementation does not affect the Agency's right to terminate the Agreement

or participation of a beneficiary (see Article 50), reduce the grant or recover amounts unduly paid (see Articles 43 and 44).

ARTICLE 50 — TERMINATION OF THE AGREEMENT OR OF THE PARTICIPATION OF ONE OR MORE BENEFICIARIES

50.1 Termination of the Agreement, by the beneficiaries

50.1.1 Conditions and procedure

The beneficiaries may terminate the Agreement.

The coordinator must formally notify termination to the Agency (see Article 52), stating:

- the reasons why and
- the date the termination will take effect. This date must be after the notification.

If no reasons are given or if the Agency considers the reasons do not justify termination, the Agreement will be considered to have been ‘**terminated improperly**’.

The termination will **take effect** on the day specified in the notification.

50.1.2 Effects

The coordinator must — within 60 days from when termination takes effect — submit:

- (i) a periodic report (for the open reporting period until termination; see Article 20.3) and
- (ii) the final report (see Article 20.4).

If the Agency does not receive the reports within the deadline (see above), only costs which are included in an approved periodic report will be taken into account.

The Agency will **calculate** the final grant amount (see Article 5.3) and the balance (see Article 21.4) on the basis of the reports submitted. Only costs incurred until termination are eligible (see Article 6). Costs relating to contracts due for execution only after termination are not eligible.

Improper termination may lead to a reduction of the grant (see Article 43).

After termination, the beneficiaries’ obligations (in particular Articles 20, 22, 23, Section 3 of Chapter 4, 36, 37, 38, 40, 42, 43 and 44) continue to apply.

50.2 Termination of the participation of one or more beneficiaries, by the beneficiaries

50.2.1 Conditions and procedure

The participation of one or more beneficiaries may be terminated by the coordinator, on request of the beneficiary concerned or on behalf of the other beneficiaries.

The coordinator must formally notify termination to the Agency (see Article 52) and inform the beneficiary concerned.

If the coordinator's participation is terminated without its agreement, the formal notification must be done by another beneficiary (acting on behalf of the other beneficiaries).

The notification must include:

- the reasons why;
- the opinion of the beneficiary concerned (or proof that this opinion has been requested in writing);
- the date the termination takes effect. This date must be after the notification, and
- a request for amendment (see Article 55), with a proposal for reallocation of the tasks and the estimated budget of the beneficiary concerned (see Annexes 1 and 2) and, if necessary, the addition of one or more new beneficiaries (see Article 56). If termination takes effect after the period set out in Article 3, no request for amendment must be included unless the beneficiary concerned is the coordinator. In this case, the request for amendment must propose a new coordinator.

If this information is not given or if the Agency considers that the reasons do not justify termination, the participation will be considered to have been **terminated improperly**.

The termination will **take effect** on the day specified in the notification.

50.2.2 Effects

The coordinator must — within 30 days from when termination takes effect — submit:

- (i) a report on the distribution of payments to the beneficiary concerned and
- (ii) if termination takes effect during the period set out in Article 3, a '**termination report**' from the beneficiary concerned, for the open reporting period until termination, containing an overview of the progress of the work, an overview of the use of resources, the individual financial statement and, if applicable, the certificate on the financial statement (see Articles 20.3 and 20.4).

The information in the termination report must also be included in the periodic report for the next reporting period (see Article 20.3).

If the request for amendment is rejected by the Agency (because it calls into question the decision awarding the grant or breaches the principle of equal treatment of applicants), the Agreement may be terminated according to Article 50.3.1(c).

If the request for amendment is accepted by the Agency, the Agreement is **amended** to introduce the necessary changes (see Article 55).

The Agency will — on the basis of the periodic reports, the termination report and the report on the distribution of payments — **calculate** the amount which is due to the beneficiary and if the (pre-financing and interim) payments received by the beneficiary exceed this amount.

The **amount which is due** is calculated in the following steps:

Step 1 — Application of the reimbursement rate to the eligible costs

The grant amount for the beneficiary is calculated by applying the reimbursement rate(s) to the total eligible costs declared by the beneficiary and its linked third parties in the termination report and approved by the Agency.

Only costs incurred by the beneficiary concerned until termination takes effect are eligible (see Article 6). Costs relating to contracts due for execution only after termination are not eligible.

Step 2 — Reduction due to substantial errors, irregularities or fraud or serious breach of obligations

In case of a reduction (see Article 43), the Agency will calculate the reduced grant amount for the beneficiary by deducting the amount of the reduction (calculated in proportion to the seriousness of the errors, irregularities or fraud or breach of obligations, in accordance with Article 43.2) from the grant amount for the beneficiary.

If the payments received exceed the amounts due:

- if termination takes effect during the period set out in Article 3 and the request for amendment is accepted, the beneficiary concerned must repay to the coordinator the amount unduly received. The Agency will formally notify the amount unduly received and request the beneficiary concerned to repay it to the coordinator within 30 days of receiving notification. If it does not repay the coordinator, the Agency will draw upon the Guarantee Fund to pay the coordinator and then notify a **debit note** on behalf of the Guarantee Fund to the beneficiary concerned (see Article 44);
- in all other cases, in particular if termination takes effect after the period set out in Article 3, the Agency will formally notify a **debit note** to the beneficiary concerned. If payment is not made by the date in the debit note, the Guarantee Fund will pay to the Agency the amount due and the Agency will notify a debit note on behalf of the Guarantee Fund to the beneficiary concerned (see Article 44);
- if the beneficiary concerned is the former coordinator, it must repay the new coordinator according to the procedure above, unless:
 - termination takes effect after an interim payment and
 - the former coordinator has not distributed amounts received as pre-financing or interim payments (see Article 21.7).

In this case, the Agency will formally notify a **debit note** to the former coordinator. If payment is not made by the date in the debit note, the Guarantee Fund will pay to the Agency the amount due. The Agency will then pay the new coordinator and notify a debit note on behalf of the Guarantee Fund to the former coordinator (see Article 44).

If the payments received **do not exceed the amounts due**: amounts owed to the beneficiary concerned will be included in the next interim or final payment.

If the Agency does not receive the termination report within the deadline (see above), only costs included in an approved periodic report will be taken into account.

If the Agency does not receive the report on the distribution of payments within the deadline (see above), it will consider that:

- the coordinator did not distribute any payment to the beneficiary concerned and that
- the beneficiary concerned must not repay any amount to the coordinator.

Improper termination may lead to a reduction of the grant (see Article 43) or termination of the Agreement (see Article 50).

After termination, the concerned beneficiary's obligations (in particular Articles 20, 22, 23, Section 3 of Chapter 4, 36, 37, 38, 40, 42, 43 and 44) continue to apply.

50.3 Termination of the Agreement or the participation of one or more beneficiaries, by the Agency

50.3.1 Conditions

The Agency may terminate the Agreement or the participation of one or more beneficiaries, if:

- (a) one or more beneficiaries do not accede to the Agreement (see Article 56);
- (b) a change to their legal, financial, technical, organisational or ownership situation (or those of its linked third parties) is likely to substantially affect or delay the implementation of the action or calls into question the decision to award the grant;
- (c) following termination of participation for one or more beneficiaries (see above), the necessary changes to the Agreement would call into question the decision awarding the grant or breach the principle of equal treatment of applicants (see Article 55);
- (d) implementation of the action is prevented by force majeure (see Article 51) or suspended by the coordinator (see Article 49.1) and either:
 - (i) resumption is impossible, or
 - (ii) the necessary changes to the Agreement would call into question the decision awarding the grant or breach the principle of equal treatment of applicants;
- (e) a beneficiary is declared bankrupt, being wound up, having its affairs administered by the courts, has entered into an arrangement with creditors, has suspended business activities, or is subject to any other similar proceedings or procedures under national law;
- (f) a beneficiary (or a natural person who has the power to represent or take decisions on its behalf) has been found guilty of professional misconduct, proven by any means;
- (g) a beneficiary does not comply with the applicable national law on taxes and social security;
- (h) the action has lost scientific or technological relevance;
- (i) not applicable;
- (j) not applicable;

- (k) a beneficiary (or a natural person who has the power to represent or take decisions on its behalf) has committed fraud, corruption, or is involved in a criminal organisation, money laundering or any other illegal activity;
- (l) a beneficiary (or a natural person who has the power to represent or take decisions on its behalf) has committed:
 - (i) substantial errors, irregularities or fraud or
 - (ii) serious breach of obligations under the Agreement or during the award procedure (including improper implementation of the action, submission of false information, failure to provide required information, breach of ethical principles);
- (m) a beneficiary (or a natural person who has the power to represent or take decisions on its behalf) has committed — in other EU or Euratom grants awarded to it under similar conditions — systemic or recurrent errors, irregularities, fraud or serious breach of obligations that have a material impact on this grant (**extension of findings from other grants to this grant**; see Article 22.5.2);
- (n) despite a specific request by the Agency, a beneficiary does not request — through the coordinator — an amendment to the Agreement to end the participation of one of its linked third parties or international partners that is in one of the situations under points (e), (f), (g), (k), (l) or (m) and to reallocate its tasks.

50.3.2 Procedure

Before terminating the Agreement or participation of one or more beneficiaries, the Agency will formally notify the coordinator or beneficiary concerned:

- informing it of its intention to terminate and the reasons why and
- inviting it, within 30 days of receiving notification, to submit observations and — in case of Point (l.ii) above — to inform the Agency of the measures to ensure compliance with the obligations under the Agreement.

If the Agency does not receive observations or decides to pursue the procedure despite the observations it has received, it will formally notify to the coordinator or beneficiary concerned **confirmation** of the termination and the date it will take effect. Otherwise, it will formally notify that the procedure is not continued.

The termination will **take effect**:

- for terminations under Points (b), (c), (e), (g), (h), (j), (l.ii) and (n) above: on the day specified in the notification of the confirmation (see above);
- for terminations under Points (a), (d), (f), (i), (k), (l.i) and (m) above: on the day after the notification of the confirmation is received.

50.3.3 Effects

- (a) for **termination of the Agreement**:

The coordinator must — within 60 days from when termination takes effect — submit:

- (i) a periodic report (for the last open reporting period until termination; see Article 20.3) and
- (ii) a final report (see Article 20.4).

If the Agreement is terminated for breach of the obligation to submit reports (see Articles 20.8 and 50.3.1(l)), the coordinator may not submit any reports after termination.

If the Agency does not receive the reports within the deadline (see above), only costs which are included in an approved periodic report will be taken into account.

The Agency will **calculate** the final grant amount (see Article 5.3) and the balance (see Article 21.4) on the basis of the reports submitted. Only costs incurred until termination takes effect are eligible (see Article 6). Costs relating to contracts due for execution only after termination are not eligible.

This does not affect the Agency's right to reduce the grant (see Article 43) or to impose administrative sanctions (Article 45).

The beneficiaries may not claim damages due to termination by the Agency (see Article 46).

After termination, the beneficiaries' obligations (in particular Articles 20, 22, 23, Section 3 of Chapter 4, 36, 37, 38, 40, 42, 43 and 44) continue to apply.

(b) for termination of the participation of one or more beneficiaries:

The coordinator must — within 60 days from when termination takes effect — submit:

- (i) a report on the distribution of payments to the beneficiary concerned;
- (ii) a request for amendment (see Article 55), with a proposal for reallocation of the tasks and estimated budget of the beneficiary concerned (see Annexes 1 and 2) and, if necessary, the addition of one or more new beneficiaries (see Article 56). If termination is notified after the period set out in Article 3, no request for amendment must be submitted unless the beneficiary concerned is the coordinator. In this case the request for amendment must propose a new coordinator, and
- (iii) if termination takes effect during the period set out in Article 3, a **termination report** from the beneficiary concerned, for the open reporting period until termination, containing an overview of the progress of the work, an overview of the use of resources, the individual financial statement and, if applicable, the certificate on the financial statement (see Article 20).

The information in the termination report must also be included in the periodic report for the next reporting period (see Article 20.3).

If the request for amendment is rejected by the Agency (because it calls into question the decision awarding the grant or breaches the principle of equal treatment of applicants), the Agreement may be terminated according to Article 50.3.1(c).

If the request for amendment is accepted by the Agency, the Agreement is **amended** to introduce the necessary changes (see Article 55).

The Agency will — on the basis of the periodic reports, the termination report and the report on the distribution of payments — **calculate** the amount which is due to the beneficiary and if the (pre-financing and interim) payments received by the beneficiary exceed this amount.

The **amount which is due** is calculated in the following steps:

Step 1 — Application of the reimbursement rate to the eligible costs

The grant amount for the beneficiary is calculated by applying the reimbursement rate(s) to the total eligible costs declared by the beneficiary and its linked third parties in the termination report and approved by the Agency.

Only costs incurred by the beneficiary concerned until termination takes effect are eligible (see Article 6). Costs relating to contracts due for execution only after termination are not eligible.

Step 2 — Reduction due to substantial errors, irregularities or fraud or serious breach of obligations

In case of a reduction (see Article 43), the Agency will calculate the reduced grant amount for the beneficiary by deducting the amount of the reduction (calculated in proportion to the seriousness of the errors, irregularities or fraud or breach of obligations, in accordance with Article 43.2) from the grant amount for the beneficiary.

If the payments received **exceed the amounts due**:

- if termination takes effect during the period set out in Article 3 and the request for amendment is accepted, the beneficiary concerned must repay to the coordinator the amount unduly received. The Agency will formally notify the amount unduly received and request the beneficiary concerned to repay it to the coordinator within 30 days of receiving notification. If it does not repay the coordinator, the Agency will draw upon the Guarantee Fund to pay the coordinator and then notify a **debit note** on behalf of the Guarantee Fund to the beneficiary concerned (see Article 44);
- in all other cases, in particular if termination takes effect after the period set out in Article 3, the Agency will formally notify a **debit note** to the beneficiary concerned. If payment is not made by the date in the debit note, the Guarantee Fund will pay to the Agency the amount due and the Agency will notify a debit note on behalf of the Guarantee Fund to the beneficiary concerned (see Article 44);
- if the beneficiary concerned is the former coordinator, it must repay the new coordinator according to the procedure above, unless:
 - termination takes effect after an interim payment and
 - the former coordinator has not distributed amounts received as pre-financing or interim payments (see Article 21.7).

In this case, the Agency will formally notify a **debit note** to the former coordinator. If payment is not made by the date in the debit note, the Guarantee Fund will pay to the

Agency the amount due. The Agency will then pay the new coordinator and notify a debit note on behalf of the Guarantee Fund to the former coordinator (see Article 44).

If the payments received **do not exceed the amounts due**: amounts owed to the beneficiary concerned will be included in the next interim or final payment.

If the Agency does not receive the termination report within the deadline (see above), only costs included in an approved periodic report will be taken into account.

If the Agency does not receive the report on the distribution of payments within the deadline (see above), it will consider that:

- the coordinator did not distribute any payment to the beneficiary concerned and that
- the beneficiary concerned must not repay any amount to the coordinator.

After termination, the concerned beneficiary's obligations (in particular Articles 20, 22, 23, Section 3 of Chapter 4, 36, 37, 38, 40, 42, 43 and 44) continue to apply.

SECTION 4 FORCE MAJEURE

ARTICLE 51 — FORCE MAJEURE

'Force majeure' means any situation or event that:

- prevents either party from fulfilling their obligations under the Agreement,
- was unforeseeable, exceptional situation and beyond the parties' control,
- was not due to error or negligence on their part (or on the part of third parties involved in the action), and
- proves to be inevitable in spite of exercising all due diligence.

The following cannot be invoked as force majeure:

- any default of a service, defect in equipment or material or delays in making them available, unless they stem directly from a relevant case of force majeure,
- labour disputes or strikes, or
- financial difficulties.

Any situation constituting force majeure must be formally notified to the other party without delay, stating the nature, likely duration and foreseeable effects.

The parties must immediately take all the necessary steps to limit any damage due to force majeure and do their best to resume implementation of the action as soon as possible.

The party prevented by force majeure from fulfilling its obligations under the Agreement cannot be considered in breach of them.

CHAPTER 7 FINAL PROVISIONS

ARTICLE 52 — COMMUNICATION BETWEEN THE PARTIES

52.1 Form and means of communication

Communication under the Agreement (information, requests, submissions, ‘formal notifications’, etc.) must:

- be made in writing and
- bear the number of the Agreement.

All communication must be made through the Participant Portal **electronic** exchange system and using the forms and templates provided there.

If — after the payment of the balance — the Agency finds that a formal notification was not accessed, a second formal notification will be made by registered post with proof of delivery (‘formal notification on **paper**’). Deadlines will be calculated from the moment of the second notification.

Communications in the electronic exchange system must be made by persons authorised according to the Participant Portal Terms & Conditions. For naming the authorised persons, each beneficiary must have designated — before the signature of this Agreement — a ‘legal entity appointed representative (LEAR)’. The role and tasks of the LEAR are stipulated in his/her appointment letter (see Participant Portal Terms & Conditions).

If the electronic exchange system is temporarily unavailable, instructions will be given on the Agency and Commission websites.

52.2 Date of communication

Communications are considered to have been made when they are sent by the sending party (i.e. on the date and time they are sent through the electronic exchange system).

Formal notifications through the **electronic** exchange system are considered to have been made when they are received by the receiving party (i.e. on the date and time of acceptance by the receiving party, as indicated by the time stamp). A formal notification that has not been accepted within 10 days after sending is considered to have been accepted.

Formal notifications **on paper** sent by **registered post** with proof of delivery (only after the payment of the balance) are considered to have been made on either:

- the delivery date registered by the postal service or
- the deadline for collection at the post office.

If the electronic exchange system is temporarily unavailable, the sending party cannot be considered in breach of its obligation to send a communication within a specified deadline.

52.3 Addresses for communication

The **electronic** exchange system must be accessed via the following URL:

<https://ec.europa.eu/research/participants/portal/desktop/en/projects/>

The Agency will formally notify the coordinator and beneficiaries in advance any changes to this URL.

Formal notifications on paper (only after the payment of the balance) addressed **to the Agency** must be sent to the official mailing address indicated on the Agency's website.

Formal notifications on paper (only after the payment of the balance) addressed **to the beneficiaries** must be sent to their legal address as specified in the Participant Portal Beneficiary Register.

ARTICLE 53 — INTERPRETATION OF THE AGREEMENT

53.1 Precedence of the Terms and Conditions over the Annexes

The provisions in the Terms and Conditions of the Agreement take precedence over its Annexes.

Annex 2 takes precedence over Annex 1.

53.2 Privileges and immunities

Not applicable

ARTICLE 54 — CALCULATION OF PERIODS, DATES AND DEADLINES

In accordance with Regulation No 1182/71³⁰, periods expressed in days, months or years are calculated from the moment the triggering event occurs.

The day during which that event occurs is not considered as falling within the period.

ARTICLE 55 — AMENDMENTS TO THE AGREEMENT

55.1 Conditions

The Agreement may be amended, unless the amendment entails changes to the Agreement which would call into question the decision awarding the grant or breach the principle of equal treatment of applicants.

Amendments may be requested by any of the parties.

55.2 Procedure

The party requesting an amendment must submit a request for amendment signed in the electronic exchange system (see Article 52).

The coordinator submits and receives requests for amendment on behalf of the beneficiaries (see Annex 3).

If a change of coordinator is requested without its agreement, the submission must be done by another beneficiary (acting on behalf of the other beneficiaries).

³⁰ Regulation (EEC, Euratom) No 1182/71 of the Council of 3 June 1971 determining the rules applicable to periods, dates and time-limits (OJ L 124, 8.6.1971, p. 1).

The request for amendment must include:

- the reasons why;
- the appropriate supporting documents, and
- for a change of coordinator without its agreement: the opinion of the coordinator (or proof that this opinion has been requested in writing).

The Agency may request additional information.

If the party receiving the request agrees, it must sign the amendment in the electronic exchange system within 45 days of receiving notification (or any additional information the Agency has requested). If it does not agree, it must formally notify its disagreement within the same deadline. The deadline may be extended, if necessary for the assessment of the request. If no notification is received within the deadline, the request is considered to have been rejected

An amendment **enters into force** on the day of the signature of the receiving party.

An amendment **takes effect** on the date agreed by the parties or, in the absence of such an agreement, on the date on which the amendment enters into force.

ARTICLE 56 — ACCESSION TO THE AGREEMENT

56.1 Accession of the beneficiaries mentioned in the Preamble

The other beneficiaries must accede to the Agreement by signing the Accession Form (see Annex 3) in the electronic exchange system (see Article 52) within 30 days after its entry into force (see Article 58).

They will assume the rights and obligations under the Agreement with effect from the date of its entry into force (see Article 58).

If a beneficiary does not accede to the Agreement within the above deadline, the coordinator must — within 30 days — request an amendment to make any changes necessary to ensure proper implementation of the action. This does not affect the Agency's right to terminate the Agreement (see Article 50).

56.2 Addition of new beneficiaries

In justified cases, the beneficiaries may request the addition of a new beneficiary.

For this purpose, the coordinator must submit a request for amendment in accordance with Article 55. It must include an Accession Form (see Annex 3) signed by the new beneficiary in the electronic exchange system (see Article 52).

New beneficiaries must assume the rights and obligations under the Agreement with effect from the date of their accession specified in the Accession Form (see Annex 3).

ARTICLE 57 — APPLICABLE LAW AND SETTLEMENT OF DISPUTES

57.1 Applicable law

The Agreement is governed by the applicable EU law, supplemented if necessary by the law of Belgium.

57.2 Dispute settlement

If a dispute concerning the interpretation, application or validity of the Agreement cannot be settled amicably, the General Court — or, on appeal, the Court of Justice of the European Union — has sole jurisdiction. Such actions must be brought under Article 272 of the Treaty on the Functioning of the EU (TFEU).

As an exception, for the following beneficiaries:

- KWANSEI GAKUIN EDUCATIONAL FOUNDATION

such disputes must — if they cannot be settled amicably — be referred to arbitration. Each party must formally notify to the other party its intention of resorting to arbitration and the identity of the arbitrator. The Permanent Court of Arbitration Optional Rules for Arbitration Involving International Organisations and States in force at the date of entry into force of the Agreement will apply. The appointing authority will be the Secretary-General of the Permanent Court of Arbitration following a written request submitted by either party. The arbitration proceedings must take place in Brussels and the language used in the arbitral proceedings will be English. The arbitral award will be binding on all parties and will not be subject to appeal.

If a dispute concerns administrative sanctions, offsetting or an enforceable decision under Article 299 TFEU (see Articles 44, 45 and 46), the beneficiaries must bring action before the General Court — or, on appeal, the Court of Justice of the European Union — under Article 263 TFEU. Actions against offsetting and enforceable decisions must be brought against the Commission (not against the Agency).

ARTICLE 58 — ENTRY INTO FORCE OF THE AGREEMENT

The Agreement will enter into force on the day of signature by the Agency or the coordinator, depending on which is later.

SIGNATURES

For the coordinator

Athanasios KONSTANDOPOULOS with ECAS id nkonstat signed in the Participant Portal on 04/04/2019 at 07:34:26 (transaction id SigId-113223-yOCj192W5zutzTlwpzxkEyAx6Pinl2oVHUbzN20TY9sTKE C58VTAvmk9StuFt2qkVbbQuzc7OsLd7vfKWBmFTBzW-jpJZscgsw0K6y59gzpmaPB-RpCSRdAOXmp9ejq2Wwj6guR8WoCQCid3LKdA0L3G Qq). Timestamp by third party at Thu Apr 04 08:34:32 CEST 2019

For the Agency

Signed by Angelo MARINO with ECAS id marinag as an authorised representative on 26-04-2019 18:24:18 (transaction id SigId-67328-zn7eszza3ALzN6t3vr0s6MgcoNnJUKBKrH7ufbydHySc9qQllXeu2mhqDWzsuollAeKfwNnXuMxsZrwx8QzJB57O-jpJZscgsw0KN09GwxKpZgW-zowfzkazuCrvXhoewvHzyNyYFwd7Uij9ylzsRhcHx4JfG) Fri Apr 26 18:24:22 CEST 2019



EUROPEAN COMMISSION
Research Executive Agency
Safeguarding Secure Society



ANNEX 1 (part A)

Research and Innovation action

NUMBER — 833507 — FASTER

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1.1. The project summary

Project Number ¹	833507	Project Acronym ²	FASTER
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One form per project

General information

Project title ³	First responder Advanced technologies for Safe and efficient Emergency Response
Starting date ⁴	The first day of the month after the signature by the Commission
Duration in months ⁵	36
Call (part) identifier ⁶	H2020-SU-SEC-2018
Topic	SU-DRS02-2018-2019-2020 Technologies for first responders
Fixed EC Keywords	Crisis management operations, Equipments and sub systems, Crisis management, Rescue of people, Protection of order and rescue forces, Avert and foreseen Catastrophes
Free keywords	

Abstract ⁷

The term first responders usually refers to law enforcement, fire, and emergency medical personnel. These responders, however, are not the only assets that may be required in the aftermath of a strike on the homeland. In contrast, the more appropriate term, emergency responders, comprises all personnel within a community that might be needed in the event of a natural or technological (man-made) disaster or terrorist incident. These responders might include hazardous materials response teams, urban search and rescue assets, community emergency response teams, anti-terrorism units, special weapons and tactics teams, bomb squads, emergency management officials, municipal agencies, and private organizations responsible for transportation, communications, medical services, public health, disaster assistance, public works, and construction. In addition, professional responders and volunteers, private nonprofit, nongovernmental groups (NGOs), such as the Red Cross, can also play an important role in emergency response. As a result, the tasks that a national emergency response system would be required to perform are more complex than simply aiding victims at the scene of a disaster, carried out by several kinds of professional users with different roles and expertise. Moreover, emergency preparedness and response lifecycle is a complex process that consists of the preparation, response, and recovery from a disaster, including planning, logistical support, maintenance and diagnostics, training, and management as well as supporting the actual activities at a disaster site and post-recovery after the incident.

1.2. List of Beneficiaries


Associated with document Ref. Ares(2019)2256001 - 29/03/2019

Project Number ¹	833507	Project Acronym ²	FASTER
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List of Beneficiaries

No	Name	Short name	Country	Project entry month ⁸	Project exit month
1	ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS	CERTH	Greece	1	36
2	ENGINEERING - INGEGNERIA INFORMATICA SPA	ENG	Italy	1	36
3	HELLENIC TELECOMMUNICATIONS ORGANIZATION S.A. - OTE AE (ORGANISMOS TILEPIKOINONION TIS ELLADOS OTE AE)	OTE	Greece	1	36
4	DIGINEXT	DXT	France	1	36
5	Crisisplan B.V.	CPLAN	Netherlands	1	36
6	DRONE HOPPER SL	DH	Spain	1	36
7	ROBOTNIK AUTOMATION SLL	ROB	Spain	1	36
8	SYNELIXIS LYSEIS PLIROFORIKIS AUTOMATISMOU & TILEPIKOINONION ANONIMI ETAIRIA	SYN	Greece	1	36
9	INOV INESC INOVACAO - INSTITUTO DE NOVAS TECNOLOGIAS	INOV	Portugal	1	36
10	FONDAZIONE LINKS - LEADING INNOVATION & KNOWLEDGE FOR SOCIETY	LINKS	Italy	1	36
11	KPEOPLE RESEARCH FOUNDATION	KPRF	Malta	1	36
12	KAJAANIN AMMATTIKORKEAKOULU OY	KAMK	Finland	1	36
13	VRIJE UNIVERSITEIT BRUSSEL	VUB	Belgium	1	36
14	PANEPISTIMIO DYTIKIS ATTIKIS	UWA	Greece	1	36
15	AYUNTAMIENTO DE MADRID	ADM-POL	Spain	1	36
16	SERVICIO MADRILENO DE SALUD	SUMMA	Spain	1	36
17	ECOLE NATIONALE SUPERIEURE DES OFFICIERS DE SAPEURS-POMPIERS (ENSOSP)	ENSOSP	France	1	36
18	WYZSZA SZKOLA POLICJI W SZCZYTNE	WSPOL	Poland	1	36
19	KAJAANIN KAUPUNKI	KAJ	Finland	1	36
20	ELLINIKI OMADA DIASOSIS ATTIKIS	HRTA	Greece	1	36
21	MUNICIPIO DE GRANDOLA	MG	Portugal	1	36
22	CONSORZIO PER IL SISTEMA INFORMATIVO (CSI PIEMONTE)	CSIP	Italy	1	36

1.2. List of Beneficiaries

 Associated with document Ref. Ares(2019)2256001 - 29/03/2019

No	Name	Short name	Country	Project entry month ⁸	Project exit month
23	KWANSEI GAKUIN EDUCATIONAL FOUNDATION	KGU Japan	Japan	1	36

1.3. Workplan Tables - Detailed implementation

1.3.1. WT1 List of work packages

WP Number ⁹	WP Title	Lead beneficiary ¹⁰	Person-months ¹¹	Start month ¹²	End month ¹³
WP1	Project Management	1 - CERTH	66.00	1	36
WP2	Social, Legal, Ethical and Privacy	13 - VUB	29.00	1	36
WP3	Requirements, specifications and system architecture	1 - CERTH	123.00	1	36
WP4	IoT Platform, Wearables and Social Media Sources	14 - UWA	73.00	4	32
WP5	Autonomous Vehicles	7 - ROB	72.00	4	32
WP6	Resilient communication solutions for first responders	8 - SYN	93.00	4	32
WP7	Improving protection and capacity for individual first responders	4 - DXT	97.00	4	32
WP8	Team-oriented enhanced situational awareness tools	2 - ENG	70.00	4	32
WP9	Integration	9 - INOV	78.00	10	36
WP10	Pilot Demonstration and Evaluation	5 - CPLAN	157.00	7	36
WP11	Dissemination and Exploitation	11 - KPRF	123.00	1	36
WP12	Ethics requirements	1 - CERTH	N/A	1	36
Total			981.00		

1.3.2. WT2 list of deliverables

Deliverable Number ¹⁴	Deliverable Title	WP number ⁹	Lead beneficiary	Type ¹⁵	Dissemination level ¹⁶	Due Date (in months) ¹⁷
D1.1	Project reference manual and quality plan	WP1	1 - CERTH	Report	Confidential, only for members of the consortium (including the Commission Services)	3
D1.2	Annual Project Periodic Reports v1	WP1	1 - CERTH	Report	Confidential, only for members of the consortium (including the Commission Services)	12
D1.3	Annual Project Periodic Reports v2	WP1	1 - CERTH	Report	Confidential, only for members of the consortium (including the Commission Services)	24
D1.4	Annual Project Periodic Reports v3	WP1	1 - CERTH	Report	Confidential, only for members of the consortium (including the Commission Services)	36
D1.5	Semi-Annual Periodic Management Reports v1	WP1	2 - ENG	Report	Confidential, only for members of the consortium (including the Commission Services)	6
D1.6	Semi-Annual Periodic Management Reports v2	WP1	2 - ENG	Report	Confidential, only for members of the consortium (including the Commission Services)	12
D1.7	Semi-Annual Periodic Management Reports v3	WP1	2 - ENG	Report	Confidential, only for members of the consortium (including the Commission Services)	18
D1.8	Semi-Annual Periodic Management Reports v4	WP1	2 - ENG	Report	Confidential, only for members of the consortium (including the Commission Services)	24

Deliverable Number¹⁴	Deliverable Title	WP number⁹	Lead beneficiary	Type¹⁵	Dissemination level¹⁶	Due Date (in months)¹⁷
D1.9	Semi-Annual Periodic Management Reports v5	WP1	2 - ENG	Report	Confidential, only for members of the consortium (including the Commission Services)	30
D1.10	Semi-Annual Periodic Management Reports v6	WP1	2 - ENG	Report	Confidential, only for members of the consortium (including the Commission Services)	36
D1.11	Data Management Plan v1	WP1	13 - VUB	ORDP: Open Research Data Pilot	Confidential, only for members of the consortium (including the Commission Services)	6
D1.12	Data Management Plan v2	WP1	13 - VUB	ORDP: Open Research Data Pilot	Confidential, only for members of the consortium (including the Commission Services)	18
D1.13	Project Final Report	WP1	1 - CERTH	Report	Confidential, only for members of the consortium (including the Commission Services)	36
D2.1	SELP Benchmark Report	WP2	13 - VUB	Report	Confidential, only for members of the consortium (including the Commission Services)	4
D2.2	SELP Compliance Report	WP2	11 - KPRF	Report	Confidential, only for members of the consortium (including the Commission Services)	7
D2.3	SELP Impact Assessment	WP2	13 - VUB	Report	Confidential, only for members of the consortium (including the Commission Services)	12
D2.4	SELP Continuous Monitoring Report v1	WP2	13 - VUB	Report	Confidential, only for members	24

Deliverable Number¹⁴	Deliverable Title	WP number⁹	Lead beneficiary	Type¹⁵	Dissemination level¹⁶	Due Date (in months)¹⁷
					of the consortium (including the Commission Services)	
D2.5	SELP Continuous Monitoring Report v2	WP2	13 - VUB	Report	Confidential, only for members of the consortium (including the Commission Services)	36
D3.1	User Requirements and Definition of Use Cases v1	WP3	5 - CPLAN	Report	Confidential, only for members of the consortium (including the Commission Services)	6
D3.2	User Requirements and Definition of Use Cases v2	WP3	5 - CPLAN	Report	Confidential, only for members of the consortium (including the Commission Services)	24
D3.3	Technical Specifications v1	WP3	1 - CERTH	Report	Confidential, only for members of the consortium (including the Commission Services)	9
D3.4	Technical Specifications v2	WP3	1 - CERTH	Report	Confidential, only for members of the consortium (including the Commission Services)	24
D3.5	Usability and performance analysis	WP3	1 - CERTH	Report	Confidential, only for members of the consortium (including the Commission Services)	36
D3.6	System Architecture v1	WP3	2 - ENG	Report	Confidential, only for members of the consortium (including the Commission Services)	12
D3.7	System Architecture v2	WP3	2 - ENG	Report	Confidential, only for members of the consortium (including the	24

Deliverable Number¹⁴	Deliverable Title	WP number⁹	Lead beneficiary	Type¹⁵	Dissemination level¹⁶	Due Date (in months)¹⁷
					Commission Services)	
D4.1	IoT computing and communication v1	WP4	9 - INOV	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D4.2	IoT computing and communication v2	WP4	9 - INOV	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D4.3	IoT middleware and IoT enabled devices v1	WP4	14 - UWA	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D4.4	IoT middleware and IoT enabled devices v2	WP4	14 - UWA	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D4.5	Wearable computing framework and devices v1	WP4	14 - UWA	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D4.6	Wearable computing framework and devices v2	WP4	14 - UWA	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D4.7	Data fusion from IoT and wearable devices v1	WP4	9 - INOV	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D4.8	Data fusion from IoT and wearable devices v2	WP4	9 - INOV	Other	Confidential, only for members of the consortium (including the Commission Services)	30

Deliverable Number¹⁴	Deliverable Title	WP number⁹	Lead beneficiary	Type¹⁵	Dissemination level¹⁶	Due Date (in months)¹⁷
D4.9	Report on social media analysis v1	WP4	10 - LINKS	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D4.10	Report on social media analysis v2	WP4	10 - LINKS	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D5.1	Robotic platform complete design and development v1	WP5	7 - ROB	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D5.2	Robotic platform complete design and development v2	WP5	7 - ROB	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D5.3	Navigation, Sensor and Communication Architecture v1	WP5	12 - KAMK	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D5.4	Navigation, Sensor and Communication Architecture v2	WP5	12 - KAMK	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D5.5	Swarm of Drones Architecture v1	WP5	6 - DH	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D5.6	Swarm of Drones Architecture v2	WP5	6 - DH	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D5.7	Autonomous navigation and control tool v1	WP5	7 - ROB	Other	Confidential, only for members	15

Deliverable Number¹⁴	Deliverable Title	WP number⁹	Lead beneficiary	Type¹⁵	Dissemination level¹⁶	Due Date (in months)¹⁷
					of the consortium (including the Commission Services)	
D5.8	Autonomous navigation and control tool v2	WP5	7 - ROB	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D5.9	Enriched 3D spatial mapping v1	WP5	7 - ROB	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D5.10	Enriched 3D spatial mapping v2	WP5	7 - ROB	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D6.1	5G-enabled network v1	WP6	3 - OTE	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D6.2	5G-enabled network v2	WP6	3 - OTE	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D6.3	Quality of Service Monitoring Framework v1	WP6	8 - SYN	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D6.4	Quality of Service Monitoring Framework v2	WP6	8 - SYN	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D6.5	Extending communication capabilities though UAV swarms v1	WP6	9 - INOV	Other	Confidential, only for members of the consortium (including the	15

Deliverable Number¹⁴	Deliverable Title	WP number⁹	Lead beneficiary	Type¹⁵	Dissemination level¹⁶	Due Date (in months)¹⁷
					Commission Services)	
D6.6	Extending communication capabilities though UAV swarms v2	WP6	9 - INOV	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D6.7	Emergency Communication devices v1	WP6	14 - UWA	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D6.8	Emergency Communication devices v2	WP6	14 - UWA	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D6.9	Distributed network of trust v1	WP6	23 - KGU Japan	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D6.10	Distributed network of trust v2	WP6	23 - KGU Japan	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D7.1	UxV-extended human vision with gesture-based controls v1	WP7	1 - CERTH	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D7.2	UxV-extended human vision with gesture-based controls v2	WP7	1 - CERTH	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D7.3	First responder localization and local situational awareness v1	WP7	14 - UWA	Other	Confidential, only for members of the consortium (including the Commission Services)	15

Deliverable Number¹⁴	Deliverable Title	WP number⁹	Lead beneficiary	Type¹⁵	Dissemination level¹⁶	Due Date (in months)¹⁷
D7.4	First responder localization and local situational awareness v2	WP7	14 - UWA	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D7.5	AI tools for disaster scene analysis, risk anticipation and early warning v1	WP7	4 - DXT	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D7.6	AI tools for disaster scene analysis, risk anticipation and early warning v2	WP7	4 - DXT	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D7.7	User-intuitive interfaces for AR-enabled devices v1	WP7	4 - DXT	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D7.8	User-intuitive interfaces for AR-enabled devices v2	WP7	4 - DXT	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D8.1	FASTER Knowledge Models for the Information Retrieval v1	WP8	2 - ENG	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D8.2	FASTER Knowledge Models for the Information Retrieval v2	WP8	2 - ENG	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D8.3	Tools for enhanced situational awareness in the CC v1	WP8	2 - ENG	Other	Confidential, only for members of the consortium (including the Commission Services)	15

Deliverable Number¹⁴	Deliverable Title	WP number⁹	Lead beneficiary	Type¹⁵	Dissemination level¹⁶	Due Date (in months)¹⁷
D8.4	Tools for enhanced situational awareness in the CC v2	WP8	2 - ENG	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D8.5	Data visualisation and AR tools for collaboration v1	WP8	4 - DXT	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D8.6	Data visualisation and AR tools for collaboration v2	WP8	4 - DXT	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D8.7	Mobile application for effective response management v1	WP8	10 - LINKS	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D8.8	Mobile application for effective response management v2	WP8	10 - LINKS	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D9.1	Integration plans v1	WP9	9 - INOV	Report	Confidential, only for members of the consortium (including the Commission Services)	15
D9.2	Integration plans v2	WP9	9 - INOV	Report	Confidential, only for members of the consortium (including the Commission Services)	30
D9.3	Integration of tools for first responders v1	WP9	1 - CERTH	Other	Confidential, only for members of the consortium (including the Commission Services)	18
D9.4	Integration of tools for first responders v2	WP9	1 - CERTH	Other	Confidential, only for members	33

Deliverable Number¹⁴	Deliverable Title	WP number⁹	Lead beneficiary	Type¹⁵	Dissemination level¹⁶	Due Date (in months)¹⁷
					of the consortium (including the Commission Services)	
D9.5	Integration of communication and IoT components v1	WP9	9 - INOV	Other	Confidential, only for members of the consortium (including the Commission Services)	18
D9.6	Integration of communication and IoT components v2	WP9	9 - INOV	Other	Confidential, only for members of the consortium (including the Commission Services)	33
D9.7	System validation and testing v1	WP9	9 - INOV	Report	Confidential, only for members of the consortium (including the Commission Services)	21
D9.8	System validation and testing v2	WP9	9 - INOV	Report	Confidential, only for members of the consortium (including the Commission Services)	36
D10.1	Scenarios and pilot planning v1	WP10	5 - CPLAN	Report	Confidential, only for members of the consortium (including the Commission Services)	15
D10.2	Scenarios and pilot planning v2	WP10	5 - CPLAN	Report	Confidential, only for members of the consortium (including the Commission Services)	30
D10.3	End-user training v1	WP10	5 - CPLAN	Other	Confidential, only for members of the consortium (including the Commission Services)	18
D10.4	End-user training v2	WP10	5 - CPLAN	Other	Confidential, only for members of the consortium (including the	33

Deliverable Number¹⁴	Deliverable Title	WP number⁹	Lead beneficiary	Type¹⁵	Dissemination level¹⁶	Due Date (in months)¹⁷
					Commission Services)	
D10.5	Trials setup, pilot execution and demonstration v1	WP10	16 - SUMMA	Report	Confidential, only for members of the consortium (including the Commission Services)	21
D10.6	Trials setup, pilot execution and demonstration v2	WP10	16 - SUMMA	Report	Confidential, only for members of the consortium (including the Commission Services)	36
D10.7	Impact Assessment and evaluation for first responders	WP10	21 - MG	Report	Confidential, only for members of the consortium (including the Commission Services)	36
D11.1	Dissemination plan	WP11	11 - KPRF	Report	Public	6
D11.2	Innovation Strategy plan	WP11	11 - KPRF	Report	Public	9
D11.3	Report on Dissemination activities v1	WP11	11 - KPRF	Report	Public	18
D11.4	Report on Dissemination activities v2	WP11	11 - KPRF	Report	Public	36
D11.5	Stakeholders Group Report v1	WP11	11 - KPRF	Report	Public	18
D11.6	Stakeholders Group Report v2	WP11	11 - KPRF	Report	Public	36
D11.7	Sustainability model	WP11	11 - KPRF	Report	Public	24
D11.8	FASTER technologies and services adoption recommendations	WP11	5 - CPLAN	Report	Public	36
D11.9	Mission oriented Exploitation plan	WP11	2 - ENG	Report	Public	36
D12.1	H - Requirement No. 1	WP12	1 - CERTH	Ethics	Confidential, only for members of the consortium (including the Commission Services)	12
D12.2	POPD - Requirement No. 2	WP12	1 - CERTH	Ethics	Confidential, only for members	12

Deliverable Number¹⁴	Deliverable Title	WP number⁹	Lead beneficiary	Type¹⁵	Dissemination level¹⁶	Due Date (in months)¹⁷
					of the consortium (including the Commission Services)	
D12.3	POPD - Requirement No. 3	WP12	1 - CERTH	Ethics	Confidential, only for members of the consortium (including the Commission Services)	12

1.3.3. WT3 Work package descriptions

Work package number ⁹	WP1	Lead beneficiary ¹⁰	1 - CERTH
Work package title	Project Management		
Start month	1	End month	36

Objectives

The objectives of WP1 include: a) the overall administration of the project, b) coordination of scientific and technical activities and continuous monitoring of the progress, c) risk identification and management d) quality control of the project’s outcomes, e) management of project resources and f) resolution of conflicts and g) monitoring of social and technology acceptance. In addition, it will offer the necessary interface to the EU services and external actors.

Description of work and role of partners

WP1 - Project Management [Months: 1-36]
CERTH, ENG, DXT, CPLAN, ROB, SYN, INOV, KPRF, VUB, UWA, MG
T1.1 Project Administration, coordination and reporting (CERTH + ENG + DXT + CPLAN + ROB + SYN + INOV + KPRF + VUB + UWA) [M1-M36]
 This task consists of financial, stakeholder and contractual management aspects of the project and it also reflects the responsibility of the relationship with the European Commission and the liaison with external organizations. The tasks of administrative management include the preparation of the quarterly reports/periodic reports/financial statements and certificates, the organization of the Consortium meetings, the collection, and dissemination of the EU financial contribution and the representation of the Consortium towards the EU and all relevant external entities. Furthermore, the current task will be responsible for the coordination of information flows within the project and the resolution of conflicts. The first step in this direction will be the preparation of the Project Reference Manual and Quality Plan. This task will lead the preparation of deliverables D1.1, D1.[2-4], D1.[5-10], and D1.13.

T1.2 Scientific coordination and technical management (ENG + CERTH + DXT + SYN + INOV + UWA) [M1-M36]
 This task focuses on the coordination of the project, in terms of its technical/scientific components. The task will monitor the project plan and the status of technical activities, identifying critical paths, bottlenecks, and problems at interfaces among technical WPs which could cause delays in reaching the technical milestones and the deployment of pilots. It will also include mechanisms for monitoring the project scope and reorientation of the project plan if objectives change as a result of new scientific developments. Task responsibilities will also include the scheduling of teleconference and webinars that will allow all partners and especially pilot sites to gain a perfect understanding of all the deployed technologies. This task will contribute to the preparation of D1.1, D1.[2-4], D1.[5-10], and D1.13.

T1.3 Quality assurance and risk management (CERTH + ENG + DXT + CPLAN + ROB + SYN + INOV + KPRF + VUB + UWA) [M1-M36]
 The current task will define the action for the quality control of all the project outcomes and help the entire consortium to complete all project responsibilities at the highest level of excellence. The quality methodologies and procedures applied will be in line with ISO 9001 requirements. This task will formulate a detailed and robust risk management plan that will minimize the effects of any unplanned difficulty or delay being propagated across task and work packages. More specifically the quality assurance and risk management processes will include: a) Control actions and time schedules, b) Requirements, specifications and quality objectives, c) Responsibilities and authorities among partners, d) Development, testing, configuration, acceptance and maintenance plans, e) Procedures for acceptance and quality control f) Expected risks and contingency plans, g) Assessment of the progress of the project for the early detection of significant deviations related to unexpected risks. This task will lead the preparation of the Quality Assurance Plan (QAP), which will be included in D1.1, and contribute to the identification and resolution of quality assurance and risks management aspects documented in D1.1, D1.[2-4], D1.[5-10], and D1.13.

T1.4 Societal acceptance and technology adoption monitoring (VUB + CERTH + ENG + SYN + KPRF + MG) [M1-M36]
 FASTER aims to develop tools that could be potentially exploitable. Therefore, they will have to be acceptable not only for responders but also to the society as a whole. This includes the broader public who may have a keen interest in healthcare delivery, something that is often highly politicized, the medical world, professionals working in the emergency services and various political groupings within society. For new tools such as that envisaged within FASTER, they must be acceptable to such groups who will need to support it and work with it. This task will map relevant actors

and continuously assess their acceptance perspective. In doing so it will build upon the materials elicited in WP2 and the SELP analysis. Moreover, FASTER will monitor the adoption of new technologies in first responder organizations throughout the project, in conjunction with their impact and societal acceptance. The aim of this task is to make an analysis of what efforts need to be made to ensure acceptance, providing feedback in all design phases for possible changes that could improve the outlook.

Participation per Partner

Partner number and short name	WP1 effort
1 - CERTH	28.00
2 - ENG	9.00
4 - DXT	3.00
5 - CPLAN	2.00
7 - ROB	2.00
8 - SYN	4.00
9 - INOV	3.00
11 - KPRF	3.00
13 - VUB	7.00
14 - UWA	3.00
21 - MG	2.00
Total	66.00

List of deliverables

Deliverable Number ¹⁴	Deliverable Title	Lead beneficiary	Type ¹⁵	Dissemination level ¹⁶	Due Date (in months) ¹⁷
D1.1	Project reference manual and quality plan	1 - CERTH	Report	Confidential, only for members of the consortium (including the Commission Services)	3
D1.2	Annual Project Periodic Reports v1	1 - CERTH	Report	Confidential, only for members of the consortium (including the Commission Services)	12
D1.3	Annual Project Periodic Reports v2	1 - CERTH	Report	Confidential, only for members of the consortium (including the Commission Services)	24
D1.4	Annual Project Periodic Reports v3	1 - CERTH	Report	Confidential, only for members of the consortium (including the Commission Services)	36

List of deliverables

Deliverable Number ¹⁴	Deliverable Title	Lead beneficiary	Type ¹⁵	Dissemination level ¹⁶	Due Date (in months) ¹⁷
				the Commission Services)	
D1.5	Semi-Annual Periodic Management Reports v1	2 - ENG	Report	Confidential, only for members of the consortium (including the Commission Services)	6
D1.6	Semi-Annual Periodic Management Reports v2	2 - ENG	Report	Confidential, only for members of the consortium (including the Commission Services)	12
D1.7	Semi-Annual Periodic Management Reports v3	2 - ENG	Report	Confidential, only for members of the consortium (including the Commission Services)	18
D1.8	Semi-Annual Periodic Management Reports v4	2 - ENG	Report	Confidential, only for members of the consortium (including the Commission Services)	24
D1.9	Semi-Annual Periodic Management Reports v5	2 - ENG	Report	Confidential, only for members of the consortium (including the Commission Services)	30
D1.10	Semi-Annual Periodic Management Reports v6	2 - ENG	Report	Confidential, only for members of the consortium (including the Commission Services)	36
D1.11	Data Management Plan v1	13 - VUB	ORDP: Open Research Data Pilot	Confidential, only for members of the consortium (including the Commission Services)	6
D1.12	Data Management Plan v2	13 - VUB	ORDP: Open Research Data Pilot	Confidential, only for members of the consortium (including the Commission Services)	18
D1.13	Project Final Report	1 - CERTH	Report	Confidential, only for members of the consortium (including the Commission Services)	36

Description of deliverables

D1.1 Project reference manual and quality plan [M3]
 D1.[2-4] Annual Project Periodic Reports [M12,M24,M36]
 D1.[5-10] Semi-Annual Periodic Management Reports [M06,M12,M18,M24,M30,M36]
 D1.[11-12] Data Management Plan [M6-M18]
 D1.13 Project Final Report [M36]

D1.1 : Project reference manual and quality plan [3]
 Project reference manual and quality plan

D1.2 : Annual Project Periodic Reports v1 [12]
 Annual Project Periodic Reports. Interim versions of this deliverable will be produced annually.

D1.3 : Annual Project Periodic Reports v2 [24]
 Annual Project Periodic Reports

D1.4 : Annual Project Periodic Reports v3 [36]
 Annual Project Periodic Reports

D1.5 : Semi-Annual Periodic Management Reports v1 [6]
 Semi-Annual Periodic Management Reports. Interim versions of this deliverable will be produced semi-annually.

D1.6 : Semi-Annual Periodic Management Reports v2 [12]
 Semi-Annual Periodic Management Reports

D1.7 : Semi-Annual Periodic Management Reports v3 [18]
 Semi-Annual Periodic Management Reports

D1.8 : Semi-Annual Periodic Management Reports v4 [24]
 Semi-Annual Periodic Management Reports

D1.9 : Semi-Annual Periodic Management Reports v5 [30]
 Semi-Annual Periodic Management Reports

D1.10 : Semi-Annual Periodic Management Reports v6 [36]
 Semi-Annual Periodic Management Reports

D1.11 : Data Management Plan v1 [6]
 Data Management Plan

D1.12 : Data Management Plan v2 [18]
 Data Management Plan

D1.13 : Project Final Report [36]
 Project Final Report

Schedule of relevant Milestones

Milestone number¹⁸	Milestone title	Lead beneficiary	Due Date (in months)	Means of verification
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Work package number ⁹	WP2	Lead beneficiary ¹⁰	13 - VUB
Work package title	Social, Legal, Ethical and Privacy		
Start month	1	End month	36

Objectives

This work package is responsible for assessing the impact in terms of ethical responsibility, fundamental rights, data protection and privacy, as well as addressing any issues identified during the design and the development phases of the project’s solutions. Striking the proper balance between the legitimate interests and the rights and obligations contained in the personal data protection framework and other legal approaches connected to privacy is of the utmost importance. This includes the new General Data Protection Regulation (GDPR) 2016/679/EU, case law of the European Court of Human Rights and key illustrative examples from member states of the European Union. To this end, legal and ethical requirements should be effectively embedded in the relevant technologies (including on the basis of the so-called data protection by design principle (art. 25 in GDPR)). WP2 has been designed to comply with the need to perform an impact assessment as described by article 35 GDPR.

Description of work and role of partners

WP2 - Social, Legal, Ethical and Privacy [Months: 1-36]
VUB, CPLAN, KPRF, UWA

T2.1 Analysis of the relevant regulatory and ethical frameworks (VUB + KPRF) [M1-M4]
 This task aims to navigate the key ethical and legal requirements that are likely to be applicable to FASTER. Providing such material will inter alia involve an analysis of: a) the ethical requirements incumbent upon first responders and the frameworks they work within, b) the data protection framework including, but not limited to, the General Data Protection Regulation (GDPR) and key national provisions linked to data protection, c) the European Court of Human Rights case law relating to the privacy of the individual and the obligations that must apply under national law to protect individual rights, d) legal possibilities and restraints found within national law for the use and sharing of data in emergency contexts such as public emergencies, natural disasters and terrorist attacks. FASTER will, in terms of Member State law, look at the examples of the countries that will host the trial sites during the course of the project. This task will produce D2.1.

T2.2 SELP Compliance framework (KPRF + VUB) [M3-M7]
 The Compliance framework will take the form of contextual recommendations for the Project based on the legal requirements identified in T2.1. There will be three main elements: a) Legal obligations impact assessment: this sub-task will develop a framework for the impact of the FASTER system upon legal requirements, including data protection/privacy and fundamental rights, conduct an assessment upon personal data protection and privacy and formulate recommendations on how to improve the observance of data protection and privacy, b) Ethical impact assessment: develop a framework, conduct an assessment and formulate recommendations on how to improve the observance of applicable ethical and social principles, c) Liability Impact Assessment: consider how the relevant legal principles may be engaged by FASTER, taking into account the specific features of that system, conduct an assessment against the above mentioned principles and ensure observance of relevant legal requirements by formulating a set of recommendations on how to ensure compliance, aiming to increase exploitation of a potential FASTER related product by reducing potential liabilities. This task contributes to D2.2 and D2.3.

T2.3 SELP Specifications (VUB + KPRF + UWA) [M7-M12]
 T2.3 will involve the creation of a complex interactive questionnaire based on the contextual requirement identified in T2.2. Each partner involved in the project will be tasked with answering the questions that are relevant to them. In doing so they will be required to demonstrate what they will need to do (e.g. on a technical level) to address the requirements addressed in T2.2. The aim of this impact assessment processes is two provoke a genuine and two-way discussion between legal and technical partners on SELP requirements and how they need to be implemented in practice. The responses will be used to create the Impact assessment report (D2.3).

T2.4 SELP recommendations (VUB + CPLAN + KPRF + UWA) [M8-M36]
 The aim of this task is to continuously monitor the impacts of FASTER on the requirements identified in the FASTER impact assessment, as the system is integrated, tested and evaluated. The monitoring will be performed by the VUB, who will access any information arising from the work of the project, attend any meeting of the consortium and interfere should it considers the work of the consortium incompatible. On top of that, the VUB can be consulted on any matter within the scope of FASTER. In case of dispute, the issue will be referred to the Ethics Advisory Board (EAB). This

task will produce two periodical deliverables (D2.[4-5]), ensuring that the results of the impact assessment report are implemented by all relevant partners on a continuous basis.

Participation per Partner

Partner number and short name	WP2 effort
5 - CPLAN	1.00
11 - KPRF	7.00
13 - VUB	19.00
14 - UWA	2.00
Total	29.00

List of deliverables

Deliverable Number ¹⁴	Deliverable Title	Lead beneficiary	Type ¹⁵	Dissemination level ¹⁶	Due Date (in months) ¹⁷
D2.1	SELP Benchmark Report	13 - VUB	Report	Confidential, only for members of the consortium (including the Commission Services)	4
D2.2	SELP Compliance Report	11 - KPRF	Report	Confidential, only for members of the consortium (including the Commission Services)	7
D2.3	SELP Impact Assessment	13 - VUB	Report	Confidential, only for members of the consortium (including the Commission Services)	12
D2.4	SELP Continuous Monitoring Report v1	13 - VUB	Report	Confidential, only for members of the consortium (including the Commission Services)	24
D2.5	SELP Continuous Monitoring Report v2	13 - VUB	Report	Confidential, only for members of the consortium (including the Commission Services)	36

Description of deliverables

D2.1 SELP Benchmark Report [M4]
 D2.2 SELP Compliance Report [M7]
 D2.3 SELP Impact Assessment [M12]
 D2.[4-5] SELP Continuous Monitoring Report [M24, M36]

<p>D2.1 : SELP Benchmark Report [4] SELP Benchmark Report</p> <p>D2.2 : SELP Compliance Report [7] SELP Compliance Report</p> <p>D2.3 : SELP Impact Assessment [12] SELP Impact Assessment</p> <p>D2.4 : SELP Continuous Monitoring Report v1 [24] SELP Continuous Monitoring Report</p> <p>D2.5 : SELP Continuous Monitoring Report v2 [36] SELP Continuous Monitoring Report</p>

Schedule of relevant Milestones

Milestone number¹⁸	Milestone title	Lead beneficiary	Due Date (in months)	Means of verification
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Work package number ⁹	WP3	Lead beneficiary ¹⁰	1 - CERTH
Work package title	Requirements, specifications and system architecture		
Start month	1	End month	36

Objectives

WP3 will prepare and revise the end user requirements and the FASTER technical specifications and architecture. Technical partners will first collaborate with end users to comprehensively analyse their expectations and formulate them into user requirements and use cases, which will enable the definition of technical components and the complete FASTER architecture, as well as pilot scenarios. Deliverables produced within WP3 will serve as input to all R&D work packages (WP4 8). WP3 will also assess the performance and usability of the proposed tools and solutions for first responders.

Description of work and role of partners

WP3 - Requirements, specifications and system architecture [Months: 1-36]
CERTH, ENG, OTE, DXT, CPLAN, DH, ROB, SYN, INOV, LINKS, KPRF, KAMK, VUB, UWA, ADM-POL, SUMMA, ENSOSP, WSPOL, KAJ, HRTA, MG, CSIP, KGU Japan

T3.1 User requirements and use cases (CPLAN + CERTH + ENG + DXT + ROB + SYN + ISMB + KPRF + KAMK + VUB + UWA + ADM + SUMMA + ENSOSP + WSPOL + KAJ + HRTA + MG + RP) [M1-M24]
 The goal of this task is two-fold: a) identify and formulate the expectations of end-users and b) select and describe a set of relevant use cases that will put the functionalities of the system into context. The effort will begin with an interactive workshop (M03, the Netherlands) to exploit the expertise of both the project’s end-users and external first responders. Considering the SELP recommendations, a draft list of requirements will be validated and refined with input from the second end-user workshop, which will also serve as an opportunity to advance the initial selection of use cases and describe the core sets of interactions between different types of first responders and the FASTER system. The outcome of this task (reported in D3.[1-2]) will constitute input for T3.2. Given the consortium’s commitment to delivering a system that responds to the practical needs of the end-users, WP3 will closely collaborate with WP10 to incorporate the results of user evaluation. As such, the related deliverable will be regularly updated based on the feedback from end-users sought at key stages of the development process (i.e. integration tests, pilots).

T3.2 Specification of system requirements (CERTH + ENG + OTE + DXT + CPLAN + DH + ROB + SYN + INOV + ISMB + UWA + IBIRC) [M4-M24]
 Based on the results of T3.1, this task will aim to transform the identified user requirements into detailed technical specifications that will cover both functional and non-functional system characteristics. To achieve this goal, a deep technological analysis of each component, including user interfaces and interoperability will be performed. The list of system requirements will be prioritized and be combined with indicative testing approaches that will allow the unified verification of each system module. Finally, the above-described results will be the starting point for the definition and optimization of the FASTER architecture, which will structure and formulate the development and integration processes of the project. The current task will contribute to the preparation of D3.[3-4] and D3.[6-7].

T3.3 Continuous usability and performance analysis (CERTH + ENG + CPLAN + SYN + UWA + ADM + SUMMA + ENSOSP + WSPOL + KAJ + HRTA + MG + RP) [M13-M36]
 Starting from the beginning of the end user training period and the first pilot, this task will continuously assess the usability and performance of FASTER tools and solution from an end-user point of view, until the end of the project. This analysis will help to redefine and fine-tune the user requirements and system components, based on feedback received from first responders, according to their in-field experience with the FASTER products. To that end, FASTER has allocated equipment budget to the end-users, will also be organizing field trials during its project meetings where the first responders will be testing and validating the ongoing developments, and will further be using online communication tools (website, specific portal/blog/forums) to ensure the frequent communication of technology developers and first responders. These will allow for a more frequent and gamified bi-directional exchange of information. Technology blogs will offer the latest lab testing results and development progress, with the end-users offering their feedback and suggestions. Complementary to this, the end-users will be sharing multimedia from their training session (e.g. with action/body cams) to offer a better and more complete picture of their operating needs to the technology developers. The current task will contribute to the preparation of D3.5

T3.4 System architecture and component specifications (ENG + CERTH + DXT + SYN + INOV + ISMB + KAMK + VUB + UWA + IBIRC) [M7-M24]

This task will define the FASTER logical architecture to ensure that all system parts will work together seamlessly and effectively. More specifically, this task will identify the architectural modules and components, along with all the conceptual and technical needs for the execution of pilot data collection/harmonization and the development of the platform. Particular attention will be given to the definition of the FASTER cloud-based infrastructure capable of processing heterogeneous data, including real-time streams from IoT devices. In addition, the way data are accessed and exchanged internally (among the modules and components) as well as externally (legacy system interfaces) will be defined, while incorporating ethical and data management principles in the system architecture. Communication interface descriptions from the different tools, devices and systems including APIs, interfaces and criteria for integration will be considered. Finally, the architecture will include options and recommendations for both short (adding in other emerging technologies) and long-term (updates on the platform itself) extensions of the platform. The current task will contribute to the preparation of D3.[6-7]

Participation per Partner

Partner number and short name	WP3 effort
1 - CERTH	16.00
2 - ENG	16.00
3 - OTE	1.00
4 - DXT	6.00
5 - CPLAN	16.00
6 - DH	1.00
7 - ROB	2.00
8 - SYN	6.00
9 - INOV	6.00
10 - LINKS	3.00
11 - KPRF	1.00
12 - KAMK	4.00
13 - VUB	2.00
14 - UWA	9.00
15 - ADM-POL	4.00
16 - SUMMA	2.00
CMFF	1.00
ESDP	1.00
17 - ENSOSP	4.00
18 - WSPOL	4.00
19 - KAJ	4.00
20 - HRTA	4.00
21 - MG	6.00
22 - CSIP	1.00
RP	1.00

Partner number and short name	WP3 effort
23 - KGU Japan	2.00
Total	123.00

List of deliverables

Deliverable Number ¹⁴	Deliverable Title	Lead beneficiary	Type ¹⁵	Dissemination level ¹⁶	Due Date (in months) ¹⁷
D3.1	User Requirements and Definition of Use Cases v1	5 - CPLAN	Report	Confidential, only for members of the consortium (including the Commission Services)	6
D3.2	User Requirements and Definition of Use Cases v2	5 - CPLAN	Report	Confidential, only for members of the consortium (including the Commission Services)	24
D3.3	Technical Specifications v1	1 - CERTH	Report	Confidential, only for members of the consortium (including the Commission Services)	9
D3.4	Technical Specifications v2	1 - CERTH	Report	Confidential, only for members of the consortium (including the Commission Services)	24
D3.5	Usability and performance analysis	1 - CERTH	Report	Confidential, only for members of the consortium (including the Commission Services)	36
D3.6	System Architecture v1	2 - ENG	Report	Confidential, only for members of the consortium (including the Commission Services)	12
D3.7	System Architecture v2	2 - ENG	Report	Confidential, only for members of the consortium (including the Commission Services)	24

Description of deliverables

D3.[1-2] User Requirements and Definition of Use Cases [M6, M24]
 D3.[3-4] Technical Specifications [M9, M24]
 D3.5 Usability and performance analysis [M36]
 D3.[6-7] System Architecture [M12, M24]

D3.1 : User Requirements and Definition of Use Cases v1 [6]

User Requirements and Definition of Use Cases

D3.2 : User Requirements and Definition of Use Cases v2 [24]

User Requirements and Definition of Use Cases

D3.3 : Technical Specifications v1 [9]

Technical Specifications

D3.4 : Technical Specifications v2 [24]

Technical Specifications

D3.5 : Usability and performance analysis [36]

Usability and performance analysis

D3.6 : System Architecture v1 [12]

System Architecture

D3.7 : System Architecture v2 [24]

System Architecture

Schedule of relevant Milestones

Milestone number ¹⁸	Milestone title	Lead beneficiary	Due Date (in months)	Means of verification
MS1	User Requirements and Use Cases Formulated	1 - CERTH	6	User Requirements and Use Cases Formulated
MS2	Systemic Requirements Specified	1 - CERTH	9	Systemic Requirements Specified
MS3	System Architecture Designed and Components Specified	2 - ENG	12	System Architecture Designed and Components Specified

Work package number ⁹	WP4	Lead beneficiary ¹⁰	14 - UWA
Work package title	IoT Platform, Wearables and Social Media Sources		
Start month	4	End month	32

Objectives

WP4 will design and implement of solutions for First Responders, based on the use of IoT middleware and devices, for use during search and rescue operations. The focus will be steered towards the use of wearables for humans and animals (K9s), enabling the communication of sensory data between first responders and the fusion of generated data in order to create situational awareness and enhance the operational capabilities on site. As a result, this WP will pursue: a) The design and implementation of a robust and resilient computational and communication framework for the deployed IoT sensors, b) The provision of a compliant IoT middleware and devices, c) The definition and provision of wearables for humans and K9s and d) The means to ensure fusion of sensory data.

Description of work and role of partners

WP4 - IoT Platform, Wearables and Social Media Sources [Months: 4-32]
UWA, ENG, OTE, SYN, INOV, LINKS, KAMK, HRTA, KGU Japan

T4.1 Secure IoT computing and communication (INOV + OTE + SYN + KAMK + UWA + IBIRC) [M4-M32]
 This task will deal with the security on IoT computing and communication. The task will start by identifying the most suitable communication protocol for FASTER IoT taking their security capabilities into account (focusing on standardized protocols) and will implement the chosen one. The analysis will take into account the confidentiality, integrity, origin authentication, freshness and availability in network security requirements. The task will also develop the secured edge computing system providing real-time notifications to the First Responders and Control Centre, being, therefore, an input for T4.4. The current task will contribute to the preparation of D4.[1-2].

T4.2 Secure IoT middleware and IoT enabled devices (UWA + OTE + SYN + KAMK) [M4-M32]
 Starting from the identification of the IoT device types that will be used in the context of the project, this task will focus on the design and implementation of a middleware which will ensure the secure communication between these devices and the computational units at the network edge (including wearable single board computers) and at the cloud. Consideration of the operational environment in which this communication will take place, as well as of the communication capabilities of protocols in terms of range, extendibility and resilience, will lead to the adoption of technologies to be deployed in order to support the implementation of the secure IoT middleware of FASTER. The current task will contribute to the preparation of D4.[3-4].

T4.3 Wearable computing framework and devices for humans and animals (UWA + INOV + ISMB + KAMK + HRTA) [M4-M32]
 This task will focus on the design and implementation of wearables for humans and animals (K9s), capable of collecting, processing and communicating the sensory data following the security specifications defined in T4.1. Starting from the selection and provision of the necessary hardware platforms for wearable computing, T4.3 will develop and implement the activity recognition modules for First Responders and K9s. These modules will be compatible with external wearables, as well as with standalone mobile devices, while the activities to be detected will be co-defined with the end-users to adhere to real emergency management needs. Different sensors (e.g., accelerometers, gyroscope, GPS) for in-field agent status monitoring, subsequent processing (even locally) of sensory data and the communication of mission-critical info will be considered in this context. Finally, T4.3 will address all issues related to the use of textile wearables, featuring several sensors able to collect biometric and environmental data. The current task will contribute to the preparation of D4.[5-6].

T4.4 Sensory data fusion from IoT and wearable devices (INOV + ISMB + KAMK + UWA) [M4-M32]
 This task will fuse data coming from different sensors located either at the K9 units, gathering movement or in the wearable devices in the First Responders' uniform or smart textiles, collecting environmental and biometric measures. T4.4 will take as input the wearable computing framework from T4.4 and identify which of the available data fusion techniques is best suited for FASTER: data association, state estimation or decision fusion. The current task will contribute to the preparation of D4.[7-8].

T4.5 Social media analysis for monitoring and event detection (ISMB + ENG) [M4-M32]
 This task focuses on real-time social media analysis in order to detect the occurrence or verify a forecasted emergency event and extract informative content for First Responders to improve their situational assessment. Statistical volumetric

approaches will be coupled with advanced text analysis (e.g. NLP, word embedding), image classification algorithms (e.g. deep learning based on CNN), open and linked databases (Open Street map, GeoNames), in order to detect and localize events at different geographical scales (International level up to city level) and classify data according to the key Disaster Risk Management processes and needs (e.g. alert and warnings, event-related measures, quantification of affected people or damaged infrastructures, request/offer for help, donation & volunteering). The task will also consider the identification and filtering of potentially malicious information (i.e. false rumors, malpractices), the potential bias of monitoring urban areas. Also, drastic decrease/absence of messages will be studied in order to detect potential network shortages. Finally, this task will create a social media dashboard for data visualization and web-based API for data sharing. The current task will contribute to the preparation of D4.[9-10].

Participation per Partner

Partner number and short name	WP4 effort
2 - ENG	6.00
3 - OTE	2.00
8 - SYN	4.00
9 - INOV	14.00
10 - LINKS	16.00
12 - KAMK	7.00
14 - UWA	19.00
20 - HRTA	3.00
23 - KGU Japan	2.00
Total	73.00

List of deliverables

Deliverable Number ¹⁴	Deliverable Title	Lead beneficiary	Type ¹⁵	Dissemination level ¹⁶	Due Date (in months) ¹⁷
D4.1	IoT computing and communication v1	9 - INOV	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D4.2	IoT computing and communication v2	9 - INOV	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D4.3	IoT middleware and IoT enabled devices v1	14 - UWA	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D4.4	IoT middleware and IoT enabled devices v2	14 - UWA	Other	Confidential, only for members of the consortium (including	30

List of deliverables

Deliverable Number ¹⁴	Deliverable Title	Lead beneficiary	Type ¹⁵	Dissemination level ¹⁶	Due Date (in months) ¹⁷
				the Commission Services)	
D4.5	Wearable computing framework and devices v1	14 - UWA	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D4.6	Wearable computing framework and devices v2	14 - UWA	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D4.7	Data fusion from IoT and wearable devices v1	9 - INOV	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D4.8	Data fusion from IoT and wearable devices v2	9 - INOV	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D4.9	Report on social media analysis v1	10 - LINKS	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D4.10	Report on social media analysis v2	10 - LINKS	Other	Confidential, only for members of the consortium (including the Commission Services)	30

Description of deliverables

D4.[1-2] IoT computing and communication [M15, M30]
D4.[3-4] IoT middleware and IoT enabled devices [M15, M30]
D4.[5-6] Wearable computing framework and devices [M15, M30]
D4.[7-8] Data fusion from IoT and wearable devices [M15, M30]
D4.[9-10] Report on social media analysis [M15, M30]
D4.1 : IoT computing and communication v1 [15]
IoT computing and communication
D4.2 : IoT computing and communication v2 [30]
IoT computing and communication
D4.3 : IoT middleware and IoT enabled devices v1 [15]
IoT middleware and IoT enabled devices
D4.4 : IoT middleware and IoT enabled devices v2 [30]

IoT middleware and IoT enabled devices
D4.5 : Wearable computing framework and devices v1 [15] Wearable computing framework and devices
D4.6 : Wearable computing framework and devices v2 [30] Wearable computing framework and devices
D4.7 : Data fusion from IoT and wearable devices v1 [15] Data fusion from IoT and wearable devices
D4.8 : Data fusion from IoT and wearable devices v2 [30] Data fusion from IoT and wearable devices
D4.9 : Report on social media analysis v1 [15] Report on social media analysis
D4.10 : Report on social media analysis v2 [30] Report on social media analysis

Schedule of relevant Milestones

Milestone number¹⁸	Milestone title	Lead beneficiary	Due Date (in months)	Means of verification
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Work package number ⁹	WP5	Lead beneficiary ¹⁰	7 - ROB
Work package title	Autonomous Vehicles		
Start month	4	End month	32

Objectives

The aim of this work package is to design and develop the autonomous vehicles that will be utilized throughout the project duration. The objectives of WP5 also include a) the development and implementation of advanced navigation features, b) SoA sensors integration on the deployed UxVs and c) the exploration and 3D mapping of complex scenes using operational UxV swarms.

Description of work and role of partners

WP5 - Autonomous Vehicles [Months: 4-32]
ROB, CETH, DH, KAMK, ADM-POL

T5.1 Design and development of a robotic platform with advanced navigation features (ROB + DH + KAMK) [M4-M32]
 This task will design and implement the robotic system, focusing on its timely and effective operation. UGVs will be ruggedized and able to work in harsh conditions of humidity and temperature. The main robot with advanced navigation features and the ability to carry multiple sensors will be implemented as an out-door autonomous vehicle based on the Polaris model from RANGER. Robotnik will make all the necessary design and development over the Polaris platform to add the following specifications: a) Improved autonomy, b) Full Off-road driving capabilities (clearances, suspension), c) Easy placement of sensors (height and connectivity), d) Predefined routing/outdoor navigation, e) manual/autonomous driving mode, f) Commands through ROS or adaptation with external HMI's, g) Bridges to other protocols, h) Sensor integration (2d,3d lasers, RTK GPS, thermal camera on board), i) Improved communications (Ubiquity commercial products Airmax (2GHz,5GHz band) for PtP, 4G LTE routers). The current task will contribute to the preparation of D5.[1-2].

T5.2 Integration of SoA sensors for navigation, mapping, communications and first response aid (KAMK + DH + ROB) [M4-M32]
 This task will design and develop the platform architectures to accommodate different common sensor technologies to use the same communication network and exchange data in a standardized manner. Sensor fusion technique recommendations will be determined accordingly to usability in establishing a situational awareness for first responder unit. Sensors will be tested in both indoor and outdoor situations and they will need to meet the environmental requirements of FASTER scenarios. The platforms will, with data collected through sensors, be able to localize persons (victims, perpetrators, first responders), determine risk factors (fire, smoke, toxins, constructive, etc.), determine routes for navigation and provide means for communication. The main goal is to provide the first responders with accurate data that will ensure a successful rescue and/or countermeasure while securing the job safety of the FR's. The current task will contribute to the preparation of D5.[3-4].

T5.3 Swarm operational capabilities to allow complex tasks (DH + CETH + ROB + ADM) [M4-M32]
 This task will design, develop and deploy a heterogeneous fleet of UxVs, mixing specific first responder platforms with commercial platforms to operate in a coordinated and flexible manner in different scenarios/mission in different swarm configurations. The goal will be to deliver a solution for deploying – in an organized and coordinated manner – multiple UxVs to acquire information about the disaster scenes where the first responders will be operating in order to utilize it both pre-operative (i.e. for planning), as well as during operations (e.g. using the estimated 3D maps - T5.5). The current task will contribute to the preparation of D5.[5-6].

T5.4 UxVs navigation and control capabilities (ROB + DH + KAMK) [M4-M32]
 This task will develop a new embedded machine learning algorithm that will be able to periodically recalibrate a certain set of parameters outlining the navigation control strategy adopted at each given instance. This module will consume data from the area coverage module, investigated and validated in ROBORDER H2020 project for border surveillance coverage levels calculation based on a given terrain map, the geometric camera area of sight and the technical visual specifications of the onboard mounted visual sensors. The surveillance coverage indicator will be considered as the main factor deciding the online optimization criterion. This tool will embed self-learning cognitive capabilities based on a model-free, Resource Controller tool. The main focus of this task will be the development of a module able to exploit fused and raw real-time data towards establishing a fully autonomous operational navigation and control framework. The current task will contribute to the preparation of D5.[7-8].

T5.5 3D Mapping the disaster scene using swarms of UxVs (ROB + CERTH + CPLAN) [M4-M32]
 This task will focus on the development of an optimized framework for region-of-interest exploration. The first element for such a mechanism will employ modern and thoroughly validated techniques for 3D map reconstruction from the collected visual measurements exploiting the available unmanned assets and the respective visual payload. The second element for such mechanism will consider a novel optimization technique, based on an efficient combination of deep learning and swarm-coordination algorithms, aiming at fully-exploiting the heterogeneous UxVs' operational capabilities (metering, endurance, moving and hovering) towards an optimized region exploration (i.e. mapping time, mapping resolution, mapping quality, mapping assets required, energy (battery) consumed, etc.) mission performance. Novel ROS robotics algorithms, drivers and tools, as PCL or RGBD-6D-SLAM will be utilized. The 3D spatial mapping will be enriched with sensor information to generate location-based information relevant to assess the area risk and pictures (extracted from a video camera) with location information. The current task will contribute to the preparation of D5.[9-10].

Participation per Partner

Partner number and short name	WP5 effort
1 - CERTH	7.00
6 - DH	22.00
7 - ROB	27.00
12 - KAMK	14.00
15 - ADM-POL	2.00
Total	72.00

List of deliverables

Deliverable Number ¹⁴	Deliverable Title	Lead beneficiary	Type ¹⁵	Dissemination level ¹⁶	Due Date (in months) ¹⁷
D5.1	Robotic platform complete design and development v1	7 - ROB	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D5.2	Robotic platform complete design and development v2	7 - ROB	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D5.3	Navigation, Sensor and Communication Architecture v1	12 - KAMK	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D5.4	Navigation, Sensor and Communication Architecture v2	12 - KAMK	Other	Confidential, only for members of the consortium (including the Commission Services)	30

List of deliverables

Deliverable Number ¹⁴	Deliverable Title	Lead beneficiary	Type ¹⁵	Dissemination level ¹⁶	Due Date (in months) ¹⁷
D5.5	Swarm of Drones Architecture v1	6 - DH	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D5.6	Swarm of Drones Architecture v2	6 - DH	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D5.7	Autonomous navigation and control tool v1	7 - ROB	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D5.8	Autonomous navigation and control tool v2	7 - ROB	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D5.9	Enriched 3D spatial mapping v1	7 - ROB	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D5.10	Enriched 3D spatial mapping v2	7 - ROB	Other	Confidential, only for members of the consortium (including the Commission Services)	30

Description of deliverables

Deliverables
D5.[1-2] Robotic platform complete design and development [M15, M30]
D5.[3-4] Navigation, Sensor and Communication Architecture [M15, M30]
D5.[5-6] Swarm of Drones Architecture [M15, M30]
D5.[7-8] Autonomous navigation and control tool [M15, M30]
D5.[9-10] Enriched 3D spatial mapping [M15, M30]

D5.1 : Robotic platform complete design and development v1 [15]
Robotic platform complete design and development

D5.2 : Robotic platform complete design and development v2 [30]
Robotic platform complete design and development

D5.3 : Navigation, Sensor and Communication Architecture v1 [15]
Navigation, Sensor and Communication Architecture

D5.4 : Navigation, Sensor and Communication Architecture v2 [30]
Navigation, Sensor and Communication Architecture

D5.5 : Swarm of Drones Architecture v1 [15]

Swarm of Drones Architecture

D5.6 : Swarm of Drones Architecture v2 [30]

Swarm of Drones Architecture

D5.7 : Autonomous navigation and control tool v1 [15]

Autonomous navigation and control tool

D5.8 : Autonomous navigation and control tool v2 [30]

Autonomous navigation and control tool

D5.9 : Enriched 3D spatial mapping v1 [15]

Enriched 3D spatial mapping

D5.10 : Enriched 3D spatial mapping v2 [30]

Enriched 3D spatial mapping

Schedule of relevant Milestones

Milestone number ¹⁸	Milestone title	Lead beneficiary	Due Date (in months)	Means of verification
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Work package number ⁹	WP6	Lead beneficiary ¹⁰	8 - SYN
Work package title	Resilient communication solutions for first responders		
Start month	4	End month	32

Objectives

The main objective of this WP6 is to provide high quality, resilient and secure communication services, even under adverse conditions, when existing communication solutions may be either unreliable or not available at all. To this end, WP6 will focus on: a) the development of a flexible, reconfigurable and 5G-enabled communications platform, b) the implementation of services related to the use cases, QoS and performance monitoring of the network, c) extending the range of existing communication capabilities through UAV swarms and d) independent emergency communication solutions.

Description of work and role of partners

WP6 - Resilient communication solutions for first responders [Months: 4-32]
 SYN, ENG, OTE, DH, ROB, INOV, UWA, SUMMA, KGU Japan

T6.1 Instantiation and reconfiguration of 5G-enabled network (OTE + SYN) [M4-M32]
 This task is responsible for the design, implementation and integration of the 5G-enabled communication platform of FASTER, considering the requirements, use cases and in particular the runtime characteristics of the services hosted on the platform to facilitate First Responders. The platform will support flexible provisioning, reconfiguration, management and orchestration of application components, including cloud resources, both centralized (to accommodate generic functions) and edge RAN (to facilitate the instantiation or reconfiguration of services upon request). With respect to the adoption of existing MANO frameworks, FASTER consortium plans to build upon the most appropriate among the available, mature and open source solutions (e.g. OPNFV, OSM, SONATA, ONAP). Moreover, this task will include the development and implementation of the network functions comprising the services of the supported use cases, following compliant ETSI NFV IFA WG interfaces and formats for the descriptors and packages of the virtual machine and Docker images. The current task will contribute to the preparation of D6.[1-2].

T6.2 Quality of Service Monitoring Framework for optimized service performance (SYN + OTE) [M4-M32]
 This task will implement and integrate the required tools within the 5G-enabled FASTER platform that would allow for the QoS control of the service and the infrastructure resources, through the monitoring of specific and relevant metrics, such as latency, bandwidth, computation efficiency, etc. Special attention will be paid in order to include the monitoring of cross-layer interactions between network and application related metrics. The important outcome of this process will be the timely reaction of the service with respect to scaling and/or placement of the service (or functions) in order to optimize the performance of the service and thus satisfy the user requirements during runtime. In this way, VNF Forwarding Graphs can adapt to the expected network performance and ensure the required QoS for the running applications. This loop consisting of the Monitoring-Analysis-Planning-Execution (MAPE) processes will build on runtime as well as batch processing of collected data and utilize Artificial Intelligence for achieving truly optimized service performance and infrastructure resource allocation. The current task will contribute to the preparation of D6. [3-4].

T6.3 UAV relay for extending communication capabilities (INOV + OTE + DH + ROB + SYN + UWA + IBIRC) [M4-M32]
 This task will extend the existent communication network by utilizing swarms of UAVs to relay communications from the nearest point with live communication. The task will implement a meshing algorithm that will automatically ensure an adaptation of the UAVs' configuration in order to have continuous communication at the required QoS, independently of the First Responders location within the disaster area. T6.3 will also develop efficient algorithms to compute the optimal position of the drone for either maximizing the data rate or minimizing the power transmission, according to the requirements (i.e., extending the communication or transmitting wearables data). The current task will contribute to the preparation of D6.[5-6].

T6.4 Low cost, emergency communication devices for citizen and first responder notification (UWA + SYN + INOV + SUMMA + IBIRC) [M4-M32]
 This task will develop a low-cost emergency communication device, suitable to be deployed in the early stages of an emergency, allowing communication between First Responders and civilians. Design principles will include independence from existing communication infrastructures, still allowing the transmission of messages containing basic

instructions able to be received in the effective broadcasting area of the device. To extend this range, the task will also emphasize on the design of the appropriate deployment framework enabling the combination of several devices in order to create an ad hoc broadcasting infrastructure. Applications targeting mobile phones and smartwatches will be implemented in order to enable the capturing and presentation of critical information delivered over the emergency communication devices, in a safe from tampering mode, using encoding of the transmitted information, and the multiplexed broadcasting of messages targeting different groups (Citizens/Responders). The current task will contribute to the preparation of D6.[7-8].

T6.5 Distributed network of trust based on blockchain and smart contract technologies (IBIRC + ENG + INOV + UWA) [M4-M32]

This task will implement a distributed network of trust through blockchain and smart contract technologies, suitable to provide trusted, decentralized transparency across numerous parties, making it possible to help align emerging demands for relief with the most readily available resources and capabilities provided by first responders, LAEs, aid agencies, community members, volunteers, IoT devices, wearables, UxVs, and other participants. Thus making it possible to bring assistance and resources where and when it is most needed. This distributed network of truth will give all parties involved in the relief effort the ability to write and read relevant data on an open platform, thus speeding up the first responders' response and efficiency to a whole new level. This distributed network of trust will operate as an ad hoc supply chain network on mobile apps, operational control centres, IoT, wearables, drones and other participants to connect demands with supplies. Where demands can be any request for assistance and supplies can be any resource or service that fulfills the demands and can be provided by any participant including humans, organizational entities or devices such as UxVs, IoT and wearables. Here smart contract technology will make it possible to determine which offer is the best one based on relief needs, triggering acceptance of the offer, and setting in motion delivery of the first responder relief. The current task will contribute to the preparation of D6.[9-10].

Participation per Partner

Partner number and short name	WP6 effort
2 - ENG	3.00
3 - OTE	20.00
6 - DH	1.00
7 - ROB	3.00
8 - SYN	21.00
9 - INOV	14.00
14 - UWA	13.00
16 - SUMMA	1.00
CMFF	0.50
ESDP	0.50
23 - KGU Japan	16.00
Total	93.00

List of deliverables

Deliverable Number ¹⁴	Deliverable Title	Lead beneficiary	Type ¹⁵	Dissemination level ¹⁶	Due Date (in months) ¹⁷
D6.1	5G-enabled network v1	3 - OTE	Other	Confidential, only for members of the consortium (including	15

List of deliverables

Deliverable Number ¹⁴	Deliverable Title	Lead beneficiary	Type ¹⁵	Dissemination level ¹⁶	Due Date (in months) ¹⁷
				the Commission Services)	
D6.2	5G-enabled network v2	3 - OTE	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D6.3	Quality of Service Monitoring Framework v1	8 - SYN	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D6.4	Quality of Service Monitoring Framework v2	8 - SYN	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D6.5	Extending communication capabilities though UAV swarms v1	9 - INOV	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D6.6	Extending communication capabilities though UAV swarms v2	9 - INOV	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D6.7	Emergency Communication devices v1	14 - UWA	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D6.8	Emergency Communication devices v2	14 - UWA	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D6.9	Distributed network of trust v1	23 - KGU Japan	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D6.10	Distributed network of trust v2	23 - KGU Japan	Other	Confidential, only for members of the consortium (including the Commission Services)	30

Description of deliverables

D6.[1-2] 5G-enabled network [M15, M30]
 D6.[3-4] Quality of Service Monitoring Framework [M15, M30]
 D6.[5-6] Extending communication capabilities through UAV swarms [M15, M30]
 D6.[7-8] Emergency Communication devices [M15, M30]
 D6.[9-10] Distributed network of trust [M15, M30]

D6.1 : 5G-enabled network v1 [15]
 5G-enabled network

D6.2 : 5G-enabled network v2 [30]
 5G-enabled network

D6.3 : Quality of Service Monitoring Framework v1 [15]
 Quality of Service Monitoring Framework

D6.4 : Quality of Service Monitoring Framework v2 [30]
 Quality of Service Monitoring Framework

D6.5 : Extending communication capabilities though UAV swarms v1 [15]
 Extending communication capabilities though UAV swarms

D6.6 : Extending communication capabilities though UAV swarms v2 [30]
 Extending communication capabilities though UAV swarms

D6.7 : Emergency Communication devices v1 [15]
 Emergency Communication devices

D6.8 : Emergency Communication devices v2 [30]
 Emergency Communication devices

D6.9 : Distributed network of trust v1 [15]
 Distributed network of trust

D6.10 : Distributed network of trust v2 [30]
 Distributed network of trust

Schedule of relevant Milestones

Milestone number¹⁸	Milestone title	Lead beneficiary	Due Date (in months)	Means of verification
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Work package number ⁹	WP7	Lead beneficiary ¹⁰	4 - DXT
Work package title	Improving protection and capacity for individual first responders		
Start month	4	End month	32

Objectives

The aim of this WP is to deliver a set of technologies to improve the situational awareness of the first responders and boost their capacity and effectiveness in the field. Overall, the delivered technologies will be designed in an ergonomic manner so as to not obstruct the first responders during their operations. Therefore, the focus will be on wearable technologies and hand gestures, as well as offering augmented vision and visualization of information in a natural, intuitive and unobstructed manner. The first responders will be accompanied by a personal mini-UxV to extend their vision capacity, which will be controlled in an exocentric manner via gestures. Further, edge processing will be deployed on their wearable/AR devices to allow for localisation and understanding of the scenes as well as communication with their accompanying K9 units.

Description of work and role of partners

WP7 - Improving protection and capacity for individual first responders [Months: 4-32]
DXT, CERTH, ENG, DH, ROB, LINKS, KAMK, UWA, ENSOSP, HRTA

T7.1 Gesture recognition applications for controlling devices and UxVs (CERTH + DH + ROB + ISMB + UWA) [M4-M32]
 T7.1 will be responsible to deliver automatic gesture recognition solutions for actions performed by the first responders and convert them into control commands issued to the corresponding devices. To that end, T7.1 will receive raw sensory data streams from multiple wearable devices and motion sensors embedded in the first responders' gear. Subsequently, machine learning models will be trained to recognize a selected set of gestures. These will be selected in cooperation with the end-users so as to offer plausible and ergonomic gesture control and communication capabilities to the first responder users. Recent advances in deep learning such as hybrid and multi-path deep Convolutional/Recurrent Neural Networks (CNN/RNN) will be utilised, combined with Long Short-Term Memory (LSTM) cells. The goal will be real-time gesture recognition with high recall and precision rates. Advanced data augmentation, unsupervised and incremental learning, as well as multiple regularization and dropout techniques, will be leveraged to ensure proper training and robustness to missing or malfunctioning individual sensors. Another layer of training will be employed to translate the recognized gestures to the corresponding commands and deliver them to the coupled devices and UxVs for actuation and navigation respectively. The current task will contribute to the preparation of D7.[1-2].

T7.2 UxV-extended human vision (CERTH + DH + ROB + UWA) [M4-M32]
 T7.2 will provide advanced AR vision technologies to first responders, enabling them to virtually inspect and navigate unreachable areas. To that end, a set of different UxVs will be first employed to map the area of interest (T5.5), providing T7.2 with a 3D model of the scene. This task's goal is to offer an exocentric X-Ray like view of occluded areas using a personal mini-UAV. To achieve, two ways will be investigated, first, by utilizing the pre-scanned 3D model of the environment (T5.5) and operating on a localisation basis, and second, by locally registering the UAV's exocentric view with the user's egocentric one, and using image-based rendering techniques to overlay the hidden area visuals on top of the occluding obstacles. The scene will be re-rendered and visualized using see-through AR devices (head-mounted displays or mobiles), providing an X-Ray like view of the scene with the geometry between the first responder and the area of interest either made transparent or removed, allowing the first responder to see through walls and other obstacles. The responder will be able to inspect the scene both from his physical viewpoint in a mixed-reality mode, select another virtual viewpoint or view the UAV's camera feed in the first-person mode. Aided by advanced AR vision, first responders will better understand the surrounding structures and will be able to control and navigate the UAVs to reposition them using gesture control (T7.1). The current task will contribute to the preparation of D7.[1-2].

T7.3 First responder and K9 localization and local situational awareness (UWA + CERTH + ENG + DXT + ROB + HRTA) [M4-M32]
 This task will develop a module for estimating the first responder and K9 unit's position to be shared with the other emergency operators leveraging on the sensor values produced by the wearable devices, including the AR equipment. The registration will be performed locally on the AR device using its sensors if exploitable in the first responder environment; otherwise, positioning will be done in degraded mode using GPS/EGNSS/INS techniques. The resulting position will also be transferred to the FASTER cloud infrastructure for filtering and aggregation processing. Fused information will be directly displayed in the Portable COP for subject tracking.

Additionally, this task will also develop applications for smart-watches and wearables devices (equipped on humans and animals) exploiting a Deep Learning model to provide a framework over which capturing and identifying arm/body movements. Given that first responders may be situated in conditions which make it difficult to communicate with centralised infrastructure (i.e. a burning building), a classification algorithm will be deployed at the wearable device and its output will be transferred to other edge devices exploiting IoT communication protocols (e.g., BLE). The results are expected to be twofold: a) the first responder will be able to translate the signal movements or alerts from the wearables to simple coded messages and communicate them in a non-visual/non-audible way through vibrations (again using the wearable devices) that follow the Morse code to provide haptic communication, b) extract valuable information about K9 behavior (e.g., movement or bark) and translate it to specific messages that can be transmitted wirelessly through IoT communication protocols to first responders. The current task will contribute to the preparation of D7.[3-4].

T7.4 AI tools for disaster scene analysis, risk anticipation and early warning (DXT + CERTH + ENG + ISMB + KAMK + UWA) [M4-M32]

This task will be in charge of implementing a module to collect, fuse, and deliver most of the FASTER data coming from and to first responders. First, it will receive commands and supportive data from the PCOP/C2. These will need to be combined with data provided by the wearable/IoT/AR devices. It will then fuse it in a combined manner to produce a minimal set of information to provide to the first-responder. Data fusion will be handled by employing state-of-the-art machine learning algorithms, trained to identify, detect and recognize information related to potential risks. This will allow for early warning and coordinated planning of responses to unforeseen circumstances and situations that will arise during the first responders’ deployment in the field. The current task will contribute to the preparation of D7.[5-6].

T7.5 User-intuitive interfaces for AR-enabled devices (DXT + ROB + UWA + ENSOSP) [M4-M32]

This task will be in charge of researching, designing and developing user-intuitive interfaces for AR devices for critical operations in uncontrolled environments. After creating a taxonomy of user interfaces and interactions used in existing AR, VR and 3D applications, T7.6 will research and develop new interaction and visual metaphors suitable for first-responders. Techniques such as paper prototyping or wireframing will be used to present prototypes to users on a very regular basis and adapt according to their feedback. This task will ensure that all the displayed information is provided in non-disruptive ways, yet legible and intuitive to manipulate. Deep attention will be paid to deal with the transition between accurate and approximate position of the first responder to find the best way to avoid misleading her/him with digital information that does not precisely match the real-world element they refer to. Smartphones and AR glasses will be targeted, focusing respectively on touch screen interactions and “holographic” AR with hands-free interactions in conjunction with T7.2 outcomes. The current task will contribute to the preparation of D7.[7-8].

Participation per Partner

Partner number and short name	WP7 effort
1 - CERTH	33.00
2 - ENG	4.00
4 - DXT	25.00
6 - DH	2.00
7 - ROB	4.00
10 - LINKS	11.00
12 - KAMK	2.00
14 - UWA	11.00
17 - ENSOSP	2.00
20 - HRTA	3.00
Total	97.00

List of deliverables

Deliverable Number ¹⁴	Deliverable Title	Lead beneficiary	Type ¹⁵	Dissemination level ¹⁶	Due Date (in months) ¹⁷
D7.1	UxV-extended human vision with gesture-based controls v1	1 - CERTH	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D7.2	UxV-extended human vision with gesture-based controls v2	1 - CERTH	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D7.3	First responder localization and local situational awareness v1	14 - UWA	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D7.4	First responder localization and local situational awareness v2	14 - UWA	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D7.5	AI tools for disaster scene analysis, risk anticipation and early warning v1	4 - DXT	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D7.6	AI tools for disaster scene analysis, risk anticipation and early warning v2	4 - DXT	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D7.7	User-intuitive interfaces for AR-enabled devices v1	4 - DXT	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D7.8	User-intuitive interfaces for AR-enabled devices v2	4 - DXT	Other	Confidential, only for members of the consortium (including the Commission Services)	30

Description of deliverables

D7.[1-2] UxV-extended human vision with gesture-based controls [M15, M30]
 D7.[3-4] First responder localization and local situational awareness [M15, M30]
 D7.[5-6] AI tools for disaster scene analysis, risk anticipation and early warning [M15, M30]
 D7.[7-8] User-intuitive interfaces for AR-enabled devices [M15, M30]
 D7.1 : UxV-extended human vision with gesture-based controls v1 [15]

UxV-extended human vision with gesture-based controls
D7.2 : UxV-extended human vision with gesture-based controls v2 [30]
UxV-extended human vision with gesture-based controls
D7.3 : First responder localization and local situational awareness v1 [15]
First responder localization and local situational awareness
D7.4 : First responder localization and local situational awareness v2 [30]
First responder localization and local situational awareness
D7.5 : AI tools for disaster scene analysis, risk anticipation and early warning v1 [15]
AI tools for disaster scene analysis, risk anticipation and early warning
D7.6 : AI tools for disaster scene analysis, risk anticipation and early warning v2 [30]
AI tools for disaster scene analysis, risk anticipation and early warning
D7.7 : User-intuitive interfaces for AR-enabled devices v1 [15]
User-intuitive interfaces for AR-enabled devices
D7.8 : User-intuitive interfaces for AR-enabled devices v2 [30]
User-intuitive interfaces for AR-enabled devices

Schedule of relevant Milestones

Milestone number¹⁸	Milestone title	Lead beneficiary	Due Date (in months)	Means of verification
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Work package number ⁹	WP8	Lead beneficiary ¹⁰	2 - ENG
Work package title	Team-oriented enhanced situational awareness tools		
Start month	4	End month	32

Objectives

WP8 will provide innovative and efficient tools for situation awareness through an integrated approach based on a team-oriented vision, leveraging data coming from the sensors and systems (see WP4, WP5, and WP7). First Responders will be fostered to use enhanced tools being supported by data visualisation and augmented reality (AR) solutions for increasing both situational awareness and risk assessment while enhancing their decision-making capability. More specifically, WP8 aims to: a) enhance situational awareness by developing innovative tools and using a “just in time” feed model to avoid information overload, b) provide novel integrated solutions and live imagery to achieve complex tasks in an efficient way and c) implement solutions based on data visualisation and augmented reality for a more efficient display of the absolutely necessary information to the first responders.

Description of work and role of partners

WP8 - Team-oriented enhanced situational awareness tools [Months: 4-32]
ENG, DXT, LINKS, KAMK, UWA, WSPOL, KAJ, CSIP

T8.1 Knowledge-based modelling for “just in time” information retrieval (ENG + UWA) [M4-M32]
 This task will define the FASTER information and knowledge models as a standard specification for representing real events in computing machines. The information extracted by heterogeneous sources (sensors, robots, UAVs and mobile devices) will be normalized according to the FASTER knowledge models and will be represented as “events” in computing systems representing what happened in the real world. In FASTER, events will refer to real entities (e.g., persons, infrastructure, vehicles, etc.) and man-made or natural hazards (e.g., flooding, earthquake or buildings collapsed). In this context, the harmonisation of the extracted information is very important to allow the representation of the positions of first responders and resources, as well as highlight dangerous areas. The definition of the FASTER knowledge models will lead the information representation starting from the information extraction, through the event processing that provides the event information growing until the situation building that allows the representation of the situation awareness that means to represent the critical situation in progress. This task will contribute to deliverable D8.[1-2].

T8.2 Services for enhanced situational picture (ENG + KAMK + UWA) [M4-M32]
 This task will define and develop a multilayer information processing able to process diverse types of data and information coming from heterogeneous data sources, namely IoT devices and sensors as well as UxVs for real-time situational awareness. Once the desired information is extracted and normalized according to the FASTER knowledge models (as described in T8.1), it will be correlated with other relevant events, including relevant event handling and integrated with historical data and external (not yet integrate) information sources for building the real-time situational picture with higher level information (e.g. risk-level, risky zones/areas, people at risk, etc.) through complex event processing techniques, to avoid possible redundancies and to reduce the computational complexity. In addition, data and information resulting from the UxVs swarms enabling disaster scene 3D mapping (T5.5) will be integrated and correlated to generate a team-oriented situational picture. This task will contribute to deliverable D8.[3-4].

T8.3 Data visualisation and AR tools for collaboration (DXT + ENG + ISMB + KAMK + WSPOL + KAJ) [M4-M32]
 This task will exploit the results of WP7 to build the collaborative AR capabilities of the FASTER platform and deliver the mobile AR system augmenting first responders' experience within emergency scenes. Both indoor and outdoor environments will be supported and augmented with spatial information regarding the incidents, localized alerts, safety information or other first responders' location. The proposed system will offer fully registered AR capabilities, enabling fine positioning of safety elements superimposed to the first responder's view. To guide first responders within unknown places, T8.3 will develop path planning functions, either providing guidance to first responders or using a path directly designated from the Portable Control Centre. This task will also develop a module of the mobile AR system enabling for first responders place and display persistent AR annotations on the field. These annotations will enable first responders to exchange information about a specific location with other practitioners and control center operators to manually place information in a 3D map. This task will contribute to deliverable D8.[5-6].

T8.4 Mobile application for effective response management (ISMB + ENG + RP) [M4-M32]

Within this task, an intelligent mobile application for first responders will be designed, implemented and tested, able to deliver/retrieve multimedia geo-located contents from in-field agent from/to their smartphones in real-time, supporting both gestures and voice command. The reference usage scenario will be a wrist-mounted smartphone and associated wearable devices delivering biometric and environmental measures, as well as signals related to the in-field agent activities and safety. The mobile application will be capable of receiving missions and tasks from a control center and updating their progress while sending additional geo-located reports to improve the situational awareness of decision makers sitting at control rooms. A multi-agency scenario will be supported, including the involvement of volunteers. A web-based back-office application for control center will be implemented to allow mission management, data visualization and validation, as well as data exchange with other software modules. This task will contribute to deliverable D8.[7-8].

Participation per Partner

Partner number and short name	WP8 effort
2 - ENG	36.00
4 - DXT	10.00
10 - LINKS	13.00
12 - KAMK	2.00
14 - UWA	4.00
18 - WSPOL	1.00
19 - KAJ	1.00
22 - CSIP	3.00
Total	70.00

List of deliverables

Deliverable Number ¹⁴	Deliverable Title	Lead beneficiary	Type ¹⁵	Dissemination level ¹⁶	Due Date (in months) ¹⁷
D8.1	FASTER Knowledge Models for the Information Retrieval v1	2 - ENG	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D8.2	FASTER Knowledge Models for the Information Retrieval v2	2 - ENG	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D8.3	Tools for enhanced situational awareness in the CC v1	2 - ENG	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D8.4	Tools for enhanced situational awareness in the CC v2	2 - ENG	Other	Confidential, only for members of the consortium (including	30

List of deliverables

Deliverable Number ¹⁴	Deliverable Title	Lead beneficiary	Type ¹⁵	Dissemination level ¹⁶	Due Date (in months) ¹⁷
				the Commission Services)	
D8.5	Data visualisation and AR tools for collaboration v1	4 - DXT	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D8.6	Data visualisation and AR tools for collaboration v2	4 - DXT	Other	Confidential, only for members of the consortium (including the Commission Services)	30
D8.7	Mobile application for effective response management v1	10 - LINKS	Other	Confidential, only for members of the consortium (including the Commission Services)	15
D8.8	Mobile application for effective response management v2	10 - LINKS	Other	Confidential, only for members of the consortium (including the Commission Services)	30

Description of deliverables

D8.[1-2] FASTER Knowledge Models for the Information Retrieval [M15, M30]
 D8.[3-4] Tools for enhanced situational awareness in the CC [M15, M30]
 D8.[5-6] Data visualisation and AR tools for collaboration [M15, M30]
 D8.[7-8] Mobile application for effective response management [M15, M30]

D8.1 : FASTER Knowledge Models for the Information Retrieval v1 [15]
 FASTER Knowledge Models for the Information Retrieval

D8.2 : FASTER Knowledge Models for the Information Retrieval v2 [30]
 FASTER Knowledge Models for the Information Retrieval

D8.3 : Tools for enhanced situational awareness in the CC v1 [15]
 Tools for enhanced situational awareness in the CC

D8.4 : Tools for enhanced situational awareness in the CC v2 [30]
 Tools for enhanced situational awareness in the CC

D8.5 : Data visualisation and AR tools for collaboration v1 [15]
 Data visualisation and AR tools for collaboration

D8.6 : Data visualisation and AR tools for collaboration v2 [30]
 Data visualisation and AR tools for collaboration

D8.7 : Mobile application for effective response management v1 [15]
 Mobile application for effective response management

D8.8 : Mobile application for effective response management v2 [30]

Mobile application for effective response management

Schedule of relevant Milestones

Milestone number¹⁸	Milestone title	Lead beneficiary	Due Date (in months)	Means of verification
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Work package number ⁹	WP9	Lead beneficiary ¹⁰	9 - INOV
Work package title	Integration		
Start month	10	End month	36

Objectives

The main objective of this WP is to provide the complete FASTER system fully integrated, tested in a laboratory environment and validated for deployment and usage in a real environment. These goals are achieved through detailed planning and continuous support and splitting the technological integration into 2 areas (one of the tools for the first responders and another for the communication functionalities) and finally validation and testing of the results. The activities should release an intermediate report of the activities and a final report with the validation.

Description of work and role of partners

WP9 - Integration [Months: 10-36]
INOV, CERTH, ENG, OTE, DXT, ROB, SYN, LINKS, KAMK, UWA, CSIP, KGU Japan
 Description of work
T9.1 Continuous integration planning and support (INOV + CERTH + ENG + DXT + ROB + SYN + ISMB + UWA + RP) [M10-M33]
 The software and systems integration methodology provides a consistent approach to effective integration activities and is integral to the development of an advanced situational awareness system. The software units, components, and sub-systems will be assembled by the software designers and test teams to ensure the software and systems elements are created properly. The integration levels and the development plan (DP) for software determine if constructed elements are ready and subject to verification or validation activities. The development plan establishes the plan for the development of software during the phase of the program. This plan establishes system level engineering standards, practices, and guidelines for the development of CI and non-CI system software. The effective methods and processes for software and systems integration require disciplined software design and development practices, including test planning, test execution, configuration control, quality, and reporting to management and the customer of the work product being tested inside integration facilities. Successful software and systems integration objectives are accomplished by a) agreeing and identifying blocking issues, b) assigning responsibility to fixing blocking issues, c) scheduling dates from responsible teams, d) holding periodic meetings until issues and concerns are closed out and e) evaluating current integration facilities schedules. This task will contribute to deliverable D9.[1-2].

T9.2 Integration of tools for individual first responders (CERTH + ENG + DXT + ROB + INOV + ISMB + KAMK + UWA) [M16-M33]
 This task will integrate the software and the hardware components of the technical WPs’ tools to ensure their interoperation. To this end, coordinated testing with the software and hardware designers and test teams will ensure that the software and hardware systems elements and standalone tools are working together properly. The effective methods and processes for software and systems integration require disciplined software and hardware design and development practices that will be taken into consideration. This task will contribute to deliverable D9.[3-4].

T9.3 Integration of communication and IoT components (INOV + OTE + KAMK + UWA + IBIRC) [M16-M33]
 This task will take as input T4.1, T4.2 and T6.2 in order to ensure that both the extension of the communication and the wearable IoT will be integrated into a single platform that can be mounted on a UAV. This task will contribute to deliverable D9.[5-6].

T9.4 System validation and testing (INOV + CERTH + ENG + DXT + ROB + SYN + KAMK + UWA + RP + IBIRC) [M16-M36]
 The objective of this task is to validate that the developed solutions comply with the defined requirements. The task will define the methodology and testing plan as well as the quality metrics that can be applied to monitor and assess the quality of developed systems. In this task, the integrated FASTER solutions, namely tools and communication/IoT components (T9.2 and T9.3) will be deployed for the final testing and validation of the specific use cases. All necessary functional tests will be performed to continuously validate the correct integration between the several developed systems. This will be performed in the technical partners’ lab where the end-users will evaluate the prototypes. This task, therefore, focuses on functional lab trials of the FASTER solutions, to be performed whenever the first version of a system is available. This task will contribute to deliverable D9.[7-8].

Participation per Partner

Partner number and short name	WP9 effort
1 - CERTH	11.00
2 - ENG	10.00
3 - OTE	4.00
4 - DXT	6.00
7 - ROB	4.00
8 - SYN	5.00
9 - INOV	18.00
10 - LINKS	2.00
12 - KAMK	5.00
14 - UWA	7.00
22 - CSIP	2.00
23 - KGU Japan	4.00
Total	78.00

List of deliverables

Deliverable Number ¹⁴	Deliverable Title	Lead beneficiary	Type ¹⁵	Dissemination level ¹⁶	Due Date (in months) ¹⁷
D9.1	Integration plans v1	9 - INOV	Report	Confidential, only for members of the consortium (including the Commission Services)	15
D9.2	Integration plans v2	9 - INOV	Report	Confidential, only for members of the consortium (including the Commission Services)	30
D9.3	Integration of tools for first responders v1	1 - CERTH	Other	Confidential, only for members of the consortium (including the Commission Services)	18
D9.4	Integration of tools for first responders v2	1 - CERTH	Other	Confidential, only for members of the consortium (including the Commission Services)	33
D9.5	Integration of communication and IoT components v1	9 - INOV	Other	Confidential, only for members of the consortium (including	18

List of deliverables

Deliverable Number ¹⁴	Deliverable Title	Lead beneficiary	Type ¹⁵	Dissemination level ¹⁶	Due Date (in months) ¹⁷
				the Commission Services)	
D9.6	Integration of communication and IoT components v2	9 - INOV	Other	Confidential, only for members of the consortium (including the Commission Services)	33
D9.7	System validation and testing v1	9 - INOV	Report	Confidential, only for members of the consortium (including the Commission Services)	21
D9.8	System validation and testing v2	9 - INOV	Report	Confidential, only for members of the consortium (including the Commission Services)	36

Description of deliverables

D9.[1-2] Integration plans [M15, M30]
D9.[3-4] Integration of tools for first responders [M18, M33]
D9.[5-6] Integration of communication and IoT components [M18, M33]
D9.[7-8] System validation and testing [M21, M36]

D9.1 : Integration plans v1 [15]
Integration plans

D9.2 : Integration plans v2 [30]
Integration plans

D9.3 : Integration of tools for first responders v1 [18]
Integration of tools for first responders

D9.4 : Integration of tools for first responders v2 [33]
Integration of tools for first responders

D9.5 : Integration of communication and IoT components v1 [18]
Integration of communication and IoT components

D9.6 : Integration of communication and IoT components v2 [33]
Integration of communication and IoT components

D9.7 : System validation and testing v1 [21]
System validation and testing

D9.8 : System validation and testing v2 [36]
System validation and testing

Schedule of relevant Milestones

Milestone number¹⁸	Milestone title	Lead beneficiary	Due Date (in months)	Means of verification
MS4	First Integrated Tool and Components Versions Delivered	9 - INOV	18	First Integrated Tool and Components Versions Delivered
MS6	Updated Technologies based on feedback received from pilot 1	9 - INOV	30	Updated Technologies based on feedback received from pilot 1

Work package number ⁹	WP10	Lead beneficiary ¹⁰	5 - CPLAN
Work package title	Pilot Demonstration and Evaluation		
Start month	7	End month	36

Objectives

This work package will: a) design appropriate scenarios for demonstrating the FASTER system, b) demonstrate the FASTER system in pilots that simulate real-life conditions of the work of first responders, c) evaluate the performance of the FASTER system, d) measure and assess the extent to which employing FASTER facilitates first responder operations and e) report on the validation of the FASTER tools, technologies and approaches

Description of work and role of partners

WP10 - Pilot Demonstration and Evaluation [Months: 7-36]
CPLAN, CERTH, ENG, OTE, DXT, ROB, SYN, LINKS, KPRF, KAMK, VUB, UWA, ADM-POL, SUMMA, ENSOSP, WSPOL, KAJ, HRTA, MG, CSIP, KGU Japan

T10.1 Scenario definition and pilot planning (CPLAN + CERTH + ENG + DXT + ROB + SYN + ISMB + KPRF + KAMK + UWA + ADM + SUMMA + ENSOSP + WPSOL + KAJ + HRTA + MG + RP + IBRC) [M7-M30]
 The performance of the FASTER system and its added value to first responder operations will be demonstrated in three pilots. The corresponding scenarios revolve around structural collapse, flooding, and terrorism. With input from WP3 (in particular, user requirements and use cases), the details of the initial scenarios will be refined to present the participant first responders with realistic challenges. In terms of pilot planning, this task will ensure close collaboration between the end-users involved in the pilots and the technical developers to enable the identification of relevant evaluation criteria and the measurement thereof (T10.3). Finally, this task will take into account the evaluation results of each pilot and adjust the planning of the upcoming ones, if necessary. This task will contribute to deliverable D10.[1-2].

T10.2 End-user training (including methodologies and technologies) (CPLAN + DXT + ROB + ADM + SUMMA + ENSOSP + WPSOL + KAJ + HRTA + MG + RP) [M16-M36]
 A relevant aspect of the FASTER project is education as both technology and users' needs are constantly evolving. Therefore, there is a requirement to not just provide the project results to those working in the emergency management, but also to educate them about the underlying principles, approaches and development strategy of the project. In order to facilitate a more effective and efficient way of making sure that FASTER users and stakeholders at all levels are educated, FASTER includes the definition of a training module that will be provided through the development of dedicated seminar/conference/workshop events organized with the aim to familiarize the end-users with the FASTER tools. In this way, the end-users operate the FASTER tools without the assistance of the technical developers. This task will contribute to deliverable D10.[3-4].

T10.3 Pilot preparation and execution in relevant environments (including engagement and field testing) (SUMMA + CERTH + ENG + OTE + DXT + CPLAN + ROB + SYN + KAMK + UWA + ADM + ENSOSP + KAJ + HRTA + MG + RP + IBRC) [M10-M36]
 In this task experimental test-beds and demos will be set up, integrating all the components that will reflect the characteristics of the actual building blocks of a real setup from the use cases (T3.1). The test-beds and demos will be configured based on the requirements and field data, as well as on specific resource and infrastructure that will be provided by the pilot owners. Moreover, this task is dedicated to running the FASTER tools demonstration according to the trial setup previously defined. In addition, this task deals with the definition of the plan for managing demonstration activities. Based on the use cases, the demonstration plan will ascertain that all designed services are covered by the demonstrators and that all project KPIs are measured. This report uses the information available from T3.1 regarding the use case scenarios and requirements elicitation. This task will contribute to deliverable D10.[5-6].

T10.4 Impact Assessment and evaluation for first responders (MG + CERTH + CPLAN + KPRF + VUB + ADM + SUMMA + ENSOSP + WPSOL + KAJ + HRTA + RP) [M19-M36]
 Based on the lesson learned in the field tests that will take place in the three different pilot sites, using real-life testing to verify the performance of first responders using the FASTER solutions and methodologies, this task will evaluate of the proposed technological solutions and methods and assess their impact for first responders. Feedback will be obtained in a qualitative and quantitative manner and a measure of the success of the trials will be provided. The validation results will be directed into the internal feedback process, aiming at improvements of the FASTER components and domain-specific services, from technical and innovation perspectives. This task will contribute to deliverable D10.7.

Participation per Partner

Partner number and short name	WP10 effort
1 - CERTH	6.00
2 - ENG	4.00
3 - OTE	3.00
4 - DXT	5.00
5 - CPLAN	22.00
7 - ROB	4.00
8 - SYN	3.00
10 - LINKS	1.00
11 - KPRF	4.00
12 - KAMK	4.00
13 - VUB	2.00
14 - UWA	2.00
15 - ADM-POL	13.00
16 - SUMMA	4.00
CMFF	4.00
ESDP	4.00
FIIBAP	1.00
17 - ENSOSP	10.00
18 - WSPOL	5.00
19 - KAJ	10.00
20 - HRTA	14.00
21 - MG	15.00
22 - CSIP	11.00
RP	2.00
23 - KGU Japan	4.00
Total	157.00

List of deliverables

Deliverable Number ¹⁴	Deliverable Title	Lead beneficiary	Type ¹⁵	Dissemination level ¹⁶	Due Date (in months) ¹⁷
D10.1	Scenarios and pilot planning v1	5 - CPLAN	Report	Confidential, only for members of the consortium (including	15

List of deliverables

Deliverable Number ¹⁴	Deliverable Title	Lead beneficiary	Type ¹⁵	Dissemination level ¹⁶	Due Date (in months) ¹⁷
				the Commission Services)	
D10.2	Scenarios and pilot planning v2	5 - CPLAN	Report	Confidential, only for members of the consortium (including the Commission Services)	30
D10.3	End-user training v1	5 - CPLAN	Other	Confidential, only for members of the consortium (including the Commission Services)	18
D10.4	End-user training v2	5 - CPLAN	Other	Confidential, only for members of the consortium (including the Commission Services)	33
D10.5	Trials setup, pilot execution and demonstration v1	16 - SUMMA	Report	Confidential, only for members of the consortium (including the Commission Services)	21
D10.6	Trials setup, pilot execution and demonstration v2	16 - SUMMA	Report	Confidential, only for members of the consortium (including the Commission Services)	36
D10.7	Impact Assessment and evaluation for first responders	21 - MG	Report	Confidential, only for members of the consortium (including the Commission Services)	36

Description of deliverables

Deliverables
D10.[1-2] Scenarios and pilot planning [M15, M30]
D10.[3-4] End-user training [M18, M33]
D10.[5-6] Trials setup, pilot execution and demonstration [M21, M36]
D10.7 Impact Assessment and evaluation for first responders [M36]
D10.1 : Scenarios and pilot planning v1 [15]
Scenarios and pilot planning
D10.2 : Scenarios and pilot planning v2 [30]
Scenarios and pilot planning
D10.3 : End-user training v1 [18]
End-user training
D10.4 : End-user training v2 [33]

End-user training

D10.5 : Trials setup, pilot execution and demonstration v1 [21]
 Trials setup, pilot execution and demonstration

D10.6 : Trials setup, pilot execution and demonstration v2 [36]
 Trials setup, pilot execution and demonstration

D10.7 : Impact Assessment and evaluation for first responders [36]
 Impact Assessment and evaluation for first responders

Schedule of relevant Milestones

Milestone number¹⁸	Milestone title	Lead beneficiary	Due Date (in months)	Means of verification
MS5	First Pilots Completed	5 - CPLAN	21	First Pilots Completed
MS7	Final Tools and Components Delivered, Start of final Pilots	5 - CPLAN	33	Final Tools and Components Delivered, Start of final Pilots

Work package number ⁹	WP11	Lead beneficiary ¹⁰	11 - KPRF
Work package title	Dissemination and Exploitation		
Start month	1	End month	36

Objectives

This WP concerns a wide involvement of first responders, administrations and civil protection entities in Europe as potential end-user of FASTER infrastructure. It will deal with the interactive dissemination of the project results, which is also a strategic task to fine-tune project outcomes. As such, it entails the definition of the Dissemination and Communication plans, the implementation of the communication materials (brochures, logo, visual identity) for the project, the setup of the project web site, the organising and participation in events focused on stakeholders enlargement and a strong action of liaison with other on-going project and existing networks operating in the same area. Proper dissemination level measures will be taken during the project course. Another key objective of this WP is to capitalize the innovation achieved, plan and develop actions for future sustainability and further exploitation in order to facilitate the future adoption of FASTER results by first responders. This work package is fundamental for guaranteeing the success of FASTER, its wide impact, and its future sustainability after the project deadline. Relevant stakeholders identified in T11.5 will be actively involved in the WP in order to draft the innovation plan based on users' feedback and to foster the adoption of the FASTER approach in disasters response.

Description of work and role of partners

WP11 - Dissemination and Exploitation [Months: 1-36]
KPRF, CERTH, ENG, DXT, CPLAN, ROB, SYN, INOV, LINKS, KAMK, UWA, ADM-POL, SUMMA, ENSOSP, WSPOL, KAJ, HRTA, MG, CSIP, KGU Japan

T11.1 Interactive Dissemination and Communication (KPRF + CERTH + ENG + DXT + CPLAN + ROB + SYN + INOV + ISMB + KAMK + UWA + ADM + SUMMA + ENSOSP + WSPOL + KAJ + HRTA + MG + RP + IBIRC) [M1-M36]
 In this task, all partners, under the guidance of T11.1 leader, will agree on general interactive dissemination strategies, plan all the dissemination tools and the communication channels to be used during the project and harmonise these with the local project's spreading activities. A timeline will be agreed together with commitments for each partner. The dissemination plan will cross all WPs for the entire duration of the project. Milestones will be established to ascertain across the 36 months the effective attainment of all the impact objectives set. Furthermore, all partners will be involved in targeted dissemination and communication activities which will be monitored and periodically reported during the project. This task will organise the proper dissemination activities to present the project's achievement to Department and Faculties of (mainly European) universities. The goal is not only to show FASTER results but also to receive scientific and methodological suggestions from tutors, researchers, and students.

T11.2 Innovation strategy definition and management (KPRF + CERTH + ENG + CPLAN) [M1-M9]
 A specific innovation strategy will be defined for FASTER solutions. Innovation will be described in terms of a desirable future state for the FASTER services sustainability and exploitation. The strategy will be adaptive and conceived to evolve over time according to reference domain dynamic changes. This task will be continuously monitored by the Innovation Management Board (IMB).

T11.3 Project exploitation (ENG + CERTH + DXT + CPLAN + ROB + SYN + INOV + KPRF + KAMK + UWA + ADM + SUMMA + ENSOSP + WSPOL + KAJ + HRTA + MG + RP + IBIRC) [M10-M36]
 An exploitation plan will be developed under T11.3, focusing on the exploitation of the overall project results as well as individual partner specific exploitation objectives. A clear step by step plan will be developed that describes how to direct the project results to a mission-oriented exploitation of results: first responders and cities will indicate their exploitation objectives regarding public service development and deployment, the research organizations will elaborate how to utilize the results within their Research & Development initiatives and educational initiatives within for example courses, tutorials. Moreover, the strategy for the management of IPR related issues will be addressed in the plan for the use and dissemination of outcomes (POMT: Project Outcomes Management Tool). POMT will be used as a management tool allowing the consortium to manage the exploitation objectives. It will list all the intellectual property rights that are applied for and foreground that might be exploited.

T11.4 First responders engagement and stakeholders management (KPRF + CERTH + ENG + CPLAN) [M3-M36]

An in-depth exercise of stakeholder mapping with all project’s partners will be carried out, possibly in the course of virtual or real workshops (utilising gamification strategies/tools, in order to engage the end-users). The identification of the actors to target will enable effective dissemination and the formulation of the Advisory Board (AB). AB will be composed of a number of relevant and complementary organisations from outside the consortium, thus offering an even greater multi-cultural representation of end-users, stakeholders, and other interested parties. It will assist the consortium in the steering of the project and gaining rich and targeted insights, requirements and feedback from interested stakeholders and external experts. Pathways to reach stakeholders, engage them and maintain such engagement will be designed and executed here. Hence, this task will be in charge of animating the AB, organising dedicated sessions during meetings and workshops, inviting high profile members to specific events, circulating information and newsletters, and handling requests to join the community. Further, this task aims to link the FASTER results to national, regional, and local influencers, decision makers, and professionals in the industry and the educational field. Some external organisations have already expressed strong interest in FASTER, by signing letters of support. The work will count on a dedicated platform which will include four main components: 1) a dedicated web site, 2) a participatory environment supporting exchange of experiences, 3) a polling/rewarding application which will allow scoring for most active users, 4) a gamification space with a sandbox where users could “play” a role game to test FASTER features.

T11.5 Policy and recommendations (CPLAN + CERTH + DXT + SYN + KPRF + ADM + SUMMA + ENSOSP + WSPOL + KAJ + HRTA + MG + RP) [M25-M36]

In the context of T11.5, FASTER will undertake a challenging exercise, proposing a set of government policies aiming to support authorities in the application of new approaches introduced by the project. The activity will involve periodic discussions with stakeholders in order to assess proposals that adhere to a broad spectrum of acceptance and usability of new technologies. Furthermore, a feasible strategy for the implementation of synergies among government authorities, on the theme of new technologies supporting first responders, will be addressed through the direct involvement of key stakeholders in the discussion.

Participation per Partner

Partner number and short name	WP11 effort
1 - CERTH	9.00
2 - ENG	13.00
4 - DXT	3.00
5 - CPLAN	9.00
7 - ROB	2.00
8 - SYN	3.00
9 - INOV	2.00
10 - LINKS	1.00
11 - KPRF	27.00
12 - KAMK	2.00
14 - UWA	4.00
15 - ADM-POL	6.00
16 - SUMMA	3.00
CMFF	1.50
ESDP	1.50
17 - ENSOSP	7.00
18 - WSPOL	6.00
19 - KAJ	3.00
20 - HRTA	8.00

Partner number and short name	WP11 effort
21 - MG	7.00
22 - CSIP	1.00
RP	2.00
23 - KGU Japan	2.00
Total	123.00

List of deliverables

Deliverable Number ¹⁴	Deliverable Title	Lead beneficiary	Type ¹⁵	Dissemination level ¹⁶	Due Date (in months) ¹⁷
D11.1	Dissemination plan	11 - KPRF	Report	Public	6
D11.2	Innovation Strategy plan	11 - KPRF	Report	Public	9
D11.3	Report on Dissemination activities v1	11 - KPRF	Report	Public	18
D11.4	Report on Dissemination activities v2	11 - KPRF	Report	Public	36
D11.5	Stakeholders Group Report v1	11 - KPRF	Report	Public	18
D11.6	Stakeholders Group Report v2	11 - KPRF	Report	Public	36
D11.7	Sustainability model	11 - KPRF	Report	Public	24
D11.8	FASTER technologies and services adoption recommendations	5 - CPLAN	Report	Public	36
D11.9	Mission oriented Exploitation plan	2 - ENG	Report	Public	36

Description of deliverables

Deliverables

D11.1 Dissemination plan [M6]

D11.2 Innovation Strategy plan [M9]

D11.[3-4] Report on Dissemination activities [M18, M36]

D11.[5-6] Stakeholders Group Report [M18, M36]

D11.7 Sustainability model [M24]

D11.8 FASTER technologies and services adoption recommendations [M36]

D11.9 Mission oriented Exploitation plan [M36]

D11.1 : Dissemination plan [6]

Dissemination plan

D11.2 : Innovation Strategy plan [9]

Innovation Strategy plan

D11.3 : Report on Dissemination activities v1 [18]

Report on Dissemination activities

D11.4 : Report on Dissemination activities v2 [36]

Report on Dissemination activities
D11.5 : Stakeholders Group Report v1 [18] Stakeholders Group Report
D11.6 : Stakeholders Group Report v2 [36] Stakeholders Group Report
D11.7 : Sustainability model [24] Sustainability model
D11.8 : FASTER technologies and services adoption recommendations [36] FASTER technologies and services adoption recommendations
D11.9 : Mission oriented Exploitation plan [36] Mission oriented Exploitation plan

Schedule of relevant Milestones

Milestone number¹⁸	Milestone title	Lead beneficiary	Due Date (in months)	Means of verification
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Work package number ⁹	WP12	Lead beneficiary ¹⁰	1 - CERTH
Work package title	Ethics requirements		
Start month	1	End month	36

Objectives

The objective is to ensure compliance with the 'ethics requirements' set out in this work package.

Description of work and role of partners

WP12 - Ethics requirements [Months: 1-36]

CERTH

This work package sets out the 'ethics requirements' that the project must comply with.

List of deliverables

Deliverable Number ¹⁴	Deliverable Title	Lead beneficiary	Type ¹⁵	Dissemination level ¹⁶	Due Date (in months) ¹⁷
D12.1	H - Requirement No. 1	1 - CERTH	Ethics	Confidential, only for members of the consortium (including the Commission Services)	12
D12.2	POPD - Requirement No. 2	1 - CERTH	Ethics	Confidential, only for members of the consortium (including the Commission Services)	12
D12.3	POPD - Requirement No. 3	1 - CERTH	Ethics	Confidential, only for members of the consortium (including the Commission Services)	12

Description of deliverables

The 'ethics requirements' that the project must comply with are included as deliverables in this work package.

D12.1 : H - Requirement No. 1 [12]

In case the participation of humans is confirmed, templates of the final informed consent/assent forms and final information sheets (in language and terms intelligible to the participants) as well as the procedures and criteria that will be used to identify/recruit research participants must be submitted as a deliverable.

D12.2 : POPD - Requirement No. 2 [12]

The host institution must confirm that it has appointed a Data Protection Officer (DPO) and the contact details of the DPO will be made available to all data subjects involved in the research. For host institutions not required to appoint a DPO under the General Data Protection Regulation 2016/679, a detailed data protection policy for the project must be submitted as a deliverable.

D12.3 : POPD - Requirement No. 3 [12]

In case personal data processing is confirmed, the templates of the informed consent forms and information sheets with regard to processing of personal data (in language and terms intelligible to the participants) must be submitted as a deliverable.

Schedule of relevant Milestones

Milestone number¹⁸	Milestone title	Lead beneficiary	Due Date (in months)	Means of verification
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1.3.4. WT4 List of milestones

Milestone number ¹⁸	Milestone title	WP number ⁹	Lead beneficiary	Due Date (in months) ¹⁷	Means of verification
MS1	User Requirements and Use Cases Formulated	WP3	1 - CERTH	6	User Requirements and Use Cases Formulated
MS2	Systemic Requirements Specified	WP3	1 - CERTH	9	Systemic Requirements Specified
MS3	System Architecture Designed and Components Specified	WP3	2 - ENG	12	System Architecture Designed and Components Specified
MS4	First Integrated Tool and Components Versions Delivered	WP9	9 - INOV	18	First Integrated Tool and Components Versions Delivered
MS5	First Pilots Completed	WP10	5 - CPLAN	21	First Pilots Completed
MS6	Updated Technologies based on feedback received from pilot 1	WP9	9 - INOV	30	Updated Technologies based on feedback received from pilot 1
MS7	Final Tools and Components Delivered, Start of final Pilots	WP10	5 - CPLAN	33	Final Tools and Components Delivered, Start of final Pilots

1.3.5. WT5 Critical Implementation risks and mitigation actions

Risk number	Description of risk	WP Number	Proposed risk-mitigation measures
1	A partner leaves the consortium either by its own decision or by a decision from the Project Management Committee. Impact: Critical Likelihood: Low	WP1, WP10, WP11, WP12, WP2, WP3, WP4, WP5, WP6, WP7, WP8, WP9	Preventive actions: * Continuous and Effective Monitoring of Partner’s progress. * Inform Project Coordinator Corrective actions: * Inform the EC of partner’s withdrawal and reallocation. * Communication with all partners, redistribution of tasks. Re-allocation of the partner’s effort to the remaining partners. * If critical competencies lack in existing partners, find new ones. * If the leaving party concerns a pilot case, the consortium will identify new ones with the same profile. Most of the partners participate in relevant projects and clusters and will make use of these potential networks. * Specifically, to the participation of IBIRC from Japan (JST from Japan will fund IBIRC), the risk of not receiving funding is assessed as low impact. This is due to the fact the EU consortium has the expertise to carry on the task led by IBIRC and effort allocated to it (T6.5). If it arises, then FASTER has foreseen two mitigation actions i) travel budget for stakeholders will be utilised for engaging IBIRC as external stakeholder, and IBIRC will carry on the work with self-investment (possibly from another Japanese source), and/or ii) the GA will decide whether any project activities that remain uncovered can be absorbed by the remaining partners (given the highly complementary nature of the consortium, this is straight-forward from a skills perspective).
2	Delays are estimated to occur in a particular result due for a Project Milestone. Impact: Critical Likelihood: Medium	WP1, WP10, WP11, WP12, WP2, WP3, WP4, WP5, WP6, WP7, WP8, WP9	Preventive actions: * Continuous monitoring of WP activities, Communication with WP Leader * Effective allocation and planning of work from the WP Leader. Corrective actions: * Analysis of causes for the delay and possible actions may include: * Assigning activities to other partners. * Re-allocation of the effort to the partners. * Tighter schedule to monitor progress in greater detail
3	Low progress on community building and engagement of stakeholders Impact: Critical Likelihood: Medium	WP11	Preventive actions: * User interest and support already at proposal stage (see Letters of Support after Section 6) * Existing partners with strong network of organisations * A dedicated User Community Manager (Maureen Weller from CPLAN) * Systematic engagement of FRs and stakeholders in a useful manner through an innovative process provided by the Innovation Manager (Fabio Persossini from KPRF) Corrective actions: * Push communication and dissemination activities. * Initiate personal contacts from each partner to their community partners

Risk number	Description of risk	WP Number	Proposed risk-mitigation measures
4	Reluctance from partners to provide data due to confidentiality and security issues. Impact: Medium Likelihood: Medium	WP1, WP10, WP11, WP12, WP2, WP3, WP4, WP5, WP6, WP7, WP8, WP9	Preventive actions: * Consortium agreement clarifies access to data and existing knowledge * Additional confidentiality agreements between partners for the knowledge/ data which is characterized as “sensitive” and “confidentiality” Corrective actions: * Recall to signed agreements * Finding other data sources and providers from extensive partner networks
5	Low cooperation between technological and user teams Impact: Critical Likelihood: Medium	WP1, WP10, WP11, WP12, WP2, WP3, WP4, WP5, WP6, WP7, WP8, WP9	Preventive actions: * The UCB has the assignment of ensuring clarity and consistency in communicating with the end users, including their systematic participation to the project activities. * Actions fostering cooperation between the project’s key domains Corrective actions: * More intense internal communication and ad-hoc training sessions for both teams under the responsibility of the Project Manager.
6	Failure to provide a reference implementation model Impact: Critical Likelihood: Low	WP1, WP10, WP11, WP12, WP2, WP3, WP4, WP5, WP6, WP7, WP8, WP9	Preventive actions: * Fostering a bottom-up approach and inter-disciplinary approach, involving domain experts and user groups. * Workshops with key stakeholders are planned in the context of WP11, for deep understanding of the area, and early identification of such issues. Corrective actions: * The phased nature of the project enables the application of corrective actions, based also on the findings of the workshops and other early feedback means.
7	Failure to provide comprehensive use cases and extract the requirements that will drive the project Impact: Critical Likelihood: Low	WP1, WP10, WP11, WP12, WP2, WP3, WP4, WP5, WP6, WP7, WP8, WP9	Preventive actions: * The consortium includes a strong basis of end-user stakeholders * The networks of the user partners allow for relevant outreach/ involvement * FASTER technical partners are experienced in working in multidisciplinary consortia, and can effectively support the cases and requirements elicitation. Corrective actions: * Use cases definition and requirements elicitation are two-phase processes; this facilitates alignment during the second round.
8	Failure to provide a concrete architecture specification Impact: Critical Likelihood: Low	WP3	Preventive actions: * Experienced ICT partner in open architectures and data management * Project incorporates all necessary know-how and technical expertise. * Architecture specification is a two-phase process, interacting with the other WPs; this enables early detection of problems, enabling their correction during the second phase. Corrective actions: * Two releases of the system architecture allow for adjustments.
9	Failure to provide specification of major FASTER technologies Impact: Critical Likelihood: Low	WP3	Preventive actions: * Consortium brings together major players in the corresponding fields, with complementary know-how and expertise. Corrective actions: * The phased nature of the project enables the application of corrective actions for any emerging issue. * Feedback

Risk number	Description of risk	WP Number	Proposed risk-mitigation measures
			from the interaction with the users and technical experts, as well as from early dissemination activities is foreseen for early identification.
10	Failure to develop core FASTER services and Apps Impact: Critical Likelihood: Low	WP4, WP5, WP6, WP7, WP8	Preventive actions: * Consortium brings together major players in the corresponding fields, with complementary know-how and expertise. * The development will be built upon APIs and tools that FASTER partners have either developed themselves, or are extremely familiar with. Corrective actions: * The phased nature of the project enables the application of corrective actions for any emerging issue. * The outcomes of first prototyping, integration and piloting, will result in the redefinition of the implementation plan, incorporating corrective actions.
11	Problems with the integration of internal FASTER components Impact: Critical Likelihood: Medium	WP9	Preventive actions: * Provide low-level specifications on interfaces among main components based on standard formats (APIs, Web services, low-level components, etc.). Corrective actions: * The outcome of first prototyping and integration, along with piloting findings, will result in the redefinition of the integration plan, with the incorporation of corrective actions.

1.3.6. WT6 Summary of project effort in person-months

	WP1	WP2	WP3	WP4	WP5	WP6	WP7	WP8	WP9	WP10	WP11	WP12	Total Person/Months per Participant
1 - CERTH	28	0	16	0	7	0	33	0	11	6	9		110
2 - ENG	9	0	16	6	0	3	4	36	10	4	13		101
3 - OTE	0	0	1	2	0	20	0	0	4	3	0		30
4 - DXT	3	0	6	0	0	0	25	10	6	5	3		58
5 - CPLAN	2	1	16	0	0	0	0	0	0	22	9		50
6 - DH	0	0	1	0	22	1	2	0	0	0	0		26
7 - ROB	2	0	2	0	27	3	4	0	4	4	2		48
8 - SYN	4	0	6	4	0	21	0	0	5	3	3		46
9 - INOV	3	0	6	14	0	14	0	0	18	0	2		57
10 - LINKS	0	0	3	16	0	0	11	13	2	1	1		47
11 - KPRF	3	7	1	0	0	0	0	0	0	4	27		42
12 - KAMK	0	0	4	7	14	0	2	2	5	4	2		40
13 - VUB	7	19	2	0	0	0	0	0	0	2	0		30
14 - UWA	3	2	9	19	0	13	11	4	7	2	4		74
15 - ADM-POL	0	0	4	0	2	0	0	0	0	13	6		25
16 - SUMMA	0	0	2	0	0	1	0	0	0	4	3		10
· CMFF	0	0	1	0	0	0.50	0	0	0	4	1.50	0	7
· ESDP	0	0	1	0	0	0.50	0	0	0	4	1.50	0	7
· FIIBAP	0	0	0	0	0	0	0	0	0	1	0	0	1
17 - ENSOSP	0	0	4	0	0	0	2	0	0	10	7		23
18 - WSPOL	0	0	4	0	0	0	0	1	0	5	6		16
19 - KAJ	0	0	4	0	0	0	0	1	0	10	3		18
20 - HRTA	0	0	4	3	0	0	3	0	0	14	8		32

	WP1	WP2	WP3	WP4	WP5	WP6	WP7	WP8	WP9	WP10	WP11	WP12	Total Person/Months per Participant
21 - MG	2	0	6	0	0	0	0	0	0	15	7		30
22 - CSIP	0	0	1	0	0	0	0	3	2	11	1		18
· RP	0	0	1	0	0	0	0	0	0	2	2	0	5
23 - KGU Japan	0	0	2	2	0	16	0	0	4	4	2		30
Total Person/Months	66	29	123	73	72	93	97	70	78	157	123		981

1.3.7. WT7 Tentative schedule of project reviews

Review number ¹⁹	Tentative timing	Planned venue of review	Comments, if any
RV1	19	TBD	N/A
RV2	36	TBD	N/A

1. Project number

The project number has been assigned by the Commission as the unique identifier for your project. It cannot be changed. The project number **should appear on each page of the grant agreement preparation documents (part A and part B)** to prevent errors during its handling.

2. Project acronym

Use the project acronym as given in the submitted proposal. It can generally not be changed. The same acronym **should appear on each page of the grant agreement preparation documents (part A and part B)** to prevent errors during its handling.

3. Project title

Use the title (preferably no longer than 200 characters) as indicated in the submitted proposal. Minor corrections are possible if agreed during the preparation of the grant agreement.

4. Starting date

Unless a specific (fixed) starting date is duly justified and agreed upon during the preparation of the Grant Agreement, the project will start on the first day of the month following the entry into force of the Grant Agreement (NB : entry into force = signature by the Commission). Please note that if a fixed starting date is used, you will be required to provide a written justification.

5. Duration

Insert the duration of the project in full months.

6. Call (part) identifier

The Call (part) identifier is the reference number given in the call or part of the call you were addressing, as indicated in the publication of the call in the Official Journal of the European Union. You have to use the identifier given by the Commission in the letter inviting to prepare the grant agreement.

7. Abstract

8. Project Entry Month

The month at which the participant joined the consortium, month 1 marking the start date of the project, and all other start dates being relative to this start date.

9. Work Package number

Work package number: WP1, WP2, WP3, ..., WPn

10. Lead beneficiary

This must be one of the beneficiaries in the grant (not a third party) - Number of the beneficiary leading the work in this work package

11. Person-months per work package

The total number of person-months allocated to each work package.

12. Start month

Relative start date for the work in the specific work packages, month 1 marking the start date of the project, and all other start dates being relative to this start date.

13. End month

Relative end date, month 1 marking the start date of the project, and all end dates being relative to this start date.

14. Deliverable number

Deliverable numbers: D1 - Dn

15. Type

Please indicate the type of the deliverable using one of the following codes:

R	Document, report
DEM	Demonstrator, pilot, prototype
DEC	Websites, patent filings, videos, etc.
OTHER	
ETHICS	Ethics requirement
ORDP	Open Research Data Pilot
DATA	data sets, microdata, etc.

16. Dissemination level

Please indicate the dissemination level using one of the following codes:

- PU Public
- CO Confidential, only for members of the consortium (including the Commission Services)
- EU-RES Classified Information: RESTREINT UE (Commission Decision 2005/444/EC)
- EU-CON Classified Information: CONFIDENTIEL UE (Commission Decision 2005/444/EC)
- EU-SEC Classified Information: SECRET UE (Commission Decision 2005/444/EC)

17. Delivery date for Deliverable

Month in which the deliverables will be available, month 1 marking the start date of the project, and all delivery dates being relative to this start date.

18. Milestone number

Milestone number: MS1, MS2, ..., MSn

19. Review number

Review number: RV1, RV2, ..., RVn

20. Installation Number

Number progressively the installations of a same infrastructure. An installation is a part of an infrastructure that could be used independently from the rest.

21. Installation country

Code of the country where the installation is located or IO if the access provider (the beneficiary or linked third party) is an international organization, an ERIC or a similar legal entity.

22. Type of access

- VA if virtual access,
- TA-uc if trans-national access with access costs declared on the basis of unit cost,
- TA-ac if trans-national access with access costs declared as actual costs, and
- TA-cb if trans-national access with access costs declared as a combination of actual costs and costs on the basis of unit cost.

23. Access costs

Cost of the access provided under the project. For virtual access fill only the second column. For trans-national access fill one of the two columns or both according to the way access costs are declared. Trans-national access costs on the basis of unit cost will result from the unit cost by the quantity of access to be provided.

History of Changes

Version 1 – 4 February 2019
<ul style="list-style-type: none"> • Update work package descriptions according to updated deliverable numbering • Updated Gantt chart to include WP12 - Ethics requirements • Updated lead beneficiaries in WP6 as they were erroneously distributed • Corrected lead beneficiary of D10.7 • Profile of UWA has been updated in section 4 • In section 1.3.1 of Part B, “guarantee” has been replaced with “improve”. Previous wording was overstating and not achievable at all cases. • Improvements have been made in sections 1.3.3 and 1.3.3.4 to answer to the reviewers’ comment on the geographical placement of use-case pilots and field trials
Version 2 – 11 February 2019
<ul style="list-style-type: none"> - Updated cost explanation for all partners, including those with other costs below 15% of personnel costs (Section 3.4) - Defined role for linked 3rd parties and more details on their legal status (Section 4.2.16 (SERMAS), 4.2.22 (RP)) - Ethics requirements have been added in the Ethics section of Part B (Sections 5.1.2, 5.1.3.2, 5.1.3.5). The actions that will be taken are described and their validation through the respective deliverables is specified. - Changes in equipment of partner SERMAS in order to improve validation capabilities during the pilots
Version 3 – 15 February 2019
<ul style="list-style-type: none"> • Review scheduling has been updated to M19 and M36 (end of Section 3.2.3) • No subcontracting confirmed and stated in end of Section 3.4 • No unit costs from SMEs confirmed and stated in end of Section 3.4 • More details on travelling expenses for all partners. More details on expenses for training meeting • Changes in equipment of partner ADM in order to improve validation capabilities during the pilots • Updated justification for KGU travel expenses • Added breakdown of activities (WP), effort (PM) and budget for the linked third parties of SERMAS and RP. Moreover, their legal relations are defined. • Changed the acronym of the Japanese partner from IBIRC to KGU to be in par with Part A
Version 4 – 20 February 2019
<ul style="list-style-type: none"> • Updated Section 4.2.22 to reflect role/effort/budget changes in main beneficiary and third party • Updated “Other costs” for Partners 1 and 4 to provide more details • Updated “Other costs” to remove and redistribute audit costs that are not applicable for Partners 9, 10, 12 • Changes in equipment of partner CSIP in order to improve validation capabilities during the pilots • Updated Section 1.3.3, 2.2.4.3, 3.3, 4.1.22 and 4.2.22 to replace RP with CSIP as main beneficiary. • Updated 4.3 to remove RP from partners contributing to eligibility. Eligibility is still covered
Version 5 – 25 February 2019
<ul style="list-style-type: none"> • Updated “Other Costs” to include linked third parties • Updated Section 4.2.22 to correct budget distribution among main beneficiary and third party • Updated Section 4.2.16 and Section 4.2.22 with more details on the legal links between beneficiaries and linked third parties.
Version 6 – 7 March 2019
<ul style="list-style-type: none"> • Corrected Other costs for partner 10 and added missing costs for equipment • Disambiguation of linked third parties for partner 16 in Section 4.2.16

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1.1 MOTIVATION AND OBJECTIVES

1.1.1 Motivation and Main Goal

The European Environment Agency¹ (EAA) reports that Europe is experiencing an increasing number of disasters, derived either from natural phenomena, technological accidents or human actions [Wehrli10]. These disasters affect EU citizens, the EU economy and environment every year [Echo]. Over the period 1980-2016, the total reported losses caused by weather and climate-related extremes in the EEA member countries amounted to 436 billion EUR². The economic and societal impact will continue to escalate, as weather-related disasters alone could affect about two-thirds of the EU population annually by the year 2100, according to a recent data-driven forecast study [Forzieri17]. First responders³ (FRs) are the people who are among the first to arrive and provide assistance at the disaster scene. First responders are typically professionals with specialized training, including LEAs, firefighters, emergency medical personnel, rescuers, K9 units, civil protection authorities and other related organisations.

Due to the nature of their work, first responders are often operating in risky and hazardous conditions disaster sites, like demolished, burnt or flooded districts, being exposed to non-visible threats such as very high temperatures and dangerous gases. Furthermore, first responders may experience incidents (e.g. sudden illness, dizziness or exhaustion strokes) during operations, which can prevent them from completing their mission, but, more importantly, put their own health at risk. Overzealous first responders may often not notice early signs or choose to ignore them in favour of accomplishing their mission, which can lead to become additional casualties of the disaster [Slate].

Despite their willingness and proper training, first responders' capabilities may be limited by chaotic environments, making it extremely difficult for them to estimate the exact position of the victims, dangerous areas, other first responder teams or valuable resources. The overwhelming amount of information available to them may reduce rather than increase their situational awareness. Multiple displays and gadgets are adding clutter to their equipment. Autonomous vehicles are useful in disaster scenes, according to a member of the Reykjavik Search and Rescue (SAR) Team, who claims that using drones has enabled them to respond faster and more accurately [Tele], but they lack in operational autonomy. Communication between first responders and the Command and Control centre is often obstructed by broken, overloaded or non-existent network infrastructure [Drj]. In addition to communication, cooperation and interoperability amongst first responders with LEAs and community members needing help or willing to help is often ad-hoc and lacks coordination. Often the problem lies not so much in the lack of resources and willingness to provide help, but in the logistics to efficiently direct and deliver assistance to the right places where and when it is most needed. These problems raise the need to exploit rapidly evolving technological advances towards *protecting first responders* from multiple and unexpected dangers, and provide solutions enabling them to *operate in a seamless and efficient way* in any environment and in cooperation with the community.

FASTER acknowledges the development of different tools partially addressing some the identified issues that first responders are facing and intends to go beyond them developing complete solutions that will be validated on the field. Indicatively, ATAK and CommandWear track the locations of responders, monitor their physiological condition and display it on their smartphones, while enabling text and voice communications. VaultRMS and Human-SystemsIntegration are also offering physiological monitoring, while Six15 provides Augmented Reality (AR) devices for first responders. Third Insight is offering AI solutions for improving drones' autonomy on the field and LinkAiders is offering mesh communication technologies.

Main Goal: FASTER aims to address the challenges associated with the protection of first responders in hazardous environments, while at the same time enhancing their capabilities in terms of situational awareness and communication. FASTER will provide innovative, accepted and efficient tools covering 1) **Data collection** providing a secure IoT platform for distributed, real-time gathering and processing of heterogeneous physiological and critical environmental data from smart textiles, wearables, sensors and Social Media, 2) **Operational capabilities** providing flexible, multi-functional autonomous vehicles, including swarms of them, for extended inspection capabilities and physical mitigation, 3) **Risk assessment** providing tools for individual health assessment and disaster scene analysis for early warning and risk mitigation, 4) **Improved ergonomics** providing augmented reality tools for enhanced information streaming, as well as body and gesture-based interfaces for vehicle navigation and communication, 5) **Resilient communication** at the field level providing haptic communication capabilities, emergency communication devices, communication with K9s; and at the infrastructure level through 5G technologies and UAVs, 6) **Tactical situational awareness** providing innovative visualisation services for a portable Common Operational Picture for both indoor and outdoor scenarios representation. 7) **Efficient Cooperation and Interoperability** amongst first responders, LEA, community members and other resource providers to request and deliver

¹ <https://www.eea.europa.eu/>

² <https://www.eea.europa.eu/data-and-maps/indicators/direct-losses-from-weather-disasters-3/assessment-1>

³ <https://dictionary.cambridge.org/us/dictionary/english/first-responder>

assistance where and when it is most needed using blockchain technology to give everyone involved the ability to write and read data (including sensor data) on an open source platform to speed up disaster relief to a whole new level.

The FASTER consortium is an **interdisciplinary while focused** team consisting of **8 experienced academic / research partners** (CERTH, INOV, ISMB, KP, UWA, KAMK, VUB, KGU), **3 industries** (ENG, OTE, DXT) operating in the fields of integrated systems, communications and AR solutions for first responders, respectively, **4 SMEs** (ROB, DH, CPLAN, SYN) offering their expertise in autonomous vehicles, crisis management and communication solutions and **8 First Responder** organizations including LEAs, firefighters, medical emergency services, K9 units, disaster response teams and civil protection organizations. FASTER encompasses all the elements required to research and develop new technologies for first responders, involving them in the design and validation of the tools.

1.1.2 Strategic Objectives

The FASTER consortium has decomposed its main objective into a set of **S.M.A.R.T (Specific, Measurable, Achievable, Realistic and Timely) Objectives (SO)**, presented with related **Key Performance Indicators (KPI)**:

SO1: Transforming First Responders' needs into validated solutions, acceptable from the society/citizens

FASTER will investigate, develop and deliver a full set of validated solutions for First Responders, created based on their needs and requirements, from a cross sectoral perspective, and civic sense sensibility, respecting the EU societal values, fundamental rights and applicable legislation to ensure that its outcomes will be become accepted from the society. FASTER aims to formulate and adopt a new approach on field validation of tools for first responders inspired by pre-commercial procurement processes that involve iterations of usability and performance assessments in conditions that simulate the first responders' working environments. **(WP2, WP3, WP9, WP10)**

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| KPI | <ul style="list-style-type: none"> ■ FASTER will gather requirements from at least 10 different First Responder units, from at least 8 countries, either partners, or external ones from the engagement program (T11.4), covering all disciplines. ■ FASTER will validate tools on the field in 2 iterations, in focus groups of at least 3 disciplines of First Responders, on 5 evaluation criteria (affordability, capability, deployability, maintainability, usability). ■ FASTER will follow a Social Ethical Legal and Privacy (SELP) methodology designed to ensure compliance with Article 35 GDPR and that key legal and ethical principles are considered and implemented. The qualification and quantification of all legal and ethical challenges facing FASTER will provide a useful metric for the compliance reports produced as part of the SELP process. |
|------------|--|

SO2: Early identification of operational risks enhancing first responder's safety

FASTER will provide an integrated prototype of a smart clothing system that includes a textile solution equipped with sensors on the jacket (external modules) and the t-shirt (internal module) of the first responder's uniform. The system will be able to detect dangerous environmental conditions using the external modules and perform physiological monitoring (e.g., body temperature and ECG data) using the internal module, applying edge processing to ensure data privacy. Alerts and notifications will be shared to first responders in the area. **(WP4)**

- | | |
|------------|--|
| KPI | <ul style="list-style-type: none"> ■ Textile wearable prototype for first responders integrated with clothing, to avoid obstructing rescue operations, durable under severe conditions and washable 50 times in standard conditions. ■ Continuous assessment of critical health conditions in real time anomaly detection (every 1s) ■ Real time anomaly detection in the environment conditions (≤500 ms) |
|------------|--|

SO3: First Responders' engagement, training and experimenting pathway

FASTER will include an engagement program for first responders based on the gamification of its novel tools and technologies. The goal will be to enforce a bi-directional communication between the technology developers and the first responders. The first will be able to showcase developments on a more frequent basis via a website, while the latter will be offering their feedback and suggestions in an online manner. This process will be gamified to better foster engagement and involvement. In addition, the first responders will be sharing hands-on multimedia material from their training sessions to better communicate their operating conditions to the technology developers. Additionally, FASTER will engage and work with the end-users to adapt the emergency response guidelines and protocols to incorporate technologies and validated processes that will arise within the project. For this purpose, FASTER will apply a systematic exchange of experiences with first responders supported by the design of a training pathway to introduce processes and technologies deployed in the project. This will be completed by the constant monitoring of the technical developments by the first responder members of the consortium as a specific task (T3.3) has been created for this purpose in addition to allocating effort to each end-user to specific technical tasks to allow for the technologies' monitoring (Section Error! Reference source not found.). Finally, FASTER will organize frequent field trials aligned with the project's meetings to offer a more hands-on experience with the different technologies developed, more efficiently preparing the grounds for the pilots. **(WP3, WP10, WP11)**

- **3 co-design phases and focus groups** for each pilot site involving first responders and the project team.
- **A dedicated mobile sandbox** will be created to let representatives from First Responders to participate in exercises simulating FASTER scenarios in field.
- Organisation of **>= 2 workshops** in premises of partners first responders to demonstrate FASTER tools.
- Organization of **>= 2 field trials** before each pilot.

SO4: Enhanced situational awareness for first responders through augmented reality technologies

FASTER will study how augmented reality can be best used to support first responders during operations despite their well-known limitations in uncontrolled environments. Coupled with results of the SO2, AR will enhance first responders' situational awareness by making immediately visible, in-situ and in real-time, information that was previously unavailable or difficult to get. FASTER users will not only be able to localise and see their targets in degraded conditions, but also receive all available information, alerts, and operation support required to perform their mission faster and safer and address effectively the emergency using a dedicated device. **(SO6), (WP7, WP8)**

- **Usability:** at least **very good in average**, scored from **minimum 20 first responders** using criteria related to effectiveness, efficiency, and user satisfaction.
- **Spatial representation of georeferenced information:** at least **3 times less errors to place on a map** and information received with the AR device compared with current means.
- **Display relevant-only information** including early warnings **in AR-enabled devices in 80% of time.**

SO5: Highly ergonomic tools for first responders' operations

FASTER will release a set of interfaces addressing the need for reduced equipment burden during emergency operations. Hands-free and sense-based interactions will be offered employing smartwatches and smart textile sensors for humans, and wearable devices for K9s. Special attention will be given to haptic communication of critical information between agents operating on the field and receiving early warnings for possible dangers. Moreover, FASTER will develop navigation interfaces for operating autonomous vehicles based on gestures. **(WP4, WP7)**

- **Gesture activity recognition model**, capable of understanding **at least 10 different signal gestures**, with **accuracy of 5% over SoA** machine learning techniques for human activity and gesture recognition.
- **Gesture-based UxV navigation**, capable of navigating autonomous vehicles with a **precision of ½ meter.**

SO6: Robust and resilient emergency communication and cooperation infrastructure

FASTER will address communication at the field level developing a low-cost device for emergency message broadcasting (ECOBBOX), able to operate in conditions where electrical power and all telecommunication infrastructure has failed, and which can form a mesh network capable of efficiently and securely broadcasting messages to the general public on mobile devices using encryption. Additionally, drones or swarm of drones will be used as relay nodes to extend the communication capabilities over regions where it is difficult to deploy a land-based relay. Mobile relay nodes (drones) can adapt their position to achieve the required quality of service (QoS) and maximize the data rate even if first responders move. Moreover, FASTER will capitalize on 5G-enabled networks to provide: 1) timely deployment and appropriate configuration of edge Radio Access Network (RAN) to cover the geographic area under investigation, and most importantly, 2) adequate cloud-based resources to fulfil the operational needs of first responders in terms of reduced latency and high bandwidth, enabling critical, time-sensitive data and real-time multimedia interactions to be processed on virtualized network edges. FASTER will also develop inter organizational cooperation and interoperability capabilities amongst first responders, LEAs and community members, giving everyone involved the ability to write and read relevant situational data on a distributed network to efficiently request and deliver assistance where and when it is most needed using blockchain and smart contract technology providing absolute transparency among all participants. **(WP6)**

- Small, low cost emergency message relay nodes, covering an area of **100 square meters each**, and capable of creating a mesh network of devices. Ability to serve more at least **2000 people per sq.km**
- Extension of existing communication network outreach, by a range of approximately **1Km per relay node**
- Proper configuration of a 5G-enabled software-based edge node with the appropriate resources, to cover the geographic area under investigation and the **operational resources in less than ½ hour.**
- Provide 5G network with **low latency** and **higher bandwidth**, at least **by 20%**, compared to 4G solutions.
- Provide a blockchain-based distributed transactional network of nodes capable of tracking fulfilment of resource and assistance requests from community members, LEAs, sensors, other entities involved and first responders, resulting in **at least 25%** faster coordination that avoids wasteful uncoordinated fulfilments, measured by questionnaires during the pilots.

SO7: Employing autonomous vehicles, as units or in swarms, for risk identification and physical mitigation

FASTER will employ diverse autonomous vehicles aiming to generate 2D/3D mapping of the environment, improve situational awareness and enable physical mitigation on the field. A robotic vehicle will be developed that will act both as an independent node integrating multiple sensors and a robotic arm if required, but also as a platform for communication and collaboration with other autonomous vehicles. In FASTER, heavy-load drones, operating for extended flight times, will facilitate multiple roles including mapping the disaster scene, extending communication capabilities as relay nodes and performing physical duties such as rapidly delivering first aid and re-

sources to inaccessible areas, removing obstacles or fighting fires. Autonomous swarms of drones will be developed, able to self-organise and collaborate to achieve complex operations. Additionally, commercial mini drones will be used as equipment for individual first responders to inspect inaccessible or dangerous areas. **(WP5)**

- | | |
|------------|---|
| KPI | <ul style="list-style-type: none"> ■ Integration of at least 3 types of sensors on the robotic vehicle for mapping, communication and vision. ■ A swarm of >5 drones operating in coordinated mode, featuring >3 types of drones will be deployed covering diverse capabilities/operations. ■ Time to deploy operational swarm fleet: <20mins from start of deployment (no transportation included) |
|------------|---|

SO8: Portable Common Operational Picture for maximizing situational awareness

FASTER will develop a Portable Control Centre that will greatly enhance situational awareness, providing Common Operational Picture (COP) for FRs on the field improving and extending information sharing and visualization, decision support and communication into any operational environment within the emergency management. The combination of critical detected events, available infrastructures and resources, first responders’ location, images and video from the scene and other relevant information will be visually communicated in an easy-to-use way greatly supporting first responder operations. Portable COP will not be limited to outdoor usage but will also provide a dedicated tool for indoor use in complex constructions visualizing people location, sensor input and providing navigation capabilities. This will significantly improve safety and intervention speed. **(WP8)**

- | | |
|------------|---|
| KPI | <ul style="list-style-type: none"> ■ Usability of FASTER situation awareness tools for first responders > 80% ■ Acceptance and adoption of FASTER situation awareness tools for first responders > 60% ■ First responders’ satisfaction rate > 70% ■ Reduction of the operational time and planning and in the long run saving of human lives > 30% ■ Improvement of job safety for first responders at indoor sites >30% |
|------------|---|

1.2 RELATION TO THE WORK PROGRAMME

The FASTER project is directly aligned with the objectives of *DRS-02-2018-OPEN: Technologies for first responders*. The project envisages becoming one of the initiatives that will help improve the protection of Europe’s first responders against multiple and unexpected dangers and enhance their capacities in harsh environments after a disaster. The table below outlines the contributions of FASTER to DRS-02-2018-OPEN.

DRS-02-2018-OPEN Specific Challenge

Innovation for disaster-resilient societies may draw from novel technologies, provided that they are affordable, accepted by the citizens, and customized and implemented for the (cross-sectoral) needs of first responders.

FASTER will focus on employing a set of SW/HW innovative technologies that are currently on the centre of attention for innovative industries around EU and will adapt them to address the needs of first responders. Such technologies include: augmented reality, drones and robotics, wearable devices, smart textiles, AI vision, IoT, 5G networks, and Blockchain. These technologies will be integrated in specific, cross-sectoral tools that are affordable, efficient and compliant with both the needs of first responders and key legal and ethical principles.

DRS-02-2018-OPEN Scope

novel solutions improving the protection of first responders against multiple and unexpected dangers, or enhancing their capacities by addressing related research and innovation issues

FASTER will introduce **Augmented Reality technologies** for improved situational awareness and early risk identification, and **Mobile and Wearable technologies** for safer and better mission management and information delivery. **Body and Gesture based User Interfaces** will enable new capabilities while reducing equipment clutter, offering better ergonomics. **Autonomous Vehicles** will extend communication capabilities and offer physical response and mitigation features. Mining data from **IoT networks and Social Media** will extract information, orchestrating an intelligent response to the disaster. FASTER will enhance situational awareness using a **Portable Common Operational Picture** interface. **Resilient Communication Support** will feature opportunistic relay services, emergency communication devices and 5G-enabled communication capabilities. **Cooperation** will also be strengthened using Blockchain technologies for information exchange. **(All objectives)**

communicating and smart wearables for first responders and K9 units

Smart wearables, including standalone devices and smart clothing are an excellent source of information for positioning and situational awareness thanks to a plethora of sensors they integrate. In FASTER, smart wearables and textiles for people and K9s will be employed to monitor locally the health status of each first responder, to provide location and environmental information to the Control Centre and to enable ergonomic interfaces for (1) hands-free navigation of autonomous vehicles, (2) handling information retrieval from AR devices, and (3) for enabling haptic communication services. **(Objectives 5, 6)**

situational awareness and risk mitigation systems for first responders using UAV and robots, connected and swarms of drones

Autonomous vehicles can provide enhanced situational awareness, helping to identify and mitigate those risks. In FASTER, they will be employed to inspect hard/impossible to reach areas, providing live imagery, and collect data to ensure a viable environment for the first responders. Drones and robots of different sizes and characteristics

will be used to support different needs during the complete life cycle of the emergency. FASTER will also develop swarm multi-objective operational capabilities to enable complex tasks in an efficient way, mission-level coordination and increased reliability in cases of single point failure. Moreover, communication challenges will be addressed considering low-latency for optimal control and high bandwidth for data transferring. **(Objective 7)**

systems based on the Internet of Things

As the number of sensors (e.g. temperature, ECG) and IoT enabled devices (e.g., smart-watches) available to first responders is increasing, FASTER will design and develop a framework for securely collecting data and processing them either on the field or a cloud infrastructure. FASTER will emphasize on the use of edge computing and mobile machine learning for sensor data processing aiming to remain operational even with no available connection, while protecting sensitive personal data (e.g. biometrics). Meaningful information will be communicated between first responders (including K9s), to enhance operational capabilities on the field. **(Objective 2, 5, 8)**

solutions based on augmented or virtual reality

First responders on the field are often called to carry a lot of equipment. However, keeping their hands available is crucial for accomplishing their mission. Situational awareness is another key element for increased efficiency. However, human cognitive capabilities are limited, and information must be available when needed. In FASTER, AR devices, such as AR glasses, mobiles and tablets, will be employed to enhance situational awareness, including risk assessment. They will overlay information related to the current position and view of the first responder, using a “just in time” feed model to avoid information overload. An intuitive, gesture-based interface will be developed to support video feeds, navigate autonomous vehicles and control the information feed. **(Objective 4)**

systems communication solutions between first responders and victims

First responders are often working in areas where communication is sparse due to destroyed infrastructure, communication shutdown and network overload. FASTER, will provide communication solutions on the field including an emergency device for broadcasting information to first responders or citizens and gestured-based haptic communication system based on smart wearable devices. It will also provide an opportunistic communication network based on swarms of drones to deliver connectivity from the nearest point with live communication. FASTER will exploit 5G infrastructure for reliable, high-bandwidth, low-latency communication. **(Objective 5, 6)**

risk anticipation and early warning technologies

The risks faced by first responders can be analysed in those concerning the visible and non-visible environmental hazards, and those concerning their own condition. FASTER will address environmental hazards continuously assessing environmental data from available sensors. It will also monitor the responders’ condition, analysing locally vital signs and sending alerts when required. Video from the autonomous vehicles and mobile devices will be analysed to identify risks. Warnings will be communicated through AR and haptic interfaces. **(Objective 2)**

mitigation, physical response or counteracting technologies

While situational awareness is a key-point in addressing disasters, physical response is also needed in most scenarios. Equipment and resources often need to be transferred in areas not accessible by first responders, and obstacles may need to be removed. FASTER will address this need by utilizing heavy-load drones that have capabilities to perform such tasks and robots that are specialized for such applications. Both can be used to transport any resources needed on the field, including communication equipment or medical aid. **(Objective 7)**

Any novel technology or methodology under this topic should be tested and validated, not just in laboratories but also in training installations and through in-situ experimental deployment

The consortium of FASTER includes several first responder organisations, including academies that have their own training installations and testing facilities in Spain, France, Poland, Portugal and Finland. The proposed tools will be validated through a planned in-situ experimental deployment throughout the lifetime of the project. In addition to the 3 main pilots, experimental workshops, training sessions and installations will take place in the premises of all first responder units. **(Objective 1)**

They therefore need to be quick to deploy, bases on resilient and robust communication infrastructure.

FASTER will exploit advancements brought in by 5G technology to deploy a communication network very fast and provide adequate resources to first responders, offering zero-latency and ultra-high bandwidth based on network softwarization. Moreover, FASTER’s solution for extending the existing communication network by utilizing swarms of drones is both resilient-by-design, as drones can automatically adapt to ensure continuous communication, and fast, as the swarm will be autonomously deployed with minimum human intervention. Blockchain and smart contract technology will provide a distributed network of trust with absolute transparency among all participants that will enable them to coordinate, cooperate and inter-operate to maximize the efficiency of resource and assistance delivery where and when it is most needed. **(Objective 6)**

First responders, including through interdisciplinary teams (e.g. involving medical emergency services, public health authorities, law enforcement team, civil protection professionals, etc.) need to be involved in these activities. Proposals should address the participation of first responders in a systematic manner and propose new methods on how to involve them and to organise their interaction with researchers when developing, testing, and validating technologies and methods.

First responders have developed and perfected a series of procedures and protocols based on the current resources. They have a deep knowledge of the problems in the field and the shortcomings of their tools. Moreover, each sector has particular requirements and limitations. FASTER will go beyond the current practices, designing their participation in all steps from the proposal to the pilots. Extensive discussions have already taken place to identify their needs and design novel tools. A continuous usability and performance analysis has been designed that will introduce module-specific assessment cycles throughout the lifetime of the project. Further, all first responder participants have effort allocated in selected technical tasks of the project to monitor the ongoing developments (Section **Error! Reference source not found.**). FASTER has foreseen the realization of field trials, aligned with the project's meetings where specific technologies and tools will be demonstrated, typically at the end-user's premises, where participation will be ensured (Section 1.3.3.4). Furthermore, a specific strategy to engage them and activate a systematic exchange of experiences is a key part of relationships enhancement proposed by FASTER. In addition, FASTER has allocated budget to all participating first responder end-users to acquire equipment to be able to support the continuous monitoring, field trials and engagement. Moreover, with a two phased approach (Section 1.3.4), their feedback will be taken into account, ensuring that the developed solutions will be tailored to their needs. **(Objectives 1, 3)**

Solutions are to be developed in compliance with European societal values, fundamental rights and applicable legislation, including in the area of privacy, personal data protection and free movement of persons. Societal aspects (e.g. perception of security, possible effects of technological solutions on societal resilience, gender diversity) have to be taken into account in a comprehensive and thorough manner.

The aim of FASTER is to ensure, using an impact assessment methodology (see section on SELP), maximum ethical and legal compliance in order to ensure maximum exploitation. FASTER will ensure compliance not only in terms of the legal and ethical requirements upon first responders and connected organisations but also in the use of electronic health records, other sources of data and all processing related thereto. Moreover, it will map all stakeholders, including the public, and continuously monitor the effect of FASTER tools to them and society as a whole to assure societal acceptance in a systematic way in all design and development phases. **(Objective 1)**

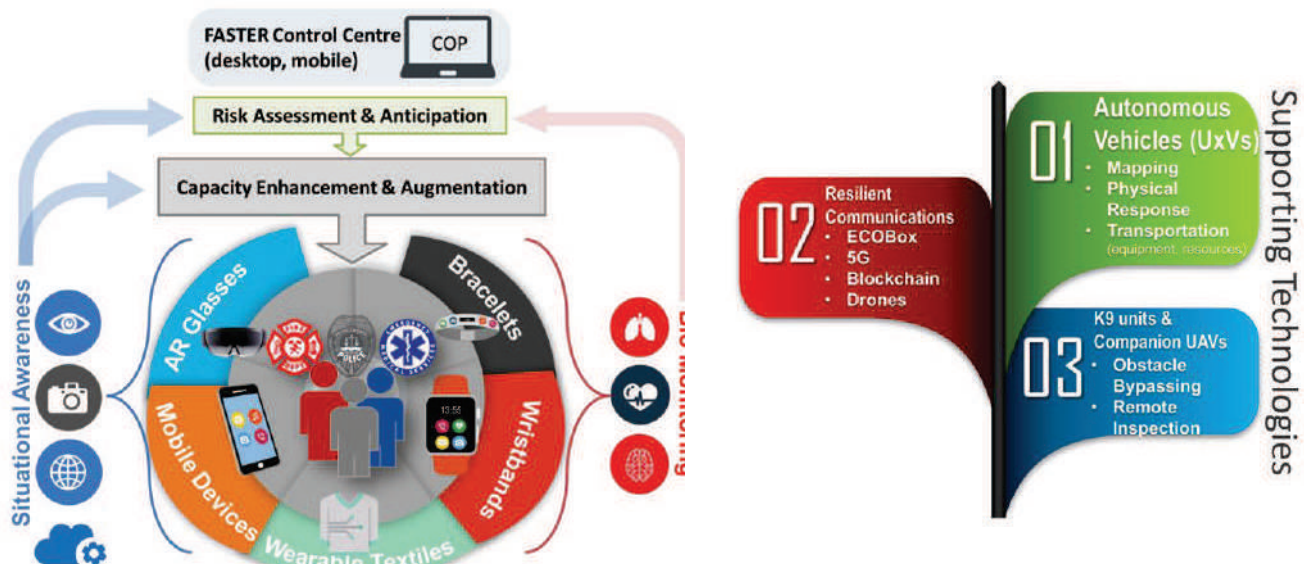
participation is encouraged, in particular with Japanese or Korean research centres.

FASTER includes a Japanese partner (KGU) that will offer its expertise in blockchain and smart contract technologies, as well as their overall know-how about disaster intervention with Japan being one of the most resilient countries in natural disasters as it is very frequently hit by them due to its geographical placement. **(Objective 6)**

1.3 CONCEPT AND APPROACH

1.3.1 Overall concept

FASTER aims to establish a new approach for disaster response in order to improve Europe's overall disaster resilience. This will be accomplished by the targeted employment and synergetic deployment of a set of appropriate and complementary technologies. Immediate response is the second phase of the disaster management cycle and is a very important aspect for dealing effectively with disasters. Consequently, FASTER will improve the disaster response and monitoring capabilities by **providing first responders with a suite of core and supplementary tools to augment their situational awareness and, as a result, improve their safety as well as enhance their operational capacity**. The focus of disaster response is mitigating the impact of the disaster and ensuring the safety of those in immediate risk. However, as this takes place during the emergency, it also includes the safety of first responders who provide the means and resources for effective disaster mitigation and protection of life. Their in-field effectiveness is critical to mitigation and ensuring a short and smooth recovery phase.



FASTER’s overall concept is illustrated in Figure 1-1, where it shows that **at the heart of FASTER’s concept lie the first responders** that will be supported by a set of ergonomic and non-intrusive **wearable devices that comprise sensors, actuators and displays, as well as artificial intelligence capacity**. These will be responsible for assessing the situation, be it either **individualized bio-monitoring** (i.e. the first responder’s situation) or **localised environmental sensing** (i.e. the surrounding scene’s situation). Their purpose will be to deliver information either in a peer-to-peer manner (between first responders themselves) or centralized points of presence (central and decentralised Control Centres). The distinction made between these two schemes is necessary as disasters can manifest in various – typically uncontrollable – ways, necessitating the employment of centralised (single main Control Centre), decentralised (portable Control Centres) and distributed (P2P) management schemes. It must be noted that FASTER will focus on P2P solutions and portable Control Centres. To that end, FASTER will consider both **edge-based** and **cloud-based** processing and analysis technologies to realize a **risk assessment and anticipation system** that will reach decisions and analyse the overall situation to provide targeted information and instructions to first responders. These will be delivered by the same wearable devices to **augment and enhance their operational capacities**.

Moreover, **FASTER will also employ a set of important supporting technologies** that will be deployed to circumvent special conditions that manifest during disasters and hamper the deployment and effectiveness of traditional disaster response systems. These are presented in Figure 1-1 (right) and entail (1) **UAVs and UGVs** for their mapping and transportation capabilities to increase overall situational awareness, deliver important resources and even offer firefighting solutions, (2) **resilient communications**, as disaster conditions may disrupt and hamper communications or even prevent operational networking conditions, and (3) **technologies for companion K9 units and mini-UAVs** for obstacle bypassing, improved inspection and navigational capabilities. These supporting technologies will expand the first responders’ arsenal and allow them to operate on most situations and conditions while protecting them in hostile environments and improving their overall effectiveness and operational capacity.

As aforementioned, in the heart of FASTER’s concept lie the first responders and purposely they will be involved during all phases of the FASTER project’s realization as discussed in Section 1.3.4. For this reason, FASTER involves multi-disciplinary first responder organizations in its consortium to allow from their specific viewpoints a wide grade of involvement during FASTER’s design, development and testing phases. For this purpose, first responder organizations are **participating heavily in the design and piloting phase**. Moreover, in order to create tools that will match first responders’ needs, FASTER is establishing new ways of involving them in the development phase. They will participate in a **continuous usability and performance assessment program** (T3.3) of the tools and **each FR organization will monitor the development of a key technology**. All solutions will be designed for specific scenarios and use cases that simulate actual operational scenarios, as presented in Section 1.3.3. In addition, device selection, ergonomics and operational capacity will be decided after multi-party discussions between the technical team and the first responder representatives. As a result, **FASTER will deliver specific, validated solutions for first responders**. Societal acceptable will not be neglected as all social, ethical and legal aspects will be considered to materialize FASTER’s concept into widely accepted disaster response solutions.

Through this preliminary discussion with the end-users, FASTER has already designed its first response approach and the tools to be employed as illustrated in *Figure 1-2*. **Three phases of operation are considered** with the first one deploying autonomous vehicles for **mapping the area** as well as setting up the ground for the operating first responders, placing communication relay nodes and deploying advanced 5G communication services. The Portable Control Centre provides the required situational awareness to design and support operations. Next, first responders enter the disaster scene performing **search and rescue** operations on a mapped environment where their wearable devices are both sharing information to the back-end system (or among them), but also delivering to them directions, tasks, events and positioning/localisation data through AR technologies (visual, haptic, AR glasses). The set of field-deployed technologies that enhance the first responders’ operation capacity, including autonomous vehicles, will rely on ergonomic interfaces like hand tracking, gesture recognition or implicit action recognition. Finally, the **risk mitigation** phase operations include physical intervention like transportation of resources to inaccessible areas via autonomous vehicles and removing citizens from dangerous areas.

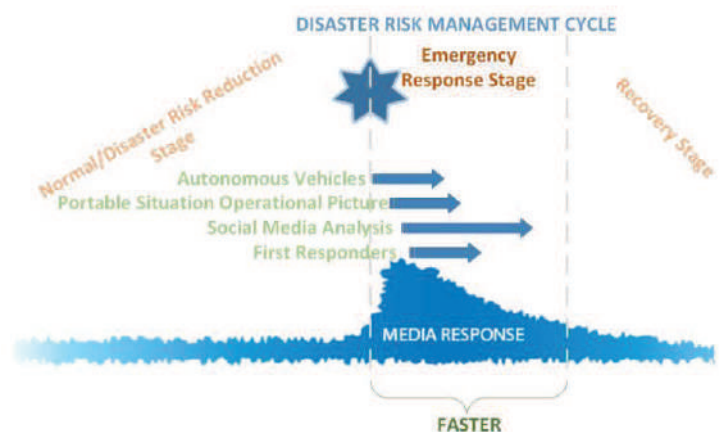


Figure 1-2: Three phases of the Response stage and related FASTER tools.

1.3.2 Technical approach

FASTER will develop a set of tools towards enhancing the operational capacity of first responders while increasing their safety in the field. It will introduce **Augmented Reality technologies** for improved situational awareness and early risk identification, and **Mobile and Wearable technologies** for better mission management and information delivery to first responders. **Body and Gesture based User Interfaces** will be employed to enable new capabilities while reducing equipment clutter, offering unprecedented ergonomics. Moreover, FASTER will provide a platform of **Autonomous Vehicles**, namely drones and robots, aiming to collect valuable information from the disaster scene prior to operations, extend situational awareness and offer physical response capabilities to first responders. FASTER will gather multi-modal data from the field, utilizing an IoT network, and Social Media content to extract, either locally or in the cloud, meaningful information and to provide an enhanced Common Operational Picture to the responder teams in a decentralised way using **Portable Control Centres**. It will additionally use blockchain technology to keep track of needs and capabilities using smart contracts for maximum efficiency. The whole system will be facilitated by tools for **Resilient Communications Support** featuring opportunistic relay services, emergency communication devices and 5G-enabled communication capabilities.

Augmented Reality for operational situational awareness

Mobile Augmented Reality (AR) for Operational Support: This module aims to offer more efficient situational awareness and decision making to practitioners in critical conditions that require full attention and focus from involved first responders.

FASTER aims to provide Augmented Reality (AR) technology to the Civil Protection field units, delivering in real time information gathered from the other FASTER components (e.g. alerts, team status and location, sensor values...), filtering the information and providing targeted content to the AR user. AR will be supplied both through mobile phones and AR glasses (e.g. HoloLens) and will enable first responders to access previously unreachable information in a contextual fashion, by superimposing the data to the real world.

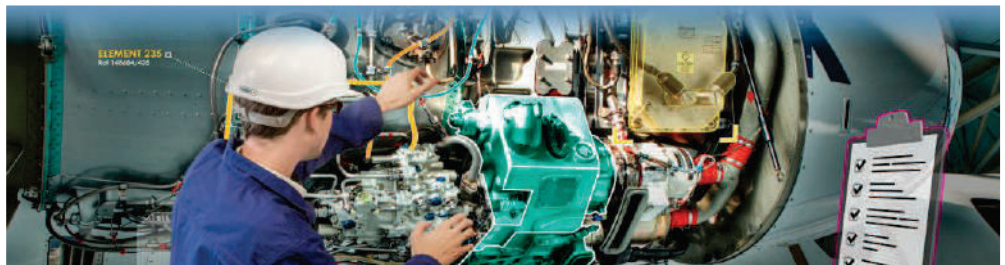


Figure 1-3 The concept of operational assistance using AR © DXT

FASTER aims to provide Augmented Reality (AR) technology to the Civil Protection field units, delivering in real time information gathered from the other FASTER components (e.g. alerts, team status and location, sensor values...), filtering the information and providing targeted content to the AR user. AR will be supplied both through mobile phones and AR glasses (e.g. HoloLens) and will enable first responders to access previously unreachable information in a contextual fashion, by superimposing the data to the real world.

Extended vision technologies using commercial lightweight UAVs: Many different factors may prevent first responders from reaching and visually inspecting impassable and/or dangerous areas in disaster sites, such as ruins, obstacles, harmful or unknown environmental conditions. FASTER aims to extend first responders' visual perception by deploying lightweight and camera-equipped UAVs to explore otherwise inaccessible or potentially dangerous areas. These small-factor UAVs will comprise part of the first responders' gear and will be deployed on demand when and where necessary. Drones are typically used to extend the user's line of sight by transferring their video stream to the piloting user that flies the UAV in first-person mode. This necessitates the use of a screen, therefore also requiring the user's focused attention. Instead, FASTER will offer first responders an exocentric X-ray like visualization of occluded areas from their physical viewpoint, thanks to a combination of UAVs with AR see-through devices and advanced 3D scene analysis and modelling algorithms. This will widen their field of view and offer the ability to make obstacles between the UAV and the responder partially transparent. Video streamed from the UAV's camera will be rendered via an image-based rendering pipeline to augment the user's vision capabilities and enable better navigation, remote discovery and situational awareness in narrow and complex environments.



Figure 1-4: The concept of AR extended vision using UAVs.

FASTER will offer first responders an exocentric X-ray like visualization of occluded areas from their physical viewpoint, thanks to a combination of UAVs with AR see-through devices and advanced 3D scene analysis and modelling algorithms. This will widen their field of view and offer the ability to make obstacles between the UAV and the responder partially transparent. Video streamed from the UAV's camera will be rendered via an image-based rendering pipeline to augment the user's vision capabilities and enable better navigation, remote discovery and situational awareness in narrow and complex environments.

Mobile and Wearable technologies

Mission management and progress monitoring: During emergencies there is a strong need of effective coordination between the control centre and in-field units. FASTER will design and implement a novel mobile application for first responders able to: support inter-agency communication, manage mission tasking and progress monitoring, allow real-time reporting of incidents and of geo-located multimedia content to improve situational awareness. The mobile application will rely on a cloud-based back-end and front-end to provide data services and the user interface for decision makers at control room, respectively. The mobile application will interact with other components to provide responders the latest available data, including the location of K9 units. The mobile application developed within I-REACT project (Figure 1-5, Figure



Figure 1-5: Mission management

1-6) will be used as an initial asset to add advanced features such as voice control, gesture and activity recognition.

Wearable sensors and smart textiles: FASTER will design and develop a prototype regarding the use of electronic devices (i.e., sensors) in wearable textiles, equipped inside an underwear of the first responder's uniform, that will be able to collect biometric data (i.e., body temperature, heart rate). Also, sensors will be deployed on the First responder's uniform (i.e., temperature, humidity). All these data will be communicated with the help of a smartphone to provide for *edge computing capabilities* and enhance the information gained at almost real-time, including accurate positioning, since calculations will take place at the edge of the network. On top of this, the design of the solution for FASTER will have to follow the existing security standards for the first responder's uniforms, keeping in mind the protection of electronic parts of wearables, under extreme conditions that first responders may face.



Figure 1-6 in-field agent location and monitoring

Body and Gesture based User Interfaces

Hand gesture recognition: FASTER will provide a framework for wearable devices that will capture and identify arm/body movements exploiting Artificial Intelligence. It will provide non-visual/non-audible communication capabilities, translating movements or critical readings from paired wearable devices to coded messages, able to be communicated to cooperating agents on the field through vibrations on wearable devices and following Morse code. A Deep Learning model adapted to mobile devices will be implemented, to classify motion signals to predefined gestures in real-time. Given that often during operations communication infrastructure has collapsed, messages will be transmitted using IoT communication protocols (e.g., Bluetooth Low Energy; BLE).



Figure 1-7: How HANGER works

K9 Behaviour Recognition: In the context of FASTER, a Deep Learning model and a novel wearable device for K9s will be developed, featuring sensors (i.e. 3-axis accelerometer and gyroscope) able to capture and transmit in real time motion signals and situational status of K9s, while the former will be able to extract valuable information about K9 behaviour and translate it to specific messages that can be transmitted wirelessly through IoT communication protocols to first responders. At the same time, the definition of a communication protocol will be studied that will translate the K9's behaviour (e.g., movement or bark) into a message addressed at the person in need in order to inform him/ her about the K9's role and provide some useful tips that should be followed to facilitate the first responder's work.

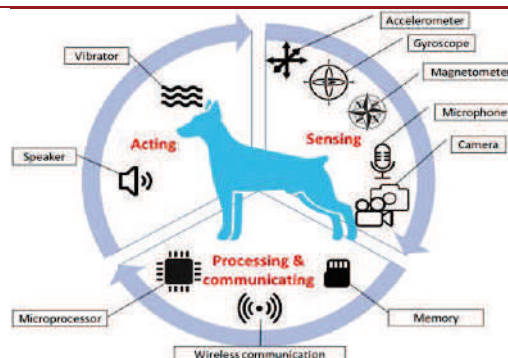


Figure 1-8: K9 Behaviour Recognition concept

Gesture-based UxV navigation: Within FASTER, different UxVs will be deployed by first responders on the site of a disaster in different scenarios. FASTER will provide customized hands-free solutions for UxV navigation and control, offering new capabilities and unprecedented ergonomics to first responders, while eliminating the need of separate and additional controller devices and reducing equipment clutter. Research will be directed towards developing touchless, easy to operate and human intuitive exocentric interfaces, based on body, head and hand gestures. Compared to egocentric approaches, a direct feed of the drone's view will not be required, and first responders will be able to steer the UxVs via gaze and head movement recognition and navigate the space using hand gestures. Multifunctioning devices already present in the first responders' gear, like monitoring smartwatches equipped with accelerometers and the AR headset, will be utilized for pose and body parts tracking, while AI algorithms will be employed to recognize a set of UxV-specific gestures, defined in collaboration with End-Users. Combined with augmented vision technologies offered by FASTER, first responders will be presented with a holistic approach for the precise UxV navigation, even in narrow and out of sight areas.

Autonomous Vehicles

Robotic Platform: The FASTER robotic vehicle will include a robotic platform, integrating different sensors (optical and thermal cameras, environmental, nuclear, biological, chemical, radiological and explosives) and, if required by the use cases, a robotic arm with several end-effectors options (grippers or tools). The AGV will provide the drone the next interconnections: tether, autonomous take off/land from AGV, battery charger. The wireless broadband mesh communications incorporating robust waveforms, supporting data exchange of large amounts of data (including video) and enabling multi-robot cooperation (UAVs). The advanced operation control console, with enhanced user interface and visualisation capabilities, including visual analytics and advanced controls for immersive user experience. Location and 3D modelling algorithm, generating advanced 3D mapping of the environment.

Heavyweight drones for mapping/physical operations: FASTER will em-

ploy an array of drones of different sizes and equipped with different payloads will be capable to provide different services to the first responder's operators. In particular, thermal/visual/chemical mapping of the area, physical operations like carrying heavy first response equipment, while providing communications node capabilities to provide resilient network. The capability to operating in **swarms** in a coordinated manner following simple operational rules will also be provided. This swarm of drones will include drones from different sizes and capabilities manufactured by DRONE HOPPER, able to interface with other commercial drones.



Figure 1-9: A drone prototype from DH.

Resilient Communications Support

Emergency Communication Box: In the context of FASTER, a novel, low cost device, capable of delivering through broadcasting, critical information to first responders or instructions to a crowd of Civilians will be developed. This will be achieved by utilising Wi-Fi technology for broadcasting emergency notifications, exploiting the capabilities of IEEE 802.11 protocol to broadcast of information in the form of SSIDs. Taking advantage of the SSID broadcasting mechanism, the devices will be able to send encrypted and signed messages (to avoid the malicious injection of false information) in a massive way, able to cover large number of recipients. Applications targeting mobile phones and smartwatches will be used to capture and present these notifications, which can be encoded using Public Key Cryptography, and allowing the multiplexed broadcasting of messages targeting different groups (Citizens/Responders). By deploying multiple devices, a mesh communication network could be provided, increasing the coverage area. Triggering message broadcasting will be feasible even from great distances (10s or 100s of kms), using the appropriate technology (LoRa or Short-wave to devices).

5G-enabled communication infrastructure: The 5G-enabled infrastructure will offer the means to manage and orchestrate resources of an edge cloud in the proximity to the geographic area under investigation and in accordance to the requirements of the rescue team. This will be achieved by leveraging the advantages provided by 5G technologies, including 1) the timely deployment of an edge RAN node, 2) the configuration of the resources, highlighting the capability to extend allocated resources (scaling in/out capabilities) in real-time, migrate part of the Network Service (one or more Virtual Network Functions instantiated in new Virtual Machines or containers) and modify the VNF Forwarding Graph to steer traffic more efficiently and thus covering the changing operational capabilities of the responders' teams in real-time.

Blockchain distributed network: Blockchain allows central systems of first responders and other relief mission participants, including social networks and IoT control systems, to connect via a distributed network. For the involved parties, this means: 1) distributed power: all participants are equally entitled and can continue to use their own resource planning system, 2) partner interoperability: single source of truth for all operations that is updated in real time, 3) ad hoc capabilities: all parties, including offsite participants such as donors and service/resource providers, are free to join and leave at any time, and 4) privacy: all participants are owner of their own data and don't have to expose their resource capacities to other participants, yet can respond to needs they are capable of fulfilling.

Communication mesh through opportunistic relay services (UAV, UGV, wearables): It has been shown that UAVs can be integrated into a cellular network to compensate cell overload or site outage, to enhance public safety in the failure of the base stations, and to boost the capacity of the network. FASTER will provide a resilient communication service based on devices from the FASTER eco-system and an augmented communication support through opportunistic relay services e.g. swarm of drones' usage. FASTER will implement a resilient communication service, employing common devices that will allow, in the worst-case scenario, a degraded service providing the minimal acceptable network performance in order to provide the basic services in a crisis scenario. Moreover, this service will ensure communications even in inaccessible areas through the deployment of relay nodes.

Common Operational Picture

Portable Control Centre: FASTER will develop a decentralised solution for Common Operational Picture that will be supported by services and tools to deal with an adaptive environment, considering contextual information and according to a shared situational picture. FASTER advanced visualization tools will provide different types of information regarding the position of first responders, possible victims, evacuation and rescue routes, managing countermeasures, resources required and, at the same time, highlight dangerous areas (ruins, burnt buildings, flooded areas), dangerous environmental conditions (extreme temperatures, dangerous gases and so on) through an advanced geo-location information system visualisation layer for both **3D indoor and outdoor** scenarios. **FASTER Portable Control Centre** will allow teams of FRs on the field to make an efficient and effective decision while facing a critical situation and select and organize the proper response. Two versions are foreseen: a desktop and a mobile version. Moreover, as users require and expect more sophisticated and easy-to-use tools to visualise and analyse remotely sensed geospatial data, it will be developed novel visualisation metaphors and new ways to merge and visualise essential information in a COP for enabling end-users to understand the critical situation at a glance, having an overall and continuously up-to-date situation awareness.

Social Media analysis: Validation is the key challenge when considering social media information for situational assessments during emergencies. FASTER will implement smart filtering techniques that will exclude erroneous or misleading data, retaining only informative content related to emergency situations and enhance real-time situational assessment. Text mining and deep learning techniques will be used to classify social media posts according to the event type and map it into relevant categories, which will be co-defined with the FASTER first responders. Deep learning models will be used to recognize scenes depicting emergency situations, such as floods, fires, and extreme weather events, and also damaged infrastructures, from social media multimedia content. Furthermore, these models will be extended to specific object recognition from UAVs, which can be effectively used for mission critical tasks. The specific list of objects and will be subject of this activity will be co-defined with first responders.

1.3.3 Target applications and Use Cases of the FASTER system

The FASTER solution will be demonstrated in three carefully selected scenarios that cover diverse disaster types and involve the **tools deployed** as shown in the following table. The Use Cases have been selected to cover diverse scenarios including open, urban and indoors environments. The geographical distribution of the Use Cases pilots has been defined according to the interest and the facilities available from each First Responder entity.

Scenarios	Autonomous Vehicles	AR tools	Smart Wearables	Gesture Interfaces	Resilient Communication	Portable Control Centre
Collapsed building	Drones Robots	Operational support, mission management, Extended vision	Wearables, smart textiles, K9	Communication, UxV navigation	Ecobox, Low-latency 5G	Social Media Analysis, P-COP
Urban Flooding	Drones	Operational support, mission management	Wearables, smart textiles	Communication, UxV navigation	Ecobox, Blockchain, UAV enabled	Social Media Analysis, P-COP
Indoor disaster	Robots	Operational support, mission management, Extended vision	Wearables, smart textiles	UxV navigation	IoT Communication, Blockchain	P-COP (indoor 3D tool)

1.3.3.1 Use Case 1: Collapsed building (natural or man-made disaster)

Supporting First Responders: ADM, SUMMA, MG, HRTA (Madrid, Spain)

The application of FASTER will be first demonstrated in a multi-storey building collapse case. The scenario revolves around a structural failure that triggers the complete collapse of a building in an urban environment. *Possible escalation factors in terms of the risks such a situation poses to first responders include: building materials, building contents (e.g. storage of chemicals), presence of fire and weather conditions. These conditions may bring about physical hazards (e.g. unstable rubble pile, electrical equipment or sharp objects) or chemical hazards.*

Main scenario: An explosion is reported at Madrid (Spain). An emergency team is activated, composed of experts from the fire-fighting department, medical services and police. Given the reports of a collapsed building and the high probability of victims under debris, search and rescue dogs units are activated. The first step is to define a security area. For this purpose, FASTER **autonomous vehicles** (drones and robots) are employed to map the area, including structurally unstable locations, possible heat-zones and the presence of toxic gases, without putting under risk the intervening responders. As soon as the security area is identified from the created map sent to the control centre, the firefighting forces, supported by the police, enter the scene to complete an assessment of the scenario. Firefighters (as leaders of the operation) and the other first responders communicate through the main Control Centre (112)

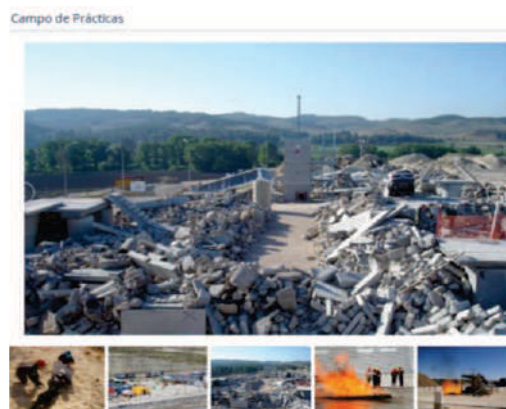


Figure 1-10: Use Case 1 pilot site

and carry radio communication devices and smartphones, being used depending on the availability of communications. A **low-latency, high-availability 5G network** is activated to ensure availability. Their equipment includes smart clothing and wearables to **monitor their vital signs and the quality of the environment**, assuring their adequate health status and prompt response when required, **improve the accuracy of the location** information and enable **haptic communication** if required. Leaders of the operation are also equipped with a **FASTER Portable Control Centre** that can provide COP information such as position of responders, resources and dangerous zones in the area. **AR-enabled communication and collaboration** tools are also available through mobile and AR devices. In cases that a specific zone is not inspectable, a mini drone or robot can be navigated to provide **extended vision capabilities** to first responders. The video feed is transmitted to the AR device in real time. **K9 units are also equipped with wearables** assisting their localization and their communication capabilities in a noisy environment.

Supporting First Responders: CSIP, WSPOL, ENSOSP, MG (Piedmont, Italy)

The second use case of FASTER consists of a major flood in a city with a high building density, which poses challenging hazards to first responders. *Escalation factors may include: Disruption of services, Dangerous debris carried by water, Live victims trapped under water, Looting and People stranded on evacuation routes.*

Main scenario: A severe storm affected the north-western part Piedmont region, affecting the south-eastern one, overflowing Po, Tanaro, Bormida, Belbo, Scrivia and Orba rivers and threatening people of the cities and villages they flow through. The local authorities began to take safeguard measures to protect population. Due to the continuous increase of the water levels, the main rivers of the region flooded many towns and villages. In Alessandria city, all the neighbourhoods next to the river were flooded by Tanaro River. Many other minor cities and villages stretching along the rivers were flooded affecting communication and transportation; the main sites involved were Valenza by Po River, Canelli by Belbo River, Acqui Terme and and Castelnuovo by Scrivia River. Authorities deploy a swarm of **heavy load drones** to map the area that has been affected. Moreover, **images and videos are continuously collected from Social Media** providing information in almost real time. Based on the collected information, authorities carefully design the mission of minimizing the disaster’s impact and evacuating people and animals. A press release is released with instructions on how to deal with the threat. In areas where communication means are offline, **heavy load drones** are transferring **emergency communication boxes** that can broadcast the instructions, as well as comfort items and essential goods. Blockchain technology is employed to log and track needs identified by drones, sensors, from social media sources, and other participants. The needs are matched to first responder capabilities and coordinated among other participants onsite and offsite (such as aid agencies, donors and volunteers) participants. First responders participating in the operation are provided with their tasks through the **FASTER mission management application** in their mobiles and they are continuously updated on the newest developments and the location of people in danger. They are equipped with **smart clothing and sensors** to continuously monitor their health status during operations. Local operation leads are also equipped with **FASTER Portable Control Centres** for a local COP to take better informed decisions.

1.3.3.3 Use Case 3: Indoor disaster (natural or man-made disaster)

Supported by: KAJ, MG (Kajaani, Finland)

The third application of the FASTER solution will be demonstrated in an indoor disaster scenario. An explosion in a populated building presents first responders with many hazards ranging from fires and their implications (e.g. heat or smoke), dangerous debris, hazardous materials, to the possibility of secondary attacks. *Escalation factors may include: Secondary explosion, Hostages, Shooting, Toxic chemical release, Mobile phone jamming*

Main scenario: The local alarm centre gets an emergency alarm from a building in the town of Kajaani, where a fire has been set off by a man-made explosive ordnance. The first responder unit responding to the alarm opens up their device with the FASTER **Portable Control Centre** and more specifically the indoor 3D environment tool. While driving to the site, the Chief of Unit forms his plan of actions using the **P-COP** to assess the current situation. P-COP will provide information, based on surveillance, sensor and construction automation observations for: 1) number and position of people inside of the building, 2) location of the fire in the construction, 3) inaccessible rooms due to renovation work, 4) whether electricity is still on. Getting to the site, the first responding unit acts according to law, confirming that the fire alarm has, indeed, actually gone off in the space displayed in the P-COP. Interviewing people who have independently evacuated the building, the Chief of Unit gets reason to assume, that the disaster is man-made, and that the perpetrator is still be inside the building. Mobile communications are jammed for safety reasons. A **low-latency, high-availability 5G network** is activated for First Responders only, to ensure availability. Inside of the building, the fire is expanding and creating heavy smoke. Two groups have closed themselves in separate rooms, not directly close to the fire. An **autonomous robot** is deployed to locate the fire and identify the perpetrator using its onboard camera. **Responders are navigated** to the spot receiving instructions on the AR devices, as well as surveillance and sensor observations at their route, while receiving video stream from the robot. They are equipped with **smart clothing and sensors** to continuously monitor their health status during the operation. Instructions to the trapped people telling them when they are safe to exit the building are broadcasted to their mobiles through IoT protocols and a safe route is shared.



Figure 1-11: UC3 Conceptual Diagram.

Apart from the three main pilots described above, additional field trials will be implemented in the context of FASTER, in order to make engineering trials and preliminary tests of the FASTER functionalities. The goal is to gradually integrate all agents and functionalities to the platform, mitigating the risks of unexpected failures during the integration. In addition, these field trials will be used to more efficiently and frequently involve the first responder end-user members of the consortium in testing, validating and offering feedback about the ongoing technological developments. Further, they will be used to prepare the first responders for the subsequent piloting stages. These field trials will be organized during project's meetings taking place at First Responder premises to ensure (1) the active and high participation of actual end-users and (2) the demonstration of the developed technologies to all First Responders participating in the consortium achieving a high EU geographical coverage. To better prepare for these field trials, FASTER has allocated equipment budget to all end-users to be able to realistic support such trials (Section 3.4).

1.3.4 Overall approach and methodology

The FASTER project will be executed over a **period of 36 months**, organised in **three (3) different phases**, and, to manage its goals and objectives (for details see Section 3.1.1 Overall structure of the work plan), it will follow an iterative and incremental spiral development process and more specifically, adopt the **SCRUM**⁴ methodology, combined with a heavy **end-user-involvement** throughout the project. This phased approach is illustrated in Figure 1-12, with each phase feeding into the next.

The FASTER consortium adopts the SCRUM methodology not only because it **reduces the overall time of development** and **enables timely problem resolution**, but also because it supports the **regular communication of progress and outcomes to the related stakeholders**. The interaction between the FASTER end-users and the development team will be enforced and **valuable feedback will be collected** allowing for **on-time adjustments** and **corrective actions** to be taken, while at the same time, the design and implementation of *effective and cost-efficient situational awareness tools for first responders operating in harsh unstructured environments that will optimally and accurately address the expected requirements*, will be ensured.

In more detail, the FASTER project activities are organized into 11 Work Packages with horizontal development (*wearables, IoT, UxVs, communication technologies, AI and mobile technologies*) and vertical management and outreach activities (Section **Error! Reference source not found.**). The three phases mix these activities efficiently in order to reach the desired outcomes and subsequently presented in detail (see also the Gantt chart in Section 3.1.3).

Initial Developments Phase (M01 - M12)

The first phase of FASTER **spans the first 12 months** where initial discussions among the technical team and the First Responder representatives will lay the grounds for the delivery of efficient and ergonomic situational awareness tools. At the beginning the focus will be on defining the **end-user requirements (MS01)** which will be analysed and mapped to functionalities and then specifications to eventually define the tools' **architecture**, exchanged and interoperable data formats and fluent interfaces, and set the ground for the subsequent R&D activities (**MS03**), while at the same time, assembling the systemic requirements for each tool (**MS02**). Moreover, project management systems will be implemented over this first year, both general, technical and among first responders. Finally, during this phase, contacts with interested stakeholders will start and the **Advisory Board will be assembled**.

⁴ <https://scrum.org/>

timely demonstration of FASTER's results to any interested stakeholders and establish grounds for any potential further exploitation of the technologies, as well as extensively disseminate the project's results.

1.3.5 Positioning of the project

Tools	Starting point	TRL
Augmented Reality for operational situational awareness	Mobile Augmented Reality (AR) for Operational Support. FASTER will build on the state-of-the-art Mixed Reality technology developed by DXT for military training. This has been positively assessed in January 2018 as a TRL6 system demonstrated in a relevant environment in the SIMBA project developed by DXT for the French Defence. However, this environment was limited and controlled. Thus, we start at a TRL4 for an application for first responders in more complex and larger environments.	4 -> 7
	Extended vision technologies using commercial lightweight UAVs. AR devices will serve as the baseline for presenting the content to the user, while monocular feature-based tracking will localise the UAV's video feed in relation to the AR device. Image-based rendering techniques will be developed to superimpose the drone's view of the occluded area on top of the obstacles.	3 -> 5
Body and Gesture-based User Interfaces	Hand Gesture Recognition (HanGeR), developed by the CoNSeRT team of UWA in the context of H2020 TRILLION project is going to be the starting point for achieving hand gesture recognition. HanGeR exploits a Deep Learning model, to achieve real-time hand gesture recognition. The application is available for Apple and Android devices.	5 -> 7
	K9 Behaviour Recognition Wearable, WAMPA (Wearable for Activity Monitoring of Productive Animals) is a prototype of a neck-mounted wireless livestock monitoring device, developed by the CoNSeRT team of UWA that will be the starting point for the K9 Behaviour Recognition Wearable. WAMPA collects accelerometer and GPS data, either transmitted wirelessly through ZigBee or Wi-Fi in real time or stored locally to be uploaded to a server later.	3 -> 6
	Gesture-based UxV navigation. Hand/arm gestures are an intuitive way to communicate for humans, and various research works have focused on controlling UxVs with natural gestures and will serve as the baseline that will improved within FASTER. Suitable gestures will be designed with the involvement of the end-users that will consider data availability in disaster scenarios and operating field conditions. The goal will be to allow for natural and intuitive piloting of UxVs from an exocentric viewpoint.	3 -> 5
Mobile and Wearable technologies	Mission management and progress monitoring. The mobile application developed within the I-REACT project that is at TRL 4 with respect to command and control features will be used as an initial asset and further developed. Further, more advanced features will be implemented for the mobile app such as voice control, gesture and activity recognition.	4->7
	Wearable sensors and smart textiles. The starting point for FASTER will be UWA's experience in textiles and electronics based on the results of ETexWeld, where a complete e-textile system has been produced for development of interactive protective garments. FASTER will work on an edge-processing platform for analysing the collected information locally and provide real-time information and alerts for the safety of First Responders.	3 -> 6
Autonomous Vehicles	Robotic Platform. FASTER will make use of an outdoor autonomous vehicle based on the Polaris model from RANGER. Robotnik will make all the necessary development over the platform to cover the needs of the proposed use case scenarios.	5 -> 7
	Heavy-load Drones. FASTER will exploit the expertise of DH in drone manufacturing, starting from the URBAN HOPPER platform prototype, designed to counter urban & city fires worldwide. Communication and sensor payload will be integrated, and swarm capabilities will be researched in the framework of the project.	5 -> 7
Resilient Communications Support	Emergency COmmunication Box (EcoBox), developed by the CoNSeRT team of UWA is going to be the starting point for achieving resilient communications when other means are not available. The available prototype implemented in the context of H2020 STORM project can operate autonomously for several hours, allowing for deployment where all electronic and electrical means for power or communication are unavailable.	4 -> 7
	Communication mesh through opportunistic relay services. It will make usage of UAV/drones to allow an implementation of a communication mesh to the first responder teams in order to have the communications services. The set of services will be implemented by algorithms in a communications platform in order to provide opportunistic communications into the UAV to promote resilient communications.	3-> 5
	Automatization of first responders' services. Capitalizing on the work performed and achieved in 5G-related projects that participates in, such as SONATA and 5GTango, Synelaxis plans to automatize to the maximum possible extent part of the services to be offered to first responders for the management and orchestration of the network resources to be allocated.	3->5

	<p>Blockchain technology. FASTER will develop a robust distributed network of trust that makes it possible for first responders to cooperate and interoperate with other participants involved in a transparent and efficient manner. The set of services will be implemented by a system of smart contracts that will allow any participant to request and provide assistance where and when it is most needed.</p>	<p>3->5</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Portable Common Operational Picture</p>	<p>Advanced Visualization Tools. The starting point for visualizing information in FASTER is an Open WEB GIS solution (ENG) and a prototype 3D indoor visualization tool (KAMK), already investigated in other research projects, allowing to create and visualise maps and building blueprints, view scenarios, integrate and share information, in a cartographic or quantifiable form also known as Situation Operational Picture. Effective dashboards and interaction models will be included in the tools available to first responders for emergency situations.</p>	<p>5 -> 7</p>
	<p>Social Media analysis. The social media data collected within the I-REACT project (more than 1 year of data collected in 4 languages and 8 different hazards) will be used to train the novel classification and event detection algorithms that will be developed in FASTER. The UX of the social media dashboard will be drastically changed to allow a real-time usage at control centre.</p>	<p>5 -> 7</p>

1.3.6 Links with national or international research and innovation activities

The FASTER consortium will exploit synergies and complementarities with all relevant research and innovation activities at national and international levels. The FASTER partners are engaged in a number of strategic national and international partnerships and networks with other leading organizations and via bilateral collaboration agreements. They will ensure that the consortium has access to state-of-the-art knowledge and background, and that external ongoing research activities are taken into consideration.

National/International R&I activities	Links to FASTER
<p>FORENSOR: (FOREnsic evidence gathering autonomous sensor) - H2020-EU.3.7.: FORENSOR develops and validates a novel, ultra-low-power, intelligent, miniaturised, low-cost, wireless, autonomous sensor for evidence gathering that will be able to operate for up to two months with no additional infrastructure, preserving the availability and the integrity of the collected evidence.</p> <p>Participants: CERTH/VUB</p>	<p>The experience gained in object tracking, classification and event detection within FORENSOR will be exploited in FASTER for high-level scene interpretation. With respect to SELP issues, FORENSOR’s work could be used as a starting point and adapted to the needs of FASTER. Linking with FORENSOR will be achieved since CERTH coordinates both projects. (Linked to WP2, WP6)</p>
<p>TRILLION (TRusted, Citizen -LEA coLLaboratlon over sOcial Networks): TRILLION proposes an open, flexible, secure and resilient socio-technical platform to foster effective collaboration of citizens and Law Enforcement Agencies (LEAs). Using the TRILLION platform, citizens are able to assist LEAs through active participation. On the other hand, LEAs can detect incidents, locate onsite citizens, other LEAs and first responders to communicate with them and request more information.</p> <p>Participants: ENG/UWA/CERTH/INOV</p>	<p>UWA’s experience in human activity recognition and hand gesture recognition based on wearable and mobile devices equipped with motion sensors (e.g., accelerometer) will be exploited in FASTER for enabling context awareness. Moreover, the Social, Ethical, Legal and Privacy issues, will be taken into consideration when collecting motion data and extracting information. Finally, HanGeR application will be used as a starting point to fulfil the needs of FASTER. (Linked to WP4)</p>
<p>STORM (Safeguarding Cultural Heritage through Technical and Organisational Resources Management) – H2020-DRS-11-2015: STORM proposes a set of novel predictive models and improved non-invasive and non-destructive methods of survey and diagnosis, for effective prediction of environmental changes and for revealing threats and conditions for cultural heritage sites.</p> <p>Participants: ENG/UWA/KPRF/INOV</p>	<p>ENG’s experience on events correlation and reasoning, will be used in FASTER to define a shared information model. UWA’s experience in emergency communications with no internet connectivity (ECOBEX) will be exploited in FASTER for the development of a resilient mesh communication network that can connect victims and first responders.</p>
<p>I-REACT (Improving resilience to emergencies through advanced cyber technologies) - H2020-DRS-01-2015: I-REACT aims to be the first European-wide platform to integrate emergency management data coming from multiple sources, including social media and crowdsourcing. This way, it will produce information faster and allow citizens, civil protection services and policy makers to prevent and/or react against disasters.</p> <p>Participants: ISMB</p>	<p>The software architecture model will be used as a base in order to structure the data driven platform. The machine learning models for filtering social media streams will be extended with image processing technique to achieve image classification for the mobile application, AR device and UAVs. The mobile application developed within the I-REACT project will be used as an initial asset. (Linked to WP4, WP8)</p>

<p>eVACUATE (A holistic, scenario-independent, situation-awareness and guidance system for sustaining the Active Evacuation Route for large crowds), FP7 (2013 - 2017). This project addresses the creation of a holistic system that a) will enhance the effectiveness of complex evacuation operations at any venue, b) adapt evacuation plans, c) dynamically survey how an evacuation evolves and d) support civil protection authorities.</p>	<p>the project, DXT was responsible of designing, implementing and validating the Common Operational Picture component of the system. This component was the main interface between the data gathering components (sensors, CCTVs, social media), the simulation components (crowd estimation, crowd simulation, evacuation hot spots) and the end-users, providing the 2D/3D view of the monitored building and its surroundings. (Linked to WP6, WP7)</p>
<p>Participants: DXT</p>	<p>DXT develops the component for the visualisation of building interiors and damaged structures in the field of this project. Crisisplan’s primary responsibilities involve scenario definition, user/system requirements and specifications, and oversight of the pilot activities and system validation. Both partners will exploit the experience accumulated in INACHUS in relevant areas in FASTER project. (Linked to WP7, WP8).</p>
<p>INACHUS (Technological and Methodological Solutions for Integrated Wide Area Situation Awareness and Survivor Localisation to Support Search and Rescue Teams), FP7-SEC (2014-2018). INACHUS aims to achieve a significant time reduction related to Urban Search and Rescue phase by providing wide area situation awareness solutions for improved detection and localisation of the trapped victims assisted by simulation tools.</p>	<p>This FP7 flagship project, initiated and coordinated by DXT, developed an innovative system integrating the latest advances in Virtual and Augmented Reality, and Simulation to enhance the operational preparedness for complex crisis. DXT currently commercialises the results of the INDIGO and Crimson, its predecessor, projects as the Crimson product line.</p>
<p>Participants: DXT/CPLAN</p>	<p>http://crimson.diginext.fr (Linked to WP7, WP8)</p>
<p>INDIGO, Innovative Training & Decision Support for Emergency operations, FP7-SEC (2010-2013). The INDIGO system enables a) 3D realistic visualization of the crisis environment, b) creation and simulation of different adaptive scenarios and events for planning and anticipating future states, and c) simultaneous training of decision makers, managers, first responders operating in the field.</p>	<p>WSPOL will exploit the experience it acquired through SECTOR on the complications of multi-agency processes when aiming at setting-up and design cross-discipline supporting information Systems. WSPOL will use this experience to help with the design and the architecture definition of the FASTER tools. (Linked to WP8)</p>
<p>Participants: DXT</p>	<p>In the ALFA project one of the concerns is the secure communications for mobile devices. The experience acquired by INOV and ENG could be linked with FASTER and will allow a better achievement for the project. (Linked to WP4, WP8)</p>
<p>SECTOR (Secure European Common Information Space for the Interoperability of First Responders and Police Authorities) - FP7: SECTOR aimed to improve crisis management in multi-actor emergency responses by establishing future Common Information Spaces, expanding EU knowledge on multi-agency processes.</p>	<p>The expertise gained during MARISA project by ENG will be useful for processing information coming from difference sources and improving information exchange, situational awareness, decision-making and reaction capabilities. (Linked to WP8)</p>
<p>Participants: WSPOL</p>	<p>UWA’s experience acquired from ETextWeld, where a complete e-textile system with embedded sensors, actuator, processors and communication has been produced for interactive protective garments that are able to monitor health, activity, position and the environmental risky situations. The wearability and comfort factors been studied, and results will be exploited to meet FASTER needs. (Linked to WP4)</p>
<p>ALFA (Advanced Low Flying Aircrafts Detection and Tracking) – BES-04-2015: ALFA proposes using fused sensors added to existing surveillance means to significantly improve detection in aircraft surveillance.</p>	<p>ROBOTNIK will develop in the framework of the project robotic vehicles for Border surveillance in hostile environments. The outcomes from ROBORDER will be used in the new platform to be developed in FASTER as a starting point. Moreover, the participation of CERTH in both projects will allow better communication and collaboration between the two projects. (Linked to WP5)</p>
<p>Participants: INOV/ENG</p>	<p>Participants: ROB/CERTH</p>
<p>MARISA (Maritime Integrated Surveillance Awareness) – SEC-H2020-BES-19-2016: The overarching goal of MARISA project is to provide the security communities operating at sea with a data fusion toolkit, which makes available a suite of methods, techniques and modules.</p>	<p>Participants: UWA</p>
<p>Participants: ENG</p>	<p>ETexWeld (Welding of E-Textiles for Interactive Clothing) – MSCA-RISE: ETextWeld combines welding, textiles, electronics and informatics technologies that aim to develop novel e-textile structures including transmission lines, sensors, actuators, micro-processors, personalized algorithms, on-body computing and user feedbacks in order to make a breakthrough towards interactive clothing.</p>
<p>ETexWeld (Welding of E-Textiles for Interactive Clothing) – MSCA-RISE: ETextWeld combines welding, textiles, electronics and informatics technologies that aim to develop novel e-textile structures including transmission lines, sensors, actuators, micro-processors, personalized algorithms, on-body computing and user feedbacks in order to make a breakthrough towards interactive clothing.</p>	<p>Participants: UWA</p>
<p>ROBORDER (Autonomous Swarm of Heterogeneous Robots for Border Surveillance) – H2020-SEC-20-BES-2016: ROBORDER aims at developing and demonstrating a fully-functional autonomous border surveillance system with unmanned mobile robots which will incorporate multimodal sensors for early identification of criminal activities at border and coastal areas.</p>	<p>Participants: UWA</p>

1.3.7 Gender analysis

The consortium acknowledges the “gender issue” as stated in the EU regulation 1291/2013 as of 11. December 2013 establishing Horizon 2020 and supports the objectives of the framework programme on: a) Gender balance in research teams, b) Gender balance in decision-making and c) Integrating gender/sex analysis in R&I content. The companies and organisations involved in FASTER are committed to encouraging equal opportunities of career

among women and men in their staff according to national and European laws and corporate ethical code. The project basically addresses women's needs, as much as men's needs. Women partners are fairly involved in the project. The partners will promote gender equality within the frame of the project, addressing the EC goal of reaching a 40% participation of women at all levels, in implementing and managing research programmes. In particular, the General Assembly, which is in charge of monitoring the progress of the overall project, will also have the task of:

- Adopting the appropriate measures encouraging women participation in project management, to achieve a balanced representation
- Solving any gender-related issue.
- Supporting the implementation of the recommendations produced by the European Technology Assessment Network (ETAN) as well as by the "Helsinki Group" on the development and production of statistics and indicators, about the situation of women in scientific research.

In order to integrate the gender dimension in the R&I content, FASTER will take all the necessary steps to ensure that both genders will be equally involved during the research activities, which will lead also to scientific quality and societal relevance of the project solutions. Also, an understanding of both genders' needs, behaviours and attitudes and social/cultural features of both women and men will be carefully handled both during the development phase and during the testing one. In general, FASTER is gender-neutral because the same requirements for audience measurement will apply for both genders without any reason to discriminate them. Nevertheless, particular attention in all the phases of the project will be paid to gender-related issues that will be considered while investigating scenarios and user needs.

1.4 AMBITION

FASTER has a clear vision of going well beyond the state of the art providing cross-discipline tools to assist FIRST Responders in all aspects of their work. It aims to improve situational awareness by creating an IoT network for data collection using sensors, wearables and smart textiles (Section 1.4.1) to protect first responders and event information extracted for Social Media (Section 1.4.2). All the information collected will be provided to both individual first responders through AR-enabled devices (Section 1.4.3) and operation leaders building a Common Operational Picture with an innovative interface for portable devices (Section 1.4.4). FASTER will enhance the operational capabilities of First responders providing flexible, multi-functional autonomous vehicles (Section 1.4.5) as well as extended vision capabilities beyond obstacles (Section 1.4.6) utilizing cameras on them. Body and gesture-based interfaces will be developed to improve ergonomics and reduce the equipment overhead (Section 1.4.7). FASTER will also address communication problems both at the field level providing haptic communication capabilities among first responders (Section 1.4.7) and enhanced communication with K9s (Section 1.4.8) and the infrastructure level utilizing 5G technologies and UAVs to achieve resilient and reliable connection (Section 1.4.9). Finally, focus will be put to improve end-user engagement to maximize their involvement (Section 1.4.10).

1.4.1 Sense-based Interactions for first responders

Research on the way smart clothing or smart textiles can be used to help first responders on the action field has attracted a lot of attention lately, especially because of the involvement of many technologies of interest, e.g., sensors, Internet of Things, Body Area Networks, edge-computing. To this end, in [Magenes10] a presentation of the performance on the field of two sets of sensorised garments that were developed to monitor the health status of first responders is presented. Each garment, also, comes with a communication infrastructure to present the data to the managers in a control centre. Around the same time, [Breckenfelder10] propose the use of a cognitive Sensor Network using wireless sensor nodes in gloves to provide alerts for temperature values or share retreat messages. In [Diogo12], the authors propose a system that is combined with mobile technologies in order to capture and use real-time data to be used for real-time coordination of actions in the field through the use of an iPad (for management of the data) and smartphones (for their sensors). Finally, [Vanveerdeghem14] propose a Wireless Sensor Network where each textile sensor node manages to perform synchronously acquire measurement and analyse them to detect certain events. In addition, some proposed researches were funded by European FP7 programs like [ProeTex10] and [Esponder14].

Ambition: FASTER will utilize the collected experience on the design and production of smart textiles, in order to produce a wearable textile that could be added in the underwear of a first responder's uniform to collect biometric measurements. Together with IoT sensors on the uniform collecting environmental measurements (e.g., temperature), they will transmit data to a mobile device that could analyse it and provide alerts based on the results. This edge-computing system will provide real-time notifications and measurements protecting first responders even in a sparse communication environment in a SELP compliant way.

Innovation Potential: Information regarding the environmental conditions faced during a mission and the health status of first responders will drastically improve their protection against unexpected dangers. An edge-computing system that will collect and process the data from the sensors located both on the uniform and in textile solutions, along with those collected from smart-watches, to provide for near real-time alerts and notifications that could ei-

ther be sent on near-by colleagues or provide visualization (e.g., a light on the uniform becoming red when the person is in danger) that will help for easier recognition of the situation.

1.4.2 Event Detection from Social Media

Social media is an essential data source for real time information and especially powerful in terms of quickly identifying disaster incidents of any kind. Nowadays, there are 2.8 billion active social users globally, and 2.5 billion of them are on mobile. Due to the noise included, accurately identifying the right data can seem like a needle in a haystack. However, there is a lot of actionable content that can be useful for emergency responders and authorities if properly identified. Another challenge of social media analysis arises from the lack of structured spatial information. For example, geo-localisation of tweets is available for less than 1% of the total posts [Longhini17] and extracting spatial information from data such as the post text is a challenging task, especially in real-time.

During the last decade, a number of studies have been done on event detection from social media data. The most successful ones are based on pre-selected keywords, like SensePlace [Maceachren11], TEDAS [Li12] and Twitcident [Abel12], which enrich the emergency information using text semantics. However, these approaches use a predefined set of keywords, hence they can detect only specific event types. Similar approaches have been presented [Marcus11], where a Tweets' similarity metric based on a reference taxonomy is used. Another approach is based on the Tweets' position, while a spatio-temporal analysis has been used to cluster Flickr photos [Chen09], but not in real-time data. Topic Detection and Tracking (TDT), has raised a lot of contributions in the early years [Allan98]. However, TDT works best with big documents and not with short messages like Tweets.

Ambition: In FASTER, *text analysis will be coupled with deep learning techniques to implement a classifier for social media posts and an event detection algorithm.* Deep learning models will be developed to specialize available general-purpose object recognition deep neural networks (e.g. Inception, ResNet, etc.) in order to recognize emergency situations such as floods, fires, extreme weather events, and damaged infrastructure. To perform this training, emergency-related pictures collected from Twitter for more than 12 months in 4 languages and for 8 different natural hazards (e.g. floods, fires, earthquakes, storms) will be used. Crowdsourcing platforms will be used to label the training datasets. *FASTER will implement a named entity recognition technique to retrieve location, greatly improving the capability of pinpointing specific events.*

Innovation Potential: The ability to collect data, including multimedia content, from Social Media has become of paramount importance nowadays as it is fast becoming a primary and reliable source for real-time information that includes actionable content. Identifying useful content in Social Media combining text and image and location analysis is a generic tool that can be utilised beyond disaster-related emergencies. The image classification models will be extended to analyse images from the FASTER mobile application, AR devices, and UAVs for mission critical tasks.

1.4.3 Mobile Augmented Reality guidance and assistance

Augmented Reality (AR) enables new ways to deliver information to end-users in-situ while keeping them hand-free. By overlaying digital contextual content over real elements, AR reduces the frontier between the real and virtual world. AR already thrives in several domains like gaming or retail [NRN18]. AR devices, especially glasses/helmets, have reached a mature enough level to be incorporated into critical procedures such as first responders' tasks with proper technological compromises. Recent projects such as the SIMBA system [D18] developed for the French Defence by DXT, an ARGUS partner, have shown the impressive added value of AR to train soldiers in the real world. AR provides new means for real-time, in situ, data visualisation and interactions that gives more immersion and context to critical information. AR devices became recently standalone devices, being quite light while powerful. They can connect to other systems to interact with other actors, i.e. persons and/or system components.

However, AR has still elusive technical limitations [PC16, Blanco18] that make it not immediately suitable for critical operations in any conditions. In short, these mainly relate to the impossibility to register the AR device (i.e. get its exact position and orientation) in uncontrolled environments where, for instance, light or weather can change and obstruct the device sensors. This results in the impossibility to perfectly align digital and real worlds thus delivering misleading and/or wrong information to the user about what she/he is seeing. Critical sectors such as the industry, security or defence domains require more reliable solutions that are yet to be developed. Moreover, most current AR demonstrations do highlight the technology capabilities, but are standalone systems that are not usable in real conditions [Jetter18, Medium17]. A new approach is needed to make best use of these AR devices in uncontrolled environments and for critical operations. FASTER will hence research the best technological compromises to make best use of the AR technology in all conditions, while coping with its limitations.

Ambition: FASTER will utilise the latest advances in AR to guide and assist first responders in their operations. A specific AR interface will be developed to handle operations in any environments, seamlessly switching from registered to unregistered modes without misleading the user. Research will be performed to implement a new capability in AR devices to support large built areas where the provision of AR assistance will be most useful. For this purpose, FASTER will leverage Building Information Modelling (BIM) capabilities to not only discover in real time

the surrounding environment of First responders with scanning methods provided by drones and AR devices, but also utilise the relevant information from these CAD models (3D geometry, position key elements such as water points, exits...). To cope with the unavailability of BIM, FASTER will enable the reconstruction of a 3D mock-up of the site using 3D scanning techniques developed in the project and exploiting those embedded in the AR device. Additionally, novel caching and out-of-core methods will be implemented to enable AR devices with limited memory capacity to support very large buildings. This will be a premiere in the field of AR. Finally, path planning, field annotation and navigation assistance AR capabilities will be implemented. Research will be needed to find the best compromises to offer such useful assistance even when the AR device is not well localized.

Innovation Potential: FASTER will deliver one of the very first operational prototype of a mobile AR system suitable for first responders for heads up, hands free, contextualised operational support in a wide range of environments to fasten and ease the realisation of complex tasks while making them safer. FASTER will deliver a technical solution to make modern AR system exploitable in large built environment using caching and out-of-core techniques as well as the 3D mock-up of the building structure, imported from CAD models, as a reference for the device registration. This would be a premiere in the AR domain to the best of our knowledge.

1.4.4 Advanced Visualisation Tools for Situation Awareness

Endsley [Endsley11] defines Situational Awareness (SA) as a process based on perception and comprehension development about what is happening in the environment inside of a volume and space of time, and the projection of its status in the near future. In disaster scenarios, situation awareness tools provide emergency management teams with a clear perception of the scene, highlighting the relations between the actors involved and environmental factors in respect to time and space. Map making and spatial analysis for disaster response have improved drastically due to Geographic Information Systems (GIS) developments in the last 10–15 years [Valacich10]. Disaster incidents continue to demonstrate the practical need for GIS in disaster response [Tomaszewski15]. The indoor environment brings its own challenges, when mapping needs to be done in advance and localisation of individuals, events and/or circumstances are made with sensor and surveillance technology. Processing data for the establishment of situational awareness requires that the data is understood from its situation of origin and processed accordingly. This will lead to an effective tool for crisis management in indoor scenarios.

Many research projects focused on situational awareness, such as: FP7 project SPARTACUS [SPARTACUS] provides anytime anywhere localization through combined use of existing GNSS, GALILEO, and innovative dead-reckoning systems. The FP7 project ESS [ESS] provides a centralized synchronization framework managing the data and information flow between the different public authorities involved in emergency management operations. There are also open-source solutions such as GeoFES [GeoFES], offering situation awareness through interactive maps, synthetic and holistic risk assessment; Virtual OSOCC [VOSOCC] gathering information from verified sources; Ushahidi [Ushahidi] a situation awareness mapping portal for diverse geo-tagged crowd-sourced info, offering automatic filtering of big amounts of data; or commercially such as CATS [CATS] or the Consequence and Assessment Tool Set, as developed by Leidos; WebEOC [WebEOC] or Web Based Emergency Operations Center, as developed by Intermedix. However, these systems do not provide a holistic solution and most of the above commercial offers are rigid in design and cannot be readily augmented to serve adaptive needs.

Ambition: FASTER will utilize the latest advances in visualization tool and, all the gathered data will be developed to enable end-users to understand critical information at a glance in order to have an overall situation awareness displayed. A set of integrated visualization services will be provided, including operational dashboard for context monitoring and integration of high availability mapping functionalities to represent FRs position, dangerous areas maps and environmental conditions visualization along other relevant information. With a 3D geospatial visualisation engine at its core, the SA advanced visualization tools will be able to represent data in context, enabling better legibility, user awareness and faster acknowledgment of the current and forecasted situation. Novel visualization metaphors and new ways will be defined to merge and visualise essential information in a Portable Common Operational Picture for enabling end-users to understand the critical situation at a glance, having an overall and continuously up-to-date situation awareness.

Innovation Potential: Novel interaction models (dashboards, situational pictures, maps, etc.) will be made available to the FRs. In this way, the situation generated by processing and analysis information can be easily displayed on a Portable Common Operational Picture (according to the criteria chosen by the user), enhancing first responder's capacity by improving situational awareness (displaying the position of other first responders, possible position of victims, position of resources and infrastructures required and highlight dangerous areas); extending FRs operational capabilities (improving area mapping and victim detection); protecting first responders (showing potentially dangerous uncharted areas, environmental conditions and so on).

1.4.5 Autonomous Vehicles

Initial remote situation awareness (SA) is deemed key by first response bodies to understand the scope and localization of the different disaster areas. Quick aerial access to these areas provides the necessary helicopter to get first overall disaster range and initial points of interest. Once the operations have started, general situational awareness

is important to monitor progress and follow the different first response actions. A closer and more specific analysis of the area can provide thermal, chemical or nuclear mapping in real time without putting human lives at risk. Autonomous vehicles can offer diverse services in the disaster scene, including scene exploration capabilities, remote inspection of inaccessible areas, a resilient means to locate survivors, points of entry into damaged buildings, environmental hazards, and other disaster-related information, all without exposing human rescuers to a potentially dangerous environment [Gregory17]. Furthermore, they can offer critical equipment transportation and dangers operations performance using robotic equipment platforms. While these Autonomous Vehicles (AV) perform these task, they also serve as nodal repeaters for necessary resilient communication network, ensuring critical communication continuity during the complete service. Each type of vehicle, though, has a corresponding trade-off that must be considered in the application of disaster recovery. Unmanned Ground Vehicles (UGVs) provide powerful platforms for observation in such environments, with the capacity for heavy payloads and lengthy endurance. However, they are generally slow moving and have a reduced field of view. On the other hand, Unmanned Aerial Vehicles (UAVs) (or drones) are fast, but have relatively restrictive payload limitations, short flight times [Michael12], [Cesare15], and a need for potentially vulnerable wireless communications. Disaster zones may span large environments [Gregory16] and pose several challenges for an autonomous system, including complex terrain and areas of intermittent, degraded, or non-ubiquitous communication [Michael12].

Ambition: FASTER Robotic platform (UGV+UAV) will utilize the latest advances in ruggedized components, so to be able to work under harsh conditions. It will also include advanced sensor integration, high-performing wireless broadband mesh communications to support robot-to-robot connection for non-line-of-sight operations, multiple video transmission, data integrity and coverage and multi-robot cooperation, advanced sensing and 3D interactive markers control for advanced user interaction and collaborative working, on-board smart processing to improve the integration of sensing and processing, visual analytics and 3D mapping construction. Moreover, FASTER will provide heavy load drones, able to lift up to 600Kg and fly for up to an hour under full load. Drones will be equipped with different sensors for mapping and communication relay purposes. Swarm capabilities will be developed to enable multiple complex autonomous operations.

Innovation Potential: The new technology developed within FASTER will allow the first responders to have a fast analysis of the environment by using the sensors carried by the robotic platform (UGV + UAV), including wide video broadband communication by mesh wireless connection. 3D mapping of the environment will be provided so to have a first visual awareness of the situation as well as advanced control systems allowing an immersive operator experience. Moreover, swarm autonomous operation capabilities will enable completing tasks in an efficient way without the need for multiple operators collaborating.

1.4.6 Extended vision technologies using commercial lightweight UAVs

Disaster scenes may often include difficult to navigate structures, like destructed and demolished buildings, or districts with aggressive and potentially harmful environmental conditions. Reaching and visually inspecting such areas is paramount to locate possible victims and ensuring the safety of the first responders operating in the scene. With drone popularity soaring recently and being largely driven by their vision-related capabilities, UAVs can be deployed in such circumstances to realize the concept of drone augmented human vision.

Visualization of remote areas and infrastructure has always been a goal of AR research [Feiner95]. Typically, a video feed of the remote area is composed on the real scene with either virtual information or real-world scale video [Coffin06, Kasahara14]. In [Neumann03], the concept of augmented video environments for surveillance with projective texture mapping of live video to an outdoors reconstruction was proposed. Similar, but for indoor surveillance, the video streams were presented in a spatial model in [Wang07]. Current commercial solutions for flight control of a UAV beyond the line of the sight and visual inspection of remote places are based on transferring the video feed from the UAV's camera to the operator. The main disadvantage of this method is the limited field of view, which is restricted by the camera sensor. This makes navigating through narrow passages and searching the surrounding space for potential victims more difficult and tedious. Furthermore, first responders may face difficulties in spatially relating their physical position to the area currently inspected by the drone in complex environments.

Ambition: Within FASTER, first responders will deploy small lightweight UAVs on demand to assist in visually inspecting otherwise inaccessible areas. The focus will be directed towards providing first responders with a mixed-reality exocentric view of occluded areas, where obstacles and other objects between the responder's physical position and the area of interest could be made transparent or removed. This view will be available via AR devices (head-mounted see-through displays or mobiles), which will also support hand gesture recognition for directing the UAV to a new location and selecting a virtual point of view. The goal is to allow the investigation of difficult to reach remote scenes from safe physical positions while spatially relating the occluding blockers with the invisible scene, eventually offering an X-Ray like view.

Innovation Potential: An X-Ray like representation of the surrounding 3D space will be available to first responders, providing them with a wider field of view and enabling them to quickly visualize and understand and complex

environments with low cognitive effort. The ability to observe distant or occluded geometry from their current physical position will increase situational awareness and facilitate in planning search and rescue operations. This will improve the safety of first responders in disaster scenarios, as well as their ability to quickly locate victims and/or recognize imminent danger. Improved situational awareness can also manifest in infrastructure related modification situations like when needing to drill a hole without damaging the cables or pipes located on the other – occluded – side.

1.4.7 Body and Gesture-based Interfaces for first responders

First responders often need to carry a lot of equipment that impedes their efforts. FASTER will develop ergonomic interfaces to allow them to do more with no additional equipment clutter. Body activity and gestures will be used for communication, vehicle navigation and mission management activities. Currently, a vast plethora of commercial wearable devices focused on fitness tracking are able to recognize human activities. Similar techniques such as the ones proposed in recent research [Mantyla00, Wang12] can be used in order to recognize gestures, leveraging on sensors included in mobile phones (accelerometers, gyroscope). The rise of Deep Learning has influenced motion signal processing [Kasnesis17]. The performance of Deep Learning models surpasses conventional methods on human activity/gesture recognition tasks [Ronao16, Ordóñez16]. Moreover, recent advances in motion signal processing suggest that models relying on late sensor fusion achieve higher performance [Kasnesis18]. Regarding communication, based on [Maderer16], common devices with an actuator, such as a smartwatch, Bluetooth headset or fitness tracker, could be used for passive haptic learning. Therefore, the training on Morse code communication, with messages sensed over vibrations by a smartwatch can be done in a short time, enabling communication with no need of visual or audio information, and using devices worn under protective suits. For remote navigation we mostly find screen-based or monocular gesture-based solutions, both of which are cumbersome to utilize in field conditions. In [Kasahara13], a touch screen device is used to control a drone in the user's reference frame and map the commands to the drone's local coordinate frame. Other approaches [Sugimoto05, Saakes13, Hing10] involve external camera tracking of the UAVs which is irrelevant for disaster response scenarios.

Ambition: FASTER utilize the latest advances in human activity and hand gesture recognition and improve them to accurately recognize gestures by using visual and sensory data from mobiles, wearables and AR devices (e.g. accelerometers, gyroscope, GPS, camera), allowing in-field responders to perform a wide range of actions. Gestures as well as body cues like gaze or pointing directions will be exploited to design, implement and test in realistic conditions DL-based natural and easy to use interaction techniques that will not obstruct the first responders' activities gesture recognition techniques to allow 1) mobile mission management (accepting mission tasks, reporting a problem etc.) 2) haptic communication, by identifying gestures as messages and transmitting them as Morse code vibrations and 3) navigation of autonomous vehicles in the disaster scene. The activities and gestures to be detected will be co-defined with the end-users involved in the consortium to adhere to real needs. Voice command will be also employed, if necessary.

Innovation Potential: During a rescue operation, the need for communication between first responders is essential for the coordination of efforts, and the protection of the stuff. However standard communication means may not be possible, due to excessive noise, distance between rescuers, while the use of communication devices such as radio or mobile devices may not be possible due the conditions of the operating environment (high temperatures, use of masks). Ergonomic body and gesture-based interfaces can address this problem, allowing the responders to perform diverse tasks. Combined with haptic interfaces, they can improve both the efficiency of first responders without obstructing the rescue operations, and their safety when combined with physiological signals sending automated distress signals. Similar interfaces can be used to operate and control equipment such as autonomous vehicles.

1.4.8 Communicating with K9s

Since dogs are widely employed as service animals to perform tasks, such as search and rescue, there is a growing interest in recognizing their behaviour. In particular, collar-worn devices that collect motion signals [Ladha13, Kiyohara15] and ego-centric cameras that capture viewpoint of the dog have been utilized successfully to identify dog activities [Iwashita14], using machine learning techniques. Recent works [Ehsani18] fuse these sensor channels and adopt deep learning techniques to achieve higher classification performance, predict the future movements of a dog, and eventually develop a visually intelligent agent that can plan movements similar to the dog.

Ambition: In FASTER, measurements from animal wearable devices worn by K9s will be captured and through DL techniques they will be classified to certain movements that could trigger an action (i.e. playback of a message to a discovered person in need). Special care will be given in the case of discovering a person in need where oral commands (by the trainer) should be forwarded, through a microphone on the K9, to the person to guide him/her during the rescue operation. To this end, K9s will be equipped with a *wearable device* able to collect data regarding their movement through the appropriate sensors (3-axis accelerometer and gyroscope as it is shown in Figure 1-8). The data will be transmitted to a receiver owned by their trainer where they will be processed and classified to useful information regarding the K9s behaviour. When the classification points to the discovery of a person, then oral commands could be provided through a microphone on K9 so that the first responder can provide useful infor-

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mation to the endanger individual to calm him/her or a pre-recorded message can be played, informing that help is underway.

Innovation Potential: K9s undergo strict training sessions where they learn to perform certain (signature) moves when in action which moves are expected to be used for the training of the system. The interaction with the individual is, also, important in order to prepare for the help and to provide some important information and emotional support during the rescue attempt. FASTER aims at producing *a wearable prototype* for the K9s capable of using on board machine intelligence for detecting signature movements by K9s. For this, the collection of a dataset of moves of K9s will take place, in order to enable the use of DL techniques and classify the measurements to behaviour movements, so as to provide the notifications that describe the required actions.

1.4.9 Resilient Communication and Cooperation

With communications for first responders being extremely important, research is conducted in order to provide new solutions ([Shen17]) or delve deeper into existing ones [Fernandez18]. The need for allowing the first responder to seamlessly take advantage and transmit to any of the available communication networks has also been under research [Tait17]. In [Li14], the authors proposed to let public safety users deploy relay nodes to extend the communication coverage when necessary [Ferrus13, Baldini14]. The usage of a mobile relay node was only addressed at the FP7 ABSOLUTE [ABSOLUTE] project that aimed to provide a low latency and large coverage networks using aerial base stations. In situations where it is impossible or too risky to let public safety users deploy relays, drones were proposed to carry a communication relay [Li15, ABSOLUTE].

In most related literatures about the mobile relay deployment, the coverage is assumed to be constant [Kershner39], [Yun10]. In practice, the coverage of the Control Centre and the relay are determined by their positions, allocated resource and quality of service (QoS) requirement, which should be jointly considered [Islam12]. When the QoS is the outage probability, the criteria of optimizing relay position for maximizing the coverage subject to the outage probability requirement is the fundamental. The outage probability ensures that the message could be delivered from the source to the destination, but the delay is unpredictable. For the public safety network, long delay may cause loss of life and property. On the other hand, In IoT wearable devices that require low power transmitters to send their data to the Control Centre, the mobile remote relay does not need to maximize the data rate but to minimize power transmission.

There are a number of projects implementing and evaluating aspects of the 5G MANO architecture and tools, mostly based on the MANO framework for NFV proposed by ETSI. SONATA [Draxler17, SONATA] and 5GTango [Parada18, 5GTANGO] are developing MANO tools for 5G networks, extending ETSI MANO entities to accomplish their goals. Open Source MANO [OSMa, OSMb] is providing tools to interact with the compute and storage nodes in the NFVI to manage VNF functions based on their performance and portability characteristics. OPNFV [Price12, ONFV] is another open source project, aiming to validate multi-vendor, inter-operable NFV solutions.

Ambition: FASTER will address resilient communications in multiple levels: **1)** Extending the communication network beyond the last operational point of communication using a drone or swarm of drones as a relay service; FASTER will develop efficient algorithms to identify the optimal position of the drones for either maximizing the data rate or minimizing the power transmission, addressing this trade-off. The positioning will change dynamically to adjust to movement of first responders. **2)** Broadcasting emergency messages to both civilians regarding safety processes and first responders with emergency messages; FASTER will introduce the Emergency Communication Box [ECB] for broadcasting encrypted messages. A mobile application will accompany EcoBox able to receive and read the transmitted messages. Bi-directional communication will be studied. **3)** Managing and orchestrating of applications for first responders, including technologies related from IoT to AR/VR in a 5G infrastructure.

FASTER will leverage the architecture, available tools and techniques for managing network services and properly extending them to meet first responders' needs. A particular focus of FASTER will be on the network support for the IoT and media applications, including a detailed knowledge of network capabilities and performance and the configuration of forwarding graphs between components of media sessions, since cross-layer interactions between MANO functions at the network and application layers are critical for ensuring the orchestration of underlying network capabilities. To this end FASTER will also explore the application of blockchain and smart contract technologies to coordinate transparent interactions between first responders and all other parties involved in the relief effort, including members of the community, LEAs, aid agencies and volunteers.

Innovation Potential: FASTER will provide resiliency in the communications of first responders, as it will, short after a disaster, 1) extend the communication network via a drone mesh from the last operational access point to the disaster area, 2) deploy the EcoBox devices in the under-need area, without dependence on the communication infrastructure (only access to a Wi-Fi router is needed); 3) ensure the availability of services by utilizing the advances in network softwarization that 5G brings. All these approaches are posed to innovate in disaster response scenarios both as standalone novel solutions, but also by offering a communication resilience solutions arsenal to accommodate most field conditions.

1.4.10 Participative Engagement for First responders and their key stakeholders

Systematic engagement of First Responders in a useful manner has been a challenge in several previous EU projects (MAPid⁵, STORM⁶). In the FASTER project an innovative process will be developed aggregating the IAP2⁷ methodology with a dedicated platform which will support the “social” relation among first responders and the exchange of experience with scientists working in the project. The platform is based on four main components: 1) a dedicated web site, 2) a participatory environment supporting exchange of experiences, 3) a polling/rewarding application which will allow scoring for most active users, 4) a gamification space with a sandbox where users could “play” a role game to test FASTER features.

Ambition: FASTER is going to introduce technologies and processes improvement which could have positive impacts in first responders work condition, starting from their safety and ranging to their effectiveness during disasters. The ambitions of participative engagement are of two kinds: from one side the acceptance of new processes and related technologies should become a strength point more than the actual weak one; on the other side the systematic relationship among the research team and first users through innovative approaches and with rewarding mechanisms will improve the adherence of solutions proposed to user requirements.

Innovation Potential: The participative engagement, will be a tangible innovation in first responders’ community. Furthermore, the methodology in place grouped with the supporting technologies could be easily enlarge to a wider plateau of stakeholders which could include scientists but also decision makers and opinion leaders. The possibility to have open discussions and scoring of first responders’ position toward new coming technologies will be also very important for decision taking at industrial level. Innovation is expected also from the social and humanity view point with the engagement providing a sort of bridge between the top and the bottom of the value chain.

2 IMPACT

FASTER aims to address the challenges associated with the protection of first responders in hazardous environments, while at the same time enhancing their capabilities in terms of situational awareness and communication. This section presents the expected impacts of the FASTER project as well as the measures that will be taken to maximise these positive impacts. To clearly describe the expected impacts of FASTER we first delve deeper into some key aspects of modern societies in relation to emergencies and First Responders.

Modern societies can be understood as the intersection of four interdependent systems:

1. The natural environment of geography, climate and weather;
2. The built environment of cities, engineered systems, and physical infrastructure;
3. The social environment of human populations, communities and socio-economic activities;
4. An information ecosystem that overlays the other three domains and provides the means for understanding, interacting with, and managing the relationships between the natural, built, and human environments⁸.

This complex and interconnected society is set to undergo a major transformation and, in particular the role of First Responders has to address new challenges. First responders around the globe share a common mission to ensure the safety and security of the people they serve and protect. With ever evolving and emerging threats and challenges comes the need for responders to share novel guidelines and find advanced technologies in order to respond safely and efficiently. First Responders face a considerable challenge in seeking to provide the necessary solutions to current and future threats. At the same time, this challenge presents immense opportunities for the defence and security industries able to deliver effective functions, integrate systems and maximize security and productivity. The design and integration of intelligent infrastructure-including embedded sensors, unmanned aerial vehicles, intelligent protective clothing, the Internet of Things (IoT), advanced wireless information technologies, real-time data capture and analysis, and machine-learning-based decision support-holds the potential to greatly enhance public safety, emergency management, disaster recovery, and overall community resilience, while addressing new and emerging threats to public safety and security.

So far, however, little effort has been made to study the acceptance of such innovative information technologies by first responders, who are supposed to use them in their daily practice. A recent research suggests that first responders find emerging technologies to deliver potential advantages⁹, when those technologies have been designed in order to be not invasive and easy to use. FASTER will introduce improved responding processes based on methods, tools and technologies designed in accordance with first responders needs, to maximise the positive expectation. FASTER results will be able to support first responders in all kinds of crises and operations. Once FASTER highly competitive technologies will be successfully accepted and used by first responders, they will boost first respond-

⁵ https://www.youtube.com/watch?v=XwNXwN19_iY

⁶ <http://www.storm-project.eu/>

⁷ <https://www.iap2.org/>

⁸ Dunaway, M., Murphy, R., Venkatasubramanian, N., Palen, L., & Lopresti, D. (2017). Research Agenda in Intelligent Infrastructure to Enhance Disaster Management, Community Resilience and Public Safety. *arXiv preprint arXiv:1705.01985*.

⁹ Weidinger, J., Schlauderer, S., & Overhage, S. (2017). Is the Frontier Shifting into the Right Direction? A Qualitative Analysis of Acceptance Factors for Novel Firefighter Information Technologies. *Information Systems Frontiers*, 1-24.

ers' timeliness, precision and effectiveness. Wider adoption of these innovations will mean higher quality services, which will ultimately result in swifter, better responses and more lives saved, enhancing how emergency situations are managed.

2.1 EXPECTED IMPACTS

2.1.1 Project contribution to the Expected Impacts mentioned in the work programme

Table 2-1 Project contribution to the Expected Impacts mentioned in the work programme, under the relevant topic

Expected Impact mentioned in the work programme	FASTER contribution & Key Performance Indicators (KPI)
<i>Novel tools, aimed at facilitating FR operations</i>	<p><u>Project outcomes:</u> FASTER aims to provide innovative and efficient tools following an integrated approach (SO.8). The tools in question here are defined as all the new devices that first responders will be able to manipulate and that will facilitate their operations. FASTER will exploit solutions for both the protection (Smart wearable, Support for inter-agency communication and Intelligent response dispatcher) of first responders and the enhancement of their capacities and operations (Inter agency communication, advanced Visualisation tool, Swarms of UAVs, Dedicated robotic platform and the resilient communicator "ECOBox").</p> <p><u>Measurement (KPIs):</u></p> <ul style="list-style-type: none"> Adherence of tools to first responders' facilitation needs (measured in terms of User Requirements) >75%
<i>Novel technologies, aimed at facilitating FR operations</i>	<p><u>Project outcomes:</u> FASTER will exploit a wide range of innovative technologies and solutions for both the protection of first responders and the enhancement of their capacities and operations. FASTER will provide innovative and efficient tools following a more holistic approach that is covered by the outcome of SO.2, SO.3, SO.4, SO.5 and SO.6 as well as their impact. In particular, FASTER will deploy novel technologies aimed at improving FRs operations: smart wearables and sensors for enhancing communication, protection and situation awareness, for accurate positioning of responders, real-time recording of their biophysical condition and monitoring of possibly hazardous environmental conditions; UAVs and robotic systems for an extended field awareness; augmented reality solutions for an advanced situational awareness displaying necessary information for the first responders, that will support both situational awareness and risk assessment, while at the same time will enhance the decision-making capabilities of the responders; IoT technologies for real-time gathering and processing of data from heterogeneous information sources. The operational capacities will be enhanced by enabling the communication between the first responders and between them and the portable control centre (SO.8) using blockchain and smart contract technologies to coordinate transparent interactions between first responders, operational command stations, LAE, community members and all other parties involved in the relief efforts. The operational capacities will also provide and designed system communication solutions for cases where the conventional communication systems fail.</p> <p><u>Measurement (KPIs):</u></p> <ul style="list-style-type: none"> Effectiveness of FASTER technologies measured through interviews, against first responders requirements >80% Acceptance of FASTER technologies for first responders, measured through interviews >60%
<i>Novel guidelines aimed at facilitating FR operations</i>	<p><u>Project outcomes:</u> Preparation of crisis scenarios and universal response algorithms (also for use in training purposes) as planned in SO.1 and SO.3, taking into account the use of technical measures, for cyclically repeated situations: large-scale fires, floods and local flooding, earthquakes, construction disasters, explosions and collapses in excavations underground, transport (communication) disasters and accidents, industrial disasters. Scientific studies and training materials (in English and also in project partner's languages) on technical aspects of crisis response will be prepared.</p> <p><u>Measurement (KPIs):</u></p> <ul style="list-style-type: none"> Usability of guidelines, measured through interviews >80% Guidelines distributed >20
<i>Novel methods aimed at facilitating FR operations</i>	<p><u>Project outcomes:</u> On the basis of the experience of EU Member States, new methods of cooperation (including international cooperation) and coordination of activities of emergency services in response to crisis situations will be developed. The legal acts regarding crisis management which are in force in EU Member States and legal regulations of the European Parliament will be analysed in order to find the best solutions see SO.2 and SO.3.</p> <p>New methods of rescue operations, including the ability to apply new technical means, will be tested within a virtual simulation and in the real conditions of the field practices. The training materials with new cooperation methods (including international cooperation) in the field of responding to crisis situations will be provided. Legal solutions for implementation in the European Parliament's legal acts, regarding technical means and solutions in the field of identification, prevention and response to crisis situations, will be proposed.</p> <p><u>Measurement (KPIs):</u></p> <ul style="list-style-type: none"> Acceptance by first responders for proposal of improvement in methods and regulation >60%

	<ul style="list-style-type: none"> Participants to training activities >200 <p>Associated with document Ref. Ares(2019)2256001 - 29/03/2019</p>
<i>New knowledge about field-validation of different tools involving first responders in (real-life) scenarios</i>	<p><u>Project outcomes:</u> FASTER will introduce a methodology to assess existing post-disaster situation (see SO.1), using the FASTER early risk detection and situational awareness tool (see SO.2 and SO.4), which will provide first responders a deep awareness of their safety and effectiveness of their operations. Three experimental field validations will be done along the project life.</p> <p><u>Measurement (KPIs):</u></p> <ul style="list-style-type: none"> Effectiveness of FASTER tools measured through interviews >80%
<i>New knowledge about field-validation of different technologies involving first responders in (real-life) scenarios</i>	<p><u>Project outcomes:</u> FASTER project will take a real-life scenarios driven approach that means technological tools (see SO.4, SO.5, SO.6 and SO.7) will be validated through a carefully planned in-situ validation throughout the lifetime of the project. The design of the different technological solutions will be driven by the real use cases, which have been carefully selected with the several FASTER First Responders, including academies, which have their own training installations with the objective of capturing the diversity and complementarity of the requirements for deploying solutions to fully support FRs in real-time operations. Moreover, the field validations considered in the project (and the related demonstrations) are representative of FRs daily operations. Apart from the main pilots, additional field trials will be implemented in order to make field validation of FASTER functionalities.</p> <p><u>Measurement (KPIs):</u></p> <ul style="list-style-type: none"> 3 field validations fully defined validation of 5 solutions delivered
<i>New knowledge about field-validation of different approaches involving first responders in (real-life) scenarios</i>	<p><u>Project outcomes:</u> Starting surveys in EU Member States dealing with crisis response interviews with experts representing emergency and police services will be conducted in order to obtain information about how to facilitate the deployment of new process minded approaches generated in FASTER project (see SO.1). Furthermore, an estimation of contribution given by new approaches dealing with first responders' safety and facilitation in operation will be experimented in real life field.</p> <p><u>Measurement (KPIs):</u></p> <ul style="list-style-type: none"> Exercises performed >5 Effectiveness of new approaches, measured through interviews >60%

2.1.2 Other substantial impacts of the project

FASTER will introduce improved responding processes based on advanced communication methods, tools and technologies for first responders. First responders involved in FASTER project are not volunteers but full member of a safety force. From this perspective, in order to evaluate the impact on responding processes, it could be interesting to consider how FASTER can reduce “barriers to Respond”¹⁰, following a responders-centric approach. Figure 2.1 shows how FASTER will impact main issues arising when a call is received and what could be the impact generated thanks to the enhanced communication technologies provided.

¹⁰ Özcan, K., Jorgenson, D., Richard, C., & Hsieh, G. (2017, February). Designing for Targeted Responder Models: Exploring Barriers to Respond. In CSCW (pp. 916-924).

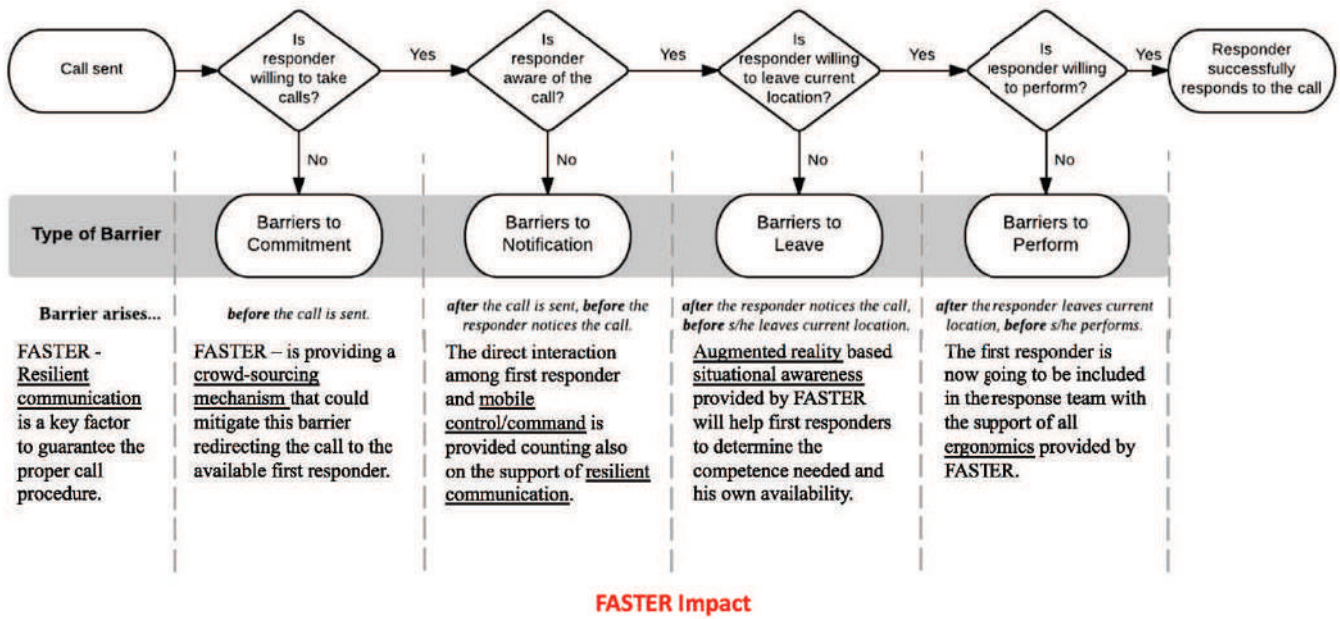


Figure 2-1: Faster impact

FASTER expected impact will cover and improve the overall “barriers flow” providing different solutions. FASTER will provide a better and enhanced resilient communication that represents a solution for the first three steps in the “barriers flow”, while the following two could get advantages by introduced new technologies which will support profiling and ranking in order to address the right people during emergencies.

FASTER technologies will be integrated in the existing stream that is continuously evolving and changing. This transformation has as direct consequences, advances and changes in the role of emergency forces and in their safety expectation while acting to face disasters in communities. With proper restraint and respect for constitutional concerns, the use of technology in disaster response, will continue to allow first responders to enhance their ability to serve and protect their respective communities¹¹. In the following Table 2-2 some key additional impacts are addressed in order to have a better understanding of FASTER innovation strategy:

Table 2-2 Other substantial impacts of the project

Other Substantial Impacts	
Innovation capacity	<p><u>Project outcomes:</u> Two main aspects should be considered when addressing the Innovation Capacity of FASTER: from one side there is the pure technologies introduction innovation which could represent a tangible step beyond the state of the art; from the other side the project should face barriers to introduction represented by the lack of capacity in digesting such technologies on field operation. FASTER is proposing a smooth approach intended to facilitate the introduction of those new technologies also using principles of capacity building for first responders.</p> <p><u>Measurement:</u> Number of first responders involved in the innovation process; grade of acceptance of new technologies.</p>
New market opportunities	<p><u>Project outcomes:</u> An early evaluation of market opportunities (see chapter 2.2.3), has been presented, based on expected technologies evolution compared with the expenditure plan of first responders. Being the project focused on a maximum of TRL 6 solution, a real market opportunity is too far to be estimated, but technologies and supported tools are in line with the market expectation.</p> <p><u>Measurement:</u> Number of potential industrial outcomes is considered as a good measurement index to understand if the project is in line with market trends.</p>
Strengthen competitiveness and growth of companies	<p><u>Project outcomes:</u> In particular SMEs which will share research knowledge, could build on that their future offer, taking advantage from FASTER outcome, stimulating, at the same time, their growth. Larger companies will be more interested in devices and structural technologies which could be engineered after the project end.</p> <p><u>Measurement:</u> Expectation from both SMEs and large companies in the consortium and same categories stakeholders’ view.</p>

¹¹ Inspired by: TIMOTHY ROUFA 2018

<p>Issues related to climate change or the environment</p>	<p>Project outcomes: FASTER will have to deal with hazardous environments making this issue a substantial impact of the project. These environments have impact in both the safety of the population (and most especially in the safety of the First Responders) as well as environmental impacts.</p> <p>The risks faced by First Responders and K9 units will be divided in those concerning the visible and those concerning the non-visible environmental hazards. FASTER will address environmental hazards by a continuous assessment of the environment, analysing inputs from available sensors embedded in mainly two technologies: wearables (for both the First Responders and K9 units); and UxVs able to reach hard/impossible areas. These technologies will be complemented with Augmented Reality (AR) in order to extend the visible environmental hazards with non-visible information. Both technologies will be employed to inspect, provide live imagery, and collect data to ensure a viable environment for the First Responders and K9 units.</p> <p>Measurement: In the non-visible environmental hazards, examples include the variety of hazardous compounds detected (i.e., number of different compounds and their concentration - ppm). In the visible environmental hazards, the visible information will be extended by the information coming from the sensors. Measurements include, for example, the number and variety of AR channels (i.e., number and type of unifying AR with the visible environment).</p>
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2.1.3 Barrier and Obstacles

The PESTLE Analysis is a framework used to scan the organization’s external macro environment. The letters stand for Political, Economic Socio-cultural, Technological, Legal and Environmental (factors). In the FASTER project they can be summarised as in Table 2-3 below:

Table 2-3 PESTLE Analysis

Political	Economic	Social
<ul style="list-style-type: none"> • Voluntary sector support • Local & national government support • Priority changes • Difficulties in convincing political and government decision-makers to implement new technical solutions 	<ul style="list-style-type: none"> • Cost to implement • Cost to support • Human resource costs • Secondary spin off values • Law enforcement budget limitations • Costs of replacement of used or damaged equipment • Costs of first responders trainings • Issues of possible insurance compensation 	<ul style="list-style-type: none"> • Community site awareness • Site value awareness • Needs of users • Local community support • Social acceptance of use new solutions • Social and human concerns about potential interactions with autonomous or remotely controlled devices
Technical	Legal	Environmental
<ul style="list-style-type: none"> • Software Hardware changing technologies • Accuracy of measurements problems of adapting existing tele-information networks and databases and accessing them • problems of remote communication for devices control and data transmission 	<ul style="list-style-type: none"> • Protection policies • Planning regulations • Health and Safety regulations • Risk assessment requirements • Regulations regarding the powers of specific law enforcement services and its tasks in crisis management action • Insurance regulations • Crisis management regulations 	<ul style="list-style-type: none"> • Long and short-term changes (Short term weather conditions plus long terms trends forecast) • Topographical changes • Natural hazards (man-made) • Climate changes (temperature, humidity or air pollution that may impede equipment operation or remote communication and data transfer)
<p>Overall: The FASTER project background complexity can only be addressed by the Consortium through the analysis of PESTLE factors listed above and of the other ones that will arise during the project.</p>		

The project is an example of action strongly focused on safety, holding great potential for improving the saving of life and assessing the dangers to human health highly exposed in hazardous environments due to various disasters. From this perspective, the project should not face any specific social or political barriers. However, in these two areas, it should be noted that possible pre-emptive political decision-makers may be concerned with the need to spend money on new equipment and the transmission system. The main issue will also be the question regarding the effectiveness of the new equipment and system. Expended money will be counted and the confirmation of ef-

effectiveness in the form of a larger number of rescued people be demanded. Political as well social acceptance of new solutions use will be given if the project will be able to demonstrate its effectiveness. It must be assumed that people may be afraid of interacting with autonomous or remotely controlled devices. Main economic issue is always represented by the costs of new solutions. By the way, government and local authorities' budgets are limited and the project has to provide a real and strong confirmation for spending more money for equipment, FR trainings, IT and data transmission system and its maintenance. The effect of new equipment, the introduction of autonomous or remotely controlled devices, should be considered in insurance costs, as well as the resulting reliability achieved by using them. Technical issues may be particularly important. In particular, the differences and non-adaptation issues of the system's software and data transmission requirements could be incompatible with the existing ICT networks. In a terroristic attack situation there will be no or very limited possibilities to use the mobile phone network. Moreover, legal matters are objective issues. The use of the FASTER system and equipment must comply with all types of legal regulations regarding crisis management, law enforcement regulations, health and safety law, insurance law and others that could concern. Considering the environment, beyond the direct impacts on the environment itself, the possibility of equipment non-functioning under certain atmospheric and local conditions has to be taken into consideration. Temperature, humidity or air pollution may impede equipment operation or remote communication and data transfer.

2.2 MEASURES TO MAXIMISE IMPACT

The starting point of the analysis regarding the strategies that FASTER will put in place in order to maximize the impact both in term of dissemination and exploitation is the consideration of the sector's economics (see 2.2.3), but there are some key principles FASTER team would like to apply in order to achieve the proper interactive dissemination of project results for specific stakeholders and also a general communication of information about the project for the all the audience.

2.2.1 Dissemination of results

Discipline of knowledge dissemination generated with EU funding is nowadays changing starting from last year (2017). In general, there is a need to increase the visibility and possibility to use or re-use of any knowledge publication.

Open access to scientific publications produced with public money is beneficial not only for a restricted community of originating scientist but also for speeding up innovation and involving citizens and society. Each participant must ensure open access to all peer reviewed scientific publications relating to their results (Article 29.2 of the Grant Agreement sets out detailed legal requirements on open access to scientific publications).

To cope with the goal of increasing the visibility and possibility to re-use any knowledge publication, FASTER dissemination policy is following the discipline according to the three steps foreseen path:

- Step 1 – Depositing publications in repositories
- Step 2 – Selecting the open access route
- Step 3 – Providing open access to deposited publications

According to this approach, publications will be available on an open access public archive where a FASTER dedicated Community will be created. Depending on the kind of publications, Consortium will ensure both the two possible routes: Green open access (self-archiving) and Gold open access (open access publishing). Finally, FASTER authors will ensure the open access of the deposited version of their publications on any selected sources.

With this foreword, due to the difference in the audience composition, dissemination and transfer of knowledge will be focused on targeted groups, either the media companies/organisations or entertainment and educational service providers in the home networking market. A particular effort will be dedicated to reach people within the so called "Informal Economy" which refers to the underground economy. FASTER will also undertake a media campaign targeting the market domain (Media). The overall dissemination approach along with technical details will be customised according to the various targeted audiences. All Consortium partners will contribute in the dissemination activities by means of:

- European Commission dissemination channels (such as EC Portals, information days, Commission workshops, etc.).
- Project website with public and private areas.
- Partner websites, individual email, etc.
- Project presentations adapted for the different target communities.
- Newsletters, fact sheets and brochures.
- Publications.
- Attendance and/or organisation of conferences and workshops:

Statistics of publications, the number of citations, as well as the number of website visitors and reference links will be continuously collected serving as a performance metric. Over the lifetime of FASTER, the selection of channels may be revised in order to reach the target audience in the optimal way.

Down the line, the channels that the project will use to disseminate the results will then be (Table 2-4):

Dissemination item	Timing	Monitoring of Effectiveness
Project Documentation	Upon project completion, the number of documents, papers, deliverables, technical reports, and presentations will be made available. The project will provide an <u>extended fact sheet</u> about the project. The majority of the project documents will have a <u>common look</u> : a common template for the presentations, deliverables, reports, meeting minutes, and in general adopting a common look and feel in any document related to the project. FASTER will draft its own logo, which will be used extensively in all dissemination material and on partner's websites for enhanced visibility in order to build a project identity .	High quality project deliverable submitted on time.
Plan for Using and Disseminating (PUD) knowledge	Plan for Using and Disseminating knowledge that will cover aspects such as Knowledge Transfer, Commercialisation and Sustainability. The elaboration of the Business Plan will be carried out as an iterative process during the whole project duration consolidating the final version at the end of the project. This plan will be flexible and subject to changes. Depending on the project results, new dissemination and exploitation opportunities will be explored. An updated plan will be released yearly.	Regular update of the dissemination plan: at least yearly.
Publications in international journals and conferences	Presentation of the FASTER project and of its results will be published in journal and magazines specific for first responders. The same kind of presentation will be made in international conferences with the objective to generate interest to the FASTER methodology and technologies in order to enlarge the community.	Number of published papers in journals and conferences. Target, 8 conferences (full and short papers) and 2 journals per year.
Internal dissemination	Partners will present FASTER results internally in their organisation, in order to provide opportunities for future collaborations and knowledge exchange. In-person, e-mail/blogs and newsletter are the main communication media to be used.	Regular check during project's meeting of the successful organisations of activities inside partners
Project dissemination beyond Europe	The innovative character of FASTER expected results will hopefully attract worldwide interest. The proposed platform is expected to create international interest due to its innovative methodology and novel technologies. Therefore, the project, and its accompanying technologies, will be presented to various events outside Europe (e.g. far east countries where emergency recovery and resilience after natural disasters is an important issue, USA ...)	Participation in events (conferences, workshops, exhibitions) outside Europe
Workshops	Apart from being present at external conferences and workshops, the FASTER consortium will organise its own workshops and events where potential stakeholders, investors, partners and future collaborators will be invited.	Successful organisation of workshops with participation from external bodies: at least once a year
Presence in industry events exhibitions and summits.	In order to increase the visibility of the FASTER project to the industry and provide opportunities for collaboration, FASTER will be present in industry exhibitions, workshops, summits and bodies that are attended by potential future users such as:	Presentation of FASTER in media summits.

Activities will include developing a press and media strategy, press kit, regular press releases briefings and audience specific activities within the mentioned WP. A preliminary list of main target events and press presence to be addressed is provided in Table 2-5 and academic journal and conference targets are presented in Table 2-6.

Table 2-5 Early identified events

Event	Number of attendees
 <p>Public Safety Communication Europe is an organization working to promote excellence in the development of public safety communication and information management system. The conferences are held twice a year and, in addition to the presentations, there is also a dedicated area where FASTER project could be presented to a relevant pool of public safety experts. The next Conference will take place in Slovenia 11-13 December 2018</p>	about 100 participants from 20 countries
 <p>The Commercial UAV EXPO Europe is a pan-European event focused on drones for industrial use. During the conference the FASTER approach to drones could be presented</p>	more than 5 exhibitors
 <p>Professional Fire Services Institute is an US institute designed to educate members of Congress on the needs of fire and emergency services. Even if PFSI is a national organization, staying in contact with them could be useful to promote FASTER in USA and, in general, outside Europe.</p>	









	Milipol is a global event for homeland security. It is possible to ask for a stand where to explain, show and simulate technologies and services. The next event will be in Paris 19-22 November 2019	about 1000 exhibitors
	IFSEC International is an important security event on integrated security. Attending to this conference is useful to develop relationship with new and existing partners, to show and promote FASTER products and services to the right audience and to launch FASTER technology to a captive audience. The next event will be in London 18-20 June 2019.	
	Interschutz is a world trade fair for the fire and rescue service, civil protection safety and security. FASTER should be present In the next fair (to be held in June 2020) where there will be a section dedicated to technical and logistical solutions for disaster and emergency management.	about 1500 exhibitors
	Eurosatory is a biennial fair where land and airline industry present their products, communication system, simulation, operational disaster responses. The fair is open also for police and emergency units so is one of the right place di present and demonstrate FASTER project. The next EUROSATORY exhibition will be held in June 2020.	about 1800 exhibitors
	International Invention and Innovation Show INTARG is a tool of market-oriented promotion of innovative products, technologies and services with Technology Readiness Level (TRL) between 4 and 9, as well as innovations which already entered the market and commercialization of which already begun. The Exhibition functions also as a platform of direct contact and meetings among representatives of science, innovative enterprises, industry and business surrounding and entities supporting and financing scientific research and development.	about 5000 visitors
	EUROPOLTECH is co-organized by the General Headquarters of the Police and the Ministry of Internal Affairs and Administration, Special Forces and Military Gendarmerie. Exhibitors present solutions in the field of operational techniques, ICT, forensics, objects and people protection. In addition, at the fair there is the possibility of tangible contact with the equipment. Many exhibitors offer the possibility of independent testing.	
	KIELCE IFRE-EXPO The International Fire Protection & Rescue Exhibition Kielce IFRE-EXPO is held in Targi Kielce. The exhibitors recapitulate the exhibition and emphasise its business significance as well as the number and quality of accompanying events. The last Kielce IFRE-EXPO attracted over 5000 visitors from the Czech Republic, Slovakia, Angola, Germany, Ukraine, Lithuania, Denmark, Croatia, Tanzania, Japan and Poland.	About 5000 visitors
	The main topics of the Conference FIRE PROTECTION (organized by Technical University of Ostrava, Association of Fire and Safety Engineering Ostrava, PAVUS Prague, Technical Institute of Fire Protection Prague, RSBP, Czech Association of Fire Officers Prague) are: present and future for safety technology, load of operating centres, research, development and testing in fire protection. The conference is organized annually (in 2019 will be the 28th edition) and participants are from all over Europe (representatives of institutions, enterprises and uniforms formations dealing with security and fire protection, civil protection, crisis management,	

Table 2-6 Publication in Magazines, journals and conferences

Journals	Conferences
International Journal of Computer Vision	International Conference on Mixed and Augmented Reality
IEEE Transactions on Visualization and Computer Graphics	Computer Vision and Pattern Recognition
International Journal of Emergency Management	IEEE Virtual Reality
Internal Security by WSPol, Poland	IEEE International Conference on Advanced Video and Signal-based Surveillance.
European Law Enforcement Research Bulletin by CEPOL	European Conference on Computer Vision
Police Theory and Practice by Academy of Police Force in Bratislava, Slovakia	International Conference on Computer Vision
Security Theory and Practice by the Police Academy of the Czech Republic in Prague	Special Interest Group on Computer-Human Interaction
Kosice Security Revue by The University of Security Management in Kosice, Slovakia	IEEE Conference on Local Computer Network

2.2.2 Stakeholders addressed by FASTER

In the FASTER project, first responders and external stakeholders' will be managed by a unique team (see WP11), that will stimulate a systematic interaction among all of them. Stakeholders (external) engagement refers to the

measure of several important high-level metrics in the user's attitude towards a brand or service. A usual set of such metrics include for example the four I's of involvement, intimacy, interaction and influence of brand [Vivek12]:

1. Involvement or the presence of a stakeholder in the project various touch points, from website in order to engage the audience through various media or mobile app usage.
2. Intimacy or the affection of the person to the project. This covers not only the objective figures or facts about FASTER and its impact, but also the FASTER emotional and personal impact. Sources related to this aspect include: surveys, sentiment analysis on feedback and research on focus groups.
3. Interaction can include metrics such as actions within a page, videos played, community contributions, ratings, reviews, votes submitted, photos or videos uploaded, text messages sent, quizzes taken, recipes saved, subscriptions renewed, and so on.
4. Finally, influence is the likelihood of a person to actively support or advocate for the brand. This includes content that users forward in social media or tagging with the brand in the same media and more involved actions such as widgets that users embed in their personal blogs.

Recent research [Harrigan17] highlights the importance of the engagement process afforded through online platforms. An early identification exercise to track possible interest factors for potential stakeholders is summarised in the following table (Table 2-7):

Table 2-7 Stakeholders

Stakeholder	Key Factor	Other Factors
First responders	FASTER is specifically addressing their needs, The project is taking care of acceptance of new technologies.	First responders could also use new technologies to enlarge and manage the communication with the community.
Administrations	Mostly first responders are under the local administration authority. In this framework administrations are the main decision makers.	A standardised approach is welcome by buyers when addressing first responders' technologies.
SMEs	Flexibility and creativity provided by SMEs could be the driver to support FASTER outcomes and revenue generators for them.	FASTER is going to provide an interactive dissemination that could facilitate SMEs aggregation to face potential markets.
Large companies	By definition, emergency needs a structured approach in technology usage. Large enterprises are the ideal suppliers for that structured approach.	FASTER is going to provide an interactive dissemination that could facilitate Large companies to aggregate with SMEs in order to face potential markets.
Opinion leaders	Acceptability and investment validation could be heavily influenced by opinion leaders.	New ways to finance investments which support first responders' safety could be promoted (based on corporate social responsibility).
Research centres	First responders' technologies and tools are objective of research all over the world.	Scientific communication could stimulate joint research and potential results sharing in the research community.

This initial bunch of potential stakeholders' categories finds relation with all expected results of the project and this fact will be very important for the exploitation of the project.

2.2.3 Community building

Building up of the FASTER Community is a main goal of the dissemination campaign. The FASTER community will consist of the aggregation of the relevant first responders and stakeholders in a systematic interactive approach. The project will use experience from the activities of the formation which operate in Member States of the European Union and carry out tasks for first responders, including in the field of fire protection as well as in the protection of persons and property. The firefighters, policemen, members of rescue teams, security engineers will share their experiences, and the final effect of their cooperation will be new technical, technological and organizational solutions in the field of response to crisis situations, transport (communication), construction, industrial and also natural disasters.

The motivation that leads the building up of the FASTER community is twofold: from one side the first responder's community members will be involved in the validation of the FASTER solutions: the involvement of real users in the testing and validation of the service is fundamental to deploy innovative and successful tools; on the other side the stakeholders' community is the basis for the networking and dissemination activities. This network of organisations and experts provides a critical mass of users that offers FASTER with valuable feedback regarding test results and also a market view in terms of needs and existing competitors.

Target groups starting, from first responders, will be systematically recruited and invited to join the Community (see T.11.5). Members are encouraged to interactively contribute to the project by communicating with the consortium through the functionality offered by the FASTER Community channels (dedicated websites and social networks), attending and advertising current relevant events, and generally keeping up to date with project initiatives and developments. The progress of the Community not only generates interest in project results, but

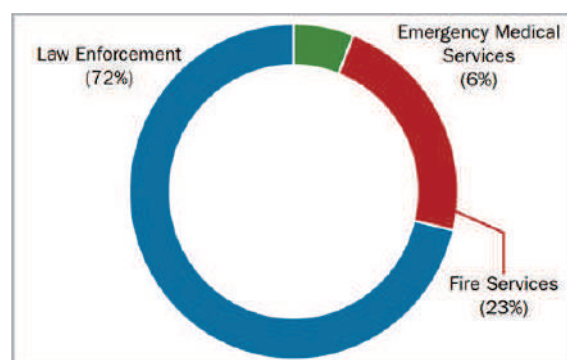


Figure 2-2 Percent breakdown of the global first responders

also provides insight regarding the future self-sustainability of the project. The results of the project should allow for their full implementation for rescue formations, as well as it is expected that the commercialisation of them will be possible. Created solutions will be a platform enabling further development within common international experience and cooperation.

2.2.4 Plan for project results exploitation

A central concept of the FASTER analysis activity is the clear definition of a first responder as a person among those responsible for going immediately to the scene of an accident or emergency to aid. Therefore, the **first responder market** is defined to include both full-time and volunteer personnel in law enforcement, fire services and emergency medical services (EMS)¹².

Figure 2-2 shows how the percent breakdown of the global first responders' budget, Law enforcement plays the main role followed by Firefighters and Emergency medical services.

Size of investment in technologies is directly linked to type of emergency addressed and the key role of law enforcement is emphasised from that point of view. The expenditure per officer is around € 160.000 for law enforcement, € 48.000 for firefighters and € 87.000 for EMSs. FASTER technologies are mostly addressing law enforcement and civil protection which represents more than 90% of the market. Moreover, the **market for Police Modernization and First Responders** is growing with the expansion of this Industry Sector Worldwide. According to Homeland Security Research Corp.'s (HSRC) new report, "European Police Modernization & First Responders Markets 2016-2022"¹³, the market growth will nearly quadruple during the 2015-2020 period, at a CAGR of 14.3% compared with a CAGR of 3.7% in 2010-2015. In \$ billion terms, the market will increase by 95% from 2015 to 2020.

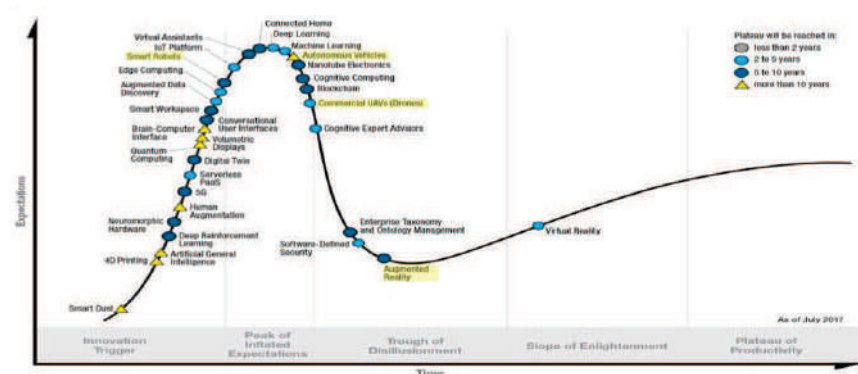


Figure 2-3 Gartner Hyper Cycle of Emerging Technologies

FASTER is expected to release technologies at an average TRL level 7, so not ready for the market. For this reason, the business planning exercise was not considered feasible at this stage; but it is important to have a forecast of what could be the future market for FASTER outcomes and, in view of that, market trends for technologies has been investigated. While having a brief view to emerging technologies, according to Gartner (Figure 2-3), it is evident that most of relevant technologies proposed



by FASTER to first responders, are part of their hype cycle. Some interviews are listed below in order to give a clear view on potential market, technologies developed in FASTER, could address.

Danny Kavanagh, Managing Director, Accenture: "I think it's got to be the fact that the mobile device has situational awareness, the mobile device has GPS coordinates associated with it, so it can provide officers with information about the area that they are in and that can be key".

Jody Weis, Director, North America Public Safety, Accenture: "Well if you talk about the connected officer, to me it all comes down to officer safety. You know lots of times we think how can we make our officers safer, do we need to get them better weapons, do we need to get them better armour to wear, what we need to do, is get them better intelligence". These technologies are just the beginning. As innovation proceeds, the array of mission-critical tools that can aid emergency services providers will continue to proliferate. By harnessing technology, FASTER will help provide first responders with crucial tools and information they need to operate.


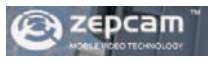

The project itself is planning to reach TRL 6 so the market for those solution should not be a short-term goal but anyway the project team is going to monitor existing players to better focus the research. A brief analysis of them is provided in the following Table 2-8:

Table 2-8 Existing players

Player	Products	Relation with the project
	PredPol uses a machine-learning algorithm to calculate its predictions. Historical event datasets are used to train the algorithm for each new city (ideally 2 to 5 years of data). It then updates the algorithm each day with new events as they are received from the department. This information comes from the agency's records management system (RMS).	The use of machine learning should be in relation with situational awareness in FASTER.
	Aventura Technologies Inc. designs, develops and manufactures IP and analog, enterprise-level CCTV, digital video recorder (DVR) and network	Not a competitor, their solution could complement

¹² Department of Homeland Security (DHS) US - The International Forum to Advance First Responder Innovation - First Responder Market Overview Synopsis - January 2017

¹³ <https://homelandsecurityresearch.com/reports/police-modernization-first-responders-markets-focus-europe/>

	video recorder (NVR) systems including; intel, int video analytics, security cameras, fiber optic, UTP accessories, hardware and software peripheral solutions for business, gaming and government.	
	For nearly a decade Reveal has designed and built award-winning smart, efficient and secure body worn video systems.	Their solution could complement FASTER ones.
	ZEPCAM makes video-on-the-move easy, robust and smart. The Zepcam mobile video platform is an open software platform for body cams, vehicle cameras and wireless CCTV.	Their solution could complement FASTER ones.
	Aeryon Labs builds high-performance drones for military, public safety, and commercial customers around the world. Aeryon's field-tested small Unmanned Aircraft Systems (UAS) set the standard for real-time, secure, aerial intelligence across a wide range of mission-critical applications from clandestine tactical missions, to search and rescue operations, to commercial inspections and more.	They could be a competitor for their experience and market presence for drones.

2.2.4.1 FASTER Business Pathway for joint exploitation

The following Table 2-9 summarises the matrix between early-identified outputs expected to be generated by FASTER project and potential stakeholders involved in their exploitation.

Table 2-9 Exploitable outcomes

Strategic Objective	Potential exploitable outcome	Stakeholders
SO1: Transforming first responders needs into validated solutions, acceptable from the society/citizens	EO1.1- Methodology to validate requirements for first responders	Administrations First responders Politicians
SO2: Early identification of operational risks enhancing First Responder safety	EO2.1-Risk identification methodology EO2.2-Risk identification tools	First responders Insurances
SO3: First Responders' engagement, training and experimenting pathway	EO3.1-First responders engagement methodology EO3.2-Engagement and management tools	First responders Administrations
SO4: Enhanced situational awareness for First Responders through augmented reality technologies	EO4.1-Situation awareness AR communication system	First responders Administrations Structured civil protection volunteers
SO5: Highly ergonomic tools for First Responders' operations	EO5.1-Smart suit EO5.2-Gesture based interface	First responders
SO6: Robust and resilient emergency communication infrastructure	EO6.1-UWAs EcoBox	First responders Communities Administrations Citizens
SO7: Employing autonomous vehicles, as units or in swarms, for risk identification and physical mitigation	EO7.1-Swarm of heavy drones	First responders Agriculture operators
SO8: Portable Common Operational Picture for maximizing situational awareness	EO8.1-Portable Control Centre for decentralised, on the field, Common Operational Picture.	First responders Emergency forces

2.2.4.2 Joint Exploitation Plans

FASTER consortium is well-aware about the need to define a possible joint exploitation pathway for project results. In the early phase of the project dealt to piloting, outcomes will be considered in view of the possible creation of one or more of the following types of joint exploitation activators:

EEIG: A European Economic Interest Grouping (EEIG) is a type of legal entity created on 1985-07-25 under European Community (EC) Council Regulation 2137/85. It is designed to make it easier for companies in different countries to do business together, or to form consortia to take part in EU programmes.

NewCO (see also JV): NewCo or Newco is a generic name for proposed corporate spin-off, start-up, or subsidiary companies before they are assigned a final name, or to proposed merged companies to distinguish the to-be-formed combined entity with an existing company involved in the merger which may have the same (or a similar) name. In a handful of cases the new company may retain the name "Newco".

Consortium: A consortium is an association of two or more individuals, companies, organisations or governments (or any combination of these entities) with the objective of participating in a common activity or pooling their resources for achieving a common goal.

Joint Venture: A joint venture (JV) is a business entity created by two or more parties, generally characterized by shared ownership, shared returns and risks, and shared governance.

2.2.4.3 Individual exploitation plans

Each project partner will plan activities to enhance its offering by incorporating FASTER relevant components in its products. Therefore, below is the related commercial strategy, the initially targeted customers use cases in order to create a heterogeneous ecosystem of actors (Table 2-10).

Table 2-10 Individual partner exploitation

DESCRIPTION	
CERTH	CERTH has established a spin-off company, namely ‘D-cube immersive solutions’ (http://www.d-cube.eu/) that aims at producing and distributing innovative high technology products. The research group of CERTH will carefully study the FASTER project results; then, it will investigate the technologies that will help to strengthen D-cube’s solutions and will give benefit to its products. Furthermore, part of CERTH’s business plan is to participate in a number of new spin-off commercial companies, capable of exploiting its research when new market needs and solutions are identified. CERTH was in fact founded to accomplish technology transfer as well as encourage entrepreneurship and innovation.
ENG	FASTER brings the long-standing R&D expertise of Engineering in integration, information processing and situational awareness tools closer to the markets through pilot deployments of advanced solutions. Accordingly, the main Engineering exploitation stream will be to set up a structured innovation and exploitation approach: i) to include and to integrate FASTER results to consolidate the appealing of its product and then enlarge its offering; ii) to contribute to the definition of guidelines for the integration and exploitation of the FASTER results and its replication for securing diverse environments, exploiting its experience primarily in the security domain; iii) to exploit its large stakeholders’ list to ensure the public outreach of the project’s activities as well as to enlarge the Pan-European Stakeholders Group. Engineering has a decennial consolidated presence on Safety and Security market. Engineering has acquired considerable experience in the realization of Security and Emergency Management solutions for its clients over several years, also being involved in the most important research and development national and European initiatives. FASTER plays a major role in enforcing the Engineering market potential in the safety and security sector. The FASTER results could also be a new step in the research on innovative technologies and solutions to be adopted in the security and crisis management domain, which will improve their offer to its customers. The results will be integrated in the current offerings or in new solutions to convey them to several existing (and potential) customers. Moreover, they will develop new innovative solutions and promote research outcomes to the Engineering Business Units.
OTE	OTE, as the main incumbent in Greece has being very much involved in wireless (e.g. WiFi, WiMAX, LTE, TETRA) and wireline (e.g., xDSL, fiber optic, FTTx, etc.) broadband technologies. As of that, has long ago identified the growing need for investing in 5G technology since this has been proven one of the fields which is very promising for OPEX and CAPEX increase while at the same time offering demanding and advanced services to the end users. This project offers OTE the chance to study, implement and test innovative architectures and technologies that meet the unique challenges of first responders' teams. OTE via this project will find a way to effectively combine technology testbeds and prototypes built in the project in order to investigate the possibility in offering such infrastructures in critical events. Finally, the promotion of the project’s results to biannual Deutsche Telecom group workshops, international workshops and Congresses will greatly enhance and strengthen the exploitation opportunities for their wide adoption, is of crucial importance for their wide adoption and deployment.
DXT	The innovations proposed in the FASTER project in general, and in its Augmented Reality component in particular, represent a significant progress in terms of support to mobile operational units evolving in the field. They have significant impact potential and commercial value. They will enable DXT to progress again the state-of-the-art and strengthen its competitiveness by offering a cutting-edge mobile AR system for the support and remote assistance of First Responders operating in critical conditions. The commercial exploitation of these results will be performed in the Crimson product line (http://crimson.diginext.fr) by DIGINEXT throughout its own network of resellers, its partnerships with major global industrials such as Thales, ATOS, Airbus, Leonardo, etc., and the community of Crimson clients that acts as multipliers.
CPLAN	CPLAN is a training and consultancy company that specializes in crisis management. It has a large network of crisis and security management professionals, in both the public and private sector. With vast experience in similar projects (FP7 and Horizon2020) as End User Coordinator, CPLAN will introduce the project’s concepts and solutions to the end user community through interactive methods such as workshops, training sessions, integration tests, and pilots. By working on a greater understanding of the FASTER solution among end users, CPLAN will generate a wider acceptance of the project and its outcomes. CPLAN will also attend conferences, exhibitions and trade shows with and first responder and policy maker audiences and will work on joint scientific papers with the project’s partners. In pursuit of commercial exploitation, the project can benefit greatly from CPLAN’s vast network of practitioners.
DHOP	DRONE HOPPER vision is based on a heavy-lift drones family concept to provide the most suitable configuration for the different needs, especially on first-responders scenarios. One of the technological paths currently under development is the coordination of different drones of different sizes, including integration of “commercial” drones in the swarm environment. This swarm technology is linked with the capability to take decisions in an autonomous way and cover specific scenarios without human supervision.
ROB	ROB as a European service robotics company is very interested in the exploitation of the FASTER robotic system. It will be used to improve and enhance the capabilities of our applications in service mobile robotics, including a new market niche as the security robotics. This system will allow the company introduce robotics in certain sectors where dangerous, repetitive and low value tasks are to be executed, improving our global market visibility and providing us great industrial relevance on the field of security and counterterrorism.

SYN	<p>Synelixis will use the results of FASTER to enhance its products and integrate the new know-how to extend existing services in the area of IoT and NFV-based cybersecurity. In more details, Synelixis in collaboration with other interested partners from the consortium is planning to offer 5G-enabled system to address first responders' requirements, by extending the capabilities of SyMon (http://www.synelixis.com/products/symon/), which is the monitoring framework of Synelixis for SDN/NFV based networks. Most importantly, cooperating with large industrial partners within FASTER, may lead to strategic alliances in the field of commercialization and technology transfer of innovative aspects of IoT security to further enhance SynField product (http://www.synelixis.com/products/prod-synfield/) by incorporating services that demand trustworthiness, secure interactions and interoperability. Thus, Synelixis will find opportunities for exploiting established partnerships and B2B or B2C relationships for future adoption. Finally, Synelixis will also seek for collaborations with interested stakeholders' groups in order to maximize the exploitation potential. To this end, Synelixis will join innovation and entrepreneurship events, while we will also pursue exploitation target via the project dissemination means.</p>
INOV	<p>INOV for its nature is interested directly in the results of technical output that are relevant for its activity; we are also interested in collaboration with other research entities and commercial organisation to exploit the outcomes. Being a private non-profit research institute INOV expect to use the output from the project into to other research activities or projects. New opportunities of collaboration with partners is also envisaged. INOV has a long history of collaboration with first responders and public administration specially forest fires. <i>Channels or actions:</i> Publications and events</p>
ISMB	<p>ISMB is a private non-profit research center that operates in the domain of the applied research with the goal to bridge the gap between the basic research results and the applied research that several markets are looking to support its digital transformation. Knowledge and results to exploit are crowdsourcing application coupled with wearable devices and Artificial Intelligence modules for the analysis of social media and images. The reference market and/or sectors are Public sector (i.e. emergency services and smart-cities), Insurance – Business-continuity. ISMB is leading the I-REACT project that it is actually ramp up the market uptake. In this exploitation phase many market contacts have been created in the public sector as well as in the private sector (i.e. insurances and business continuity). The expected Sales/Uses are to licence IPR and foreground generated within the project to the FASTER marketing front-end, to get share or stock options of new companies created to lead the exploitation process, exploiting marketing and promotion towards partners</p>
KPRF	<p>Being a research entity with main objective in social innovation, technologies and tools developed in FASTER will be the base for further research but also a huge social value to be disseminate in order to improve awareness around safety and operational condition of first responders. Nevertheless, the impact of emergency management in citizens privacy (including GDPR), will be a natural field of research for our organisation. <i>Knowledge and Results to exploit:</i> Kpeople is interested directly to methodologies and processes developed in the project; we are also interested in collaboration with research entities and commercial organisation to exploit FASTER outcomes. <i>Current Sales/Engagement on that market/sector:</i> Kpeople (through its mother company), has a long history of collaboration with first responders and public administration. These will be the main sectors in which exploitation will be driven. <i>Expected Sales/Use:</i> Kpeople expect to enlarge and promote the use of FASTER outcomes in collaboration with some commercial partners addressing mainly Malta, Italy and UK market. <i>Channels or actions:</i> Publications, Events</p>
KAMK	<p>Being a Finnish University KAMK is mostly interested in FASTER technical and process innovation to be the base for further researches and to run courses in the University. The strong link with the territory and with first responders is going to provide an ideal field of research.</p>
VUB	<p>The research group Law Science and Technology at the Free University of Brussels (VUB) is an expert in the use of health data both in the area of healthcare delivery and in scientific research. Participation in the FASTER project will allow it to develop and apply its expertise in the area of coordination of first responders in complex and demanding situations. This will improve and diversify the research output of the research group and provide it with useful material to be used in its teaching practice. In addition, involvement in the FASTER project will allow the research group to broaden its repertoire and high new staff. This will allow for involvement in further projects at the EU, national and regional research levels.</p>
UWA	<p>The Communications and Networks Laboratory of the Dept. of Electrical and Electronics Engineering of UWA is focusing on research in Telecommunications and Computer Networks. In particular the involved research team in the proposal (Computer Networks and Services Research Team, CONSERT), is researching on topics related to the use of mobile and personal devices, and implements services and applications for computers, mobile and wearable devices. In this context, the use of machine learning for providing context, situational and affect aware applications has been in the core of interests of the team, exploiting the capabilities of sensors, cameras and microphones in personal and portable devices and computers in order to improve the efficiency and usability of web/mobile applications and services. The particular field of First Responders safety and communication is of practical interest to the research team, and it is expected that the work and results of FASTER will be used in order to improve the competencies of researchers, provide the ground for further research, be exploited at scientific level. Student Theses and Dissertations will, also, be released on topics related to the work of UWA in the project (e.g., resilient communications using Wi-Fi broadcast capabilities), while active contribution in organisation of scientific events and workshops is foreseen. In parallel, in the context of the annual dissemination activities to the general public, the research results of the project will be used in order to disseminate the research potential of UWA. It should be noted that since UWA has recently emerged from the merging of two Universities of Applied Sciences (to the third largest University in Greece in terms of enrolled students), such dissemination actions, as well as opportunities for student work in state-of-the-art research fields, as these covered by FASTER, are on the front line of the University's exploitation plan. As the outcome of the research is expected to have practical results which could be directly exploited, there is consideration of exploitation also (in the form of services offered) by a University spinoff.</p>

ADM	ADM-POL is a public body, and as a Local Police in a big city, constantly our patrols are being dispatched to emergencies, many times in collaboration with either the Fire Department and/or Emergency Medical Service. The features and functionalities of FASTER , once developed and integrated to our systems and protocols of action, will improve in time and effectiveness in the help to our citizens.
SUMMA	Being a non-profit organization belonging to the Servicio Madrileño de Salud (SERMAS). Madrid Region has the second best Health System in the European Union, according to the European Commission's latest Regional Competitiveness Index. Madrid Region Health System (SERMAS) assures the adequate coverage of more than 6.5 million people, including the capital, the third largest city in the EU. SERMAS includes its network 37 hospitals, 265 primary care centres, 163 rural medical services and the emergency services SUMMA 112 , providing more than 27 million health care services a year. SERMAS has received 336 awards in 2016, acknowledging the high quality of its services.
ENSOSP	The centre for interdisciplinary studies and researches on civil protection of ENSOSP is in touch with the research centers of the two French law enforcement and it is an opportunity to disseminate information about the project and results. As the French Academy for Fire, Rescue and Civil Protection Officers, ENSOSP can disseminate information to 25 000 officers, volunteers and professional firefighters, along with its medical teams. On the operational training platform and on the virtual training platform, there is the possibility to test new technologies. And all these officers, once convinced, will disseminate information in their own fire department. ENSOSP also relies on its network of experts and referents and use an internet knowledge sharing tool called PNRs. This could be the best way to disseminate information.
WSPol	WSPol will disseminate, as widest possible, information about the project's progress, technical components, results and expand knowledge about it. WSPol as an Academy has the possibility of dissemination the information on technical and technological possibilities of the tool which will be created, within conducted studies, trainings and conferences for officers dealing with the internal security in Poland.
KAJ	KAJ is a Finnish first responder, the natural interest for FASTER project is related to new technologies coupled with improved processes which could be deployed in our fields of operation in collaboration with either the Fire Department and/or Emergency Medical Service. FASTER is expected, once developed and integrated to our systems and protocols of action, to improve in time and effectiveness in the help to our citizens.
HRTA	Knowledge and Results to exploit: Disaster preparedness, civil protection, emergency protocols. Market and/or Sectors: Civil Protection, Emergency Response, Education. Current Sales/Engagement on that market/sector: Operational First Responders (NGO). Expected Sales/Use: Enhance public safety & effectiveness of emergency response operations
MG	Knowledge and Results to exploit: Disaster preparedness; Disaster response; Civil protection; Emergency protocols. Sectors: Public safety, Coordination of emergency response and emergency means. Use: Enhance public safety; Enhance disaster preparedness; Enhance effectiveness of emergency response operations. Channels or actions: Meetings, web, social media, training events, conferences, printed media.
CSIP	Being the technical support organization of Piedmont region, which is the official Civil protection authority, CSIP will exploit enhanced Disaster preparedness, civil protection and emergency protocols with all technologies introduced by FASTER in its operation. The main objective where the project could contribute are public safety & effectiveness of emergency response operations
KGU	Being a research center involved in research and development of innovative blockchain technologies, the KGU will exploit and disseminate the FASTER results through scientific publication and participating in conferences dealing with the FASTER topics. KGU will include FASTER themes and research issues in its effort to develop a blockchain framework that can deal with the unique urgencies of a disaster response and the disparate nature of the actors involved – first responders, aid agency staff, LAEs, local health workers, contractors, affected citizens, etc. – in a shared, decentralized and real-time record of truth, which has significant value over legacy alternatives. KGU will learn valuable data from the FASTER project that will likely impact the design of this framework and its implementation in the Japanese DRM theater for first responders.

2.2.5 Data management plan

In **FASTER**, a Data Management Plan (DMP) will be defined and implemented in order to ensure a high level of data quality and accessibility for final users and stakeholders, and to allow the application of data analytics techniques. The DMP document will be prepared during innovation design phase, by using standard methodologies, and will evolve during the project. The DMP document will have two versions; one at M6 and a final one at M18. Specifically, it will address the following main topics:

- **Data format of both the collected and the delivered data:** describes the main characteristics of the data and their provenance. Moreover, it will describe also how data are used during the project and which goals are supported by the used data. Specifically, the following macro-information will be managed for each data source and dataset: (i) Dataset reference and name, (ii) Dataset description, (iii) Dataset scope and goal for **FASTER**.
- **Data protocols:** it will be specified the protocols used for data exchange within the **FASTER** tools.
- **Metadata content and format:** describes which metadata will be used within **FASTER**.
- **Data sharing:** describes the policies used to share data among partners and non-partners of the project. Particular emphasis will be given to privacy issue for those data that cannot be delivered as open access data.
- **Data portability:** it specifies how the personal data will be made portable outside the system
- **Data erasure policy:** it describes in which cases the data stored must be permanently deleted, e.g., when a user exercises the “right to be forgotten”.

- Archiving and preservation:** describe the standard techniques that will be used to store and preserve (backup) both collected and generated data in order to allow the exploitation of the data also after the end of the project. Concerning data security and privacy issues, the DMP will take into account the EU directives related to both users' rights relating to electronic communications networks and services, to the processing of personal data and the protection of privacy in the electronic communications sector. The key EU directives are the 2002/58/EC, otherwise known as ePrivacy Directive (ePD), and the (EU) 2016/679, also known as General Data Protection Regulation (GDPR). Any change in the legislation will have an effect on the ongoing research/project, regardless of the date of the legislation compared with the starting date of the research.

2.2.6 IPR Open access and Consortium agreement

Consortium partners will generate new knowledge that will be instrumental for shaping the expected project outcomes, several of which may qualify for Intellectual Property (IP) protection. On the other side, it is an obligation and will also be the interest of the consortium to widely disseminate the proposed new methods and tools. In order to disseminate results according to open access rules and obligations, whilst safeguarding at the same time the rights of the partners to protect their IP, a strategy aimed to a proper management of the generated knowledge will be developed. Table 2-11 shows the main actions regarding the IP Rights (IPR) management in FASTER.

Table 2-11: Main IPR actions

	Phases	Objectives	Actions
Pre-existing Know-how	Protection for partners	Identify knowledge brought by partners (Pre-Existing Know how); Identify use of knowledge without infringing IPRs	Register Document
	Using outside project	Determine the IPR protection for the use of pre-existing know-how outside the project	
	Definition of IP exploitation strategies	Exploitation intention of each partner; Rights of participants to license third parties; Rights-duties of each participant to apply for patents; Restrictions on public announcement.	IP Exploitation Plan document
Results	IPR identification	Identify all expected IPRs needing protection and specify their treatment; Identify unexpected protectable results	Define IP needing protection
	Definition of Contingency Plan	Ensure access to relevant IPRs for remaining members in case a participant withdraws; Specify the ways through which disagreements on IPR may be settled	Contingency Plan
	Potential Patentable Results	Traceability of knowledge generation	Basic Invention Report
	IPR Register	FASTER contact point inside and outside consortium	Patent

The procedures for the management of Intellectual Property (IP) will take into account the principles set in the Model Grant Agreement (GA)¹⁴ and in the Consortium Agreement (CA)¹⁵. **General principles** are:

- Ownership of results¹⁶:** in full compliance with the GA and the CA, results are owned by the beneficiary that generates them.
- Joint ownership by several beneficiaries:** whenever results have been jointly generated by two or more beneficiaries and it is not possible to establish the respective contribution of each beneficiary, or separate them for the purpose of applying for, obtaining or maintaining their protection, such results shall be jointly owned by the beneficiaries which generated them.
- Agreement on background:** the beneficiaries will identify and agree (in writing) on the background for the action ('agreement on background'). Background will be clearly identified within the CA, which will be concluded among the partners before the GA is signed.
- Access rights:** the beneficiaries will give each other access – on a royalty-free basis – to background needed to implement their own tasks under the action. The beneficiaries will moreover give each other access – under fair and reasonable conditions – to background needed for exploiting their own results, unless the beneficiary that holds the background has – before acceding to the GA – informed the other beneficiaries that access to its background is subject to legal restrictions or limits.

Based on the assessment of the background of the consortium partners and monitoring of the partners' potential contribution to new IP generation, a **detailed IP protection plan internal to the consortium will be elaborated.**

Concerning open access to peer-reviewed scientific publications and deliverables, it is envisaged that 'gold' open access will be the preferred option, whereby the partners will publish in peer-reviewed scientific journals that, already, are committed to solely open access methods or that can foresee (under payment) this option. The tech-

¹⁴ Annotated Model Grant Agreement, Version 2.0.1, 12 May 2015

¹⁵ Based on the DESCA Horizon 2020 Model Consortium Agreement, Version 1.2, February 2016

¹⁶ Any (tangible or intangible) output of the action such as data, knowledge or information – whatever its form or nature, whether it can be protected or not – that is generated in the action, as well as any rights attached to it, including IPR

nical reports and other communicative documents will be archived within the project website, in the repository section “Documents and reports”, with free access (‘green’ open access).

2.2.7 Communication activities

FASTER will have a strong identity that will be used in all communication and media activities. In order to complement the effort undertaken, various activities have been identified to give consistency to a preliminary plan that will be reviewed and enhanced during the project lifetime.

Table 2-12 Communication activities

Activities	Expected outcome	Audience
The FASTER project website with a two-fold functionality: project communication and pilot showcase. It will include both private and public areas, serving as a major information sharing instrument between the project partners, and being the basis of dynamic project information diffusion to the wider community (professionals, academics, the general public and industry). The public web portal will be set-up and fully operational by M3 and will include a database of dissemination material.	KPI: 12,000 visits recorded on the project’s website Contingency: Promoting the website by means of external channels (especially through social media)	Public, scientific community, project partners, media
Blogs (one per industrial sector) will be maintained to facilitate the communication on FASTER progress.	KPI: 100 Yearly interactions Contingency: Promotion through local channels	Public, scientific community, industry
The presence of the FASTER project within online social networking communities will be established by creating and maintaining accounts on Facebook, Twitter, Instagram and LinkedIn. They will be maintained to keep in contact with local communities as well as attract new users (even outside of Europe)	KPI: Facebook – 80 posts, Twitter – 100 followers, LinkedIn – 2 monthly updates Contingency: Control and encourage the publication of contents.	Public, scientific community, industry
<ul style="list-style-type: none"> • Brochures and posters will be distributed at specialised International Conferences, meetings, summits and workshops. • Online marketing promotion material: A section of the FASTER website will be devoted to the promotional advertising of the FASTER tools. In addition, each partner’s website will promote the project results through news and updates. • An electronic newsletter will be compiled and widely disseminated every 6 months via a variety of relevant academic and industry mailing lists. The newsletter will report the main activities undertaken within the FASTER project, as well as provide details on published papers produced within the project. 	KPI: 30 articles and at least 2-yearly updates through news and other relevant channels of the media partners. Contingency: Support partners to publish. Moreover, Media companies will facilitate communication activities.	Public, scientific community, industry, media
<ul style="list-style-type: none"> • International conferences with specific FASTER activities • Hackathons dedicated to First responders to ensure that platform development becomes a community activity. • International FASTER innovation workshops to bring together users and platform providers. • Demonstrations related to the FASTER platform, as well as all the technological tools that will be developed will be specific. 	KPI: 5 International conferences, >2 Hackathons, (>50 attendees), 3 international workshops (>80 attendees) (at least one in each pilot site), > 3 Demos (>50 attendees). Contingency: Encourage partners and external stakeholders to attend events. Search for additional channels.	Public, scientific community, industry representatives, project partners

3 IMPLEMENTATION

3.1 WORK PLAN – WORK PACKAGES, DELIVERABLES AND MILESTONES

3.1.1 Overall structure of the work plan

The activities of FASTER are organized in 11 work packages (WPs), which span across the 36-month period of the project. The WP plan is thoroughly designed to ensure unrestricted workflow and to fulfil the achievement of FASTER’s objectives and deliver a set of situational awareness supporting technologies for first responders. Each WP is focused on a specific aspect of the project, while the work to be carried out by each WP is internally decomposed into several tasks and assigned to partners. The FASTER WPs include:

- An administrative WP (WP1) overseeing the overall management of the project, be it either financial, technical supervision or administration and ensuring the quality of the work done as well as monitoring of risks.
- One WP responsible for all SELP aspects of the project (WP2) that will continuously monitor the project’s compliance with all regulatory and ethical frameworks.

- One WP concerning the collection of user and system requirements and the definition of FASTER architecture and its use cases, also involving the end-users to monitor the FASTER solutions suitability (WP3)
- Five R&D WPs, each focused on a different set of solutions for first responders that will be delivered by FASTER (WP4-WP8)
 - IoT and wearable sensor data acquisition, monitoring and communication (WP4)
 - Autonomous vehicles to map the disaster scenes and support first responders in the field (WP5)
 - A multitude of solutions for resilience in communications (WP6)
 - AR and AI based solutions for improving the situational awareness of the first responders (WP7)
 - A portable situational awareness system to support decision making in commanding teams (WP8)
- One WP assigned with the continuous integration of outcomes delivered by R&D WPs (WP9)
- One WP for selected pilot demonstrations that will validate the project's outcomes in realistic scenarios (WP10)
- One WP tasked with dissemination and exploitation activities that will raise awareness to relevant stakeholders and communities – scientific and end-user ones – and disseminate appropriately the project's technical advances. (WP11). This WP will also be in charge of considering exploitation and sustainability aspects to foster successful take-up.

3.1.2 Pert Chart

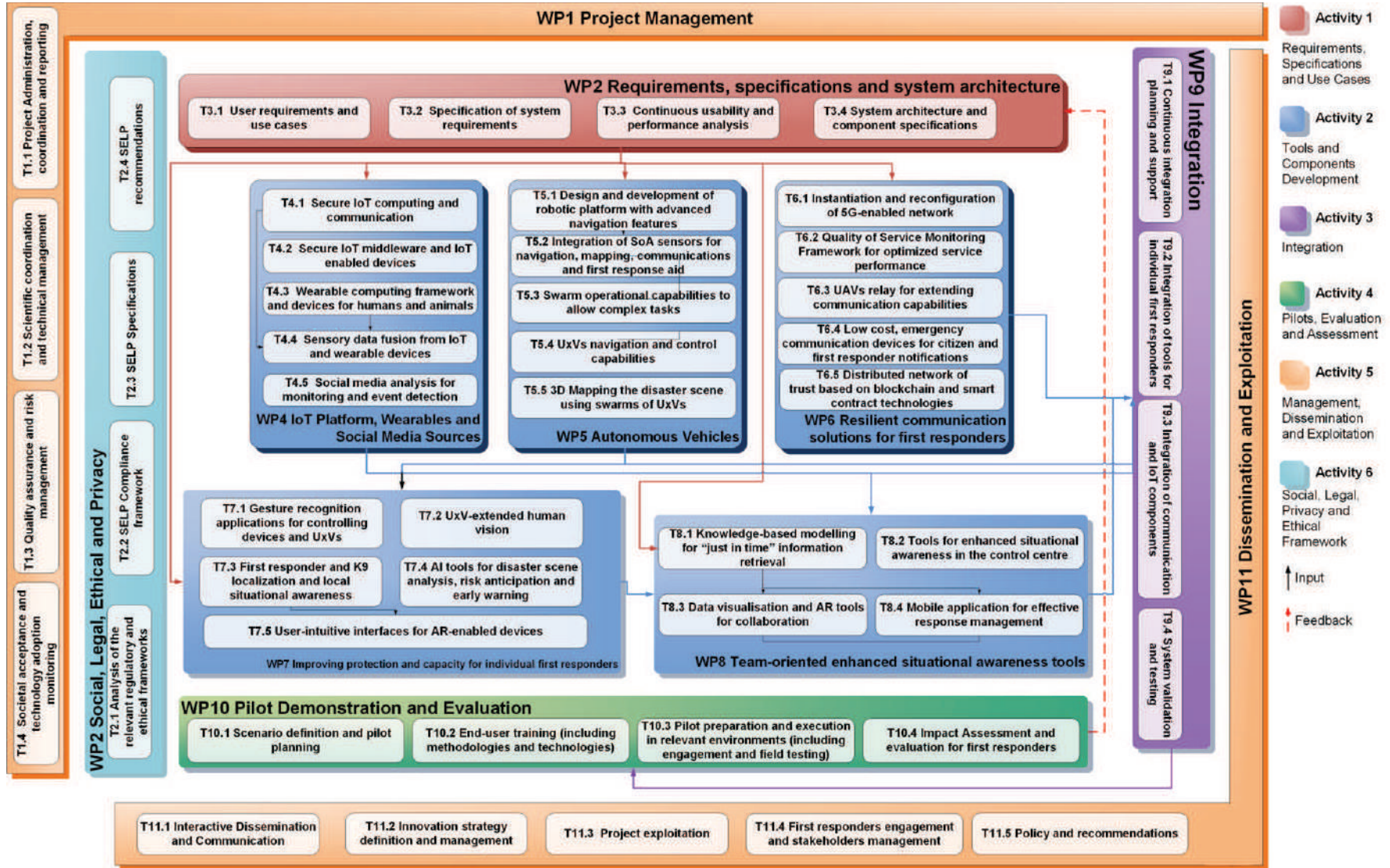


Figure 3-1:PERT diagram

3.1.3 Gantt chart

The following figure highlights the major phases of the proposed schedule. Red arrows illustrate the flow of the two major iterations with the revision of requirements, scenarios, SELP framework, etc. Periods of lower activity are indicated in light yellow (tasks running in the background, R&D activities that are unproductive to totally pause). In addition, the major milestones and pilot periods are also denoted at the bottom of the Gantt chart.

3.2 MANAGEMENT STRUCTURE AND PROCEDURES

3.2.1 Organisational Structure and Project Governance

The FASTER management structure has been designed to provide simple yet flexible processes required to ensure clear decision-making mechanisms, not only for the overall guidance of project activities, but also for interlinking all project components, optimizing liaison with the EC, and enabling cross-project cooperation. Specifically, the project management structure and procedures have been designed to ensure: 1) attaining the established project objectives and, to the best possible level, fulfilling the individual partner expectations; 2) high quality of all project actions; 3) addressing cross-cultural partnership issues associated with team working, communications and management styles; 4) implementation of proper monitoring and self-assessment procedures.

The project is managed at four different levels, with four different committees:

- **Strategic and vision management:** General Assembly (GA)
- **Administrative, financial, overall coordination:** Project Management Committee (PMC)
- **Technical and content coordination:** Technical Management Committee (TMC)
- **User community management:** User Community Board (UCB)

This organisational structure has been agreed to optimise planning, monitoring and coordination of FASTER project activities and tasks performance, reporting and accountability. FASTER will be steered and guided in a top-down fashion, while issues will be solved in a bottom-up manner. Figure 3-3 summarizes the management structure and the associated leaders (CERTH as project coordinator, ENG as technical coordinator, and CPLAN as User Community Manager). This is complemented by the innovation management support (KPRF), as link being implemented through the TMC. The FASTER management structure has been agreed among the partners and is based on similar successful models already implemented with success in previous H2020 projects.

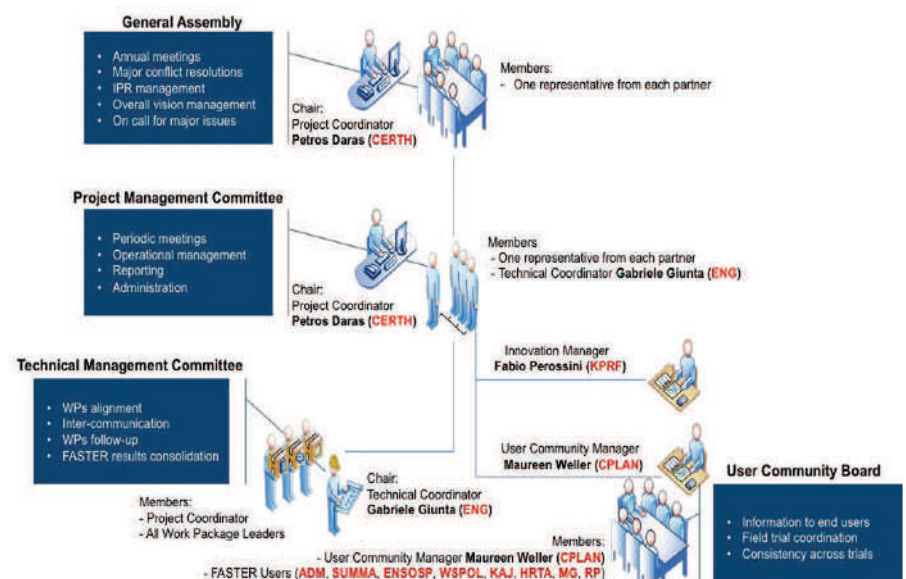


Figure 3-3 Project Management Structure

The FASTER management structure has been agreed among the partners and is based on similar successful models already implemented with success in previous H2020 projects.

3.2.2 Key Roles and Responsibilities

The **Project Coordinator (PC)** carries out the overall co-ordination and ensures daily supervision and monitoring of operations as well as official communication with the European Commission and other parties. He chairs the PMC and has the overall responsibility including financial and contractual obligations defined in the contract with the Commission. The PC (with the support of the PMC) will have the duty to prepare reports, cost statements and project documents, as well as to prepare a summary of the efforts and budget expenses and plan. The PC will make sure IPR terms and conditions specified by the Consortium Agreement are properly interpreted and adhered to. The PC is **Petros Daras from CERTH**. CERTH will also provide a Project Office (PO) comprising staff familiar with administrative, legal, financial, communication and IPR issues; it will support the several operational groups in all their responsibilities. The PC is supported by:

- The **Technical Coordinator (TC)**, who has the overall responsibility of ensuring content synchronisation between the different FASTER outcomes and alignment to the overall goals. TC will ensure the appropriate integration and overall consistency among the different work packages, coordinating and overseeing their activities to ease the integration and exploitability of the technical results. The TC is **Gabriele Giunta from ENG**.
- The **User Community Manager (UCM)** is a key role since he is the central contact point for end users and is responsible of their interaction with the FASTER researchers and technicians. Specifically, he will also manage how smooth the involvement of the FASTER interdisciplinary teams from the different FR organisations (e.g. medical emergency services, law enforcement team, civil protection and firefighter professionals and association of volunteers) in the project activities, The UCM is **Maureen Weller from CPLAN**.
- The **Innovation Manager (IM)** who will have overall control of the results of the project, making sure they are exploitable and relevant with respect to the reference markets. He will also be in charge of coordinating activities with the relevant standardization bodies. The IM is **Fabio Perossini from KPRF**.

General Assembly (GA). Chaired by the PC, the GA is the **decision-making** body of the project. It is responsible for major administrative decisions that require a vote, decides on potential disputes and conducts IPR and IPR framework management. Each partner is represented with one person. It will meet at least every 10 months and can be called to extraordinary session at the request of the PMC. The GA will be involved in the overall plans, the alleviation of any bottlenecks and the resolution of conflicts. It decides and approves project-wise changes including the approval of major changes in the work plan according to PMC or TMC proposals, and the managing of integration or withdrawal of partners and personnel for selected activities. Most issues will be decided voting (one vote per partner) with a silent acceptance rule unless there are objections. Decisions are taken by 2/3 of the votes, at meetings where at least 2/3 of the project shares are represented. The PC has a casting vote. The complete GA role, responsibilities, rules, and decision-making procedures will be detailed in the Consortium Agreement (CA).

Project Management Committee (PMC). The PMC, led by the PC, is the executive body of the project. It will meet face-to-face or by conference call at least every three months, for the following tasks: approval of the financial plan and work plan for the next project period; evaluation of progress since the last project period; discuss any issues concerning management or the smooth running of the project; resolve sensitive technical, administrative or contractual issues; monitor coherence and integration in the project; identify and analyse potential risk factors, and determine the necessary measures to minimise them, recording this in a risk register; discuss and propose internal changes in the consortium if necessary; take decisions on proposed changes to the contract or to the Consortium Agreement; deal with conflict resolution. The PMC will comprise one representative from each partner, the PC and the TC. The PMC reports to the GA. The PMC activities are supported through WP1.

Technical Management Committee (TMC). The TMC has the duty of ensuring timely progress of the project and high quality of results. The TMC reports to the PMC. It will meet (either face to face or by teleconference) every month and constantly stay in contact, mainly using e-mail and online collaboration tools. Its responsibilities are: reviewing the work plan and the overall project progress; approving the reference architecture of the FASTER platform; defining the detailed responsibilities for software components; setting the detailed scope for technical work; following up the timely achievement of milestones and production of deliverables; managing the day-to-day activity of the WPs; coordinating the integration of the activities according to the work plan; ensuring technical consistency and maximum synergy between work packages, in particular between the use case/requirements, conceptual modelling and technical work packages; maintaining a quality plan to ensure deliverables are of adequate quality; analysing the technical environment to assess risks to project impacts; forming ad-hoc Technical Task Forces, if necessary. The TMC is chaired by the TC and made of all WP Leaders, along with the PC.

Work Package Leaders (WPL). Each work package has a WPL, who is the contact person and has the responsibility for organising the work within individual work packages, including detailed planning of tasks and activities, technical solutions and management of personnel responsible for specific activities. In addition, they ensure delivery of outcomes against milestones and deadlines. The WPL team will communicate regularly among themselves (face-to-face work meetings or workshops, or by remote conference call), but also with the teams of related WPs. FASTER WP leaders have been designated based on their technical, managerial and relevant competences and specific expertise, ensuring optimum co-ordination of their activities within the project life cycle.

User Community Board (UCB). The UCB has the assignment of ensuring clarity and consistency in communicating with the end users, including their systematic participation to the project activities with regard to in the disaster risk reduction and management, the emergency management, the safety, preparedness and resilience enactment. It will also be responsible for the involvement of the end-users in the pilot definition and planning along with the pilot preparation and execution in relevant environments. Moreover, it will be collecting the evaluation and assessment feedback information flowing between pilots and design phases. The UCB reports to the PMC. It will meet (either face to face or by teleconference) every six months. It will permanently stay in contact, mainly using e-mail, online tools and regular teleconferences. Its responsibilities are: reviewing the pilots approach and deployment plan; reviewing the feedback from each pilot phase and presenting it to the GA and to the TMC as needed; monitoring pilot results and ensuring consistency across reporting approaches from trials; acting as primary point of contact to channel information from end users to technical partners; highlighting dissemination and training opportunities towards end users. The UCB will be chaired by the UCM and include only the FASTER end-users. The committee activities are supported through WP10.

3.2.3 Management Issues and Procedures

Consortium Agreement (CA): Prior to the start of the project, the PC will ensure that all partners have signed the project “Consortium Agreement” (CA). This document will set out all the internal rules and responsibility ensuring compliance to the contract signed with the EC. The CA will govern important administrative points such as: decision procedures within the project; risk management strategies; the right of each partner in the exploitation of results; equal opportunities and gender equality policies. It will include Conflict Resolution and Relationship breakdown. The CA will control the respect of IPR rules and information dissemination procedures.

IPR: The IPR management, which is of key importance in a market-oriented project, is described in Section 2.2.6.

Continuous planning. Defining coherent and detailed plans for the project work is an essential prerequisite to enable the work to progress. Over the first three months of the project, a consolidated and detailed plan will be produced and maintained by the PC with the support of the TMC and PMC. A detailed work plan monitoring will be produced and continuously *updated (at least every 2 months)* within each WP at task level avoid redundancy in tasks, ensure all tasks are covered, and to allow an efficient follow-up of progress.

Quality Management. Within FASTER, a Quality Assurance System will be established in the earliest stages of the project, with a Project Quality Plan (Task 1.3) to be delivered as D1.1 – Project reference manual and quality plan due at Month 3 and used internally by the Consortium. It will describe guidelines adopted by the project on preparation and validation of deliverables, internal peer reviewing, periodic reporting, preparation of financial statements, as well as risk management. Particular emphasis will be put on quality control of deliverables with 2 peer reviewers per deliverable (by people not or less involved), submission deadline for deliverables with thus be three weeks ahead of the official date to allow time for the quality procedure.

Deliverables. Each work package leader is responsible for the organization of the deliverables of their work package, including internal review of all reports. Once a report has passed internal work package review, it must pass project-level review. The PC and STC may review any deliverables before submission and may return them for additional refinement if they feel this necessary.

Reporting and communication. In addition to the deliverables, there will be an internal reporting mechanism and annual cost statement financial report to be submitted to the European Commission.

- *Every two months*, each WPL will write and send an internal progress briefing to the PC, by collecting contribution from partners in the WP, describing the technical and management work done, reporting difficulties, achieved milestones and deliverables, patents, publications, travel and relevant events. As a result, the PC will be able to track the overall progress and identify potential problems with individual organizations.
- *Every 6 months*, each partner will submit a report detailing progress and effort expenditure. These reports are collected by the PC. Each WPL will in addition answer a questionnaire, structured in three major sections: 1) assessment of the work done vs. the planned work; 2) key issues for the development of FASTER; 3) on-going results of evaluation indicators. CERTH as WP1 leader will analyse all the self-assessment questionnaires and summarise the overall project progress, to be presented as reports to the PMC for further analysis.
- *At M12 and M24*, each partner will prepare a financial statement, which is collected and presented to the EC by CERTH. The self-assessment questionnaires mentioned previously are used to generate the annual project management report to the EC and to be presented also in the GA. Reports to the Commission will ensure the proper implementation of the project objectives both from the consortium side as well as the Commission.

Review of the deliverables may take the following type of actions:

Review type	Results	Approach
Internal	Software	Software review will be conducted during the testing procedures and by dedicated T3.3 and T9.4. Technical aspects of the software will be reviewed by the TM according to the technical, infrastructure and design specifications decided to be included. The TM is responsible for the verification and validation of the testing results.
Internal peer review	Reports	Project reports and documents will be reviewed against the following criteria: 1) Format of the document according to the document template and Quality Standards; 2) Consistency with other relevant Deliverables (e.g. requirements and specifications); 3) Identification and correction of typing mistakes, etc. Technical aspects of the documentation will be reviewed by the WP leader and/or TM in order to ensure that all technical information is consistent to the current state-of-the-art and the recent technological research level.
Results validation	Showcases, demos, etc.	Results validation will be done both from the ICT and the user/market perspectives. Validation will concern both the technological and scientific aspects of the project. Various tools for reviewing/Evaluation of the system from users will be applied: <ul style="list-style-type: none"> • Questionnaires/Interviews, forming the structured information to be collected during the validation phase. Questionnaires will contain both closed and open questions. • Workshops/Interviews will be constituted from selected number of users. They will express their overall feelings concerning FASTER. A questionnaire will be used for information collection with open discussion encouraged and reported.

Tools and Services. The community orientation of the project is supported by an online Web portal that includes the public, community and consortium sections. This will ensure that the consortium partners fully operate in a community-oriented approach.

Conflict Resolution. The general principle applied to the resolution of disputes is that steps to resolve any dispute should be taken at the most appropriate level and referred to the next highest level in the organisational structure should satisfactory resolution not be achieved. Thus, when a conflict occurs in a WP, consensus will be sought to

solve the problem. If the issue cannot be solved, the WPL prepares a description of the problem and its possible solutions and transmits it to the TMC. If consensus cannot be reached within the TMC, the PC escalates to the PMC and a vote occurs, requiring a simple majority. Ultimately, any unresolved dispute is referred to the GA which, in the event that an amicable agreement cannot be reached within that body, will have the right to appoint external independent arbitrators. E-mail voting is allowed, according to the rules defined in the CA.

Meetings. The project will be launched by a consortium plenary kick-off meeting. The meeting will be the opportunity to share the work plan resulting from the negotiation process, to refine the common and shared understanding of tasks and resources to project development and to build up an operational team spirit among FASTER participants. Intermediate meetings and conference calls are held by the PMC. It is anticipated that working meetings will be held on demand as face-to-face meetings or as virtual meetings. Given the nature and the ambition of the project, the consortium may decide to support a series of joint meetings to speed up the development and integration process across the FASTER development teams of the different partners, as well as to foster joint effort and to support the involvement of users in FASTER. Two project review meetings with the EC Project Officer and external expert Reviewers are foreseen to take place indicatively at month 19 and at month 36.

3.2.4 Innovation Management

FASTER will deploy best practice innovation management methods to help output new and improved products, processes, methodologies and standards closely oriented to market needs. The project will connect with customers throughout the value chain and with emerging technical developments to create insights. The FASTER Work Plan has explicit provision for creating ideas, prioritising them and evaluating scientific and technical feasibility mainly in WP3 and WP11. In addition, a change authorisation process and assessment criteria will be defined in the event that a high value emerging idea requires significant change to the delivery plan.

Innovation Management will be coordinated by the IM and carried out by exploitation managers identified in each beneficiary organisation, with oversight by the TMC. Exploitation managers are responsible for ensuring capture of any relevant ideas created during their project work, prioritising and developing these to a point where they can present them to the TMC for a decision about inclusion within existing work-packages and any associated changes to the delivery plan. The innovation management activities will be performed by *T11.2*. To ensure relevant external or internal opportunities are taken up, all consortium members will contribute to exploitation with a horizon scanning report detailing opportunities or relevant insights. The resulting horizon scanning capability will inform development decisions throughout the project and will also draw on inputs from the Market interest group.

3.3 CONSORTIUM AS A WHOLE

The FASTER consortium is made of 22 European partners and one from a third country (JP), all carefully selected both for their acknowledged excellence as well as their complementarity, in order to provide the necessary knowledge, expertise, and state-of-the-art background required to ensure the success of FASTER, as well as the sustainability of the proposed research and expected results.

The consortium is well balanced in terms of partner's profiles, with:

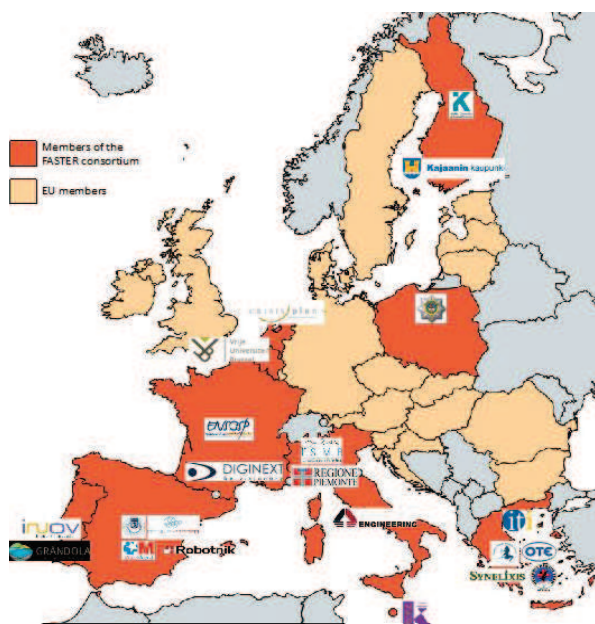


Figure 3-4: European dimension of the FASTER consortium

- 3 industrial leading companies (ENG, DXT, OTE) and 4 innovative SMEs (CPLAN, DH, ROB, SYN), each one with significant state-of-the-art background in their field, large experience in ambitious European R&D projects, demonstrated dissemination and exploitation capabilities, a strong product orientation, as well as access to the targeted market where they have leading positions;
- 7 world-class technical research centres (CERTH, INOV, ISMB, KPRF, KAMK, UWA, KGU) offering cutting-edge scientific background, as well as low TRL foundational research capabilities and ability to disseminate through top-notch scientific journals and conferences;
- 1 world-class research centre (VUB) providing its expertise to lead the studies and monitoring of legal, ethical, and societal implications;
- 8 multi-cultural and complementary first responders representatives (ADM, SUMMA, ENSOSP, WSPOL, KAJ, HRTA, MG, CSIP), including LEAs, firefighters, medical emergency services, K9 units, disaster response teams and civil protection organizations, all of them providing their valuable

field experience, their operational knowledge and expertise, their requirements and constraints, and pilot sites to ensure that the project activities and results will address real needs.

The European dimension of the consortium is very high (Figure 3-4) with partners from 10 European countries (i.e. EL, IT, FR, NL, ES, PT, MT, FI, BE, PL) and another partner from Japan.

Regarding the ties within the consortium, most of the partners have collaborated in many activities in the past (as depicted also in section 1.3.6, with indicative examples of relevant to FASTER previous collaborations), with most notably the collaboration of CERTH and ENG (indicative EU SEC projects FP7: ADVISE, LASIE, H2020: SURVANT, ANITA, DANTE, ASGARD, TRILLION). Their role (CERTH coordinating and ENG technical managing) and their strong existing collaboration offers reassurance that minimises any risks associated with FASTER execution.

3.3.1 The FASTER Stakeholder Group

In addition to the wide representation of first responders in the consortium, a community of stakeholders, first responder organizations external to the consortium, the **FASTER Stakeholder Group** (FSG), will be set-up at the beginning of the project and animated by KPRF (as described in T11.4). It will be open to new members (including Japanese entities, given the ties offered through the FASTER Japanese partner KGU), after acceptance by the team of the PC, TC and UCM. It will be composed of organisations aligned to FASTER focus. Its members will be invited to attend the FASTER workshop(s) and to apply to a position in the FASTER Advisory Boards. FASTER will use the FSG members as multipliers to accelerate the transfer of knowledge between this Research and Innovation Action and the many interested parties, and to foster the adoption of the project results.

3.3.2 Expertise in consortium

Expertise	CERTH	ENG	OTE	DXT	CPLAN	DH	ROB	SYN	INOV	ISMB	KPRF	KAMK	VUB	UWA	ADM	SUMMA	ENSOSP	WSPOL	KAJ	HRTA	MG	CSIP	KGU
Capacities																							
H2020 project coordination/participation	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
Requirements and specs	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
Social, Ethical, Legal and Privacy regulations	o	o		o									o					o					
System integration	o	o	o				o	o	o	o				o									o
First responder's scenarios					o						o				o	o	o	o	o	o	o	o	o
Pilot preparation/logistics					o				o						o	o		o			o		o
Stakeholder engagement and community building					o						o				o								o
First Responder Training			o	o							o				o	o	o	o	o	o	o	o	o
Technologies																							
Smart Wearables/ Clothing									o	o				o									
Autonomous Vehicles + swarms						o	o					o											
Augmented/Virtual Reality	o	o	o							o	o												o
IoT			o					o	o					o									o
Resilient Communication Networks			o					o	o					o									o
Mission management	o	o								o													
Situational awareness tools		o	o							o	o		o										

3.4 RESOURCES TO BE COMMITTED

Budget overview: FASTER budget reaches **7.315.375 €**, out of which the EU part is **6.999.750,00 €** and the rest is the Japanese part for KGU. KGU will in parallel receive funding from Japan Science and Technology Agency (JST), for the project duration totalling to 315.625,00 € (less than the announced 60,000,000 JPY), that includes direct and indirect costs of 30% of direct costs, distributed by the several budget categories according to the Japanese national rules for financing. Most of FASTER resources are allocated to personnel costs (68%), followed by travel (7%) and equipment expenses (3%). A small budget percentage has been allocated to audit certificate and other goods costs (2%), with the rest being the indirect costs.

Effort allocated in the project: For implementing FASTER, a total of 981 person-months has been estimated. As demonstrated in the pie chart in Figure 3-5, the effort allocation is appropriately balanced between Industry partners, SMEs, Research and end-users, for a RIA action with the specificities of the SU-DRS-02 call.

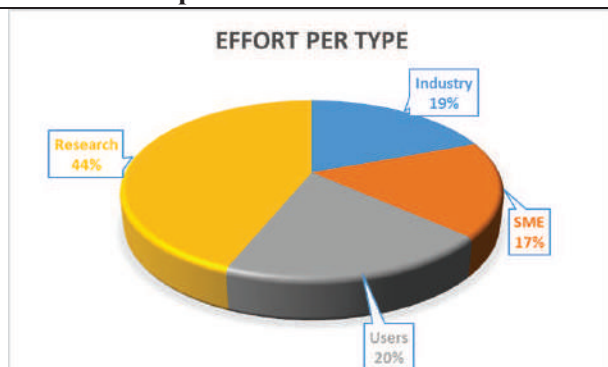


Figure 3-5 Effort per type distribution pie chart

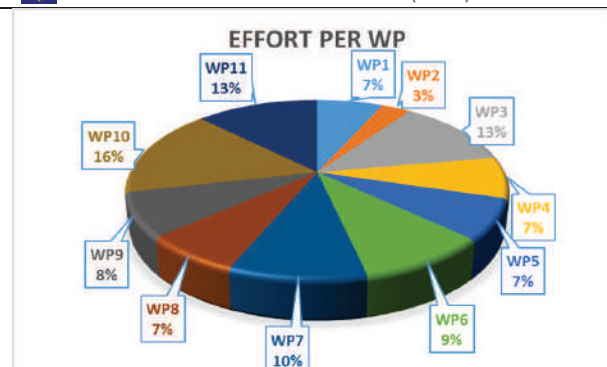


Figure 3-6 Effort per work-package distribution pie chart

Further, the pie in Figure 3-6, shows detailed distribution of the number of person months over the whole duration of the project for each work package. As can be noticed, the R&D WPs (WP4, 5, 6, 7, 8) amount to 41% of the effort. These WPs will produce all the FASTER tools, mostly as stand-alone tools, given their nature, i.e. to be almost independent from the tools provided from the other WPs. Hence, FASTER chose to have a light in terms of effort integration WP (WP9), which otherwise could be cumbersome. The high influence of first responders in FASTER developments and outcomes is also depicted on the effort of WP3 and WP10 which amounts to 29%, and by the fact that each first responder has been assigned effort to monitor the development of a key FASTER technology, as well as equipment budget for the field trials.

Other project costs: Details the other direct costs items for each participant.

Table 3-1 Other Direct Costs table

Participant	Cost (€)	Justification
01/CERTH		
Travel	€30.000,00	24 trips for project meetings, events, reviews at 1,250€ each (30K). CERTH is the coordinator of the project. Therefore, 2 persons are needed per event: PC and 1 senior/junior member of CERTH team.
Equipment	€37.500,00	Depreciation of equipment used in FASTER for 7,5K for 3 PC/laptops equipped with high-end GPUs for Deep Learning development and deployment, 12K for one server, 15K for 3 AR devices (e.g. HoloLens), 3K for 2 mini UAVs for R&D mostly in WP7 and WP9
Other goods and services	€17.500,00	5K for open access publications, 6K for audit certificate, 2,5K for Conference participation, 4K for data sharing, collaboration tools, web management portal and teleconference services.
Total	€85.000,00	
02/ENG		
Travel	€30.000,00	24 trips for project meetings, dissemination events, pilots, reviews at 1,250€ each (30K). The technical manager of the project is from ENG. Therefore, 2 persons are needed per event: TM and 1 senior/junior member of the ENG team.
Equipment	€10.000,00	Cloud service for application deployment 10K
Other goods and services	€7.500,00	Dissemination material 2.5K , Audit 5K
Total	€47.500,00	
03/OTE		
Travel	€20.000,00	20 trips for project meetings, events, reviews at 1,000€ each (20K). Meetings may require technical and senior members of the team.
Equipment		
Other goods and services		
Total	€20.000,00	
04/DXT		
Travel	€20.000,00	20 trips for project meetings, dissemination events, pilots, reviews at 1,000€ each (20K). Meetings may require technical and senior members of the team.
Equipment	€10.000,00	Mixed reality equipment (e.g. HoloLens devices. The actual items purchased will be decided according to the SoA at purchase time) (3.3K), workstations (3.3K), licences (3.4K)
Other goods and services	€2.000,00	Audit certificate, dissemination material
Total	€32.000,00	
05/CPLAN		
Travel	€20.000,00	20 trips for project meetings, dissemination events, pilots, reviews, meetings with

		First Responders at 1,000€ each (20K). Meetings may require more than one person.
Equipment		
Other goods and services		
Total	€20.000,00	
06/DH	Cost (€)	Justification
Travel	€20.000,00	20 trips for project meetings, dissemination events, pilots, reviews at 1,000€ each (20K). Meetings may require both technical and senior members of the team.
Equipment	€15.000,00	Depreciation of equipment used in WP5 for autopilot from Micropilot + small drone for WP5
Other goods and services	€15.000,00	Cost of operation including pilots
Total	€50.000,00	
07/ROB	Cost (€)	Justification
Travel	€20.000,00	20 trips for project meetings, dissemination events, pilots, reviews at 1,000€ each (20K). Meetings may require both technical and senior members of the team.
Equipment		
Other goods and services	€20.000,00	Electric car, sensors, communication devices and other material for improving autonomy, suspension and clearance enhancements for the robotic platform
Total	€40.000,00	
08/SYN	Cost (€)	Justification
Travel	€20.000,00	20 trips for project meetings, dissemination events, pilots, reviews at 1,000€ each (20K). Meetings may require both technical and senior members of the team.
Equipment		
Other goods and services		
Total	€20.000,00	
09/INOV	Cost (€)	Justification
Travel	€20.000,00	20 trips for project meetings, dissemination events, pilots, reviews at 1,000€ each (20K). Meetings may require technical and senior members of the team.
Equipment	€6.000,00	PCs, sensors, other equipment (6K)
Other goods and services	€9.000,00	Conference and publishing (3K), Consumables (6K)
Total	€35.000,00	
10/ISMB	Cost (€)	Justification
Travel	€20.000,00	20 trips for project meetings, dissemination events, pilots, reviews at 1,000€ each (20K). Meetings may require technical and senior members of the team.
Equipment	€19.000,00	Depreciation of equipment used for purchasing ICT resources in the Cloud (2.5 years) for social media monitoring, app backend and frontend for control centre (15K). Depreciation of a GPU server with multiple GPUs (4K)
Other goods and services	€4.000,00	4K Conference and publishing
Total	€43.000,00	
11/KPRF	Cost (€)	Justification
Travel	€20.000,00	20 trips for project meetings, dissemination events, pilots, reviews, meetings with First Responders at 1,000€ each (20K). Meetings may require more than one person.
Equipment		
Other goods and services	€16.000,00	Expenses to involve external stakeholders (travel expenses) in exercises and workshops 10K , Audit 3K , Publication expense 3K
Total	€36.000,00	
12/KAMK	Cost (€)	Justification
Travel	€20.000,00	20 trips for project meetings, dissemination events, pilots, reviews at 1,000€ each (20K). Meetings may require technical and senior members of the team.
Equipment	€10.000,00	Depreciation costs of sensors for navigation, mapping etc. for WP5 developments
Other goods and services	€5.000,00	2K for dissemination material, 2K Conferences participation, 1K for consumables
Total	€35.000,00	
13/VUB	Cost (€)	Justification
Travel	€20.000,00	20 trips for project meetings, dissemination events, pilots, reviews at 1,000€ each (20K). Meetings may require more than one person.
Equipment		
Other goods and services		

Total	€20.000,00	
14/UWA	Cost (€)	Justification
Travel	€20.000,00	20 trips for project meetings, dissemination events, pilots, reviews at 1,000€ each (20K). Meetings may require technical and senior members of the team.
Equipment	€6.000,00	Depreciation costs of equipment to: - upgrades for the Ecobox resilient communication device for FASTER needs. 1K - electronics and sensors to build the wearables for the K9s. 1.5K - electronics and sensors to build the textile wearables for the FR uniform. 1.7K - smartwatches and mobile phones to test the gesture recognition algorithm that will be developed for the project. 1.8K
Other goods and services	€6.000,00	Audit 2K , Dissemination (conference and publishing) 2K and Consumables 2K
Total	€32.000,00	
15/ADM	Cost (€)	Justification
Travel	€20.000,00	20 trips for project meetings, dissemination events, pilots, reviews at 1,000€ each (20K). Meetings may require more than one person.
Equipment	€5.000,00	Depreciation costs of 5 tablets with AR capabilities for users' engagement, pilots 2.5K , and equipment for validating project results (e.g. UAV) 2.5K
Other goods and services	€5.000,00	5K for organizing FASTER training meeting, including meeting place, catering, and audio-visual services
Total	€30.000,00	
16/SUMMA	Cost (€)	Justification
Travel	€6.666,00	8 trips for project meetings, dissemination events, pilots, reviews at 830€ each (~6.7K). Meetings may require more than one person from different disciplines.
Equipment	€2.500,00	Depreciation costs of 3 tablets with AR capabilities for users' engagement and pilots, equipment for validating project results (e.g. geolocators).
Other goods and services	€4.166,00	1.7K for organizing FASTER training meeting, 1.7K for organizing FASTER field trial meetings, ~ 0.76K for dissemination material
Total	€13.332,00	
16a/CMFF	Cost (€)	Justification
Travel	€6.667,00	8 trips for project meetings, dissemination events, pilots, reviews at 830€ each (~6.7K). Meetings may require more than one person from different disciplines.
Equipment	€2.500,00	Depreciation costs of 1 tablet with AR capabilities for users' engagement and pilots, equipment for validating project results.
Other goods and services	€4.167,00	1.7K for organizing FASTER training meeting, 1.7K for organizing FASTER field trial meetings, ~ 0.76K for dissemination material
Total	€13.334,00	
16b/ESDP	Cost (€)	Justification
Travel	€6.667,00	8 trips for project meetings, dissemination events, pilots, reviews at 830€ each (~6.7K). Meetings may require more than one person from different disciplines.
Equipment	€2.500,00	Depreciation costs of 1 tablet with AR capabilities for users' engagement and pilots, equipment for K9 dogs.
Other goods and services	€4.167,00	1.7K for organizing FASTER training meeting, 1.7K for organizing FASTER field trial meetings, ~ 0.76K for dissemination material
Total	€13.334,00	
16c/FIIBAP	Cost (€)	Justification
Travel	€0,00	-
Equipment	€0,00	-
Other goods and services	€0,00	-
Total	€0,00	
17/ENSOSP	Cost (€)	Justification
Travel	€20.000,00	20 trips for project meetings, dissemination events, pilots, reviews at 1,000€ each (20K). Meetings may require more than one person.
Equipment	€5.000,00	Depreciation costs of 10 tablets with AR capabilities for users' engagement, pilots
Other goods and services	€5.000,00	5K for organizing FASTER training meeting, including meeting place, catering, and audio-visual services.
Total	€30.000,00	
18/WSPOL	Cost (€)	Justification
Travel	€20.000,00	20 trips for project meetings, dissemination events, pilots, reviews at 1,000€ each (20K). Meetings may require more than one person.
Equipment	€5.000,00	Depreciation costs of 10 tablets with AR capabilities for users' engagement, pilots
Other goods and services	€10.000,00	5K for organizing FASTER two training meetings, including meeting place, cater-

		ing, and audio-visual services, 5K Conference participations and publishing
Total	€35.000,00	
19/KAJ	Cost (€)	Justification
Travel	€20.000,00	20 trips for project meetings, dissemination events, pilots, reviews at 1,000€ each (20K). Meetings may require more than one person.
Equipment	€5.000,00	Depreciation costs of 10 tablets with AR capabilities for users' engagement, pilots
Other goods and services	€5.000,00	5K for organizing two FASTER training meetings, including meeting place, catering, and audio-visual services.
Total	€30.000,00	
20/HRTA	Cost (€)	Justification
Travel	€20.000,00	20 trips for project meetings, dissemination events, pilots, reviews at 1,000€ each (20K). Meetings may require more than one person.
Equipment	€5.000,00	Depreciation costs of 10 tablets with AR capabilities for users' engagement, pilots
Other goods and services	€5.000,00	5K for organizing FASTER training meeting, including meeting place, catering, and audio-visual services.
Total	€30.000,00	
21/MG	Cost (€)	Justification
Travel	€25.000,00	20 trips for project meetings, dissemination events, pilots, reviews at 1,000€ each (20K). Meetings may require more than one person.
Equipment	€5.000,00	Depreciation costs of 10 tablets with AR capabilities for users' engagement, pilots
Other goods and services	€5.000,00	5K for organizing FASTER training meeting, including meeting place, catering, and audio-visual services
Total	€35.000,00	
22/CSIP	Cost (€)	Justification
Travel	€14.000,00	20 trips for project meetings, dissemination events, pilots, reviews at 700€ each (14K). Meetings may require more than one person.
Equipment	€10.000,00	Depreciation costs of 10 tablets with AR capabilities for users' engagement, pilots, equipment for validating project results.
Other goods and services	€0,00	-
Total	€24.000,00	
22a/RP	Cost (€)	Justification
Travel	€6.000,00	8 trips for project meetings, dissemination events, pilots, reviews at 750€ each (6K). Meetings may require more than one person.
Equipment	€0,00	-
Other goods and services	€5.000,00	5K for organizing FASTER training meeting, including meeting place, catering, and audio-visual services
Total	€11.000,00	
23/KGU	Cost (€)	Justification
Travel	€80.000,00	40 (=2 to 4)P x 12T) trips from and to Japan from our KGU delegation to meet with consortium members, participate in workshops and in pilot project runs. Please note that trips to Europe from and to Japan are more expensive than trips within Europe, because of the distance. An economy class ticket can cost between 1500 Euros and 3500 Euros, depending on the country and the time of year. The average cost of hotel plus per diem expenses in Europe from Japan is about 215 Euros.
Equipment	€35.000,00	ICT resources in the cloud to run a blockchain node: 7.5K . AR and VR equipment for running tests in Japan with first responders: 20K PC and other hardware: 2.5K Drone equipment: 5K .
Other goods and services	€12.500,00	User training and meetings: 5K (Organizing FASTER training meeting in Japan) Conference and publishing: 5K Consumables: 2.5K (Printing educational materials – cards - for training and education. Manuals for different stakeholders how to connect and use smart contracts)
Total	€127.500,00	


Subcontracting: The consortium does not plan any subcontracting

SME unit costs: No unit costs will be charged by FASTER SMEs

4 MEMBERS OF THE CONSORTIUM

4.1 PARTICIPANTS (APPLICANTS)

4.1.1 Centre for Research and Technology Hellas (CERTH)


<p>CENTRE FOR RESEARCH AND TECHNOLOGY HELLAS (CERTH)</p>	
<p>Website(s)</p>	<ul style="list-style-type: none"> • www.certh.gr • www.iti.gr
<p>Description of the legal entity</p>	<p>The Centre for Research and Technology Hellas (CERTH) is one of the largest research centres in Greece. It was founded in 2000 and is located in Thessaloniki, Greece. The mission of CERTH is to promote the triplet Research – Development – Innovation by conducting high quality scientific research and developing innovative products and services while building strong partnerships with industry (national and international) and strong collaborations with research centres and universities in Greece and abroad.</p> <p>CERTH consists of five (5) Institutes and the Central Directorate and is governed by its Board of Directors. The five institutes are: Chemical Process & Energy Resources Institute (CPERI), Information Technologies Institute (ITI), Hellenic Institute of Transport (HIT), Institute of Applied Biosciences (INAB), Institute for Research & Technology of Thessaly (IRETETH). CERTH is essentially a self-supported Research Centre generating an average annual turnover of ~ € 22 Million coming from: >30% from bilateral industrial research contracts, >60% from competitive research projects, and <10% as government institutional funding.</p> <p>More than 600 people work at CERTH with the majority being scientists. CERTH has participated successfully in more than 1,000 competitive research projects (with a total budget exceeding 423 M€ and involving more than 1,100 international partner organizations) financed by the European Union (EU), leading industries from USA, Japan and Europe and the Greek Government. Four spin off companies have been already launched through CERTH research activities. CERTH is listed among the Top-20 Research Centres of the EU with the highest participation in FP7 competitive research grants for the period 2007-2012 (16th place, up from 18th in 2011). CERTH has received numerous awards and distinctions such as: The European Commissions' Descartes Prize (2006), the European Research Council (ERC) Advanced Grant (2010), the 1st Prize in the Microsoft International Contest (2010) and many more.</p> <p>Since 2003, CERTH has been appointed by the General Secretariat for Research and Technology (GSRT) as the coordinator of the Greek EURAXESS Network, a European initiative aiming at offering personalised assistance to mobile researchers. In 2008, CERTH was among the first Greek research organisations to undersign and accept the principles of the Charter and Code for researchers while at the same time CERTH's representatives were members of the Greek delegation at the Steering Group for Human Resources and Mobility (SG HRM).</p> <p>Its latest achievement in the field of human resources is the “HR EXCELLENCE IN RESEARCH” logo awarded by the EC in April 2012 as a proof that CERTH is committed to offer the best possible working conditions, regardless the socioeconomic environment, and at the same time work towards the realisation of the European Research Area (Innovation Union, Commitment #4). CERTH is involved in strong and long-term collaborations with significant international partners.</p> <p>The Information Technologies Institute (ITI) – formerly known as Informatics and Telematics Institute is one of the leading Research Institutes of Greece in the field of Information and Communications Technology (ICT). It was founded in 1998 and since</p>

	<p>10.3.2000 it is a founding member of CERTH. CERTH-ITI is located in Thessaloniki, Greece and its current Director is Dr Dimitrios Tzovaras. CERTH-ITI is one of the leading Greek institutions in the field of Information and Communications Technology (ICT) with long experience in numerous European and national R&D projects. CERTH-ITI has participated in more than 80 EC IST projects – having coordinated at least 20 of them – and more than 100 National research projects or private sector Consulting Subcontracts. Over the last six years, the ITI research team has authored over 150 publications in scientific journals and has presented over 300 papers in international conferences (for a complete list please see our website). CERTH-ITI has a staff of 9 researchers, and more than 200 employees including university professors, fellows and assistants as well as administration and technical staff. The Institute collaborates with Imperial College, the University of Surrey and the Aristotle University of Thessaloniki for the award of PhD degrees.</p>
<p>Role of the entity in the project</p>	<p>CERTH will be the coordinator of the FASTER project. It will also lead WP3, collecting the requirements of the proposed modules and the definition of the specifications and the architecture. It will also contribute significantly in WP7 and WP8 providing its expertise in tasks related with visual processing, augmented reality and device-less interfaces. CERTH will also play an active role in the integration activities (WP9). Finally, it will contribute in piloting (WP10) and dissemination/exploitation activities (WP11).</p>
<p>Profile of key personnel</p>	<p>Dr Petros Daras (♂) PhD, MSc, SMIEEE, is a Senior Researcher (Grade A, Full Professor) and Chair of the Visual Computing Lab. He received the Diploma in Electrical and Computer Engineering, the MSc and the Ph.D. degrees in Electrical and Computer Engineering all from the Aristotle University of Thessaloniki, Greece in 1999, 2002 and 2005, respectively. His main research interests include visual content processing, multimedia indexing, search engines, recommendation algorithms and relevance feedback. His involvement with those research areas has led to the co-authoring of more than 150 papers in refereed journals and international conferences. Dr Daras has been involved in more than 20 projects, funded by the EC and the Greek Ministry of Research and Technology. Among them, he is the Technical Manager of the EC projects VICTORY, I-SEARCH and ADVISE. Dr. Daras is a Senior member of IEEE. He regularly acts as a reviewer for the European Commission and the GSRT.</p> <p>Dr Dimitrios Zarpalas (♂) was awarded a Diploma in Electrical and Computer Engineering from the Aristotle University of Thessaloniki, Greece (2003) an MSc degree in computer vision from the department of Electrical Engineering, The Pennsylvania State University, USA, and a PhD in Medical Informatics, School of Medicine, Aristotle University of Thessaloniki, Greece. He has joined the Information Technologies Institute in 2007 and is currently working as a post-doctoral Research Associate. His current research interests include real time tele-immersion applications (3D reconstruction of moving humans and their compression), 3D computer vision, 3D medical image processing, shape analysis of anatomical structures, 3D object recognition, motion capturing and evaluation, while in the past has also worked in indexing, search and retrieval and classification of 3D objects and 3D model watermarking. His involvement with those research areas has led to the co-authoring of 1 book chapter, 9 articles in refereed journals and 30 papers in international conferences. He has been involved in more than 10 research projects funded by EC, and Greek Secretariat of Research and Technology. He is a member of the Technical Chamber of Greece.</p> <p>Mr Anastasios Dimou (♂) graduated from Aristotle University of Thessaloniki as an Electrical and Computer Engineer (Dipl.) and was awarded a Professional Doctorate in Engineering (PDEng) in Information and Communication Technology at the Technical University of Eindhoven, the Netherlands. From February 2008 he is working as a Research Associate in the Informatics and Telematics Institute (ITI) of the Centre for Research and Technology – Hellas (CERTH). His research interests are covering image and video processing and analysis, semantic web technology, video coding and broadcasting, High Definition systems and biomedical applications.</p> <p>Mr Nick Zioulis (♂) was awarded an Electrical Engineering and Computer Science Diploma from the Aristotle University of Thessaloniki (2012). He is currently working at the</p>

	<p>Information Technologies Institute as a Research Assistant. His current research interests include Software Design & Development, Image Processing, and Pattern Recognition.</p> <p>Evriklia Kesisoglou (♀) received her diploma from the Department of Computer and Communication Engineering at University of Thessaly. Her research interests include neural networks, high performance computing and development of mobile applications. She has been working as a research assistant at the Informatics and Telematics Institute (ITI) of the Centre for Research and Technology (CERTH) since June 2016.</p> <p>Eleni Zisiou (♀) received the Diploma degree in Computer, Network and Communication Engineering and the MSc degree in Electrical and Computer Engineering both from University of Thessaly, in 2012 and 2013 respectively. She has worked for almost 4 years in the private sector as software engineer and application consultant. Since April 2017, she works at the Informatics and Telematics Institute (ITI) of the Centre for Research & Technology Hellas (CERTH) as a research assistant.</p>
<p>Relevant publications, products, services or achievements</p>	<ol style="list-style-type: none"> 1. A. Axenopoulos, V. Eiselein, A. Penta, E. Koblents, E. La Mattina, P. Daras, T. Semertzidis, M. Lazaridis, A. Dimou, T. Senst, J. Amores, F. Alvarez, L. Kondrad, G. Vella, A. Randazzo, P. Pomo, "A framework for large-scale analysis of video 'in the Wild' to assist digital forensic examination", IEEE Security & Privacy Magazine, Special Issue on Digital Forensics, 2017, accepted for publication. 2. D. Alexiadis, A. Chatzitofis, N. Zioulis, O. Zoidi, G. Louizis, D. Zarpalas, P. Daras, "An integrated platform for live 3D human reconstruction and motion capturing", IEEE Transactions on Circuits and Systems for Video Technology (Volume:PP, Issue: 99) 3. A. Dimou, P. Medentzidou, F. Alvarez, P. Daras, "Multi-target Detection In CCTV Footage For Tracking Applications Using Deep Learning Techniques", IEEE International Conference on Image Processing, ICIP 2016, Sept 25-28, Phoenix, Arizona, USA 4. S. Thermos, G. T. Papadopoulos, P. Daras, G. Potamianos, "Deep Affordance-grounded Sensorimotor Object Recognition", IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2017), Honolulu, Hawaii, USA, July 2017. 5. N. Zioulis, A. Papachristou, D. Zarpalas, P. Daras, "Improving Camera Pose Estimation via Temporal EWA Surfel Splatting", IEEE International Symposium on Mixed and Augmented Reality (ISMAR 2017), Nantes, France, October 9–13, 2017
<p>Relevant previous projects or activities</p>	<ol style="list-style-type: none"> 1. Factory2Fit — Empowering and participatory adaptation of factory automation to fit for workers (2016: H2020 IA). Factory2Fit project aspires to take human-centred manufacturing to a new level by giving the factory floor workers a leading role in adapting and developing their own job tasks based on their individual cognitive, physical and sensorial traits, thus initiating a leap towards more attractive, inclusive and safe manufacturing jobs. – https://www.iti.gr/iti/projects/Factory2Fit.html 2. ASGARD — Analysis System for Gathered Raw Data (2016: H2020 RIA). ASGARD aims at building a sustainable, long-lasting community of LEAs, industry and technology providers that will take care of creating (at no cost for LEAs), maintaining and evolving the best set possible of tools for the extraction, fusion, exchange and analysis of big data including cyber-offenses generated data for forensic investigation. With forensics being the main focus of the project, both intelligence and foresight dimensions will also be tackled by ASGARD. The resulting tools will exploit recent advances in the ICT sector and will be designed in a way that they are easily and rapidly deployable to face threats and needs as they emerge. – https://www.iti.gr/iti/projects/ASGARD.html 3. SURVANT — SURveillance Video Archives iNvestigation assisTant (2017: H2020 FTI). SURVANT will deliver an innovative system that will collect the relevant videos from heterogeneous repositories, extract inter/intra-camera video analytics, enrich the analytics using reasoning and inference technologies, and offer a unified search inter-

	<p>face to the user. An intuitive interface with a relaxed learning curve will assist the user create accurate search queries and receive the results using advanced visualization tools. Ethical management of personal data collected is integrated in the system design. – https://www.iti.gr/iti/projects/SURVANT.html</p> <p>4. MONICA — Management Of Networked IoT Wearables – Very Large Scale Demonstration of Cultural Societal Applications (2017: H2020 IA). The MONICA project aims to demonstrate an IoT platform in the context of multiple existing and novel Internet of Things technologies for Smarter Living and supporting an extremely large number of uses compared to existing demonstration projects. – https://www.iti.gr/iti/projects/MONICA.html</p> <p>5. FORENSOR — FOREnsic evidence gathering autonomous seNSOR (2015: H2020 IA). FORENSOR will develop and validate a novel, ultra-low-power, miniaturised, low-cost, wireless, autonomous sensor (“FORENSOR”) for evidence gathering, able to operate for up to two months without infrastructure. FORENSOR will be manageable remotely, will preserve the availability and the integrity of the evidence collected, and will comply with all relevant legal and ethical standards. – https://www.iti.gr/iti/projects/FORENSOR.html</p>
<p>Relevant significant infrastructure or equipment</p>	<p>CERTH/ITI is equipped with commercial-off-the-self equipment and devices for supporting its research and innovation activities. In addition to the typical hardware infrastructure, workstations, servers, screens, printers, etc. to cover the ongoing needs of research personnel, the major assets of the ITI infrastructure include (indicative list):</p> <ul style="list-style-type: none"> • A significant GPU infrastructure for Deep Learning • An innovative VR power wall to enable big data visualisation and analysis (2014) • A number of various haptic-interface devices • 3D projection infrastructure including an ART™ power wall, 3D beamers, glasses, and IR sensors. • A number of depth IR and stereoscopic cameras • Laser 3D scanner • A structure mobile depth camera • AR/VR devices

4.1.2 Engineering Ingegneria Informatica (ENG)

<p>ENGINEERING INGEGNERIA IN- FORMATICA</p>	
<p>Website(s)</p>	<p>www.eng.it</p>
<p>Description of the legal entity</p>	<p>ENGINEERING Ingegneria Informatica S.p.A. is the head company of the ENGINEERING Group. Engineering was founded in 1980, and it is currently the first IT group in Italy, among the top 10 IT groups in Europe, with approx. 10.300 employees and 50 branch offices in Italy and abroad, with an established presence in Belgium, Norway, Republic of Serbia, Latin America and USA.</p> <p>The group produces IT innovation to more than 1.000 large accounts in all markets, with a complete offer combining system and business integration, outsourcing, cloud services, consulting, and proprietary solutions. Engineering Data Centres offer business continuity and IT infrastructure management to about 17.000 servers and 200.000 workstations. In 2017, consolidated revenues are more than 1 billion Euro.</p> <p>Engineering operates through in the following business units: Finance, Central Government, Local Government and Healthcare, Energy & Utilities, Industry and Telecoms, delivering innovative IT solutions to main vertical markets: Aerospace, Insurance, Automotive, Banks, Consumer Products, Defence and Aerospace, Energy & Utilities, Training, Central & Local Government, Homeland Security, Life Science, Manufacturing, Media,</p>

International Organisation, Retail, Healthcare, Telecommunications, Transports, Welfare. Since 1987, Engineering innovation capability is supported by its Central Department of Research & Development, with around 250 researchers distributed in 6 laboratories, and currently involved in over 70 research projects. R&D Department have been participating in several National and European research initiatives co-funded by EC and the Italian Research Ministry, with about 33M euro/year of co-funding. The R&D Department is located across 6 different locations in Italy and in Europe.

Engineering believes in research and in the need to transform the potential of information technology into growth opportunities through innovation, in a continuous alignment with the evolution of technologies, processes and business models. The activities include the various challenges linked to the future of the global information system and environment. The goal is to contribute to the change via solutions that can create innovative experiences in order to encourage collaboration and coordination among all the involved users. The paradigms of social communication have a fundamental role, exploiting the huge potential of the current tools, such as co-creation, management of knowledge and collaborative problem solving. In this context, Engineering provides great methodological, technological and integration skills. In such a complex, varied world, Engineering has gained knowledge and experience in the most important, common Collaboration methods and in the most interesting enabling technologies, both in terms of integrated platforms (commercial and open source) and in terms of direct realisation of the very important verticalisations of many IT systems.

Engineering holds different responsibilities within the international research community, including technical and overall co-ordination of large research projects and consortia. In particular, the company is core partner of EIT ICT Labs in Italy (European Institute of Innovation and Technology) focused on leveraging ICT for Quality of Life; member of the Board of EOS (European Organisation for Security); core partner of NESSI (Networked European Software and Service Initiative); founding partner of the Future Internet PPP initiative. The European Commission aims to make FIWARE the standard platform for the Internet-of-Things (IoT) and Smart Cities, inviting ENGINEERING to form, together with other European big players (Telefonica, Orange, Atos), a foundation that encourages its adoption in all European countries. Engineering is an active member of most international open source communities and founder of SpagoWorld, a free/open source initiative managed by Engineering. The company is corporate member of OW2 Consortium and Eclipse Foundation.

Since 1987, current and past research initiatives have been accomplished at European level, most recently within H2020 Programme. In the security programmes ENGINEERING has participated and is participating to several projects relevant to DRS02: STORM (a set of novel predictive models and improved non-invasive and non-destructive methods of survey and diagnosis, for effective prediction of environmental changes and for revealing threats and conditions that could damage cultural heritage sites), TRILLION (focussing on LEA-citizen collaboration), VITAL MEDIA (consolidating a visible and sound community across Europe for the Convergence and Social Media industry, building a European creative industry alliance and new cluster networks), CASHMA (Italian project for multi-modal soft biometric authentication, with special focus on mobile devices), SEMIRAMIS (infrastructure enabling the bridge between heterogeneous identity federations, to aggregate personal data from various storages across Europe and support security and privacy at a very high level), PERSEUS (large scale demonstration of a EU Maritime surveillance System of Systems, integrating the existing national systems and platforms - Portugal, Spain, France, Italy, Greece - enhancing them with innovative capabilities and moving beyond EUROSUR's 2013 expectations, involving European agencies Frontex and EM-SA), CYSPA (support action addressing trustworthy ICT through a EU strategy to protect cyberspace, with target audiences ranging from research communities and industry to public authorities and infrastructure operators), ACDC (to start, integrated strategy ranging from adoption to governance, supported by a full service offer for controlling cyber security problems, particularly the botnets, that support the abovementioned criminal activities). Through this comprehensive security-oriented background, Engineering provides key market and field knowledge for deploying security solutions in Italy and across the Europe.

Role of the entity in the project

ENG will lead the scientific coordination and technical management of the project in T1.2, ensuring that project development is in line with the Description of Action. In addition, ENG will lead T3.4 where the FASTER System Architecture and component specifications will be defined, guaranteeing that the individual parts of the integrated solution will work together seamlessly and effectively. ENG will lead WP8 where innovative tools for building the situational awareness will be proposed and implemented, following a team-oriented and integrated approach aimed at enhancing situational awareness. In addition, ENG will lead T8.1, providing a “just in time” feed model to avoid information overload, allowing the knowledge to be interpreted by software and to be processed in real time in order to provide information. Moreover, ENG will lead T8.2 where tools for situational awareness will be designed and developed. Moreover, ENG will be involved in T8.3 in the design and development of the FASTER portable visualisation tools to enable end-users to understand critical information at a glance, in order to have an overall situation awareness displayed. Finally, ENG will lead the T11.3 for supporting the exploitation of the overall FASTER results as well as individual partner specific exploitation objectives.

Profile of key personnel

Mr Gabriele Giunta (♂) obtained a degree in Computer Science, at the Engineering Department of the University of Palermo (Italy). He is head of the “Smart Transport and Infrastructure” Unit within the R&D Laboratory of “Intelligent Systems and Social Software (IS3) for Security, Enterprises, Transport, Infrastructure” at ENGINEERING. He has participated in several Italian Ministry and EC co-funded research projects (e.g. MAIS, DIS-CoRSO and NEXOF-RA). In the field of Smart Transport and Critical Infrastructure Protection, he has coordinated two national projects: Easy Rider and SECURE!. At the present time, he is involved in STORM (Safeguarding Cultural Heritage through Technical and Organisational Resources Management), an H2020 EU project for design, developing and assessing a technological integrated framework, providing eco-innovative, cost-effective and collaborative methodologies to support all the involved stakeholders to better act in the CH prevention and intervention phases. He is also involved in the H2020 EU DEFENDER (Defending the European Energy Infrastructures) project for developing an adaptable framework for Critical Energy Infrastructure (CEI) security and resilience.

Mr Vito Morreale (♂) graduated as Doctor with laude in Electronic Engineering from the University of Palermo. He is head of the Lab of “Intelligent Systems and Social Software (IS3) for Security, Enterprises, Transport and Infrastructures” within the R&D Department at ENGINEERING. His relevant expertise and experiences include Artificial Intelligence (AI), Agent- Oriented Computing (AOC), Software Engineering, and Service-Oriented Computing (SOC), from both software engineering and technological point of view. He coordinated several research projects. The IS3 Lab has been involved in several EU security projects (PERSEUS, SAGRES, ACDC, CYSPA) and National security projects (SINTESYS, SECURE!). Currently the IS3 Lab is involved in several Security projects, such as LASIE, CAPITAL, COURAGE, PROMERC, DOGANA, TRILLION. He is the author of several scientific papers and member of several international conferences Program Committees.


Mrs Véronique Pevtschin (♀) graduated as an engineer from Brussels University and completed her education with a Master of Science degree from MIT, USA. She works as part of the IS3 Labs in business development, with a coordination of proposals in the following fields: cyber-security, homeland security, food and agricultural production. She represents Engineering in a) EOS as lead of the cyber-security working group where she was editor of the 2010 and 2011 EOS position papers on cyber-security, and b) ECSO as co-chair of the WG6.1 on ecosystems for cyber-security.

Mrs Ioana Cristina Cotoi (♀) holds a Law Degree at University of Targu-Mures (Romania) and a Master Business Management Degree at Aforisma Business School of Lecce (Italy). She has several years of experience in national and European law thanks to the internships she did in Romania and Italy. She has experience in data protection and privacy, and also in cyber security, cyber-crimes and IPR. Currently she is working in the R&D Department at ENGINEERING INGEGNERIA INFORMATICA SPA as part of the Lab of “Intelligent Systems and Social Software (IS3) for Security, Enterprises, Transport and Infrastructures”, focusing on Homeland Security Research. Her main expertise and compe-

	<p>tences came out from several legal activities carried out on Italian Ministry and EC co-funded projects, such as ACDC (Advanced Cyber Defence Centre), CYSPA (European Cyber Security Protection Alliance), CAPITAL (Cybersecurity Research Agenda for Privacy and Technology Challenges), COURAGE (Cyber-crime and Cyber Terrorism European Research Agenda), LASIE (Large Scale Information Exploitation of Forensic Data), DOGANA (Advanced Social Engineering and Vulnerability Assessment Framework), TRILLION (Trusted, Citizen - LEA collaboration over Social Networks), DANTE (Detecting and ANalysing TErrorist-related online contents and financing activities) and others.</p>
<p>Relevant publications, products, services or achievements</p>	<ol style="list-style-type: none"> 1. Susanna Bonura, Giuseppe Cammarata, Rosolino Finazzo, Giuseppe Francaviglia, and Vito Morreale. "A Novel WebGIS-based Situational Awareness Platform for Trustworthy Big Data Integration and Analytics in Mobility Context", In the Proc. of the 7th International Symposium on Cloud Computing, Trusted Computing and Secure Virtual Infrastructures (C&TC 2017), Rhodes, Greece, October 23-27, 2017. 2. Vito Morreale, Gabriele Giunta, Francesco lo Piccolo, Tommaso Zoppi, Andrea Ceccarelli, Paolo Lollini, Andrea Bondavalli, Labelling Relevant Events to Support the Crisis Management Operator. Special Issue - HASE 2016. Publication on Journal of Software: Evolution and Process. Wiley. 3. Irene Amerini, Rudy Becarelli, Francesco Brancati, Roberto Caldelli, Gabriele Giunta, Massimiliano Itria, Media trustworthiness verification and event assessment through an integrated framework, Multimedia Tools and Applications Int. Journal, Springer, March 2016. 4. Vito Morreale, Gabriele Giunta, Francesco lo Piccolo, Tommaso Zoppi, Andrea Ceccarelli, Paolo Lollini, Andrea Bondavalli, Presenting the Proper Data to the Crisis Management Operator: A Relevance Labelling Strategy. 2016 IEEE 17th Symposium on High Assurance Systems Engineering (HASE), Orlando, FL (USA). 5. Dimitri Papadimitriou, Theodore Zahariadis, Pedro Martinez-Julia, Ioanna Papafili, Vito Morreale, Francesco Torelli, Bernard Sales, Piet Demeester. Design Principles for the Future Internet Architecture. (2012). In book: The Future Internet, Publisher: Springer. Pages 55-67.
<p>Relevant previous projects or activities</p>	<ol style="list-style-type: none"> 1. DEFENDER (H2020 – CIP-01-2016) project aims at developing an adaptable framework for Critical Energy Infrastructure (CEI) security, resilience and self-healing “by design” to address, detect and mitigate cyber-physical threats, combining a range of devices/technologies for situational awareness (fixed sensors like PMUs, mobile devices like drones and advanced video surveillance). – http://defender-project.eu/ 2. MARISA (H2020 - BES-19-2016). The overarching goal of MARISA project is to provide the security communities operating at sea with a data fusion toolkit, which makes available a suite of methods, techniques and modules to correlate and fuse various heterogeneous and homogeneous data and information from different sources, including Internet and social networks, with the aim to improve information exchange, situational awareness, decision-making and reaction capabilities. The proposed solution will provide mechanisms to get insights from any big data source, perform analysis of a variety of data based on geographical and spatial representation, use techniques to search for typical and new patterns that identify possible connections between events, explore predictive analysis models to represent the effect of relationships of observed object at sea. – https://www.marisaproject.eu 3. STORM (H2020 – DRS-11-2015) project aims to determine how different vulnerable materials, structures and buildings are affected by different extreme weather events together with risks associated to climatic conditions or natural hazards, offering improved, effective adaptation and mitigation strategies, systems and technologies. An integrated system featuring novel sensors, legacy systems as well as crowdsourcing techniques is able to offer applications and services over an open cloud infrastructure. – http://www.storm-project.eu

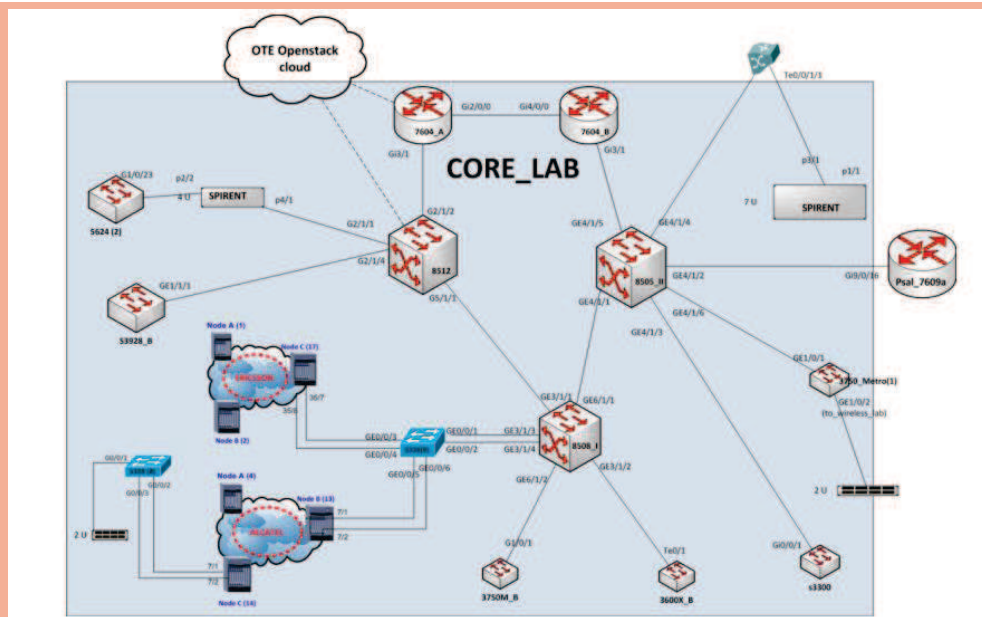
	<p>4. TRILLION (H2020 FCT-14-2014): EU Research project on security, focussing on LEA-citizen collaboration. TRILLION delivers a comprehensive service-based platform and mobile applications that support the knowledge-based, real-time collaboration among law enforcement agents, first responders and citizens whilst ensuring that privacy and data protection are taken into account. – https://trillion-project.eng.i</p> <p>5. SINTESYS is a national co-funded project (National Operational Programme for Research and Competitiveness 2007-2013, Italy) aiming to define and develop an innovative Collaborative Working Environment equipped with advanced tools for analysing, investigating and correlating vast amounts of data from a variety of heterogeneous, multichannel and multimodal open information sources. – http://sintesys.eng.it</p>
Relevant significant infrastructure or equipment	<p>The group produces IT innovation to more than 1.000 large accounts in all markets, with a complete offer combining system and business integration, outsourcing, cloud services, consulting, and proprietary solutions. Engineering Data Centres offer business continuity and IT infrastructure management to about 17.000 servers and 200.000 workstations. In 2017, consolidated revenues are more than 1 billion Euro.</p>

4.1.3 HELLENIC TELECOMMUNICATIONS ORGANIZATION S.A. (OTE)

HELLENIC TELECOMMUNICATIONS ORGANIZATION S.A.	
Website(s)	www.ote.gr
Description of the legal entity	<p>Hellenic Telecommunications Organisation S.A. (OTE) is a member of the Deutsche Telekom (DT) Group of Companies and the incumbent telecommunications provider in Greece (acting both as network operator and as service provider). OTE is the dominant voice telephony provider in Greece and together with its subsidiaries forms the leading group of companies in fixed and mobile nationwide. OTE investments (mainly in South-Eastern Europe), now address a potential customer base of 60 million people, making OTE the largest telecommunications provider. The OTE Group offers a full range of products and services, from broadband services, fixed/mobile telephony, to high-speed data communications and leased lines services. At present, OTE group of companies employ over 20,000 people in 4 countries. OTE's current R&D activities span a wide range of topics, including, inter alia, broadband technologies and services, next generation network architectures, infrastructure development etc., following to the actual challenges for the development of a fully competitive network infrastructure & a portfolio of innovative services/facilities.</p>
Role of the entity in the project	<p>The main role of OTE in the FASTER project will be to support resilient communication solutions for first responders (WP6); OTE will spend most of its effort there. OTE will specifically lead T6.1 'Instantiation and reconfiguration of 5G-enabled network' but will also play an important role in T6.3 'UAVs relay for extending communication capabilities'. Besides communications, OTE will also contribute to system specification (T3.2), IoT devices connection and integration (T4.1-2, T9.3), and the project pilots (T10.3).</p>
Profile of key personnel	<p>Dr. George Agapiou (♂) is a telecommunications engineer, holding a PhD from the Georgia Institute of Technology. He is the head of the Measurements and Wireless Technologies Research Laboratory of the Hellenic Institute of Technology (OTE SA). He has participated in various FP6, FP7, IST, STREP, Eurescom and e-ten projects and has published more than 50 papers in scientific journals and proceedings and is a CD member of the FITCE Association. His research interests include next generation wired and wireless access networks, leading to IoT appli-</p>

	<p>cations in 5G. He is a coauthor of the book next generation access networks published by klidarithmos in 2010 in Greece and coauthor of the book next generation wireless communications using radio over fiber published by John Wiley in October 2012.</p> <p>Christina Lessi (♀) received the Diploma in Electrical and Computer Engineering in 2011 from Democritus University of Thrace. She also holds an MSc in Microelectronics from National and Kapodistrian University of Athens. She has been working in OTE Group since 2013. Currently she is member of Measurements and Wireless Laboratory of OTE. From 2014 she is a PhD candidate, targeting in high speed optical communications. She has participated in European Research projects and national funded projects. Currently she is working in FP7 ICT SPIRIT and H2020 SANSA.</p>
<p>Relevant publications, products, services or achievements</p>	<ol style="list-style-type: none"> 1. “Load balancing in 5G Networks”, C. Tsirakis, P. Matzoros, P. Sioutis, G. Agapiou, MATEC Web of Conferences 125, 03010 (2017), CSCC 2017, DOI: 10.1051/mateconf/201712503010 2. “State of the art on Virtualization and Software Defined Networking for Efficient Resource Allocation on Multi-tenant 5G Networks”, C. Tsirakis, P. Matzoros, G. Agapiou, MATEC Web of Conferences 125, 03009 (2017), DOI: 10.1051/mateconf/201712503009 3. “Developing a Flexible Spectrum Management for 5G Heterogeneous Radio Access Networks”, George Agapiou, Alexandros Kostopoulos, Fang-Chun Kuo, Tao Chen, Adrian Kliks, Mariana Goldhamer, Kostas Katsalis, Roberto Riggio, Dorin Panaitopol, Antonio Cipriano, and Dimitri Marandin,. European Conference on Networks and Communications (EuCNC), Special Session, Athens, Greece, June 2016 4. “Security and Protection of Critical Infrastructures: A Conceptual and Regulatory Overview for Network and Information Security in the European Framework, also focusing upon the Cloud Perspective”, I.P. Chochliouros, A.S. Spiliopoulou, I.M. Stephanakis, D. Arvanitosis, E. Sfakianakis, E. Georgiadou, M. Belesioti and N. Mitsopoulou. In L. Iliadis et al. (Eds), Proceedings of the 16th EANN Workshops, the 2nd IPMSC-2015 Workshop, September 25 - 28, 2015, Rhodes Island, Greece, ACM, 2015. [ISBN: 978-1-4503-3580-5/15/09, DOI: http://dx.doi.org/10.1145/2797143.2797146]. 5. “Methods for Dependability and Security Analysis of Large Networks” , I.P. Chochliouros, A.S. Spiliopoulou & S.P. Chochliouros (2008).In The Encyclopedia of Multimedia Technology and Networking - Second Edition, Vol.II, Chapter CXXV, edited by M. Pagani, Bocconi University Italy. Information Science Reference, IGI Global (formerly “Idea Group Inc.”), Hershey, PA, USA, August 2008 (ISBN: 978-1-60566-014-1), pp.921-929].
<p>Relevant previous projects or activities</p>	<ol style="list-style-type: none"> 1. H2020-ICT-2014-2 COHERENT – Coordinated control and spectrum management for 5G heterogeneous radio access networks: The exponential growth of mobile traffic, drastically increasing of network complexity, and the strong need for inter-network coordination of wireless network resources call for breakthroughs in control, coordination and flexible spectrum management in 5G heterogeneous radio access networks. The COHERENT project aims to address these problems by researching, developing and validating a novel control framework for future mobile networks. The key innovation of COHERENT is to develop a unified programmable control framework to coordinate the underlying heterogeneous mobile networks as a whole. 2. H2020-ICT-2014-2 SESAME – Small cells coordination for Multi-tenancy and Edge services: SESAME targets innovations around three central elements in 5G: the placement of network intelligence and applications in the network edge through Network Functions Virtualisation (NFV) and Edge

	<p>Cloud Computing; the substantial evolution of the Small Cell concept, already mainstream in 4G but expected to deliver its full potential in the challenging high dense 5G scenarios; and the consolidation of multi-tenancy in communications infrastructures, allowing several operators/service providers to engage in new sharing models of both access capacity and edge computing capabilities.</p> <p>3. H2020-ICT-2014-2 5G-XHaul – Dynamically Reconfigurable Optical-Wireless Backhaul/Fronthaul with Cognitive Control Plane for Small Cells and Cloud-RANs: Small Cells, Cloud-Radio Access Networks (C-RAN), Software Defined Networks (SDN) and Network Function Virtualization (NVF) are key enablers to address the demand for broadband connectivity with low cost and flexible implementations. Small Cells, in conjunction with C-RAN, SDN, NVF pose very stringent requirements on the transport network. Here flexible wireless solutions are required for dynamic backhaul and fronthaul architectures alongside very high capacity optical inter-connects. However, there is no consensus on how both technologies can be most efficiently combined. 5G-XHaul proposes a converged optical and wireless network solution able to flexibly connect Small Cells to the core network. Exploiting user mobility, our solution allows the dynamic allocation of network resources to predicted and actual hotspots.</p> <p>4. H2020-ICT-2014-2 CHARISMA – Converged Heterogeneous Advanced 5G Cloud-RAN Architecture for Intelligent and Secure Media Access: CHARISMA proposes an intelligent hierarchical routing and paravirtualised architecture that unites two important concepts: devolved offload with shortest path nearest to end-users and an end-to-end security service chain via virtualized open access physical layer security (PLS). The CHARISMA architecture meets the goals of low-latency (<1ms) and security required for future converged wireless/wireline advanced 5G networking. This provides a cloud infrastructure platform with increased spectral and energy efficiency and enhanced performance targeting the identified needs for 1000-fold increased mobile data volume, 10-100 times higher data rates, 10-100 times more connected devices and 5x reduced latency.</p>
<p>Relevant significant infrastructure or equipment</p>	<p>OTE's Core Lab is equipped with the appropriate network infrastructure in order to simulate the actual OTE live core network and the corresponded services. It retains a great range of routers (from small- and medium-size to carrier routers) and switches which can be used for the implementation of complex network topologies and scenarios. Furthermore, Ethernet-over-SDH services are implemented and tested in that Lab. Additionally, Lab's network interconnection to other OTE's labs (such as Access Lab and VoIP Lab) provide the opportunity to test various scenarios and network services (i.e.: Fast Internet, VoIP, IPTV, IMS). Finally, the Lab is equipped with a state-of-the-art traffic generator and analysis tool (Spirent Test Center) in order to "conduct" the necessary experiments and testing for equipment, network topologies and proposed service scenarios. In addition, an Openstack testbed, co-located with core -lab, could be used for testing and validation virtual network components.</p>



OTE’s Core Lab main responsibilities are the provision of a reliable environment for testing and measurement of OTE’s new services and products, with regard to the Core Network. The Core Lab is equipped with the appropriate network infrastructure in order to simulate the actual OTE live core network and the corresponded services. OTE Core’s Lab retains a great range of routers (from small and medium-size to carrier routers) and switches which can be used for the implementation of complex network topologies and scenarios.

4.1.4 DIGINEXT (DXT)

DIGINEXT	
Website(s)	www.diginext.fr
Description of the legal entity	<p>Created in 1996 with the ambition to invent, develop and offer innovative products blending both real and virtual worlds for critical mission planning, training and assistance to mobile users, DIGINEXT is internationally recognized for its capacity to innovate, its excellence, its responsiveness as well as for both the quality and performance of the very high-tech products it develops for the Security, Defence, Aerospace, Transport sectors.</p> <p>With a workforce of approximately 250 persons, most of them being doctors, engineers or sector experts, the company achieved a 25M€ turnover in 2017, of which 30% have been made abroad. It regroups today the product and RTD teams of its mother company, CS Group, a major European software services and system Integration Company.</p> <p>Among several other distinctions, the company received one of the 12 “Innovation Stars of Europe” awarded by the French Ministry of Research in December 2014. The Guardian listed DIGINEXT’s CHES project in the top 10 global R&D initiatives that are changing the world of art & culture in 2014. DIGINEXT’s projects have also been selected by the European Commission in the top 50 and top 10 FP7 projects presented at its Innovation Convention 2011 and 2014. In 2018, DIGINEXT’s Crimson product has been selected by NATO as one of the top 10 innovation in 2018.</p> <p>The company benefits from a combination of high level technical expertise in the fields of critical interactive software systems, embedded electronics, and mechanical hardware. It takes advantage of this unique profile with an organization divided in three divisions contributing to the presence of the company in its markets:</p> <ul style="list-style-type: none"> • Simulation and Mixed Reality Systems for planning, training and support to operations;

- Geolocation and Navigation Systems;
- Tactical Systems and Location Based Services.

DIGINEXT provides its systems to prestigious organizations such as Civil Security, EN-SOSP, Police forces and ministries of Defence all over the world, DGA, Nexter, RUAG, Indra, Naval Group, Thales, Leonardo, Airbus, RATP, SNCF, STIB, Alstom Transport, Thales, Saab, ESA, Sagem, NATO, IBM, EDF, CEA, Technicatome, etc.

Its business development is supported by intense R&D activities to which the company allocated up to 20% of its turnover. Since its creation, DIGINEXT has been involved or is still involved, as a co-ordinator or as a partner, in multiple EC funded projects (e.g. RANGER, MATHISIS, EMOTIVE, CRISS, MAGELLAN, VASCO, INACHUS, eVacuate, INDIGO, CRIMSON, CHESS, V-City, ESS, BESST, WAVE, INSCAPE, V-Planet, V-Man, VISTA, VISICADE, etc.) that have produced most of the products the company is currently commercially exploiting.

DIGINEXT's Simulation & Mixed Reality Division has been created in 2010 from CS' Group Virtual Reality (VR) Department. Created as soon as 1994, this group was one of the industrial pioneers in the field of interactive 3D visualisation, Virtual Reality, Augmented Reality, and simulation. After 15 years of incubation within CS, this department has gained the critical size and maturity to continue its development with full autonomy in the frame of DIGINEXT. This division regroups today more than 80 PhDs and engineers specialised in interactive systems. It is among the world's top ranking RTD industrial centres with internationally acknowledged experts, and results presented in the most prestigious journals and conferences (including SIGGRAPH, Eurographics, IEEE VR, and others).

It provides world-class expertise and industrial references in the following fields:

- Situational awareness & common operational picture including 2D/3D cartography and geographic information systems
- Live, virtual and constructive simulation
- 3D computer graphics, virtual, augmented and mixed realities
- Training and e-learning
- Serious games, interactive storytelling

It is one of the few companies in the world that is a certified partner of Microsoft Mixed Reality programme.

Role of the entity in the project

DIGINEXT will be in charge of developing the Augmented Reality capabilities of the FASTER system. It will be involved in the definition of the user-requirements and use-case scenarios and will actively participate in the production of the system functional specifications and architecture. DIGINEXT will lead WP7 where UI for AR-enabled devices will be defined and will lead T8.3 where the mobile first responder system will be developed. It will also be involved in the integration activities and will assist during training, pilots and evaluation tasks.

Profile of key personnel

Dr Olivier Balet (♂) is the Chief Technology Officer of DIGINEXT. His main areas of expertise include Mixed Realities, 3D cartographic systems, and interactive storytelling. He is the initiator of the Virtual Storytelling conference series that became ICIDS, the major even in this field.

He is also an accredited and active expert to both the European Commission, since the first days of the FP5, and the Eureka programme. Dr Balet has been a French representative involved in both the European Security Research and Innovation Forum (ESRIF) Situational Awareness working group, which defined the Research Agenda for the European Commission, and the Selection Committee of the Homeland Security Research program of the French National Research Agency (ANR).

Prior to his current position, he has conducted research on 3D interaction and visualisation at the Toulouse III University. He received his diploma (M.S.) and Ph.D. in computer science (VR specialisation) from the Toulouse III University, France. He is or has been the author and the scientific director of several European funded projects since 1998 (CAVALCADE,

VISIONS, V-Man, V-Planet, VISTA, INSCAPE, CRIMSON, V-City, INDIGO, VASCO, CHESS, MAGELLAN, etc.).

He has been Virtual Reality assistant professor at both the Toulouse III University and the Institut Supérieur de l'Aéronautique et de l'Espace high school, program committee member or reviewer for international conferences (Eurographics, ICVS, VRIC, Minitrack, TIDSE, etc.), and is the author of more than 50 papers published in international journals and conference proceedings in his field of research.

Dr Eric Menou (♂) is a Senior Software Engineer and the former lead developer of both the INSCAPE and V-Man EC projects at DXT. He joined the company in 2002 where he has overseen the architecture and development of authoring tools for virtual reality and augmented reality applications, including Augmented Worker solutions and Tele-assistance applications for factories. He is today a senior expert in Augmented and Mixed reality at DIGINEXT where he leads the development of the INSCAPE product for the development of AR experiences. He received his M.S. degree and Ph.D. in Computer Science (specialization in computer graphics) from the Toulouse III University where he has been Assistant Professor for 3 years.

Dr Thomas Subileau (♂) is a Software Engineer and the lead developer of the MAGELLAN FTI project that aims to industrialize the results of MAGELLAN FP7 project under the INSCAPE brand. He joined the company to oversee the design and development of Mixed Reality applications in the civil domain, including civil security as well as industrial applications. Thomas received his M.S. degree and Ph.D. in Computer Science ("Artistic control of computer graphics rendering") from the Toulouse III University.

Relevant publications, products, services or achievements


1. **Assessing the Security of Buildings: A Virtual Reality Studio Solution**, A. Ahmad, O. Balet, A. Boin & al., The 13th International Conference on Information Systems for Crisis Response and Management, Rio de Janeiro, Brazil, 2016
2. **INACHUS: Integrated Wide Area Situation Awareness and Survivor Localisation in Search and Rescue Operations**, G. Athanasiou, A. Amditis, N. Riviere, E. Makri, A. Bartzas, A. Anyfantis, R. Werner, D. Axelsson, E. di Girolamo, O. Balet, M. Schaap, N. Kerle, N. Bozabalian, G. Marafioti, J. Berzosa, A. Gustafsson, in 5th International Conference on Earth Observation for Global Changes (EOGC 2015) and the 7th International Conference on Geo-information Technologies for Natural Disaster Management
3. **Authoring and Living Next-Generation Location-Based Experiences**, O. Balet, B. Koleva, J. Grubert, K. M. Yi, M. Gunia, A. Katsis, J. Castet, in the proceedings of the IEEE VR 2015, 23-27 March 2015, Arles.
4. **Building an IT Platform for Strategic Crisis Management Preparation**, Arjen Boin, Fredrik Bynander, Giovanni Pintore, Fabio Ganovelli, Dr. George Leventakis, Alexandre Ahmad, Olivier Balet, in the proceedings of the IEEE WiMob 2014 Workshop on Emergency Networks for Public Protection and Disaster Relief, Larnaca, Cyprus, October 8-11, 2014
5. **Technological and Methodological Solutions for Integrated Wide Area Situation Awareness and Survivor Localization to Support Search and Rescue Teams**, G. Tolt, A. Gustafsson, G. Athanasiou, A. Amditis, D. Axelsson, O. Balet, M. Donnelley, N. Kerle, A. Khalil, G. Marafioti, B. Le Saux, J. Tyni, in National Symposium on technology and Methodology for Security and Crisis Management

Relevant previous projects or activities

1. **INSCAPE** is DIGINEXT's flagship product for the intuitive creation of Augmented Reality applications for training and operational support. INSCAPE results from the eponym INSCAPE European Project and has been adopted by many prestigious customers (e.g French defence, Airbus, Alstom). – <http://www.inscape3d.com/en/products/augmentedreality>
2. **Crimson** is a product of DIGINEXT, using 3D cartography and simulation technologies, to support the chain of commandment and the first responders during crisis and security operation. It also offers unique features to train both crisis managers and field crews and to rehearse critical missions using virtual reality and simulation technologies.

	<p>Crimson has been acquired by several security organisations across Europe. It is for instance used by the National French Training School for Fire-fighters Officers to train both Fire-fighters commanding chain during Crisis Management exercises. Crimson includes the results of the CRIMSON, INDIGO, and VASCO FP7 projects and has been selected by NATO as one of the top 10 best innovation in 2018. – http://crimson.diginext.fr</p> <p>3. SIMBA is a commercial project granted by the French Defence to DXT. This project aims to develop a Mixed Reality system for the in-the-field training and operational support of soldiers. – https://www.defense.gouv.fr/actualites/articles/video-simba-le-combat-en-realite-augmentee</p> <p>4. eVACUATE, “A holistic, scenario-independent, situation-awareness and guidance system for sustaining the Active Evacuation Route for large crowds”, FP7/SEC -313161 (01/04/2013 - 01/04/2017). This project addresses the creation of a holistic system that a) will enhance the effectiveness of complex evacuation operations at any type of venue or infrastructure, b) adapt evacuation plans to the current conditions, c) dynamically survey how an evacuation is evolved and d) support civil protection authorities. In the project, DXT is responsible of designing, implementing and validating the Common Operational Picture component of the system. – http://www.evacuate.eu</p> <p>5. INACHUS, Technological and Methodological Solutions for Integrated Wide Area Situation Awareness and Survivor Localisation to Support Search and Rescue Teams”, FP7-SEC-607522 (2014-2018). INACHUS aims to achieve a significant time reduction related to Urban Search and Rescue (USaR) phase by providing wide area situation awareness solutions for improved detection and localisation of the trapped victims assisted by simulation tools. DXT develops the component for the visualisation of building interiors and damaged structures in the field of this project. – http://www.inachus.eu</p>
<p>Relevant significant infrastructure or equipment</p>	<p>DXT owns a complete back office infrastructure for collaborative cross-platform software development and testing hosted on the company’s premises with dedicated network connexion to its clients and partner’s infrastructure for distributed compilation on compilation farms, continuous integration and testing infrastructure. This includes:</p> <ul style="list-style-type: none"> • A large variety of mobile systems suitable for mixed reality applications with various OS/CPU versions as well as a representative collection of the different available GPUs ranging from mobile to desktop AMD/nVidia/Intel/Qualcomm chipsets, from entry to top-of-the-range; • Ruggedized tablets and smartphones for evaluation and use in critical contexts; • Multitouch surfaces (e.g. Lenovo Ideacenter, Samsung S40...); • Augmented reality and Virtual reality devices such as Microsoft Hololens, Leap Motion, IMUs, Google Tango tablet, Epson Moverio BT-200 glasses, Oculus Rift HMD, HTC Vive; • iBeacons and other indoor geolocation means; • 3D datasets of urban environments and means for the rapid 3D reconstruction of test-sites.

4.1.5 Crisisplan BV (CPLAN)

<p>CRISISPLAN BV</p>	
<p>Website(s)</p>	<p>www.crisisplan.nl</p>
<p>Description of the legal entity</p>	<p>Crisisplan BV is an independent and leading consultancy firm (founded in 2001) with a clear vision on crisis management. Crisisplan BV specialises in consultancy, trainings, simulations and educational courses on the subject of crisis management (in both the public and private sector). With key- personnel who also hold research positions, Crisisplan</p>

	<p>BV maintains its ties with the academic field. Crisisplan BV integrates innovative methods, academic perspectives and practical, hands-on experience in all its products and activities. Crisisplan BV has been involved in several FP7 and H2020 projects since 2008 as end-user partner, end-user community manager, organizer and coordinator of field test demonstrations and evaluation activities, as well as research partner.</p>
<p>Role of the entity in the project</p>	<p>Crisisplan BV has the key role of the User Community Manager. It will carry out tasks as leader of WP10 on the trial scenarios definition and pilot planning (T10.1) and the end-user training in terms of methodologies and technologies appliance (T10.2) where to plan, organize and validate the system releases and final trial demonstrations. Crisisplan BV has extensive experience in the organization of field tests and pilot demonstrations for both European (FP7 and H2020) and national projects. Moreover, Crisisplan BV is the leader of T3.1 on end-user requirement specification, managing the end-user participation. This work is based on the extensive experience as End-user Partner and Manager in several FP7 projects: INDIGO (242341), E-SPONDER (242411), VASCO (607737), INACHUS (607522), ZONeSEC (607292), and TransCrisis (649484).</p>
<p>Profile of key personnel</p>	<p>MSc Maureen Weller, (♀) is a senior project manager for Crisisplan BV. She is responsible for developing and assessing disaster simulations, and for training and workshops for European and international projects. Maureen has worked since 1998 in the field of crisis and disaster management and project management. Maureen joined Crisisplan in 2013 to work on European projects, including FP7 and H2020 projects. Her deep involvement in INACHUS (a project that aims achieve to a significant time reduction in Urban Search and Rescue operations by providing wide-area situation awareness solutions for improved detection and localisation of the trapped victims) bring over an advanced knowledge of search and rescue missions and current technologies, as well as the experience of a successful collaboration with professions in the field. In previous positions, Maureen worked as a Mitigation Specialist at the Texas Division of Emergency Management (2009-2012), an Emergency Services-Disaster Relief specialist at the American Red Cross (2007-2008), a Risk Management Broker for Multinational Corporations at Willis of Illinois, Inc. (2002-2005), and as an editorial staff member for the Journal of Contingencies and Crisis Management (1998-2004). She obtained a Bachelor's Degree in Journalism from the University of Illinois at Urbana-Champaign, USA. She also earned a Master's Degree in Emergency Management (MSEM) and a Master's of Business Administration from Millersville University of Pennsylvania, USA.</p> <p>MPA Werner Overdijk, (♂) is the co-founder and director of Crisisplan BV. Werner Overdijk has worked as an advisor in the field of crisis management since 1992 (his areas of expertise include disaster relief, counter-terrorism, crisis communication, control of infectious diseases, animal health, food safety and protection of the national infrastructure). Werner has extensive knowledge of both the political-administrative and operational processes that are crucial before, during and after crisis situations. He specializes in developing scenarios, workshops, training courses and large-scale simulations for senior executives, governing councils and management teams. Werner has published several articles in academic journals (on simulations and disaster relief). He contributes his vast (practical) state-of-the-art knowledge of crisis and disaster management, as well as his expertise as end- user and full partner in previous European (FP7 and H2020) projects.</p> <p>Prof. dr. Arjen Boin, (♂) is a senior partner and co-founder of Crisisplan BV. He is a Professor of Public Institutions and Governance in the Department of Political Science, Leiden University. He received his Ph.D. from Leiden University, where he taught at the Department of Public Administration. Arjen was the director of the Leiden University Crisis Research Center and the founding director of the Stephenson Disaster Management Institute at Louisiana State University. He has published widely on topics of crisis and disaster management, leadership, institutional design and correctional administration. His books include <i>The Politics of Crisis Management</i> (Cambridge University Press, winner of APSA's Herbert A. Simon book award), <i>Governing after Crisis</i> (Cambridge UP, 2008), <i>Crisis Management: A Three Volume Set of Essential Readings</i> (Sage, 2008), <i>Designing Resilience</i> (Pittsburgh University Press, 2010), <i>Mega-crises</i> (Charles C Thomas, 2012) and <i>The European Union as Crisis Manager</i> (Cambridge UP, 2013). Arjen serves on the edito-</p>

rial board of Risk Management (Palgrave) and the Journal of Contingencies and Crisis Management (Blackwell).

MSc. Lavinia Cadar, (♀) is a senior project manager at Crisisplan BV. She joined Crisisplan BV in 2015 to work Research and Innovation projects funded through European Union's Seventh Framework Programme (FP7) and Horizon 2020 and assist national and international client-specific trainings on crisis management, at different levels of their development process (e.g. scenario creation, running of exercises, evaluation). Her responsibilities include: bridging the gap between end-users (practitioners) and technical developers in projects that create supporting technologies for crisis managers; organizing, overseeing and evaluating large-scale pilot demonstrations, showcasing prototypes and market-ready solutions developed in the aforementioned projects; researching crisis management in the European Union. With a strong understanding of the challenges inherent to managing crises at both the operational and strategic levels, and an affinity for technology, Lavinia is deeply involved in facilitating the dialogue between the stakeholder and technical partners. Her experience stems from projects such as ZONESEC, TransCrisis, IN-PREP, and VASCO. Lavinia holds a Master of Science in Research in Public Administration and Organizational Science from Utrecht University. and she was awarded the Brasz scriptieprijs by the Vereniging voor Bestuurkunde (Association for Public Administration) for the best thesis in public administration in the Netherlands in 2014.

Relevant publications, products, services or achievements


Crisisplan has a vast experience in EU-funded projects. We have contributed to these projects most importantly by shaping the development of technology to best suit the needs of practitioners; starting from the extraction of user requirements and the creation of use cases to define functionalities and system specifications, our work seeks to validate interim results with end-users at key stages of development and improve them according to stakeholders' feedback. We also have an extensive network of security professionals, whose knowledge and expertise we engage in these projects through interactive and innovative methods.

Relevant previous projects or activities

1. **INACHUS**: Crisisplan BV's primary responsibilities involve scenario definition, user/system requirements and specifications, and oversight of the pilot activities and system validation. INACHUS aims to achieve a significant time reduction related to Urban Search and Rescue (USaR) phase by providing wide-area situation awareness solutions for improved detection and localisation of the trapped victims assisted by simulation tools for predicting structural failures and a holistic decision support mechanism incorporating operational procedures and resources of relevant actors. Period: 2015-2018. – <http://www.inachus.eu>
2. **ZONESEC**: Crisisplan BV participates in the ZONESEC project with responsibilities including pilot scenarios definition, validation plans, oversight of pilot demonstrations, and pilot evaluation. The global objective of ZONESEC is to support the security of citizens by providing a total solution for the protection of wide critical infrastructure areas. Period: 2014-2018.
3. **TransCrisis**: Crisisplan BV's role in the TransCrisis project is to establish the analytical framework and a codebook that will be used by other project partners to study what makes EU responses to transboundary crises both effective and legitimate in different areas (e.g. migration crisis or economic crisis) and different institution (e.g. European Parliament or European Commission). At the end of the project, Crisisplan will bring the results of the individual studies together into, most importantly, two papers with policy and, respectively, research recommendations. Moreover, Crisisplan will be responsible for an e-learning module that will offer key recommendations and insights from the project for political leaders in EU and national institutions. Period: 2015-2018.
4. **VASCO** an FP7 project that developed an IT tool that allows security professionals and administrators to jointly design and test the security of government buildings and critical infrastructure sites. Responsibilities: developing and validating user requirements; organizing system demonstration workshops and dissemination events. Period:

	<p>2014-2017. – http://vasco.diginext.fr/</p> <p>5. STEPWISE, an ISFP project that will deliver an innovative product to support the cooperation, coordination and cross-sectoral preparedness of Law Enforcement Agencies and their partners (public and private) involved in the design and protection of public spaces. The STEPWISE platform will enable the rapid creation of Virtual Reality mock-ups of real-world spaces and buildings where security and crisis plans can be devised and assessed against a wide variety of threat scenarios. Responsibilities: curriculum for training with the platform, designing and implementing the evaluation framework, and pilot organization. Period: 2018-2020.</p>
Relevant significant infrastructure or equipment	-

4.1.6 Drone Hopper, S.L. (DH)

<p>DRONE HOPPER, S.L.</p>	
Website(s)	www.drone-hopper.com
Description of the legal entity	<p><u>The Company</u></p> <p>DRONE HOPPER is a Spanish start-up devoted to designing and manufacturing heavy-duty drones to be used in various applications. Business lines range from firefighting, agriculture, rescue, load transportation, surveillance, monitoring, parcel delivery... It was created in September 2015 by Pablo Flores (CEO). All business lines use very similar technology but differ on investment needs, customer base and revenue model and therefore, are quite complementary.</p> <p>Our vision is to have a flexible and scalable family of products that overcome current limitations of RC-based drones that cover many operational scenarios by its size and systems capabilities.</p> <p><u>The Product</u></p> <p>A flexible design allowing a drone family concept envisaged to provide suitable platforms for the different business lines: from small 20-40 Kg platforms to heavy-lift 1000 Kg aircraft. The systems of the drone incorporate sensors and navigation systems that permit real time information on the most advantageous point for the operation. Because of these instruments, the drones can operate 24/7 (including night operation) and in a seamlessly coordinated manner and without putting any human life at risk.</p> <p>For firefighting, the water is nebulized directly above the seat of fire for its extinction. The design makes use of the high-speed air generated by the drone propellers to perform this process (patented technology). Finally, each drone includes a magnetic system to control the nebulization of water in order to use the appropriate amount of water mist for each specific type of fire.</p> <p>The drone can be adapted to different aircraft models to release drones at a certain altitude above the fire. The drones can also be transported by land and take off from a location close to the fire, being the latter the initial operational proposal as to comply with existing regulations for unmanned vehicles.</p> <p>For other missions, accuracy and programming capabilities coupled with the unseen payload capacity, make DRONE HOPPER a very competitive option to replace current ground</p>

tractors and ultralight airplanes.

The Prototypes

4 prototypes have been assembled, in line with the family vision. The medium-size platform is undergoing ground-tests and is scheduled to perform first public demonstration flight in September 2018. The idea for this unit is to use it as a commercial demonstrator both for agricultural and firefighting and as a flight test bed to optimize the water release and nebulization system.

Achievements

DRONE HOPPER has received funding both from the European Union (SME Instrument under Horizon 2020 programme) and the Spanish Ministry of Industry (ENISA) and is also incubated by the ESA (European Space Agency) as a winner of the ESNC (European Satellite Navigation Competition) in 2016. Also, other awards like the ONE Magazine “Valor Seguro” winner and the Innovation Award winner by the Spanish Aersopace Engineering Association have selected DRONE HOPPER in 2016 & 2017 respectively.

Recently, a big step towards the production of commercial units has come through the CDTI call for INNOGLOBAL & International Technological Cooperation Projects with India to develop URBAN HOPPER platform, designed to counter urban & city fires worldwide.

Partners

In this short period, DRONE HOPPER has been able to incorporate important technological partners to the project like University Carlos III Madrid (control and automated navigation experts), University Politécnica Madrid (regulation and certification experts). Also, an array of supplier companies necessary to design and manufacture equipment and parts (ENAIDEN, AUTOMATED DEVICES, SCHÜBELER Technologies, AXTER Aerospace, MICROPILOT ...). In addition, many potential commercial partners outside Spain have shown interest on teaming with DRONE HOPPER to work on a specific area. The most advanced collaboration abroad is with Indian company INTECH to build and distribute firefighting drones (150 litres) for building firefighting in India and Asia using turbines technology.

The Future

In the short-term, focus is on finishing and flying middle-size prototype. Also, design of URBAN HOPPER platform, derived from this middle-size prototype, is launched, in the frame of Spanish Indian collaboration project.

Also, DRONE HOPPER is investing on swarm capabilities with 1 FTE to use it as soon as possible on their operations as it is deemed critical to deliver the huge operational potential of drones.

Role of the entity in the project

The main role of DH in FASTER will be in the autonomous vehicles work package (WP5); they will spend most of their effort there: DH will lead T5.3 ‘Swarm operational capabilities to allow complex tasks’ and will participate in all other tasks of WP5. Besides their key role with autonomous vehicles, DH will also contribute to system specification (T3.2), UAVs relay (T6.3), and to the UxV related tasks of WP7 (T7.1-2).

Profile of key personnel

Pablo Flores (♂) - CEO & Founder. Aerospace engineer & MBA. 15 years’ experience in aerospace industry at AIRBUS. Latest position A320 Family Systems Chief Engineer in Spain.


Carlos Dominique (♂) – Drone technology expert - 35 years’ experience in drone industry, military & civil. AESA (Spanish Aviation Safety Agency) advisor. Drone Certification expert.

Juan Carlos Marín (♂) – COO. Environmental Engineer. In charge of overall functioning of the Company and Operations.

Ángel Madridano (♂) – MsC Electrical Engineer. PhD Student working at DRONE


	HOPPER in charge of drone coordination (swarm operation). Aurelio Ponz (♂) – PhD Electrical Engineer. In charge of mission design and sensing.
Relevant publications, products, services or achievements	-
Relevant previous projects or activities	<ol style="list-style-type: none"> 1. DH_001 - 5 litres prototype with high-end RC technology 2. DH_002 - 300 litres firefighting drone- partially financed by ENISA (Ministry of Industry) 3. DH_003 - 80 litres agricultural drone - outcome of ESA_BIC (European Space Agency - Business Incubation Centres) 4. URBAN HOPPER - 150 litres firefighter drone for urban fires. Spain - India bilateral cooperation project.
Relevant significant infrastructure or equipment	-

4.1.7 Robotnik (ROB)

ROBOTNIK	
Website(s)	www.robotnik.eu
Description of the legal entity	<p>Robotnik started its activity in 2002 and is currently a leading company in the European service robotics market. Robotnik is specialized in Mobile Robotics:</p> <ul style="list-style-type: none"> • Products: Robotics product manufacturing (mobile robot platforms, mobile manipulators). • Service Robotics Applications: (development of robots for performing autonomous tasks for the wellbeing of humans or machines, excluding manufacturing), principally Robots for Logistics and Robots for Inspection.
Role of the entity in the project	Will oversee the design and development of the mobile robotic platform and will be the leader of the autonomous mobile vehicle WP.
Profile of key personnel	<p>Mr Roberto Guzman (♂) owns the degrees of Computer Science Engineer (Physical Systems Branch) and MSc in CAD/CAM and has been Lecturer and Researcher in the Robotics area of the Department of Systems Engineering and Automation of the Polytechnic University of Valencia and the Department of Process Control and Regulation of the FernUniversität Hagen (Germany). During the years 2000 and 2001 he has been R&D Director in “Althea Productos Industriales”. At present he is CEO of Robotnik.</p> <p>Mr Rafael Lopez (♂) owns the degree of Telecommunications Engineer (Communications Branch). He worked for the R&D Department of “Althea Productos Industriales” during year 2000. In the year 2001 he is contracted by IBM as System Engineer for wide area networks in Madrid and Barcelona. He co-founded Robotnik in 2002. At present he is the R&D Manager of Robotnik and has participated and managed many EU projects during the last years. Since 2017 he is member of the board of Directors of Hisparob (Spanish Robotics Technology Platform).</p>
Relevant publications, products, services or achievements	<ol style="list-style-type: none"> 1. Konstantinos Loupos, Anastasios D. Doulamis, Christos Stentoumis, Eftychios Protopapadakis, Konstantinos Makantasis, Nikolaos D. Doulamis, Angelos Amditis, Philippe Chrobocinski, Juan Victores, Roberto Montero, Elisabeth Menendez, Carlos Balaguer, Rafa Lopez, Miquel Cantero, Roman Navarro, Alberto Roncaglia, Luca Bel-sito, Stephanos Camarinopoulos, Nikolaos Komodakis, Praveer Singh, “Autonomous robotic system for tunnel structural inspection and assessment”- International Journal

	<p>of Intelligent Robotics and Applications, Springer, 2017</p> <ol style="list-style-type: none"> Guzman, R., Navarro, R., Ferre, J. and Moreno, M. (2015), RESCUER: Development of a Modular Chemical, Biological, Radiological, and Nuclear Robot for Intervention, Sampling, and Situation Awareness. J. Field Robotics. doi: 10.1002/rob.21588 S.Abdel Naby, G.Amato, D.Bacciu, M.Broxval,S.Chessa, S.Coleman, M.Di Rocco, M.Dragone, C.Gallicchio, C.Gennaro, Roberto Guzman, Rafael Lopez, H.Lozano, L.Maguire, T.M.McGinnity, A.Micheli, G.M.P.O'Hare, F.Pecora, A.Ray, A.Renteria, A.Saffiotti, D.Swords, C.Vairo "Robotic UBIquitous COgnitive Networks". Poster at 5th International Conference on Cognitive Systems – CogSys2012 R. Qiu, Z. Ji, A. Noyvirt, A. Soroka, R. Setchi, D.T. Pham, S. Xu, N. Shivarov, L. Pignini, G. Arbeiter, F. Weisshardt, B. Graf, M. Mast, L. Blasi, D. Facal, M. Rooker, Rafael Lopez, D. Li, B. Liu, G. Kronreif, P. Smrz, “Towards Robust Personal Assistant Robots: Experience Gained In the SRS Project”, IROS 2012
<p>Relevant previous projects or activities</p>	<ol style="list-style-type: none"> BADGER (H2020): (ONGOING) "Robot for Autonomous Underground Trenchless Operations, Mapping and Navigation" SMOOTH (H2020): (ONGOING) "Smart Robots for Firefighting" ROBORDER (H2020): (ONGOING) "autonomous swarm of heterogeneous RObots for BORDER surveillance" CPSWARM (H2020): (ONGOING) " Cyber-Physical Systems swarming algorithms" BRAIN-IOT (H2020): (ONGOING) "model-Based fRamework for dependable sensing and Actuation in INtelligent decentralized IoT systems"
<p>Relevant significant infrastructure or equipment</p>	<p>Robotnik owns currently 1600 m² of industrial premises, divided as follows:</p> <ul style="list-style-type: none"> ~500 m² R&D, Engineering and Administration offices ~800 m² workshops, robotics lab, manufacturing ~300 m² warehouses and others <p>The workshops have many different mechanical tools: metal lathe, milling machine, drilling machine, grinder machine, work benches for mechanics and electronics, etc.</p> <p>The lab has special equipment for R&D projects development:</p> <ul style="list-style-type: none"> robotic mobile platforms and localization solutions mobile arms CAD/CAM software Scientific tools: logic analyser, digital oscilloscope, high precision multimeters Electronic development kits

4.1.8 Synelix Solutions S.A. (SYN)

<p>SYNELIX SOLUTIONS S.A.</p>	
<p>Website(s)</p>	<p>www.synelixis.com</p>
<p>Description of the legal entity</p>	<p>Synelixis is a high-tech SME that delivers solutions for energy efficiency, cybersecurity, warehouse automation and advanced networking. With respect to energy efficiency, its solutions focus on smart grid control and energy consumption optimization. By utilizing modern software technologies, hardware installation and open platforms, Synelixis engineers can ensure an optimized solution that fulfils the project requirements. Synelixis Solution technology superiority is a result of extensive R&D activities. The Synelixis’ personnel bring with them extensive research background, working for more than 15 years, in the RACE I & II, ACTS, ESPRIT and IST European frameworks in numerous projects and</p>

	<p>long co-operations with well renowned companies in EU and USA.</p> <p>Synelixis is member of the AIOTI, the NEM, the NESSI, the eMobility, the 5G-PPP and the Net!Works technology platforms, coordinator of the H2020 project COSSIM-644042 and Technical Coordinator of a number of EU funded projects (SOFIE, SEA, BeyWatch, COAST, DOLFIN) cooperating with prestigious companies like STMicroelectronics, Thomson, Philips, Vodafone, Telefonica, NEC, EDF, Thales, Siemens, NSN, Ericsson, ABB. The product-oriented core competencies of Synelixis include expertise in security and services for resource and energy monitoring in different environments. Aiming to offer professional high-tech solutions, Synelixis has made strategic partnerships with worldwide leading corporations. Synelixis is a registered Cisco/Linksys partner, HP Business Partner and SUN Partner.</p>
<p>Role of the entity in the project</p>	<p>Synelixis will be involved in the support of communication needs of the project use cases, implementing a 5G-enabled infrastructure with monitoring mechanisms to ensure minimum latency and high bandwidth. In particular:</p> <p>In WP3, we will contribute on the elicitation of use case requirements, translated to relevant specifications and thus leading to the overall architecture of FASTER system.</p> <p>Moreover, in WP4, we will actively participate in the security assurance of the IoT middleware, devices and respective communication means, as part of T4.1 and T4.2.</p> <p>In WP6, Synelixis will be one of the leading contributors, focusing on the implementation and integration of the 5G infrastructure to accommodate modules and components needed by the use cases. In addition, we will further provide technological tools to monitor the infrastructure in order to ensure that the operational requirements of the first responders teams are met.</p> <p>In WP9, the role of Synelixis would be to deal with integration issues as well as participate in the process of system validation and testing, as foreseen in T9.1 and T9.4.</p> <p>Moreover, in WP10, Synelixis will deal with the definition of the pilot scenarios (T10.1) and properly prepare 5G infrastructure and tools for validation and demonstration purposes (T10.3).</p> <p>Finally, in WP11, we will contribute to the dissemination (T11.1) and exploitation (T11.3) of project outcomes and provide useful insight to policies and recommendations (T11.5).</p>
<p>Profile of key personnel</p>	<p>Dr Theodore Zahariadis (♂) is the Chief Technical Officer of Synelixis. He was granted a Ph.D. degree in electrical and computer engineering from the National Technical University of Athens, and a Dipl.-Ing. Degree in computer engineering from the University of Patras. Dr. Zahariadis is also heavily involved in the EU Future Internet Assembly (FIA); he coordinates the Future Internet Architecture Group (FIArch), while he also participates in the Real-World Internet/ “Internet of Things”, the Future Services Internet and the Secure Future Internet subgroups. Currently, Th. Zahariadis is the project coordinator of H2020 COSSIM (A Novel, Comprehensible, Ultra-Fast, Security-Aware CPS Simulator) and technical coordinator of the FP7 project DOLFIN. He has been the Project Coordinator of the FP6 project ASTRALS, the Project Technical Coordinator of the FP7 projects SEA, BeyWatch, COAST, AWISSENET, VITRO, deputy Technical Manager of the FP7 IP project REVERIE, the Project Manager of the National Projects eGate and smartHome and has long experience in running large multinational and multi-million projects. In the past, he has been with Ellemedia Technologies as the CTO, the Hellenic Aerospace Industry (HAI) as Chief Engineer, the Lucent Technologies/ Bell-Laboratories, Holmdel, NJ as a Senior Consultant, Intrasoft, Intracom. Since 1994, he has participated in many ACTS, ARTEMIS and IST/ICT projects as Senior Researcher or Technical Manager. Dr. Zahariadis has published more than 100 papers in magazines, journals and conferences and he is the author/editor of 5 books. He has been a reviewer and principal guest editor in many IEEE and ACM journals and magazines and has served as TPC of a number of IEEE Conferences and has more than 1000 citations. Since 2001, he is an evaluator of IST/ICT proposals and reviewer/rapporteur in many IST projects. He is a member of the IEEE, the ACM and the Technical Chamber of Greece.</p>

Dr Panagiotis Trakadas (♂) received his Dipl.-Ing. Degree in Electrical & Computer Engineering and his Ph.D. from the National Technical University of Athens (NTUA). He is working for Synelixis Solutions S.A since 2007. From October 2001 until July 2004 he was working for Hellenic Aerospace Industry (HAI), as a Senior Engineer, on the design of military wireless telecommunications systems. In the past, he has been with the Technological Educational Institute of Athens as an Assistant Professor (September 2002 - June 2004), teaching radar and microwave technology, the Technological Educational Institute of Halkida (September 2008 – June 2009), teaching digital systems design and the National Technical University of Athens as a Senior Researcher. He has published more than 70 papers in magazines, journals, books and conferences. He is a reviewer in IEEE Transactions on Communications and IEEE Transactions on Electromagnetic Compatibility journals. Dr. Trakadas has been actively involved in many EU-FP7 and H2020 research projects (AWISSENET, VITRO, SMART, SIMPLE, XIFI, SONATA, ARMOUR), while currently is involved in H2020 5GTANGO and SOFIE projects.

Ms Aikaterini Papadopoulou, MSc (♀) is leading Synelixis' Marketing department since 2013. She holds a degree from the National and Kapodistrian University of Athens and 2 MSc degrees in the specialized areas of sustainable development and management from National and Kapodistrian University of Athens' Vocational Training Center. Before joining Synelixis, she has worked as a supervisor and market analyst for 6 years, gaining valuable insight on commercial industry and market dynamics.

Relevant publications, products, services or achievements

1. E. Tsampasis, L. Sarakis, H. C. Leligou, Th. Zahariadis, J. Garofalakis, "Novel Simulation Approaches for Smart Grids" Journal of Sensor and Actuator Networks, Vol. 5, Issue 11, June 2016, doi:10.3390/jsan5030011
2. Th. Zahariadis, G. Pau, S. Tompros, T. Kwon, "Wireless/mobile connected entertainment", IEEE Wireless Communications (Guest Editorial), Vol. 23, Issue 1, February 2016, pp. 12-13
3. A. Papadakis, Th. Zahariadis, N. Nikolaou, "Adaptive content caching simulation with visualization capabilities," Springer, Telecommunication Systems, August 2015, Volume 59, Issue 4, pp 531-539
4. P. Karkazis, P. Trakadas, Th. Zahariadis, I. Chatzigiannakis, M. Dohler, A. Vitaletti, A. Antoniou, H. C. Leligou, L. Sarakis, "Resource and service virtualisation in M2M and IoT platforms," International Journal of Intelligent Engineering Informatics, Vol. 3, Issue 2/3, 2015, pp. 205-224
5. P. Karkazis, L. Sarakis, T. Velivassaki, P. Trakadas, H. C. Leligou, Th. Zahariadis, "Energy-Efficient Trust Management Scheme in Mobile Wireless Sensor Networks" Open Transactions on Wireless Sensor Networks, Volume 1, Number 1, pp.47-62, December 2014

Relevant previous projects or activities

1. Synelixis is the Technical Coordinator of the **H2020-779984 SOFIE (Secure Open Federation for Internet Everywhere)** project that aims to develop a blockchain driven federated platform for enabling information exchange of different IoTs and data silos.
2. Synelixis is member of the **H2020-688237 ARMOUR (Large-Scale Experiments of IoT Security Trust)** project, whose central goal is to perform large-scale experimentally-driven research and provide the framework for duly tested, benchmarked and certified Security & Trust technological solutions.
3. Synelixis is member of the **H2020-700416 SUCCESS (Securing Critical Energy Infrastructures)** consortium, developing an overarching approach to threat and cybersecurity-related countermeasure analysis with special focus on the vulnerabilities introduced by Energy Smart Meters.
4. Synelixis is member of the **H2020-671517 SONATA (Service Programming and Orchestration for Virtualized Software Networks)** consortium that targets both the flexible programmability of software networks and the optimization of their deployments.
5. Synelixis is member of the **H2020-702356 5GTANGO (5G Development and valida-**

	tion platform for global industry-specific network services and Apps) consortium that develops an end-to-end ecosystem for the agile development and deployment of services based on NFV technologies.
Relevant significant infrastructure or equipment	<p>Synelixis features a cloud environment of 10 DELL blade servers, which is used for research and experimentation purposes. This cloud infrastructure is dedicated and flexible enough to host any required testing and experimentation research activity. Synelixis private cloud environment is based on OpenStack Liberty and will soon migrate to Pike release. Apart from the normal OpenStack Components (Nova, Neutron, Glance, Swift), Apache Mesos is installed and running. Moreover, Synelixis cloud environment includes open virtual switches supporting OpenFlow.</p> <p>Synelixis cloud environment has been used in several EU-funded projects (5GTANGO, SONATA, SUCCESS, ARMOUR, DOLFIN, FINESCE, XIFI) for development and testing purposes.</p>

4.1.9 INOV INESC Inovação - Instituto De Novas Tecnologias (INOV)

<p>INOV INESC INOVAÇÃO - INSTITUTO DE NOVAS TECNOLOGIAS</p>	
Website(s)	www.inov.pt
Description of the legal entity	<p>INOV INESC INOVAÇÃO is the leading private non-profit Research and Technology Organisation in Portugal, in the areas of remote detection, ICT and electronics. The INOV mission is to lead technological development and innovation processes, in close cooperation with governments, enterprises and universities. INOV has accumulated strong technical expertise in: communication networks & services; cyber security & defence; electronics product development; enterprise engineering & IT governance; monitoring and surveillance solutions; remote sensing, including video & infrared imaging and laser radar (Lidar); complex systems analysis, integration of sensor data, sensorisation with automated detection and decision making using artificial intelligence; modelling & engineering; and IT & open source solutions; GNSS navigation solutions, inertial navigation and indoor positioning.</p> <p>INOV possesses wide experience in organisation of demonstration tests and field experiments with large number of participants, related to security, surveillance, and risk management. INOV has consolidated knowledge and proven installed solutions for visual based monitoring with subsequent data fusion and target positioning & recognition, with clients and partners in Europe, USA, Brazil, Angola, Israel, China, and Turkey. As a project leader or member of consortium, INOV team successfully participated in several projects in the strategic areas of (i) multi-platform acquisition of information for situation awareness and monitoring (ii) remote monitoring, tracking and management systems.</p>
Role of the entity in the project	<p>INOVs' contribution in this project is in 2 main areas of expertise: communications and system definition and integration. Regarding communications, INOV will lead T4.1, T6.2 and participate in T6.3. As communications in FASTER includes communication between wearable devices in first responders, INOV will also lead T4.4 and participate in T4.3 in the topic. Another area of expertise of INOV is in system requirements, architecture, integration and validation. As such, INOV will lead T9.1, T9.3 and T9.4 and participate in T3.2 and T3.4. INOV will also contribute to T6.5 were it brings its expertise in blockchain from several H2020 projects.</p>
Profile of key personnel	<p>Mr. Paulo Chaves (♂) has a degree in Electric Engineering (1996, University of Coimbra) and is a R&D senior specialist at INOV, with an extensive experience in more than</p>

20 projects, national, EU and ESA funded projects and his head of the department involved in the present proposal. He also possesses experience in embedded electronics, remote communications systems, navigation systems, remote monitoring systems (C2) and sensor fusion. He participated in the national funded projects like SeaItAll (monitoring of fishing activities), EcoWT (water reader telemetering), M2M (Remote Monitoring of Vending machines), InLocIDCom (positioning system with mesh network communications), FlexitexTEX (electronic remote sensor system for electro-textile cloth). He worked in ESA navigations projects project including EGNOS-NT (precision navigation terminal) and EU projects as PERSEUS (Protective system for European maritime south Borders) and AIRBEAM (integration C2 system for aircrafts, UAVs, etc in disasters). He has submitted 5 international patents (pending). He has delivered several communications to national and international conferences and regularly collaborates with several national and international organizations as a technology consultant. He will be INOV's project coordinator/manager and remote monitoring systems specialist.

Mr. John Rodrigues (♂) is a head of the Security & Defence Business Unit at INOV, as well as member of the Board of Director of the Portuguese Association of Security & Defence Industries (DANOTEC). He has a degree in electronics and computer science (1994, Technical University of Lisbon) and several security courses, including Industrial Security Course from the Portuguese National Security Office (2009); Advanced Course for Security Directors from the United Nations Interregional Crime and Justice Research Institute (2011); Counter-Terrorism Intensive Course from the Portuguese Institute of Police Sciences and Internal Security (2013). With more than 18 years' experience as consultant and project manager, he possesses extensive knowledge on safety and security for critical infrastructures. He has participated in 11 FP7 / H2020 Security projects, as well as many other security' related projects and studies for national and international entities, including, the Portuguese Government, NATO, etc.

Ms. Filipa Borrego (♀) is the Innovation Management Coordinator and also Senior Researcher at INOV. Her research focus is on system architecture, targeting high performance and/or low power computing. Filipa graduated in Electronics and Telecommunications Engineering at the University of Aveiro, Portugal, and has a Ph.D. in Computer Architecture at Delft University of Technology, the Netherlands. She was a trainee at the European Space Agency (ESA) and a researcher at Holst Centre / IMEC, the Netherlands. She was also a Portuguese National Contact Point for the Security theme of the European Framework Programme Horizon 2020 (H2020) and a Portuguese National Expert for the Committee of Information and Communication Technologies (ICT) of H2020. Filipa was a Fulbright Visiting Scholar at the University of Texas, Austin, USA, working on methodologies to develop, license and/or commercialize early-stage technologies coming out of collaborative projects.

Relevant publications, products, services or achievements

Publications:

1. Nelson Pimenta, Paulo Chaves, Luís Fernandes, Diana Freitas - "MotionDetection in na Intelligent Textile Mattress Cover", 8th International Conference on Ambiente Intelligence (ISAmI'17), Porto 21-23 June 2017, Porto, Portugal, ISBN 978-3-319-61118-1.G.
2. P. Chaves; L. Fernandes; P. Catelas; R. Monteiro - "InLoc - INOV Localization and Identification of Containers", Navitec 2008, ESA ESTEC, Noordijk, Holanda


Products:

3. **MONICAP™** system is GPS and EGNOS vessel management and control system to monitor fishing fleet activities at sea. MONICAP is a monitoring system for the fishing activity inspection that uses Global Positioning System (GPS) for the vessel location and Inmarsat-C technology for the satellite communications between ships and a terrestrial control centre. MONICAP has been successfully introduced in the market and is currently installed or being installed in about 800 fishing ships operating under control of Portugal, Spain, France, Ireland and Angola.
4. **CICLOPE™** is a tele-surveillance system designed by INOV, highly experienced in

	<p>development of monitoring and remote-control systems. The CICLOPE system currently covers about 1,300,000 hectares of Continental Portugal. CICLOPE enables large areas to be monitored remotely, at a reduced cost per hectare. The simultaneous or individual use of video and IR cameras, as well as a special LIDAR (laser radar) sensor, allows round-the-clock observations, practically regardless of the weather conditions. CICLOPE system (i.e. cameras and associated sensor equipment) is installed in the special observation towers called SDATs (Surveillance and Data Acquisition Towers).</p> <p>5. SAFEGROUND™, an A-SMGCS system (Advanced -Surface Movement Guidance and Control System), designed to improve safety in airport movement areas (runways, taxiways and apron) by monitor and providing a situational-awareness regarding ground movements of airport vehicles (Follow-Me, catering, baggage, fuel, maintenance, etc.). The system was developed in compliance with ICAO and EUROCONTROL recommendations, and with a map-based dashboard that addresses the ED -119 standard (EUROCAE- Common Database Interchange Standard for Terrain, obstacle and Aerodrome Mapping Data - based on ISO 19100). The system was developed in collaboration with ANA (Aeroportos de Portugal).</p>
<p>Relevant previous projects or activities</p>	<ol style="list-style-type: none"> 1. FP7-SECURITY: PERSEUS “Protection of European Seas and Borders Through the Intelligent Use of Surveillance”. FP7 demonstration project supported by the FP7 Security Research theme under DG-Enterprise. The main objective is to improve European surveillance of maritime borders uniting 29 partners from 12 countries. PERSEUS addresses the call for an integrated European system for maritime border control. Its purpose is to build and demonstrate an EU maritime surveillance system integrating existing national and communitarian installations and enhancing them with innovative technologies. By means of two large scale demonstrations PERSEUS proved its feasibility and set the standards and grounds for the future development of EU maritime surveillance systems. 2. National MoD R&D program: Andromeda. The project is evolution of the results of PERSEUS. It will develop a specific C2 for interaction between the authorities (Navy and Air Force) during missions to create an augmented awareness of the mission include sensors information and real-time video selectively distributed among the mission partners and the structure of the authorities. The system is hierarchical and allows roles and specific mission messages and data exchange. 3. FP7-SECURITY: AIRBEAM “AIRborne information for Emergency situation Awareness and Monitoring” implemented a situation awareness toolbox for the management of crisis over wide area taking benefit of an optimised set of aerial (unmanned) platforms, including satellites. With an approach based on a multiplatform system for situation awareness and through an effective collaboration between industrial partners, research organisations, stakeholders and end users, AIRBEAM accomplished the following: to have an integration framework serving security applications to the multiple related initiatives and developed the technological bricks and standards allowing for the rapid take up of this multiplatform approach by Member States. 4. H2020-BES: MARISA “Maritime Integrated Surveillance Awareness”, the goal is to provide the security communities operating at sea with a data fusion toolkit, which makes available a suite of methods, techniques and modules to correlate and fuse various heterogeneous and homogeneous data and information from different sources, including Internet and social networks, with the aim to improve information exchange, situational awareness, decision-making and reaction capabilities. 5. H2020-BES: ALFA “Advanced Low Flying Aircrafts Detection and Tracking” is future-ready as technologies for drone detection will be a part of the system, which will use heterogeneous, easy-to-deploy mobile sensors based on several novel technologies. All sensor data, augmented by other existing sources of information, will be combined using evolved data fusion, providing accurate positional data for targets including eventual indication of the air vehicle type and reliable prediction of its landing site. This information will be communicated to the regional law enforcement units us-

	ing a secure communication link and mobile device application, drastically improving the reaction time.
Relevant significant infrastructure or equipment	<p>INOV can provide access to the following infra-structures, for the project development:</p> <ul style="list-style-type: none"> • Datacentre and technical rooms, which possesses teraflop-scale computers based on the most contemporary GPGPU technology (processors NVIDIA Tesla K20) and corresponding software (CUDA SDK, Matlab, etc.), supported by a modern communications infrastructure. • Special conference rooms with all technical infrastructure requirements to support periodic meetings and the realization of workshops.

4.1.10 Istituto Superiore Mario Boella (ISMB)


ISTITUTO SUPERIORE MARIO BOELLA	
Website(s)	www.ismb.it
Description of the legal entity	<p>ISTITUTO SUPERIORE MARIO BOELLA SULLE TECNOLOGIE DELL'INFORMAZIONE E DELLE TELECOMUNICAZIONI ASSOCIAZIONE is a research & innovation center operating in the Information and Communication Technologies (ICT) domain. Founded in 2000 by Compagnia di San Paolo and Politecnico di Torino, today ISMB counts on the technological and domain knowledge of around 150 researchers working in close cooperation with companies, academia, and public administrations.</p> <p>ISMB operates according to the knowledge management model: this means that it plays an active role not only in devising innovative solutions, but also in their implementation and consequent developments. This approach represents a step forward with respect to technology transfer, and in this sense, the evolutionary lines of European research are taken into account. Consistently with process innovation goals, the Institute has developed a strong competence in new business models that are a necessary component for the economic sustainability of innovative solutions. In addition, ISMB is involved in several industrial cooperation activities with both large enterprises and SMEs, as well as in various higher-education initiatives in partnership with academic institutions.</p> <p>ISMB is organized in Research Areas focused on ICT core sectors and in the RESPONDERFIRST project it will operate through the Mobile Solutions area, which focuses on the design and the implementation of Intelligent Systems exploiting top-notch technological solutions such as Artificial Intelligence/Machine Learning, Big Data, NLP and GIS. Mobile Solutions promotes a human centered approach to design solutions that cover the whole data value-chain, which starts from the data generation on devices (e.g. mobile, wearable, embedded) and the data gathering from multiple data sources (e.g. crowdsensing, geospatial-sensing, social-media, in-situ monitoring), up to the data valorization and monetization with the prototyping and provision of added-value services deployed on cloud-computing back-ends.</p> <p>The area hosts the Italian Microsoft Innovation Center (http://www.mictorino.it/web/), which is a joint innovation group between Microsoft corporation and ISMB, targeting the digital needs of industry through a multidisciplinary innovation process.</p> <p>It is important to underline the role that ISMB plays at European level in IoT-industry, BigData and Artificial-Intelligence. It acts as IoT competence center for Microsoft and participate in the activities of the Alliance of Internet of Things Innovation (AIOTI) as</p>

	<p>well as in the IoT European Research Cluster (IERC).</p> <p>Moreover, in the emergent trend of data management and analysis, ISMB has a central role in the Big Data Value Association (BDVA) (http://www.bigdatavalue.eu) focusing on the application of research activities on data analysis. In this framework, consistently with the ISMB mandate, the research areas work on innovative projects and solutions that leverage on the cooperation with industrial players, creating a bridge between the research products and the industrial innovation needs. This lead industries to have and early access to new technologies and to take advantage by the innovation coming from applied research.</p>
<p>Role of the entity in the project</p>	<p>ISMB will lead T4.5 ‘Social media analysis for monitoring and event detection’ and T8.4 ‘Mobile application for effective response management’ and will play a key role in T7.5 ‘AI tools for disaster scene analysis, risk anticipation and early warning’; they will also participate in related tasks, within the same work packages. Additionally, ISMB will have the necessary contribution to WP3 ‘Requirements, specifications and system architecture’, WP9 ‘Integration’, T10.1 ‘Scenario definition and pilot planning’, and project dissemination/ communication (T11.1).</p>
<p>Profile of key personnel</p>	<p>Claudio Rossi (♂) is a senior researcher and project manager at Istituto Superiore Mario Boella: a private ICT oriented research center located in Turin, Italy. Claudio graduated cum laude at the Politecnico di Torino, he holds a Master in Electrical and Computer Engineering from the University of Illinois at Chicago (USA) and a PhD in Electronics and Communication. He has worked at Fiat Group Automobiles in the International Manufacturing Engineering and in the World Class Manufacturing department for 3 years, and he has matured 10 years of project management in different context (industry, university, research) and domains, including manufacturing, telecommunication, computer science, remote sensing, emergency management, smart agriculture. Currently, he is the project manager and technical coordinator of the H2020 I-REACT project, which aims to exploit advanced cyber technologies in order to increase resilience to disasters caused by climate induced natural hazards. He has been a teacher for three years and he currently teaches a data analysis class at Collegio Carlo Alberto (Turin) in the framework of the “Master in data science for complex economic systems”. He authored 35 articles in high quality peer-reviewed conferences and journals, and he has co-organized several scientific workshops. His current research interests include crowdsourcing approaches, social media analysis, and predictive applications based on Artificial Intelligence with a specific focus on environmental monitoring and finance.</p> <p>Fabrizio Dominici (♂) is the head of the Mobile Solutions research area of ISMB with the responsibility to manage a group of 20+ researchers that work in the domain of digital innovation implementing Intelligent Systems that exploit top-notch technological solutions such as Artificial Intelligence, Machine Learning, Big Data, NLP and GIS. The area promotes a human centered approach to design solutions that cover the whole data value-chain which starts from the data generation on devices (e.g. mobile, wearable, embedded) and the data gathering from multiple sources of data (e.g. crowdsensing, geospatial-sensing, social-media, in-situ monitoring), up to the data monetization with the prototyping and provision of added-value services deployed on cloud-computing back-ends. Since 2012, he is also director of the Microsoft Innovation Center of Torino, which is an innovation unit set up through a cooperation agreement between Microsoft Corporation and ISMB. He has a valuable experience in developing international multidisciplinary innovation and development projects at National and European level acting as program and project manager. He is the coordinator of FLOODIS (EC contract n. 607220), I-REACT (EC contract n. 700256) and ASSIST (ESA contract n. 4000115961/15) and support the European Commission as expert.</p> <p>Quynh Nhu Nguyen (♀) received the bachelor’s degree in Industrial Design at the Politecnico di Torino in 2010 and the master’s degree in Product Service System Design at the Politecnico di Milano in 2013. Since December 2014 she has been working at the ISMB as researcher within the Mobile Solutions area with particular attention to social aspects, in terms of connections between people, physical places, objects and terminals.</p>

	Her main skills deal with: service design tools, participatory design and user analysis, info visualization, interaction design and rapid prototyping.
Relevant publications, products, services or achievements	<ol style="list-style-type: none"> 2018 - Early detection and information extraction for weather-induced floods using social media streams - Rossi, C., F. S. Acerbo, K. Ylinen, I. Juga, P. Nurmi, A. Bosca, F. Tarasconi, M. Cristoforetti, and A. Alikadic - International Journal of Disaster Risk Reduction, 03/2018. 2018 - Online clustering and classification for real-time event detection in Twitter - Angaramo, F., and C. Rossi - 1st International Workshop on Intelligent Crisis Management Technologies for Climate Events (ICMT), ACM ISCRAM Conference, Rochester (NY, USA), 2018. Nguyen, Q. N., A. Frisiello, and C. Rossi, "Co-design of a Crowdsourcing Solution for Disaster Risk Reduction", ACM Workshop on ICT Tools for Emergency Networks and DisastEr Relief (I-TENDER 2017), Co-located with ACM CoNEXT 2017, Korea, 12/2017. Favenza A., A. Farasin, N. Linty, F. DAVIS- A Machine Learning Approach to GNSS Scintillation Detection: Automatic Soft Inspection of the Events - 30th International Technical Meeting of The Satellite Division of the Institute of Navigation (ION GNSS+ 2017), Portland, Oregon (USA). 2017 - Gamified Crowdsourcing for Disaster Risk Management - Frisiello, A., Q. N. Nguyen, C. Rossi, and F. Dominici, Workshop on Data Science for Emergency Management (DSEM), co-located with IEEE International conference on Big Data 2017, Boston, Massachusetts (USA).
Relevant previous projects or activities	<ol style="list-style-type: none"> FLOODIS - Integrating Gmes Emergency Services with Satellite Navigation And Communication For Establishing A Flood Information System (Project coordinator), European Commission-FP7, 2013-2015. The main goal of this project is to develop the complete infrastructure that will alert professional users of an impending disaster and subsequently provide them with regular updates and geographical information (maps layers via mobile mapping application) concerning the disaster. Under this project, the disaster alert and information are focused on flood events, but the platform can readily be adapted to other types of disasters. I-REACT - Improving Resilience to Emergencies through Advanced Cyber Technologies (project coordinator), European Commission-H2020, 2016-2019. The project will be the first European-wide data driven platform that will integrate emergency management data coming from multiple sources, including data provided by citizens through social media and crowdsourcing, data from earth observations, predictive models, wearable devices and E-GNSS. This way, we will be able to produce information faster and allow citizens, civil protection services and policymakers to effectively prevent and/or react against natural disasters as well as to provide valuable processed data for commercial purposes. VISCA - Vineyards Integrated Smart Climate Application - (technical partner), European Commission-H2020-SC5-01-2016-2017, 2017-2020, Innovative data driven tools designed to include climate forecasting at different scales, from daily to decadal, which give farmers an action window to take decisions beforehand. The project relies on a BigData geospatial architecture to support analysis and forecasting algorithms. Research on social media analysis. This research topic aims at the detection of events and content classification through the analysis of social media specific features, text and images; Research on geospatial data use such as the Autonomous Burnt Area Detection. The goal of this activity was to evaluate satellite data services and data products in order to select the best option for building a prediction model, based on a convolutional neural network and segmentation approach, to delineate burnt areas.
Relevant significant	As a result of a cooperation agreement with Microsoft corporation, ISMB host the Italian

infrastructure or equipment	<p>Microsoft Innovation Centre (MIC) that is part of an international innovation network. The MICs can leverage on technical resources such as cloud computing resources, leading edge technologies and technical support.</p> <p>As a result of other projects developed at European and Industrial level ISMB can leverage on a GIS infrastructure to support a decision support system based on map products.</p>
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4.1.11 Kpeople Research Foundation (KPRF)

KPEOPLE RESEARCH FOUNDATION	
Website(s)	www.kpeople.eu
Description of the legal entity	<p>Kpeople Research Foundation is part of Kpeople Ltd group, it has been spun off in 2016 in order to concentrate all research activities dedicated to social challenges. Kpeople has been established in 1998, specialized in Grants and Innovation Management, providing support services to private and public organizations in innovation processes, technology transfer, and funding for research, development and innovation.</p> <p>One of the most active sectors in Kpeople organization is the Public Sector process upgrading, which witnesses the strategic attention of the company toward PA related issues, with the ambition of promoting a new thinking in Public Sector in approaches such as: co-decision making in e-government, social innovation, management of commons such as cultural heritage and qualitative evaluation methodology.</p> <p>The mission of KPRF is toward Social Innovation that is strongly needed to tackle real-world complexity. In this framework KPRF is addressing researches emphasising the relevance of SSH.</p> <p>SSH do not only bring a reflective perspective but are characterized by a generative nature that produces visions and future scenarios. KPRF aims at helping society with SSH researches, to shape the future through ideas, experiments, scenarios, interpretations, facts that can address challenges and re-orient them by envisioning long and short terms innovations.</p> <p>KPeople works on the generative nature of SSH that produces research which presents some common features:</p> <ul style="list-style-type: none"> - Complexity: SSH show a repertoire of approaches, methods and tools that are much more effective in dealing with mapping and understanding complexity; - Situatedness: the adoption of traditional innovation is quite distant from the mainstream of generative SSH that recognise situated, human-centred and participatory research approaches as the bases for building successful innovation processes, products and solutions; - Culturally framed scenarios: SSH tend to produce visions and interpretations of the possible futures that strongly rely on past and present values, beliefs, motivations and cultures; - Interdisciplinarity: SSH can easily be integrated with complementary disciplines to solve complex issues in innovative ways. <p>KP researchers are active in three European Countries (Malta, Italy, UK), on serving mainly public sector stakeholders.</p> <p>The growth of the mother company can be attributed to a unique combination of services,</p>

	<p>based on profound insight in research, innovation and funding strategies, up-to-date knowledge and more than 25 years expertise with more than 15 funding programmes in most EU countries.</p> <p>The organisation has the proven capability to link innovation suppliers and adopters from a unique Europe- wide stakeholders' network in multiple sectors, using advanced methodologies and proprietary on-line networking.</p>
Role of the entity in the project	<p>KPRF will manage the work package dedicated to Dissemination and Exploitation of project results (WP11). Furthermore, they will manage the first responders and stakeholders' engagement and systematic participation to project activities. KPRF will also manage the task dedicated to SELP compliance framework in the WP2</p>
Profile of key personnel	<p>Fabio Perossini (♂), Kpeople Research Foundation founder and Director (as well as for Kpeople ltd), Fabio more than 25 years' experience as International Program Manager. He has developed a deep experience in the management of big programs in the field of emergency management, innovation in public administration and social innovation. He has also matured a four-year experience in managing social initiatives being a pioneer in implementing horizontal subsidiarity initiatives within Municipalities and local Institutions in general.</p> <p>Giuseppe Caracciolo (♂) more than 30 years' experience in fixed and mobile telecommunications. Giuseppe has a lot of experience in the negotiation of commercial and technical agreements and in the management of big contracts both with private and public companies. Furthermore, he has developed a great experience in international working groups dealing with standardization of mobile systems and services.</p>
Relevant publications, products, services or achievements	<ol style="list-style-type: none"> 1. Revez, M. J., Delgado Rodrigues, J., Proença, N., Lobo de Carvalho, J. M., Coghi, P., Capua, M. C., ... & Perossini, F. (2016). O risco como ferramenta conceptual de uma gestão integrada da mudança: a perspectiva do projecto STORM. In Congresso Ibero-Americano Património, suas Matérias e Imatérias.
Relevant previous projects or activities	<ol style="list-style-type: none"> 1. H2020 DRS 11 STORM – 700191. STORM emphasises the use of eco-innovative, cost-effective, collaborative methodologies, novel predictive models and improved non-invasive, non-destructive diagnosis methods. STORM creates a new innovative set of processes and tools, useful for heritage sites, organisations, governments and citizens across Europe. By making the processes user focused and citizen centred, STORM brings together wider awareness of protection and prevention than ever before. 2. ICT PSP 325141 – CROSS. CROSS focuses on nurturing an innovation ecosystem that generates digital services and applications making use of information generated by users in the smart city environment. CROSS recognises unexploited opportunities for services and applications in the field of non-monetary economy, where new needs and practices are emerging, and where a new sector of the digital single market has the potential for a sustainable, inclusive and smart growth. 3. ICT PSP 029453 – CLIPS. Based on the collaboration between civil servants, public authorities, citizens and business, the CLIPS project develops a new approach to the delivery of public services using the cloud. The definition and the implementation of new services follows a mash-up approach, to develop an ecosystem template (methodology and tool kit) where services are defined specifically for the benefit of a municipality, that can be reused across the EU. 4. eTEN 046257 – MAPid Mobile Adaptive Procedure (MAP) is a complete set of flexible services to facilitate the work for civil servants in providing shortcuts to common practices, one stop shop and procedures. The service is provided through the extensive use of semantic analysis of users talk. These concepts can be fully adapted to services such as emergency procedures, human resources or administrative procedure management with the objective of simplifying procedures. In this phase of the project one of main objectives of the project was to address emergencies in cultural heritage in-

	<p>volving multidisciplinary competences. The project was tested also during the L'Aquila earthquake in Italy. In the final phase of MAP project, Kpeople realised two demonstration sites dedicated to emergency management for cultural heritage in Turin the National Museum of Cinema and the Queen's Villa. The system to manage emergencies is still running in the provincial headquarter of CNVVF.</p>
Relevant significant infrastructure or equipment	-

4.1.12 Kajaani University of Applied Sciences (KAMK)

<p>KAJAANI UNIVERSITY OF APPLIED SCIENCES</p>  <p>KAMK • University of Applied Sciences</p>	
Website(s)	www.kamk.fi
Description of the legal entity	<p>Kajaani University of Applied Sciences (KAMK) is a state-recognised institution in Finland. The activities in universities of applied sciences are regulated by the Polytechnics Act (932/2014). The government decree on polytechnics/universities of applied sciences (1129/2014) defines the objectives, extent and overall structure of polytechnic degrees. The Ministry of Education confirms the degree programmes of universities of applied sciences, and within the framework of these regulations, the universities of applied sciences decide on the content and structure of their degrees in more detail.</p> <p>KAMK was founded in 1992. It offers higher education for experts, supports professional growth and carries on Research & Development activities. It also offers and develops adult education to maintain and strengthen the working life skills. KAMK has five competence areas which emphasize international activities. For example, the Information Systems competence area combines KAMK business information technology and information technology expertise with the regionally and nationally significant Center of Measurement and Information Systems Research and Training – CEMIS. Mechanical and Mining Engineering is KUAS' newest and most rapidly developing competence area. The Business and Innovations competence area is an all-encompassing function that advances the growth of business competence and enterprise capability and enables the development of appropriate project and business operations throughout the other competence areas. Simultaneously, Business and Innovations develops student-lead enterprise and development schemes at KUAS.</p> <p>KAMK has participated in several projects funded by Structural Funds since Finland became a member of EU in 1995. KAMK has long experience both in implementing and managing EU-projects. KAMK carries out approximately 40-45 projects per year. Approximately 55 man-years are completed in R&D work yearly. The budget of the R&D department is ca 4-5 MEUR per year. The Finnish Higher Education Evaluation Council (FINHEEC) evaluates all university quality control work. KAMK has pass the FINHEEC audit at the year 2015.</p> <p>An international learning and development community consisting of approximately 2000 students and 240 experts operates in its own compact campus area located in Kajaani's impressive natural surroundings.</p> <p>KAMK research, development and innovation work supports enterprises and business life locally, nationally and, on its fields of focus, also internationally. KUAS is an important</p>

	<p>actor in the regional development of the Kainuu region. In RDI we also focus on the needs of the labour-markets through higher education development projects. Most of our projects are collaborative undertakings with private companies, education institutions, governmental and non-governmental organizations and other bodies. Our RDI-budget is around 4-5 million euros per year including 55-person work years. There are around 200 private companies collaborating with our RDI-projects.</p>
<p>Role of the entity in the project</p>	<p>KAMK will host the Finnish scenario related to a man-made disaster inside a building in collaboration with the Municipality of Kajaani (KAJ) in WP10. KAMK will also lead and manage the T5.2 – Integration of SoA sensors for navigation, mapping, communications and first response aid. KAMK will also be involved in the user requirement specification (T3.1) and system architecture definition (T3.4). Moreover, KAMK will be involved in most of the tasks of WP4 – IoT Platform, Wearables and Social Media Sources and in the development of the tools for enhanced situational awareness in the control centre leveraging on AR (T8.2 and T8.3).</p>
<p>Profile of key personnel</p>	<p>Matti Sarén (♂), President/CEO at Kajaani University of Applied Sciences (KAMK). Matti, a PhD in Computational material physics and an EMBA in Technology, has a nearly 10 yearlong carrier in University of Oulu, University of Helsinki and KAMK in Finland. Mostly working with research and project management, but also as faculty director, vice president and president. He is also a seasoned entrepreneur, with an over 20-year experience within start-ups and influential positions in well-established companies such as Metso Automation, DIMECC Ltd and Bittium Ltd. He holds 6 patents and is a member of the Finnish Physical Society.</p> <p>Mikko Kerttula (♂), Director of CEMIS - the Centre for Measurement and Information Systems. Mikko, a PhD in Technology and Master of Science, has his expertise within virtual design in the development of Personal Electronic Products. He is an experienced researcher and development manager from companies such as VTT Electronics, Nortel AS (prev. CCC Corporation Oy) and Rautaruukki. His experiences have later led him to a successful carrier as an entrepreneur with several start-ups and working as an Entrepreneur in Residence for VTT- Technical Research Center of Finland.</p> <p>Tanja Korhonen (♀), Education and Development Manager – KAMK. Tanja, a PhD student in Technology and Electrical Engineering, Information Processing Science, has a nearly 10 yearlong background in software design in Ponsse Inc. before starting her carrier in KAMK. Her expertise is in Information Systems and works both in R&D as well as teaching engineering students.</p> <p>Camilla Maunu (♀), Project Manager at the School of Information Systems. Camilla has a Master's in Military Sciences from the Finnish Defence University. During her army service she held several administrative roles on unit and regiment level. She has also a background in business, as the owner and CEO of several companies within construction. On municipality corporate development level, she has several years of experience of corporate project work and management.</p>
<p>Relevant publications, products, services or achievements</p>	<ol style="list-style-type: none"> 1. Kerttula, Mikko, "Virtual Design - A Framework for the Development of Personal Electronic Products", Academic Dissertation, University of Oulu. Espoo: VTT Technical Research Centre of Finland. 218 p. (VTT Publications 615.). ISBN 951-38-6863-X. http://www.vtt.fi/inf/pdf/publications/2006/P615.pdf 2. Kerttula, M., Battarbee, K., Kuutti, K., Palo, J., Pulli, P., Pärnänen, P., Salmela, M., Säde, S., Tokkonen, T., Tuikka, T., "New Product Development based on Virtual Reality Prototyping – Tuotesuunnittelu virtuaalimaailmassa (MET-julkaisu 13/99)", Helsinki, Metalliteollisuuden Kustannus Oy, 1999, 97 p, ISBN 951-817-719-8. 3. Kempainen J., Korhonen T. & Ravelin T. (2014). Developing Health Games requires multidisciplinary expertise. Finnish Journal of eHealth and eWelfare FinJeHew, 6(4), 200-205. 4. Leppänen, K., Kerttula, M., Tuikka, T., "Virtual Design of Smart Products", Helsinki, Edita Publishing Ltd - IT Press, 2003, 262 p, ISBN-951-826-688-3. 5. Korhonen T., Höykinpuro A. (2014). VirtuaaliKajaani 2.0 (Game). Available (31.12.2014): http://virtuaalikajaani.kajakdc.fi Suomi: Kajaanin Ammattikorkeakoulu.

Relevant previous projects or activities	<ol style="list-style-type: none"> 1. CEMIS (Centre for Measurement and Information Systems), 2010- 2. CSE (Clever Simulation Entertainment) 2011- 3. Serious Gaming Research Lab (TEKES) 2015-2016 4. RoboKai (EAKR) 2016-2018 5. VirtualKajaani (EAKR) 2010
Relevant significant infrastructure or equipment	<ol style="list-style-type: none"> 1. VR/AR-labatory resources: <ol style="list-style-type: none"> a. 3D modelling b. Photogrammetry c. 360-degree cameras d. VR-controllers and trackers 2. DC resources: <ol style="list-style-type: none"> a. Traditional datacentre b. Supercomputer 3. Robotics laboratory 4. Measurement and information systems department


4.1.13 Vrije Universiteit Brussel (VUB)

<p>VRIJE UNIVERSITEIT BRUSSEL</p>	
Website(s)	http://www.vub.ac.be/LSTS/
Description of the legal entity	<p>The multidisciplinary Research Group on Law, Science, Technology & Society (LSTS) was created in 2003 as an independent entity within the Faculty of Law & Criminology at the Vrije Universiteit Brussel (VUB). With more than 47 researchers at all levels of experience, LSTS has become a prominent European research institute in the area of technology regulation. LSTS has a well-established reputation in research concerning privacy and data protection, an area where the work done by LSTS researchers is highly influential. Other research areas at LSTS concern the impact of technologies and surveillance on fundamental rights in the Information Society, Intellectual property rights as they relate to the use of ICTs, the changing nature of law (digital legal theory) and the role of law in relation to science, technology and politics. LSTS researchers operate the Brussels Privacy Hub (www.brusselsprivacyhub.org), an internationally focused privacy research centre and the Privacy Salon, an NGO aiming at public awareness of privacy and other social and ethical consequences of new technologies. As part of the LSTS, researchers also operate the Brussels Laboratory for Data Protection & Privacy Impact Assessments, or d.pia.lab (http://dpialab.brussels), which connects basic, methodological and applied research, provides training and delivers policy advice related to impact assessments in the areas of innovation and technology development. Whilst legal aspects of privacy and personal data protection constitute our core expertise, the Laboratory mobilises other disciplines including ethics, philosophy, surveillance studies and science, technology & society (STS) studies. Predominantly the Laboratory's knowledge and expertise will be utilised in the project. LSTS and its staff have wide experience with conducting research projects of both a basic and an applied nature. To the extent needed, the core team can also draw upon the expertise of further staff members as well as the general resources of the Vrije Universiteit Brussel.</p>
Role of the entity in the project	<p>VUB is the leader of WP2 on the Social, Legal, Ethical and Privacy issues management. To this end, the main contribution of VUB will be, on the one hand, to ensure that FASTER platform respects the rights of users and, on the other, to monitor compliance of the project's research activities with the principles of responsible research and in line with the expectations, rights and the dignity of the research participants, including monitoring of societal acceptance and technology adoption. A key cornerstone of the VUB's activities in</p>

	the project will therefore be to ensure that the privacy and data protection rights of all individuals involved in the project are respected.
Profile of key personnel	<p>Prof. Dr. Paul De Hert (♂) is an international fundamental rights expert, with work on human rights and criminal and surveillance law, constitutionalism and the impact of technology on law. He is professor at Vrije Universiteit Brussel (VUB) and associate professor at Tilburg University where he teaches “Privacy and Data Protection” at the Tilburg Institute of Law, Technology, and Society (TILT). At VUB, he holds the chair of ‘International, European and Belgian Criminal Law’ and ‘History of Constitutionalism’. He is Director of the Research Group on Fundamental Rights and Constitutionalism (FRC), Director of the Department of Interdisciplinary Studies of Law (Metajuridica) and co-Director of the Research Group Law Science Technology & Society (LSTS). He is member of the editorial boards of several national and international scientific journals.</p> <p>Prof. Dr. Paul Quinn, (♂) is a researcher in law and technology and human rights law at the Research Group on Law, Science, Technology, and Society (LSTS). He is active in pursuing a number of his research interests at LSTS, including in areas such as data protection, privacy issues and problems related to stigmatization and discrimination. With respect to the first of these, he has developed an expertise in privacy and data protection issues in the area of health care delivery. He is in particular interested in the evolving use of patient data in health care delivery and has published a number of articles on these issues. In addition, in recent years he has been active a number of European research projects which have a strong focus on these themes. He is also interested on the role of the law in regulating scientific research, an interest that stems from his earlier scientific background.</p> <p>István Böröcz, LLM (♂) is a researcher at the research group on Law, Science, Technology & Society (LSTS). He is a member of the Brussels Laboratory for Data Protection & Privacy Impact Assessments (d.pia.lab). He obtained his LLM in Law and Technology at Tilburg University (2016) and his postgraduate specialist diploma in information and communication technology law at the University of Pécs (2015). He obtained his law degree (JD) at the University of Pécs (2013). He is interested in the notion of risk to the rights and freedoms of the individual along with the legal, theoretical and practical issues of Human Enhancement Technologies (HETs), with special focus on cognitive enhancement. He is involved in several EU co-funded research projects, such as STAR, MaTHiSiS, FORENSOR, SUCCESS and PARENT. He is a member of the ethical advisory board of the H2020 project CUIDAR (Cultures of Disaster Resilience among children and young people).</p> <p>Dariusz (Darek) Kloza, LLM (♂) is a full-time researcher with the Research Group on Law, Science, Technology and Society (LSTS) at Vrije Universiteit Brussel (VUB) and part-time with Peace Research Institute Oslo (PRIO). He also freelances at the Centre for Direct Democracy Studies (CDDS) at University of Białystok. His expertise concentrates on the governance of privacy and personal data protection, in particular on the notion of impact assessments for emerging technologies. He is a founding member of the Brussels Laboratory for Data Protection & Privacy Impact Assessments (d.pia.lab) at VUB-LSTS. He has been involved in a number of EU co-funded research projects, such as PIAF, ADVISE, EPINET, LASIE, FORENSOR, PARENT and MaTHiSiS. He holds both an LL.M. in Law and Technology (2010) from the Tilburg Institute for Law, Technology, and Society (TILT) at Tilburg University (with distinction) and a master degree in law from the University of Białystok (2008), having also studied at the University of Copenhagen (2007-2008).</p> <p>Eugenio Mantovani, LLM (♂) is a researcher in law and technology and human rights law. He has been involved in several FP7 and H2020 projects where he has been dealing with the ethical, psycho-social and legal, data protection and medical device aspects of technology developments, with particular focus on medical technologies and mobile technologies and on the implications of technology developments on vulnerable groups, such as the elderly. Eugenio is member of the ethical advisory boards of the FP7 project OPSIC (Operationalizing Psychosocial Support in Crisis).</p>
Relevant publica-	<ol style="list-style-type: none"> 1. Quinn, P, & Quinn, L. (2018) Big Genetic Data and its Big Data Protection Challenges

<p>tions, products, services or achievements</p>	<p>es. International review of law computer and technology (Accepted After Peer Review April 2018)</p> <ol style="list-style-type: none"> Quinn, P, (2017), <i>The EU Commission’s Risky Choice for a Non-Risk Based Strategy on Assessment of Medical Devices</i>, Computer Law and Security Review, 33, 3 361-370 Quinn, P. (2018) Crisis Communication in Public Health Emergencies: The Limits of ‘Legal Control’ and the Risks for Harmful Outcomes in a Digital Age, Life Sciences, Society and Policy. 14, 40 p., 4 2018 Quinn, P, (2017), <i>The Anonymisation of Research Data - A Pyrric Victory for Privacy that the EU Should Not Push Too Far</i>, The European Journal of Health Law, DOI: 10.1163/15718093-12341416 Mantovani, E, Quinn, P, (2013) <i>mHealth and Data Protection – The Letter and the Spirit of Consent Legal Requirements</i>, International Review for Law, Computers and Technology, Computer Law and Security Review, DOI: 10.1080/13600869.2013.801581
<p>Relevant previous projects or activities</p>	<ol style="list-style-type: none"> CYBER-TRUST - Advanced Cyber-Threat Intelligence, Detection, and Mitigation Platform for a Trusted IoT ALLADIN - Advanced hoListic Adverse Drone Detection, Identification & Neutralization PICASO - Technologies for a personal, coordinated care. The PICASO project is developing an ICT platform to support coordination of care plans for people diagnosed with co-occurring chronic diseases. FORENSOR - FORENSic evidence gathering autonomous sensor MATHISIS - Managing Affective-learning THrough Intelligent atoms and Smart InteractionS
<p>Relevant significant infrastructure or equipment</p>	<p>The VUB is a fully-fledged university. It has access to all associated facilities. This includes a fully equipped library and technical support department. It also allows the research group involved in the project access to a multi-disciplinary range of expertise and experience. The Brussels location of the university allows a convenient location for meetings and review rehearsals.</p>

4.1.14 University of West Attica (UWA)

<p>UNIVERSITY OF WEST ATTICA</p>	
<p>Website(s)</p>	<p>www.uniwa.gr</p>
<p>Description of the legal entity</p>	<p>The University of West Attica (abbreviated as UWA) founded as the result of merging two Technological Institutes (TEI of Athens and Piraeus University of Applied Sciences) of the country. The establishment of UWA aims at tackling the educational, social, cultural and developing needs of the country that are linked with the following cognitive fields (a) Social, Administrative and Financial Sciences, (b) Engineer Science, (c) Food Science, (d) Health and Care Sciences, and (e) Fine Arts Science. UWA now has 5 Schools and 26 Departments, constituting the third biggest university in Greece in terms of enrolled students.</p> <p>The CoNSeRT (CoMPUTER Networks & Services Research Team) was founded in 2016 and is part of the Communications & Networks Lab of the Electrical & Electronics Engineering Department of the University of West Attica (UWA). Its main objectives include</p>

	<p>research and teaching at both undergraduate and postgraduate level, establishment of appropriate infrastructures, participation in research programs, provision of services and inter-connecting with social, scientific and productive organizations on subjects related to the research focus of the Lab. It consists of young, undergraduate and postgraduate students, doctoral candidates and postdoctoral researchers, as well as collaborating faculty members, under the scientific supervision of Prof. Charalampos Z. Patrikakis. CoNSERT has been active in research focusing on the design and implementation of computer network and application solutions. The team consists of faculty members and researchers with great expertise in computer networking and EU research projects, with emphasis on IP networks, services and applications dealing with applications and services, mobile and wearable devices, internet of things and cloud computing. Prof. Patrikakis leading the research team, has more than 20-yr experience in R&D at both academic and industry levels in the areas of computer networks and multimedia, while the team is collaborating with professionals and other research groups at global level, working on joint research projects, supported by national and international research funds.</p>
<p>Role of the entity in the project</p>	<p>UWA's role in the project will be highly focused on technical issues, and in particular on topics related to resilient communications, design of smart textiles, gesture recognition and applications for mobile and wearable devices. The expertise of UWA's researchers in the design and development of mobile applications, APIs for providing access to sensory data and the deployment of textile solutions will drive the work in WP4 where UWA will lead the work. In particular, UWA will lead T4.2, where the design and development of a secure IoT framework for the communication of the sensors fused data will take place. Furthermore, UWA will lead T4.3 and T7.4 where issues related to the design and implementation of an edge computing framework over which processing of data (from humans and K9s) collected by wearables and mobile devices will take place in order to create situational awareness. UWA, exploiting the results of previous research, will also lead T6.3 regarding the design and development of a low-cost device that can enhance resiliency of the communications on the field between First Responders and citizens. Finally, the expertise of UWA's scientific coordinator Prof. Charalampos Patrikakis (senior member of IEEE and Associate Editor of IEEE IT professional Magazine – SIs), will be used in order to contribute to the maximisation of scientific impact, and in the planning of workshops and sessions in high impact conferences and journals.</p>
<p>Profile of key personnel</p>	<p>Assoc. Professor Charalampos Z. Patrikakis (♂), received his Dipl.-Ing. and PhD from the Electrical Engineering and Computer Science Department of NTUA, Greece. He is an Associate Professor at the Department of Electrical & Electronics Engineering of the University of West Attica. He has 20+ years of experience in international research projects, having participated in more than 32 national, European, and international programs, in 16 of which he has been involved as a technical/scientific coordinator or principal researcher. He has more than 100 publications in chapters of books, international journals and conferences, and has 2 contributions in national legislation. He is a member of the editorial committee of more than 50 international journals and conferences, has acted as editor in the publication of special issues of international journals, conference proceedings volumes, and coedited three books. He is a senior member of IEEE and a counselor of the IEEE student branch at the University of West Attica. Prof. Patrikakis has acted as scientific/technical coordinator in European projects, among them my-eDirector and SARACEN and is currently scientific coordinator of H2020 TRILLION project and Scientific and Technical Responsible of H2020 STORM project. He has also lead dissemination activities in many European projects; he is a member of many TPCs and editorial boards of international conferences and journals and has presented the results in academic and industry fora.</p> <p>Professor Maria Rangoussi (♀) holds a Diploma in Electrical Engineering from the National Technical University of Athens, Greece (1987), an MSc in Digital Signal Processing from the University of Virginia, USA (1990) and a PhD from the National Technical University of Athens, Greece (1994) in Digital Signal and Speech Processing & Pattern Recognition. In 1995 she has been a visiting researcher in the Institute of Electronics, Aalborg University, Denmark and in 1996 an adjunct lecturer in the Telecommunications Laboratory, Department of Electronic and Computer Engineering, Technical University of Crete,</p>

Greece. In 1998, she joined the Department of Electronics Engineering of the Technological Education Institute of Piraeus (now changed to Department of Electrical and Electronics Engineering of the University of West Attica), where she is currently serving as a tenured professor. She has a 20 years' experience in research and education and has been involved in a series of research projects under national and E.U. / international frameworks. She is the author of two textbooks and over 100 publications in the fields of Digital Signal Processing, Spectral Analysis, Pattern Recognition and their applications in various fields, with emphasis on Audio/Speech, Noise control and Biomedical Engineering. Her current research interests include Digital Signal Processing and Pattern Recognition algorithms and their applications in audio, environmental, biomedical engineering as well as in the characterization of new materials, structures and systems, via linear and non-linear processing methods. She is a member of IEEE, ISCA and the Technical Chamber of Greece.

Professor Savvas Vassiliadis (♂) holds a Diploma in Textiles, BSc in Electronics, and Dipl. Eng, degree in Electrical and Computer Engineering as well as a PhD in Computational Modelling. After a long industrial carrier, he joined the Department of Electrical and Electronics Engineering of the University of West Attica, Greece. Prof. Savvas Vassiliadis is author of more than 150 scientific articles published in international journals and presented in international conferences. He has published seven books and eight book chapters. His research activities include smart and multifunctional materials, computational modelling and new textile structures. He has participated in more than 35 national and international research and technological projects. Among them he has been project leader of the research project “*Applications of Textile Products with the use of Smart Materials for the Measurement, Indication and Control of Physiological Parameters* (PIMACTex-budget 800.000 Euros)”, Institutional Coordinator of the Marie-Curie 644268-ETexWeld-H2020-MSCA-RISE-2014 “*Welding of E-Textiles for Interactive Clothing*” (budget 1 million Euros). He is also a Management Committee Member of the COST action CA17107 “*Smart Textiles*”. Prof. Vassiliadis is a member of scientific committees of more than 65 international conferences and editorial boards of eight journals. Prof. Vassiliadis served as Head of the Department, as member of the Administration Council and as Vice Rector for international relations.

Dr. Michalis Feidakis (♂) holds a PhD in Affective Computing (University of Aegean), an MSc in Multimedia and Internet Computing (Loughborough University, UK) and a B.Sc. in Informatics (Athens University of Economics). He belongs to the lab teaching staff of the Department of Electrical & Electronics Engineering of University of West Attica (UNIWA). He is also an Adjunct Lecturer in the Postgraduate Program of the Department of Information & Communication Systems Engineering (University of the Aegean). He has been working as a researcher in the research groups eLearn Research Center and SMARTLEARN Research Group of the Open University of Catalonia (Universitat Oberta de Catalunya-UOC). In the past, he had an advisory role in the Information Society Office of the Ministry of Education (2004-2008), while he has also served as the National Coordinator of Asia-Europe Classroom Network (AEC-Net). His research focus is on the Affective Computing domain with applications in Computer-Supported Collaborative Learning (CSCL), holding several publications in national and international journals and conferences.

Dr. Dimitrios G. Kogias (♂) holds PhD in Computer Networks (University of Athens), an MSc in “Electronics and Radioelectrology” (University of Athens), and a B.Sc. in Physics (University of Athens). He is an Adjunct Lecturer and a Senior Researcher at the Department of Electrical & Electronics Engineering of University of West Attica (UNIWA). His research interests include Privacy and Security in Internet of Things (IoT), Cloud computing Blockchain and Human-centric networking. He has participated in more than 10 National and European projects and at many international conferences. His work has been published in international Journals and he has co-authored more than five book chapters.

MSc Maria Koukouli (♀) holds a Physics BSc (University of Patras) and an MSc in “Environmental Sciences” (University of Patras). She has been working since 2005 in the technical implementation of European projects and as Financial Project Manager. Her academic and professional interests are in the areas of environment, agricultural and regional development, Geographical Information Systems and Environmental Informatics and consulting. She has participated as co-author in several publications in national and international jour-

<p>Relevant publications, products, services or achievements</p>	<p>nals and conferences.</p> <ol style="list-style-type: none"> 1. P. Kasnesis, C. Z. Patrikakis and I. S. Venieris, "Changing Mobile Data Analysis through Deep Learning", in the IEEE IT Professional Mobile Data Analytics, vol. 19, pp. 17–23, 2017. 2. P. Kasnesis, C. Z. Patrikakis, I.S. Venieris, "PerceptionNet: A Deep Convolutional Neural Network for Late Sensor Fusion", in <i>Intelligent Systems Conference (IntelliSys) 2018</i>, 6-7 September 2018, London, United Kingdom (<i>accepted</i>) 3. C. Chatzigeorgiou, L. Toumanidis, D. Kogias, C. Patrikakis, E. Jacksch, "A Communication Gateway Architecture for Ensuring Privacy and Confidentiality in Incident Reporting", in the <i>1st International Workshop on the Internet of People and Things (IPAT 2017)</i>, June 7-9, London, 2017. 4. Patrikakis, C. Z., Konstantas, A., Kogias, D., & Choraś, M. (2017). "TRILLION project approach on scenarios definition for citizen security services", <i>International Journal of Electronic Governance</i>, 9(3-4), 267-282
<p>Relevant previous projects or activities</p>	<ol style="list-style-type: none"> 1. H2020-FCT-2014-RIA: TRILLION – "TRusted, Citizen -LEA coLLaboration over sOcial Networks", EC Project (H2020-FCT-2014), Ref. 653256. TRILLION proposes an open, flexible, secure and resilient socio-technical platform to foster effective collaboration of citizens and law enforcement officers. Using the TRILLION platform, citizens will be able to report crimes, suspicious behavior and incidents, identify hazards and assist law enforcement agents through active participation for achieving better urban security management. On the other hand, Law Enforcement Agencies (LEAs) will be able to detect incidents in a more efficient, content and context aware manner, locate onsite citizens, other LEA representatives and first responders communicate with them, request more information and assign them specific actions to address on-going incidents. – https://cordis.europa.eu/project/rcn/194841_en.html 2. H2020-MSCA-RISE-2014 – "Welding of E-Textiles for Interactive Clothing" The project aims to develop novel e-textile structures including transmission lines, sensors, actuators, microprocessors, personalized algorithms, on-body computing and user feedbacks in order to make a breakthrough towards development of interactive protective clothing and footwear that able to monitor health, activity, position of the user in the environmental risky situations, the welding technologies will be mainly used in three concepts: (i). Designing of transmission lines of e-textile structures; (ii) Integration of electronic elements (different sensors, actuators, microprocessors, data transmission and power supply systems) to textile structures; (iii) Design and development of whole e-textile system for protective clothing applications including interactive protective garments and shoes. – https://cordis.europa.eu/project/rcn/194179_en.html 3. ECoBox- "Emergency Communications Box": ECoBox is a novel way to communicate rescue instructions in cases of emergency, where there is no internet connectivity, be it wired or wireless, due to an unpredictable disaster, even if this happens combined with a complete power outage. It consists of a self-powered device, acting as a Wi-Fi access point. The device itself uses rotating names (SSIDs) for the Wi-Fi network to broadcast encrypted messages, which can be detected as nearby networks. A special (free to download) application, running on smartphones or smartwatches, decrypts the messages, constructing the emergency instructions that need to be followed by individuals or groups in distress. The encryption of the messages ensures the identity of the sender, thus not allowing ill-intended individuals to exploit the mechanic for malicious purposes. – https://consert.puas.gr/research/results/218-emergency-instructions-broadcaster 4. HanGeR – "Hand Gesture Recognition": HanGeR is a wearable application, used to capture and process motion data (3-axial accelerometer and gyroscope signals) from smart watches during hand movements (i.e., specific gestures). In particular, HanGeR exploits a Deep Learning model, in order to achieve real-time hand gesture recognition. The application is available in two versions: one for apple watches and one for android wear devices. – https://consert.puas.gr/research/results/115-machine-learning/232-

	<p><i>hanger</i></p> <p>5. W.A.M.P.A – “Wearable for Activity Monitoring of Productive Animals”: W.A.M.P.A is a neck-mounted wireless livestock monitoring device. Uses accelerometer and GPS data, which are transmitted wirelessly from the collar via a base station to a Central Node on the farm. Analysis of the data, can aid in detecting heats, monitoring feeding and rumination patterns, animal welfare and managing the health status of the farm. - https://consert.puas.gr/research/results/115-machine-learning/219-wampa</p>
<p>Relevant significant infrastructure or equipment</p>	<p>CONSERT Research team has developed early prototypes of</p> <ul style="list-style-type: none"> • an Emergency Communication Box, • a wearable device for productive animals, and • textile wearables that can measure biometrics inside the First Responders uniform (e.g. heart rate). <p>The experience from the implementation of these prototypes will be used in order to speed up the process of design and implementation of resilient communication devices and wearables for K9s, as regards manufacturing of FASTER project prototypes, thus avoiding unexpected delays.</p>

4.1.15 Ayuntamiento De Madrid - Policia Municipal (ADM-POL)

<p>AYUNTAMIENTO DE MADRID - POLICIA MUNICIPAL</p>	
<p>Website(s)</p>	<p>www.madrid.es/policia</p>
<p>Description of the legal entity</p>	<p>Ayuntamiento de Madrid (ADM), Madrid City Council (in English), is a public institution whose Police Department, MADRID MUNICIPAL POLICE, an armed force of civil nature with hierarchical structure and organization, is framed in the General Coordination for Security and Emergencies under the authority of Madrid City Council.</p> 

With a work force of 6500, Madrid Municipal Police is the largest local Force in Spain, whose main aim is to provide security in different areas, preventing and responding to civilian security problems and assisting victims, ensuring order and security during large influx of public events in collaboration with other security forces and organizers, road safety, community policing, criminal investigation, etc.

The force is organized in Inspections, Sub-inspections and Units. The operating Units are of two types: territorial and specialized. The city of Madrid is divided in 22 districts and each one of them counts with a Municipal Police Unit commanded by a high rank officer, except for the Centre District, which for operational purposes is divided into two Units.



All 22 Police District Units are primarily responsible for monitoring public spaces, ensuring normal living and preventing criminal acts, adding to this the tasks in administrative police, the coordination with the Body of Mobility Agents (Traffic Cops) in charge of directing traffic in the city and enforcing its rules.

Every District Police Unit includes a group of School Police Officers dedicated to protect minors and ensure safety in school environment, as well as a Citizen's Assistance Office where demands and complaints from citizens are immediately collected and processed, having regular meetings with the district associative network and citizen's representatives. This type of administrative and police decentralization claims that the organization is as close as possible to the citizen.



Furthermore, the institution includes 18 Specialized Units with functions to perform specific

tasks such as public safety, road safety and investigation of motor vehicles accidents, a judicial police, environment, gender and domestic violence, hate crimes, all of them providing support to other Units.



Madrid Municipal Police have stable relations with the main police networks and police organizations, either at national level (associations), or European, i.e. ENP (European Network Policewomen), CPE (Capital Policing Europe) and ECPN (European Capital Police Network), whose meetings around Europe frequently attends, as well as agreements, information sharing and frequent communication with many police forces both European and non-European.

Madrid municipal Police receives regular visits from many LEAs in order to share good practices, technology in use and working methods.

Moreover, Madrid Municipal Police keeps a close relationship with all Universities of Madrid (U. Complutense de Madrid, UAM, UPM, U. Carlos III, U. Rey Juan Carlos I and U. de Alcalá) and with other Universities or European institutions with which they have already worked with in previous FP7 or H2020 projects (i.e.: Queen Mary University, PRIO, Vrije Universiteit Brussel (VUB) etc).

Role of the entity in the project

The role of Madrid Municipal Police in this project is as PRACTITIONER (end user), mainly in the following tasks:

- Helping technical partners to define user requirements and designing the FASTER tools taking into account police expertise in a big city as Madrid and providing feedbacks on their usability and performance (T3.1 and T3.3)
- Supporting the Spanish pilot definition, planning and preparation. Also, testing and evaluate the final results in WP10.
- Disseminate and exploit the work among LEAs and own networks and participating in the Policy and recommendations task (T11.1, T11.3 and T11.5)

ADM will support the use case of collapsed building along with SUMMA.

Profile of key personnel

Ms Clara Pérez (♀) is a Police Officer since 2006 and currently working in the External Relations Section, she is actively involved in all the tasks related to EU Projects. Previously she was assigned to the Tourist Unit of Madrid Municipal Police and patrolling the city doing safety and security chores. Ms Pérez Graduated in Psychology by Universidad Autónoma de Madrid. She holds a master's degree in European Projects by Universidad Politécnica de Madrid and several training courses in almost every police field.

Relevant publications, products, services or achievements

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Relevant previ-

1. **PROXIMITY** (Policing against Racism, Xenophobia and other Forms of Intolerance);

ous projects or activities	<p>JUST/2015/RRAC/AG/BEST/9012. PROXIMITY aims to contribute to the prevention and fight against racism, xenophobia and other forms of intolerance, including hate crimes at local level, by increasing the capacities of local authorities and especially municipal police to identify and face these phenomena. Besides exchange and sharing of knowledge and experience, the project has as specific objectives to improve the identification and effective prosecution of racism, xenophobia and hate crimes in the cities, supporting local authorities and proximity policing, and to generate a practical Exchange Network and mutual learning, about how to face these challenges.</p> <ol style="list-style-type: none"> 2. ALADDIN (Advanced hoListic Adverse Drone Detection, Identification Neutralization); SEC-12-FCT-2016 (GA 740859). ALADDIN will study, design, develop, and evaluate, in series of complementary pilots, a counter UAV system as a complete solution to the growing UAV threat problem, building upon a state-of-the-art system and enhancing it by researching on various technologies and functionalities. 3. SURVANT (SURveillance Video Archives iNvestigation assisTant) ; FTI PILOT-1-2015 (GA 720417). SURVANT will deliver an innovative system that will collect the relevant videos from heterogeneous repositories, extract inter/intra-camera video analytics, enrich the analytics using reasoning and inference technologies, and offer a unified search interface to the user. An intuitive interface with a relaxed learning curve will assist the user create accurate search queries and receive the results using advanced visualization tools. Ethical management of personal data collected from surveillance videos is integrated in the system design. 4. LASIE (Large Scale Information Exploitation of Forensic Data); FP7. SEC-2013.1.6-1. The LASIE project will design and develop a novel framework to assist forensic analysts in their investigations. The envisaged framework will be based on automated technology for advanced data processing supported by an important human component in critical decision-making stages, as well as, legal and ethical aspects. The framework will consist of tools to automatically manipulate, analyse and fuse vast amounts of heterogeneous data acquired from different sources including CCTV surveillance content, confiscated desktops and hard disks, mobile devices, Internet, social networks, handwritten and calligraphic documents. The type of data considered includes text, images, video, audio and biometric information in multiple formats. 5. LETS-CROWD (Law Enforcement agencies human factor methods and Toolkit for the Security and protection of CROWDs in mass gatherings); SEC-07-FCT-2016 (GA 740466). LETS-CROWD will overcome challenges preventing the effective implementation of the European Security Model (ESM) with regards to mass gatherings. LETS-CROWD will be a security practitioner driven project, fostering the communication and cooperation among LEAs, first responders, civil protection and citizens in the fight against crime and terrorism during mass gatherings by a set of cooperation actions. The project will put citizens at the centre of the research and will assess and evaluate how security measures affect them, and how they perceive them, while respecting EU fundamental rights.
Relevant significant infrastructure or equipment	-

4.1.16 Servicio Madrileño De Salud (SERMAS) - Servicio De Urgencias Médicas De La Comunidad De Madrid (SUMMA)

SERVICIO MADRILEÑO DE SALUD - SERVICIO DE URGENCIAS MÉDICAS DE LA COMUNIDAD DE MADRID



Website(s)	http://www.madrid.org/es/transparencia/consejeria/servicio-madrileno-salud
Description of the legal entity	<p>The Spanish emergency rescue team is composed by several organizations that cooperate and coordinate for ERICAM-INSARAG emergencies, being led in this project by SERMAS-SUMMA (health related emergency services) but including also firefight services and a dog rescue association that act on their respective behalf under the coordination of SUMMA. ERICAM¹⁷ (Team of Immediate Response of Madrid Autonomous Community) is a direct intervention operational group able to offer immediate response concerning any large emergency taking place either in Madrid region or anywhere else in the world. It started in 2007, combining the ERIC (fast response team of firefight forces of Madrid region) and EIS (fast health response, SUMMA 112) and the search and rescue dog services. ERICAM was the first Spanish team to be awarded the UN INSARAG recognition since 2011 (together with UME), being also an USAR Module for urban search and rescue under the Civil Protection European Mechanism. ERICAM has successfully qualified and revalidated it over the years for acting on behalf of UN as an INSARAG network (International Search and Rescue Advisory Group)¹⁸ able to intervene in major international catastrophes following UN working methodology. This operational intervention group have successfully participated in several emergency earthquake rescue of the victims under debris services such as those that took place in the following earthquakes: Haiti (2010); Chile (2010); Lorca (2011); Ecuador (2016). SUMMA 112 belongs to the Region of Madrid Medical Services (SERMAS)¹⁹.</p> <p>Currently, Annika Coll Eriksson holds the head of the fire brigade of the Community of Madrid, composed of 1,300 professionals distributed by the 19 parks. Each fire station is assigned a "first intervention" area, which is where they go as the first option to any event. However, the resources, both material and human, are interchangeable and can be mobilized to any point in the community of Madrid in response to an operational need for emergencies.²⁰</p> <p>The emergency services of Madrid region work under established protocols of collaboration involving different emergency services such as health emergency services, firefight emergency services, civil protection, National Police, among other key first responders (depending on the emergency to be managed). Frequent training days, simulations, technical days and coordination meetings are held among the organizations involved in emergency services.</p> <p>Firefight forces of Madrid Autonomous Community is one of the organizations coordinated through the ERICAM²¹ network (Emergency and Immediate Response group of the Community of Madrid), involving different emergency services. ERICAM²² was created in 2007 with the goal to give a joint and coordinated response to catastrophes of the emergency organizations of the community of Madrid that occur both in some Span-</p>

¹⁷ See <http://www.comunidad.madrid/servicios/seguridad-emergencias/ericamemergencia-respuesta-inmediata-comunidad-madrid> 2nd July 2018.

¹⁸ See <http://www.insarag.org/>, 02nd July 2018.

¹⁹ Consejería de Sanidad. 2017. *Memoria anual de actividad del Servicio Madrileño de Salud Año 2016* Madrid: Viceconsejería de sanidad. Secretaría General del Servicio Madrileño de Salud.

²⁰ See <http://www.comunidad.madrid/servicios/seguridad-emergencias/cuerpo-bomberos-comunidad-madrid>, 23rd July 2018.

²¹ See brochure in <http://www.madrid.org/bvirtual/BVCM019269.pdf>, 2nd July 2018.

²² See <http://www.comunidad.madrid/servicios/seguridad-emergencias/ericamemergencia-respuesta-inmediata-comunidad-madrid> 2nd July 2018.

ish regions as well as in any country of the world. ERICAM has successfully qualified and revalidated it over the years for acting on behalf of UN as an INSARAG network (International Search and Rescue Advisory Group)²³ able to intervene in major international catastrophes following UN working methodology.

The group is composed of rescue personnel - firefighters, telecommunications specialist, logistics expert, dog guides and health personnel. This operational intervention group have successfully participated in several emergency earthquake rescue of the victims under debris services such as those that took place in the following earthquakes: Haiti (2010); Chile (2010); Lorca (2011); Ecuador (2016). ERICAM is in charge of the search and rescue of possible survivors buried in the rubble of urban catastrophes. It also deals with the emergency health services for them. These simulators, coordination and training activities will be used to support the development and testing of the solutions.

SUMMA is in charge of non-hospital or primary health care emergencies in Madrid region, including ordinary and urgent health transport services. SUMMA also coordinates the health emergency services, having successfully managed 1.044.459 calls in 2016. Around 6.5 million people receive the SERMAS services every year. Madrid region has around 1300 firefighters in 2018, distributed all over Madrid region in 19 firefight centres that coordinate in a common network.²⁴ In 2018 the Madrid firefight services have completed 1502 rescue services. Also, in 2018 more than one exercise of emulated emergencies were performed (532 exercises testing the emergency services).²⁵

The emergency services of Madrid region work under established protocols of collaboration involving different emergency services such as health emergency services, firefight emergency services, civil protection, among other key first responders (depending on the emergency to be managed). Frequent training days, simulations, technical days and coordination meetings are held among the organizations involved in emergency services that might be used as the basis for the tests and pilots of the technology developed by FASTER: wearables and smart clothing; drones and robots; Augmented reality; Communication; Control Centre.

The Spanish School of Rescue and detection with dogs (ESDP) is an NGO founded in 1995 by a group of professionals aiming to work with search and rescue dogs. The ESDP was formally constituted as an association in 1999, under article 22 of the Spanish Constitution (under of the Organic Law 1/2002, of 22 of March regulating the right of non-profit association), being registered on January 29 of 1,999 in the National Register of Associations with the number 164598.

The ESDP is a non-profit non-governmental organization (NGO) that aims to promote policies or actions aimed at promoting the development of excluded groups or at risk of exclusion, as well as to countries or communities considered impoverished. Its main areas of action are the development of initiatives in the field of training, advice and promotion, in the area of search and detection dogs in their different specialties, both in Spain, Europe or Internationally.

ESDP combines two complementary goals and consequent activities: emergency interventions and training, counselling and promotion, in the area of dogs' search and detection in their different specialties. To meet these objectives, the ESDP has a training section and an intervention section. The first is composed of experts, specialists in each of the areas they lead. The intervention section is composed of professionals who act in rescue and detection work, where they demonstrate the effectiveness of ESDP working methods and training techniques.

ESDP focused its initial efforts to compile and adapt the dog training techniques used by the proven most competent search and rescue canine units of the world, in order to develop the current methodological approach developed by ESDP. The ESDP has become the first reference organization regarding the training of canine search guides in Spain, having developed the first comprehensive training plan for groups of search and rescue

²³ See <http://www.insarag.org/>. 02nd July 2018.

²⁴ See <https://emergenciasmadrid.com/tipos-de-vehiculos/>. 2nd July, 2018.

²⁵ See 2017 Report http://www.comunidad.madrid/sites/default/files/memoria_2017.pdf. 2nd July 2018.

	<p>dogs. It is a homogeneous and reliable method to instruct the canine guides of all those rescue groups with dogs who wish to establish new units or improve the performance and operational capacity of the existing ones has been developed and shared over the years by ESDP.</p> <p>It should be noted that the majority of the ESDP instructors have participated in many interventions within and outside the national territory, in the emergency aid contingents that the Spain has sent to the earthquakes of Turkey (August and November 1999), El Salvador (January and February 2001), Algeria (2003), Morocco (2004) and Haiti (2010), Ecuador (2016), among others. ESDP works integrated in the ERICAM network when their intervention is required by the National Authorities in case of an emergency.</p>
<p>Role of the entity in the project</p>	<p>The Spanish emergency rescue team is expected to participate in all the phases of the development of the technology: ideation and requisite identification (in T3.1 and T3.3), iterative testing, validation processes and pilots, according to the requests of the developing team in WP10. SUMMA is the leader of the T10.3 on the pilot preparation and execution in relevant environments. Here, pilots able to properly test the technology will be also performed by the actual professionals intervening in emergency situations in emergency training fields. This configuration makes the Spanish team, namely medical health service, firefighters and association of volunteers, to be optimal for the purposes of the FASTER project as leader of the collapsed building use case (#pilot 1).</p> <p>SUMMA will also be involved in the dissemination and exploitation of the FASTER results (T11.1, T11.3) and in the policy and recommendations activity (T11.5).</p>
<p>Profile of key personnel</p>	<p>Annika Coll (♀) is the Chief of the Firefight forces of Madrid Autonomous Community. She has a degree in Architecture by Universidad Politécnica de Madrid (UPM), having worked in the design and analysis of fire protection measures for safe construction and has also built several structures. She is also the Area Responsible regarding ERICAM services and focal point of INSARAG (UN) of ERICAM, being thus in charge of the coordination of the emergencies managed by the ERICAM network. She has participated in several previous European projects, such as FIRE4, FIRE5, FIREFiGHT and FIRE IN. She has a large experience delivering expert talks and professional training. She has also participated in several UE training exercises, such as exercise ORION (2010, UK), TrimodexIII (Weeze 2016), Richter Caraïbes 2017 (Martinique) and several Table top exercises (TTX) (Austria, Finland).</p> <p>Aitor Soler Zimbrello (♂) is a firefight officer in the Region of Madrid (public body with more than 1250 professional firefighters). He has a degree on Civil Engineering by the Polytechnic University of Valencia (Spain, 2013). He has a Master in fire protection engineering by University of Comillas (2015) and a Master in Civil Protection in the railway field at the Polytechnique University of Valencia (2013). He is firefighter of Madrid Autonomous Region since 2004, being responsible of the Firefighters in the ERICAM (Fast emergency response aid group from Madrid for large catastrophes outside Madrid) since 2016. Responsible of specials units: RNBQ (Radiology, Nuclear, Bacteriology and Chemist Unit), USAR (Urban Search and Rescue Unit) and boats since 2016. Fire prevention area, 6 years. Deputy team leader in the International Search and Rescue Team, ERICAM, 5 years. Support in material acquisition control, 2 years. He is a frequent teacher in firefighters training courses: caving rescue techniques, dangerous goods, techniques for operations in collapsing buildings, interventions with aerial support, having also collaborated with the neighboring firefighter services and regular joint operations with the smaller services. He also participates in the preparation of the accreditation process for ERICAM as INSARAG Urban Search and Rescue team for the UN. Team leader in ERICAM ESP-1 team. Operational command in the international Urban Search and Rescue (USAR) missions.</p> <p>Ana Cintora (♀) is an expert health professional on emergency nursery. Ana Cintora has an extensive experience as health professional intervening in emergency situations, both in Madrid and in other locations where the services of ERICAM have been requested. Among her international duties, she participated in the emergency rescue services activated for Ecuador earthquake in 2016. She has also participated in an International</p>

Cooperation project at Bolivia's NGO "Hombres Nuevos" with the funding of Castile Leon Public Health Administration.

She has also been trained on Public Health, achieving a formal title awarded by the National Health School. She has also been formally trained on risk prevention. Additionally, she can perform as formal trainer, having the required training to perform as such. She has studied several specialized linked to emergency management of victims and care under different critical threats (both climate related and other) training programs. She belongs to the Research Commission of SUMMA 112, overseeing the nursery research of SUMMA 112. She participates in ERICAM and USAR team, having been included in several National and International emergencies.

Soledad Gomez de la Oliva (♀) has a degree in Medicine and Surgery by Complutense University (1989). She has more than 25 years' experience as Medical Doctor. She has also a Master in Public Health (1992) by Carlos III Institute and National Public Health School. She is also a medical specialist in Family and Community Medicine (2012). She has completed several training courses, including "Management of cardiac arrhythmias, Pediatric advance life support, and Basic course of catastrophes for doctors. She has specialized in Medical emergency care in patients in critical situation for the last 15 years. She is the Medical Care Coordinator of medical care management of the SUMMA emergency team, performing also as tutor of doctors in practice. She is coordinator of middle management at SUMMA 112. She has participated in 10 different Practice training under ERICAM, including several multiple victims' incident trainings. She has completed the translation of medical documentation of INSARAG equipment.

Susana Izquierdo (♀) is the President of the Escuela Española de Salvamento con Perro (ESDP), also Coordinator of the Training activities of the ESDP and is training dogs for search and rescue purposes since 1996, being also trainer of future dogs' trainers. She lectures on training of search and rescue dogs in collapsed structures and large areas for National University for Education (UNED) since 2011, among other relevant experiences as trainer and professor. She also has extended experience coordinating teams in emergency situations involving the search and rescue of victims using trained dogs. She is considered as one of the most relevant experts in dog training and search and rescue interventions using dogs both in Spain and Internationally, participating in many talks, Conferences and training activities both for public and private organizations.

López Arbesú, Mari Luz (♀) is the Manager of the Spanish School for the search and rescue dogs, overseeing the coordination and planning of all the training activities performed, both internally and targeting external stakeholders (including first responders and general population). She has been working in emergency interventions since 1989, being considered as one key expert regarding selection, training of dogs, training of trainer of dogs, together with communication and sensitization strategies on the work performed by both the search and rescue dogs and the School itself.

Relevant publications, products, services or achievements

1. Ana Cintora. International Catastrophes Group. 2017. "ERICAM. Grupo Internacional de Catástrofes Español", in *Rescate Vial* – n. 46, pp. 28-32.
2. Ana Cintora. 2015. "Enfermería y centros coordinadores de urgencias", in *Prehospital Emergency Care*.
3. Soledad Gómez de la Oliva has translated the medical documentation of INSARAG equipment:
 - The medical management of the entrapped patient with crush syndrome
 - Amputations and dismemberment
 - Identification of USAR medical personnel
 - Post mission medical reporting
 - Provision of medical care in an austere environment, specifically in a confined space
 - Recovery of deceased during USAR operations

	<ul style="list-style-type: none"> ○ The donation of medical supplies and equipment prior to demobilization <ol style="list-style-type: none"> 4. Izquierdo, Susana. <i>Operaciones de salvamento en hundimiento de edificios</i>. Ediciones GPS. Depósito Legal: M-27818-2009 5. Izquierdo, Susana. <i>Aprendizaje animal y métodos de educación y adiestramiento orientado a perros detectores, de seguridad y rescate</i>. Editorial Dickinson. ISBN: 9788490852347
Relevant previous projects or activities	<ol style="list-style-type: none"> 1. Early Intravenous Beta Blockers in Patients with ST-segment Elevation Myocardial Infarction Before Primary Percutaneous Coronary Intervention (Early Bami). 2014-2015 project funded by Carlos III Institute whose goal was the Randomized control trial for testing emergency medication in case of coronary failure. 2. SERMAS has participated in 25 previous H2020 RIA projects, including several ICT projects such as ACANTO, ASPIDE, BigMedilytics, WEAKID, MyCyFAPP
Relevant significant infrastructure or equipment	<p>The firefight Department of the Community of Madrid has 19 parks strategically distributed to respond to emergencies occurring in any municipality of the region, except in Madrid capital, Alcorcón, Leganés, Móstoles and Fuenlabrada, which have their Own fire department. In 2017, 14.459 interventions were completed. Among them, 1502 were search and rescue services.²⁶</p> <p>Madrid firefight forces have 348 vehicles, including light and heavy units depending on the risks confronted. Each vehicle is fully equipped for different emergency mitigations. 3 of the units incorporate ICT technologies able to support the adequate coordination required to confront major catastrophes.²⁷</p> <p>SUMMA has activated in Madrid the following regional emergency related resources over 2016: 82.043 services of mobile emergency services; 717 helicopter services; 36.104 fast response vehicles interventions; 106.409 medical care at home services; 7.953 nursery care at home services; 294.657 urgent health transportation; 2.899 special services; 1.930 life intermediate support health services. Firefight services involve 1300 professionals, 19 firefight centres forming an emergency network, using 348 firefight vehicles.²⁸</p> <p>Regarding specifically the earthquake emergencies material, the Spanish team available by United Nations contributes to the project with the SERMAS, firefight and dog rescue involved services materials, including established coordination processes, procedures and the required physical equipment and devices to successfully intervene in an emergency situation:</p> <p>The equipment provided to each volunteer that attends to National or International emergency situations, taking into account the limitations set by the capability of each participant to carry its own equipment:</p> <ul style="list-style-type: none"> • Water and food able to guarantee the self-supply of the participant for 7 days. • Communication devices adequate to set up a coordination centre, when arriving at the disaster area. • Radio systems to assure communication means among the emergency services adequate to be used in case the usual communications become inoperative after the catastrophe, such as autonomous electricity systems and satellite communication. <p>For locating people trapped in a collapsed structure:</p> <ul style="list-style-type: none"> • Geophones: they are seismic sensors that detect the presence of victims and locate their location under the ruins. • Telescopic poles with a search camera, which allow communication with the

²⁶ See http://www.comunidad.madrid/sites/default/files/memoria_2017.pdf, 23rd July 2018.

²⁷ See http://www.comunidad.madrid/sites/default/files/memoria_2017.pdf, 23rd July 2018.

²⁸ See http://www.comunidad.madrid/sites/default/files/memoria_2017.pdf, 2nd July 2018.

victims through the rubble.

- Along with the group there are two canine guides with dogs trained to search both living and deceased victims.

For the extrication of the victims:

- Specific devices such as drills, to open or remove walls and debris, additionally to others suitable for cutting, shoring, and lifting of loads in case of complex rescue situations.
- Complete immobilization material and material for height rescue in case of poly-trauma victims.
- Electro-medical equipment.
- Medication cases with fluid therapy, material for minor surgery and for emergency assistance in incidents involving multiple victims.

The technology will be tested in the below briefly described Spanish Civil protection School Training Camp (http://www.proteccioncivil.es/escuela-nacional/instalaciones/-/asset_publisher/jakrjONx6gHH/content/escuela-nacional-area-administrativa?inheritRedirect=false).




Description: The area to validate the technology simulates a Collapsed Structure Building with pieces of rubble; near Madrid, in the middle of a cross country, with the facilities of the National School of Civil Protection and accessible from the road A3.

The training Camp has the following characteristics:

- Collapsed Structures Area: Two zones of 7.500 m². More than 150 points of concealment. Underground galleries with a length of 240 m. Vertical access. Constructions that simulate collapsed buildings. With structures of five levels and 100 square meters per floor. Special area for shoring props movement of loads and breakage of plates. Landslide area of 4500 square meters
- Area of water
- Raft of 9.400 m³ with a Depth that in some áreas reaches 7 meters
- Simulation Accident Area: Surface 12.500 m²

If required by the project's needs, standing building might be located for adding up to this testing site.

4.1.17 French Academy for Fire, Rescue and Civil Protection Officers (ENSOSP)

<p>FRENCH ACADEMY FOR FIRE, RESCUE AND CIVIL PRO- TECTION OF- FICERS</p>	
<p>Website(s)</p>	<p>www.ensosp.fr</p>
<p>Description of the legal entity</p>	<p>The ENSOSP is the French Academy for Fire, Rescue and Civil Protection Officers that trains its 25 000 officers composing of volunteers and professional firefighters, along with its medical teams (nurses, physicians, pharmacists, and veterinarians). The Academy is in charge of initial (56%), lifelong (22%), and specialized trainings (12%). Other audiences include local authorities' representatives, government officers, business executives, French and international experts, and international firefighters. The Academy aims to meet the employers' requirements of qualified firefighters and those of Directorate of Civil Security of norms respect.</p> <p>Thanks to its own initiatives and partnerships with various entities, the ENSOSP forms technical advisors for fire and rescue services and proposes several Master Degrees in the areas of risk management, civil security law, and risk assessment in technological, biological, radiological, and chemical fields. Striving to achieve both expertise and excellence, the Academy proposes Fire-fighting training and first aid training using innovative simulation practical areas as urban, building and traffic road areas or medical emergency drills areas (SIMURGe); CRISE and risk management; Human resources management; CBNR and environmental prevention and preparedness; Operational management; Training for medical executives; Senior officers' training.</p> <p>The ENSOSP aims to be the leader in multiple networks, in order to be at the heart of break-through knowledge's integrations, exchanges, and identifications. As i.e., the Academy is an active member of the network of various national schools of public utilities, the network of Fire and Rescue Services, the European Fire Service Colleges' Association, the network of Fire and Rescue Services' Schools.</p> <p>The Academy's international cooperation concentrates on the 4 following fields: firefighters' trainings, civil protection, humanitarian assistance, and research and development projects.</p> <p>The school has, within it, a Centre for interdisciplinary studies and researches on civil protection (CERISC) which aims to conduct prospective on the fields of law, organizational management, operational and technical specialties. In addition to its team of researchers, PhD students and project managers (6 persons), ENSOSP also relies on its network of experts and referents and use an internet knowledge sharing tool called PNRs.</p>
<p>Role of the entity in the project</p>	<p>The ENSOSP is the national end user of the French government in fire, rescue and civil protection. As such, the ENSOSP will actively support the project by representing the practitioners' perspective. The ENSOSP's contribution as an end user will be complementary to those of other institutions because of his civil protection model which is specific but can also be extrapolated across Europe. To this end, ENSOSP will contribute on the case on flood in urban environment (#pilot 2) along with the Piedmont Civil Protection.</p> <p>The ENSOSP has already prepared a pilot scenario to be implemented on its training platform.</p> <ul style="list-style-type: none"> • Purpose: the purpose of this scenario is to provide firefighters with an opportunity to improve current response concepts, plans, and capabilities for a response to a structure fire. The scenario will focus on command and control coordination, critical decision making, and notifications and procedures necessary to choose the best way to find victims and extinguish the fire without being in critical area. • Scope: this scenario emphasizes the role of personnel in response to a confined fire which is not necessarily located and with unlocated victims to rescue. • Target Capabilities: scenario design objectives focus on improving understanding of a

	<p>response concept, identifying opportunities or problems, and achieving a change in attitude. This scenario will focus on the following design objectives:</p> <ul style="list-style-type: none"> ○ Improve victims detection, ○ Improve communication between frontline and rear base, ○ Improve safety of firefighters, ○ Assess flashover risks (smoke gas explosion, fire gas ignition). <ul style="list-style-type: none"> ● Detailed scenario: To be completed. <p>Material tests and operational trainings could be realized on the existing technical platform at ENSOSP site. This state-of-the-art educational and technical tool dedicated for emergency response training contains four fire and rescue stations with 64 fire engines, a control room and several small platforms over an area of 23 ha where more than 300 intervention scenarios can be tested. The existing platform includes in particular an urban area, a main road and a motorway, a villa and a building (5 levels - 4 floors). Full scale training exercises could take place on the existing residential area.</p> <p>Material tests and operational trainings could also be coordinated with the virtual platform.</p>
<p>Profile of key personnel</p>	<p>Mrs Audrey MOREL SENATORE (♀) is the Director of the CERISC in ENSOSP (staffing of 8 personnel) since its creation in September of 2013. She is Ph.D. In public law and she works in ENSOSP since October of 2008. She organizes and develops the research, the prospective and the innovation of the School. She manages the definition of the strategic politics of research, works and partnerships of search coordination (academics like Aix-Marseille University and industry). With her team, she livens up the scientific conceptualization of operational practices from the monitoring practices communities in the French fire and rescue counties. The animation of the territorial networks and the internal and external communication on the research and good practice feeds the National Portal of the Resources and the Knowledges (http://pnrs.ensosp.fr/) or the School Journal "<i>Perspectives</i>". She impulses projects of the Center in their administrative and legal or scientific implementation. She is also an expert with the Council of Europe concerning the questions relative to the legal framework of the human rights specially in saving of the populations. She is a graduate of the national Institute of the French National Institute for Advanced Studies in Security and Justice (INHESJ) in 2011. She was a professor (teaching and research) in public law for the Jean Monnet University (Saint-Etienne, France) before working for the French Civil Safety.</p> <p>Commandant Wilfried STEFIC (♂) is a project manager in research and innovation at ENSOSP at the CERISC, under legal status of attached of State Administration (administrative management corpus). He is a firefighter officer and has obtained a master in "engineering global safety management". He usually manages about a dozen of warrant officers in fire stations or services of the fire department. His thematic specialties are risk assessment for civil protection and training and development programs. For each mission, he designates a coordinator according treaty theme. He has also to communicate and increase the value of the mission. He works at ENSOSP since July 2018 and began his career as professional firefighter nine years ago. He was volunteer between 2005 and 2008. From first responder to commander of major fire-rescue operations, his experience for over thirteen years allowed him to understand "fire and rescue" thematic especially common risks such as search and rescue, structures fire or natural disasters and specialized risks such as CBRNE or emerging risks. As part of a consortium partnership with his fire department on the French National Research Agency's project "Intelligent and communicating real time diagnostics against compartments fires", he was able to animate a group composed of firefighters and scientists. He now livens up the scientific conceptualization of operational practices from the monitoring practices communities in the French fire and rescue counties. One of his missions is the animation of the territorial networks (academic, scientific or industrial) in the field of global security, especially as project manager of the European Union's Horizon 2020 project called "Fire-In" (Fire and Rescue Innovation Network).</p>
<p>Relevant publications, products,</p>	<p>ENSOSP annually published five issues of a magazine called "Perspectives - scientific books of ENSOSP". Each review is organized around twenty thematic articles containing the fields of the research centre studies: law, management and control of organizations, operational specialties or</p>

services or achievements	health. Again, those are operational officials, service managers or experts who write in a scientific target these different items.
Relevant previous projects or activities	<p>1. HyResponse (European hydrogen emergency response training programme for first responders); grant agreement No: 325348; coordinator: ENSOSP (France); parties: Air Liquide Advanced Business (France), University of Ulster (United Kingdom), Areva Storage Energy (France), Federazione Delle Associazioni Scientifiche e Tecniche (Italy), The CCS Global Group Limited (United Kingdom), Crisis Simulation Engineering SARL (France);</p> <p>The overall objective of HyResponse project is to support the successful implementation of hydrogen and fuel cell demonstration projects and market transformation by providing educational and practical hydrogen safety training to first responders and site operators. The expected outcomes and principal objectives are to:</p> <ul style="list-style-type: none"> • Develop and disseminate first responder hydrogen safety educational materials in Europe, • Build a European hydrogen training platform with mock-up real scale transport and hydrogen stationary installations on which will be realized full scale operational exercises, • Create a virtual reality platform reproducing entire accident scenarios and thereby testing the whole chain of command and communication between all members of the first responders' team, • Train European first responders, • Disseminate knowledge, • Write a final version of the European emergency response guide. <p>2. FIRE-IN (Fire and Rescue Innovation Network); grant agreement No: 740575; coordinator: Association Pegase, SAFE (France); parties: ENSOSP (France), Ministero dell'Interno (Italy), Bundesministerium des Innern (Germany), Global Fire Monitoring Center (Germany), Fraunhofer Gesellschaft (Germany), Pau Costa Foundation (Spain), Departament d'Interior – Generalitat de Catalunya (Spain), Scientific and Research centre for fire protection (Poland), Main School of Fire Service (Poland), Council of the Baltic Sea States Secretariat (Sweden), Swedish Civil Contingencies Agency (Sweden), Kentro Meleton Asfaleias (Greece), Ceska Asociace Hasicskych Dustojniku (Czech Republic), Inno TSD (France);</p> <p>FIRE-IN has been designed to raise the security level of EU citizens by improving the national and European Fire & Rescue (F&R) capability development process. FIRE-IN addresses the concern that capability-driven research and innovation in this area needs much stronger guidance from practitioners and better exploitation of the technology potentially available for the discipline. We argue that this is to be achieved by practitioners more effectively coordinating on operational needs, on available research and innovation, on standardisation, and on test & demonstration and training. Further, we claim the need for the development of a common research culture that is to be achieved by better cooperation between practitioner and research/industry organisations. FIRE-IN addresses these objectives through main areas of activity:</p> <ul style="list-style-type: none"> • The identification and harmonisation of operational capability gaps based on the contribution provided by a significant and heterogeneous practitioner network, • The identification of promising solutions to address those gaps through monitoring and screening of research outcomes and the continuous involvement of research and industry representatives, • The definition of a F&R Strategic Research and Standardisation Agenda (SRSA) based on the previous elements as well as the development of a concept for more efficient use of test & demonstration and training facilities to support innovation and joint skill development. <p>The overarching result of the project will be a proven process for organising F&R capability-driven research based on a wide practitioner and research and innovation network.</p>

The network will be linked at cross-domain and cross-border level and will feed harmonised operational requirements (or challenges) into national and EU capability development, i.e. research, innovation, procurement and standardisation programmes.

Relevant significant infrastructure or equipment

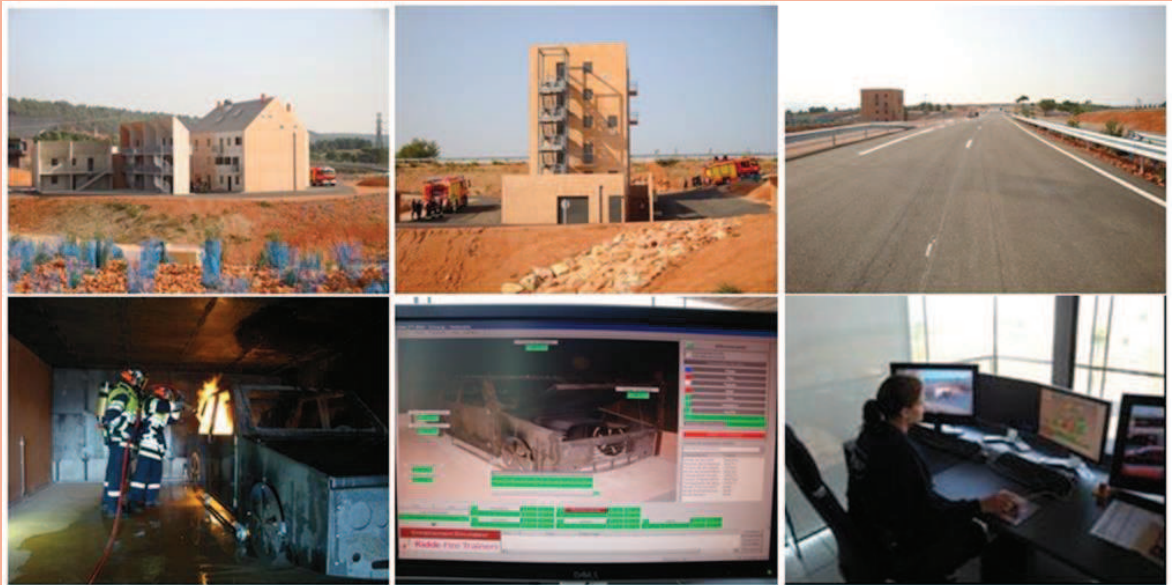
1. National portal of resources and knowledge (PNRS)

ENSOSP has developed a technical tool, based on internet technology, whose purpose is to network all the officers of French firefighters. It is the national portal of resources and knowledge (PNRS), organized in twelve thematic platforms and offering for each tools such as publications of articles, a calendar of events, forums or FAQs, a directory and structured spaces for studies or documents.

The technical part of the tool has been developed by a service provider, on the recommendations of CERISC. The current is maintained today by internal teams of the school but especially the CERISC has in charge its animation through its established networks. It's a real expertise for 7 years which was developed around the tool, these applications and benchmarking the network.

2. Operational training platform of ENSOSP

The operational training is realized on the technical platform at ENSOSP site, a state-of-the-art educational and technical tool dedicated for emergency response trainings. It contains four fire and rescue stations with 64 fire engines, a control room and several small platforms over an area of 23 ha where more than 300 intervention scenarios can be tested. The existing platform includes an urban area, a main road and a motorway, a villa and a building (5 levels - 4 floors).



Photos of ENSOSP's operational training facilities.

3. Virtual training platform of ENSOSP

The ENSOSP is using a 3D virtual reality serious game to train officers in virtual environments to face common risks and also specific risks such as radiological, nuclear or chemical in an interactive use and in real time for different sites such as classified SEVESO (chemical risk), port, airports... International training sessions have been held between French, US and Australian fire fighters for HRO and doctrine comparison studies, international training sessions are regularly held for practicing international cooperation, typically like wildfires going to/from France to Spain or Italy.



Snapshots of 3D Virtual Reality Serious Game training at ENSOSP’s virtual facility.

4.1.18 Police Academy in Szczytno (WSPOL)

POLICE ACADEMY IN
SZCZYTNO



Website(s)

www.wspol.eu

Description of the
legal entity

Police Academy in Szczytno (WSPOL) is a public institution of higher education—a university of state services, within the meaning of the Act of 27 July 2005—Law on Higher Education (Journal of Laws No. 164, item 1365), supervised by the Ministry of the Interior, as well as a Police organizational unit within the meaning of the Act of 6 April 1990 on the Police. For several years, it has been a major educational and scientific centre of the Police. Police Academy in Szczytno has two faculties, i.e. Faculty of Internal Security and Faculty of Police Applied Science.


Police Academy in Szczytno has 60 years of experience in training police officers of the uniformed services in Poland. It is the only facility of its kind in the country, which trains executives and top-class police officers. Experienced university lecturers conduct classes in the field of legal sciences (e.g. criminal law, criminology, constitutional law, civil law, administrative law, economic law), humanities and social sciences (including psychology, sociology, professional ethics, foreign languages) and vocational subjects (prevention tactics, tactics of fighting crime, traffic safety). Students also undergo training in tactics and police intervention techniques, shooting, handling of police communications equipment and information systems. The Academy offers nearly 100 types of different courses.

Police Academy has been the host of numerous scientific conferences, seminars, symposia, scientific workshops, involving representatives from Polish and foreign universities, which attract many participants. Large amount of knowledge is contributed to these events by experienced academics and officials of other uniformed formations, which are responsible for the security of the country and cooperate with the police daily. These joint

	<p>events provide an important forum for the exchange of knowledge and experience.</p> <p>An important aspect of functioning of the Academy is establishing and maintaining relations with foreign schools and police academies. The Academy is an important research centre for the needs of the Police, reckoned with both in the national and international arena. The Academy cooperates with police officers from, inter alia, Germany, France, Slovakia, Hungary, Russia, Ukraine, USA, and the Kingdom of Saudi Arabia. Police Academy in Szczytno is the only school educating police officers in Poland which belongs to the Association of European Police Colleges (AEPIC) since 2003. Moreover, our Academy actively participates in numerous events organized by the European Police College (CEPOL). The Academy has also acceded to the European Police Learning Net (EPLN).</p>
<p>Role of the entity in the project</p>	<p>As law enforcement and end users representative WSPOL's contribution in the project is in:</p> <ul style="list-style-type: none"> - WP3 - tasks 3.1 and 3.3 where end user requirements for the system will be incorporate and tools usability and performance will be assessed; - WP10 - tasks 10.1, 10.2, and 10.4 supporting the- practical operation test of the system and its technical components; - WP11 - tasks 11.1, 11.3, and 11.5 - popularisation and demonstrations during international fairs and scientific conferences also publication information about the project. <p>Moreover, WSPOL will support the use case on flood in urban environment (#pilot 2) and will provide a user prospective to the T8.3 on the definition of the tools for enhanced situational awareness in the control centre.</p>
<p>Profile of key personnel</p>	<p>Lt. Prof. Jacek Dworzecki, PhD (♂) – professor extraordinary of the Police Academy in Szczytno, a lieutenant of the Polish Police. He obtained his MA degree in 2004 in the field of physical education at the Physical Education Academy in Katowice. In 2008 he graduated from Pedagogical Academy in Czestochowa and defended his doctoral dissertation and got PhD degree in the field of history. Since 2014 he has been professor extraordinary of the Police Academy in Szczytno, after receiving the title of <i>Doctor habilitatus</i> in the science of security (Academy of Police Force in Bratislava, 2012). In 2017 he received from the President of the Slovak republic the title full professor in the field of protection of persons and property. During the years 2004-2014 he worked at the Regional Police Headquarters in Katowice as a self-defence expert, police negotiator and the head of the crown witness protection section. Since 2014 he has been employed as a lecturer at the Institute of Social Sciences of the Faculty of Administration at the Police Academy in Szczytno. For many years he has successfully cooperated with institutions mainly from Czech Republic, Slovakia and Hungary. Author of 224 peer-reviewed scientific papers (monograph, articles, research reports).</p> <p>Maj. Przemysław Wrzosek (♂) – a major of the Polish Police. Graduated from Police Academy in Szczytno and Gdańsk University. He participated in many trainings in fields of terrorism, criminal terror and crime (e.g. <i>Police actions and international cooperation within mass events</i> organized by Dutch Police, Amsterdam, Deventer, Apeldoorn, <i>De-radicalisation of Foreign Fighters</i> organized by CEPOL, British Police, Birmingham, <i>Bioterrorism intelligence</i> organized by Interpol Lyon). He took part in many 7FP European research projects on internal security issues concerning organised crime and terrorism threat and its combating. He possesses great job-related skills as investigative interviewing and interrogation skills, information analysis, criminal analysis and investigation skills - acquired through own learning, professional trainings, hard work and 26 years' experience of the police service.</p>
<p>Relevant publications, products, services or achievements</p>	<ol style="list-style-type: none"> 1. J. Dworzecki, M. Marcinek, <i>Technical aspects of use of selected specialist equipment intended for road-side rescuing</i>, New York 2015, wyd. Iglobal Writer Inc. & Pro Pomerania Foundation, 176 p, ISBN: 978-83-63680-77-0. 2. <i>Safety Engineering. Selected Aspects</i>, (Ed.) J. Dworzecki, New York 2014, pub. Iglobal Writer Inc. & Pro Pomerania Foundation, 126 p., ISBN: 978-83-63680-13-8.


	<ol style="list-style-type: none"> J. Dworzecki, <i>Traffic in Poland. Diagnosis of safety components</i>, [in:] <i>Metodológia a metodika analýzy zdrojov ohrozenia vnútornej bezpečnosti SR</i>, Bratislava 2011, pub. Akadémia Policajného zboru v Bratislave, pp. 66 – 74, ISBN: 978-80-8054-517-8. J. Dworzecki, <i>Crisis management system in Poland</i>, „The science for population protection”, <i>Lázně Bohdaneč</i> no 2/2012, pp. 5 – 20, ISSN: 1803-568X. J. Dworzecki, <i>The role of Military Police in the Slovak system of internal security. Reseach Report</i>, „Zeszyty Naukowe”, pub. Wyższa Szkoła Finansów i Prawa, Bielsko-Biała 2016, no 4, pp. 174-203, ISSN 2084-1809.
Relevant previous projects or activities	<ol style="list-style-type: none"> TAKEDOWN – Understand the Dimensions of Organised Crime and Terrorist Networks for Developing Effective and Efficient Security Solutions for First-line-practitioners and Professionals (H2020-FCT-16-2015-700688) SECTOR – Secure European Common Information Space for the Interoperability of First Responders and Police Authorities (FP7) CAMINO – Comprehensive Approach to Cyber Roadmap Coordination and Development (FP7) Preventing and combating organized crime and terrorism in the conditions of a secure, accelerated and sustainable socio-economic development National Security System of the Republic of Poland
Relevant significant infrastructure or equipment	-

4.1.19 Kajaani Kaupunki (KAJ)

<div style="display: flex; align-items: center;"> <div style="flex: 1;">KAJAANI KAUPUNKI</div>  </div>	
Website(s)	www.kajaani.fi
Description of the legal entity	Regional rescue services have a Kainuu Rescue department for carrying out the duties of rescue services. It is one of the 22 rescue services regions in the country. Rescue Department have in total 13 fire stations in the region and approximately 220 personnel (including full-time and contract). The administrative leader of the rescue department is the municipality of Kajaani and the rescue board has representatives from all over The Kainuu region.
Role of the entity in the project	The main role of KAJ in FASTER will be to lead the use case on the indoor disaster (#pilot 3). Thus, the largest part of KAJ effort is allocated to WP10 (all tasks). The rescue department, including firefighters and police department, will participate in supporting the Finnish scenario of the FASTER project offering resources and specific information/data to first rescue units which are responding to in the event an accident or in the event of a potential hazard (for example automatic fire alarm in building). This kind of information/data will give to incident commander important support for decision making and it's saves at the same time vitally important time. This work is based on previous experience as project partners.
Profile of key personnel	Janne Heikkinen (♂), Chief of Risk Management of Rescue department. He has more than 10-years' experience in accident prevention and fire inspections.
Relevant publications, products, services or achievements	Structural expert in fire prevention in Kainuu region.
Relevant previous projects or activities	<ol style="list-style-type: none"> KAT-project, which offers safety services for elder people who are living at home

	2. Fire investigation leader in Kainuu Rescue department
Relevant significant infrastructure or equipment	-

4.1.20 Hellenic Rescue Team Attica (HRTA)

HELLENIC RESCUE TEAM ATTICA	
Website(s)	www.eodathens.gr
Description of the legal entity	<p>Hellenic Rescue Team of Attica or HRTA is a union of citizens and a community centre, consisted entirely of volunteers that wish to offer their time, expertise, knowledge and personal effort in assisting fellow citizens in case of an emergency. It is an independent, non-profit organization that operates mostly for Search & Rescue (SAR) in three main fields: Wilderness (mountains, forests, non -urban areas), Water (open sea, coastline, rivers, lakes, floods) and Urban (earthquakes, floods, tsunamis). For each field of operations there is a corresponding element of highly trained individuals, ranging from level-1 support members to level-4 fully operational members, all acting as a team and tailored to each specific operation at hand.</p> <p>The Wilderness SAR division is manned with experienced mountain guides, climbers, hikers, 4x4 drivers and support members, all volunteers with the same objective – to help save lives. Predominantly challenging is the "vertical" field requiring technical climbing techniques and special rescue equipment, on which team members are specifically trained and capable of performing the rescue under all conditions.</p> <p>The Water SAR division is responsible for operations in the open sea, in inland lakes, rivers and floods, staffed with experienced scuba divers, lifeguards, speed craft pilots, sailors, whitewater guides and support members. The HRTA members often collaborate with the Hellenic Coast Guard. Our team members have excellent scientific and technical skills, but special training is necessary. After long-term intensive training, our members can be involved in coastline research, and water surface search, by foot or on boat. Experienced divers can contribute in the subsurface research, by using scuba equipment and ROVs.</p> <p>The Urban SAR provides the location, extraction and initial medical stabilization of victims trapped in confined spaces due to natural disasters, structural collapse, transportation accidents, collapsed trenches and mines. HRTA has developed a training program both theoretical and practical, based on the international accepted INSARAG and FEMA guidelines and manuals. We always try to involve and receive assistance in our training courses from related field professionals: fire services, construction and demolition engineers and technicians, civil and structural engineers, addressing a wide variety of specialized tools and equipment.</p> <p>All HRTA members/rescuers attend mandatory certified Basic Life Support (BLS) training courses by international certification associations, such as the American Heart Association (AHA), the Emergency First Response (EFR), etc, and keep it valid with re-certifications every two years. Additionally, in order to obtain the best results in operations we have created collaborations with more advanced first aid programs like: Wilderness Advanced First Aid® by American Safety and Health Institute, or Casualty Care in Mountain Rescue by BASICS, Pre-Hospital Trauma Life Support - PHTLS® - National Association of Emergency Medical Technicians and Trauma First Response program and many HRTA members</p>

	<p>are certified in these programs. This enables HRTA to provide first-aid assistance to large-scale events, such as annual running and biking competitions or even the WRC Rally Acropolis. Several members have special certifications corresponding to specific SAR fields, such as car extrications and Rescue Diver specialties. Finally, the telecommunication infrastructure of SAR teams is usually manned by members that are licensed radio amateurs, providing constant and reliable contact between the teams in the field, the operations centre and the proper authorities, in Greece.</p> <p>HRTA is registered with the General Secretariat Civil Protection (GSCP) of Greece. HRTA collaborates closely with EMAK (Fire Service Special Task Force responsible for SAR) and other Firefighting Services in common exercises, training and operations. Also, HRTA is actively involved in the JRCC (Greek maritime Search and Rescue) action plan.</p>
Role of the entity in the project	<p>HRTA is a first-responder & rescue volunteer organization with many years of experience in Search & Rescue (SAR) operations in Urban, Wilderness and Sea theaters, in close collaboration with the authorities, including the Civil Protection of Greece and the Special Task Force (EMAK) of Fire Service for disaster response. As such, HRTA will act as a domain expert in these fields for the consortium, providing insights and team-level viewpoint in terms of requirements, top-level specifications and safety procedures. It will also act as an integrated operator, end-user and demonstrator of the new procedures and technologies that will be designed & developed during this project. HRTA will support the use case on the collapsed building (#pilot 1). Finally, it will act as a society-level disseminator for related SAR organizations and the public in Greece via participation in open events and educational sessions presenting the project and its results.</p>
Profile of key personnel	<p>Mr Spyros Chrysanthopoulos, (♂), HRTA co-founder and current President. S.C. was born in Patras, Greece, in June 1972. His educational status includes a diploma in TV and Radio Electronics. He is an advanced First Aid Provider certified by NAEMT (“Pre- Hospital Trauma Life Support”), a White Water Rescuer (“Rescue 3”) and is also certified by PADI as a Rebreather and Rescue Diver. From 1990 to 1998 he was employed by a local TV Station as a TV Technician. From 1998 to date he has been an employee of Alpha Bank Greece. His interests entail to sailing, canyoning, rafting, scuba diving and music. In 1999 he co-founded the Hellenic Rescue Team Attica. As a rescuer, he has participated in numerous Search and Rescue missions, including the floods in Athens (2007, 2011, 2017), the wildfires in Attica (2018), mountain running races, mountain biking races, canoe and kayak races, Acropolis Rally, Olympic Games 2004, etc.</p> <p>Mr Theofanis Kapetanakis, (♂), HRTA member since 2008 and active Operations Manager. T.K. was born in November 1983 in Athens. He is a final year student in the Physics Department of the University of Athens. Since 2012 he has been employed as a linesman while already being member of the Hellenic Rescue Team of Attica since 2008. From 2010 to 2013 he was the 2nd in charge Operations Manager, assisting in the planning of training and exercises on Mountain Search and Rescue. Since 2014 he has been the Operations Manager directing almost all search and rescue operations. Since 2011 he has participated in several Cave rescue and Canyon rescue missions and in 2014 he became a member of Cave Rescue and Canyon Rescue Committee of Hellenic Federation of Speleology. He is a First Aid Instructor certified by EFR (Emergency First Response) Organization and a Dive Master and Discover Scuba Diving Leader certified by PADI. He also has a certification in whitewater rescue from RESCUE 3 International. In his free time he practices Speleology, having a certification in level "Team Leader" and "Cave rescue Team Leader", canyoning, at the level of "Assistant Instructor" from International Canyoning Organization for Professionals (ICO Pro). He works as a Supervisor for Rope Access Technicians in Greece (as an IRATA level 3).</p> <p>Dr Charilaos Georgiou, (♂), HRTA member since 2010 and active LEAR (team coordinator) in a “citizen observatories” project (SCENT) for civil protection and flood events management via intelligent crowd-sourcing and AI-enabled integration web platforms. C.G. received his B.Sc. degree in Informatics from University of Ioannina, Greece, in 1997, and his M.Sc. degree in Digital Signal Processing & Computer Systems and Ph.D. degree in Machine Learning & Medical Imaging, from National & Kapodistrian University of Athens,</p>

Greece, in 2000 and 2009, respectively. Since 1998, he has been working as an associate researcher, primarily with the Department of Informatics & Telecommunications at National & Kapodistrian University of Athens (NKUA/UoA), Greece. He has been actively involved in several national and EU-funded research & development projects, focusing on new and emerging technologies in medical imaging and AI applications. He has completed a 3-year post-doctorate research appointment with NKUA, specializing in sparse learning models and fMRI/EEG signal for applications in Biomedicine and Bioinformatics. Since 2016 he has been working with the Informatics Dept. of Univ. of Piraeus on another post-doctorate research position on Big data analytics & Machine Learning, focusing on emerging technologies and innovation for next-gen air traffic management & control (ATM/ATC) systems by trajectory prediction, maritime surveillance, urban mobility, human flows and large-scale sensory networks. Since 2004 he has been working in the private sector for many years as a consultant in Software Engineering and Quality Assurance (EDP/IT), as well as a professor in various ICT-related subjects. His main research interests include Machine Learning, Pattern Recognition, Signal Processing, Medical Imaging, Soft Computing and Game Theory. He has published 57 peer-reviewed journal & conference papers plus 61 independent & open-access works, technical reports, magazine articles, software toolboxes and open-access datasets, a two-volume book series on medical imaging and diagnostic image analysis, contributed in three other major books and one U.S. patent in related R&D areas. He has been a member of technical committees in international scientific conferences and has given several technical presentations in various countries. He is a member of HRTA since 2010, a certified Open Water Diver (PADI), certified first-responder (EFR, RTI) for Basic Life Support (BLS/CPR/AED), emergency oxygen provider and Paediatric BLS & first-aid (children & infants). Over the years he has been deployed for rescue, first-aid provider & humanitarian aid as a volunteer in Ghana (2011), Lesbos (2015-2016) and wildfires in Attica (2018). He is also a member of the Hellenic Informatics Union (HIU) since 2003 and serving as General Secretary of its Board since 2015, including coordination of its ICT4D group activities.

Relevant publications, products, services or achievements


1. “Scent: Smart Toolbox for Engaging Citizens into a People-Centric Observation Web”, Harris Georgiou, Thanos Konstantakis, Angelos Amditis, Athanasia Tsertou, et.al. 21st Panhellenic Conference in Informatics (PCI 2017), 28-30 Sept 2017 @ Larissa, Greece.
2. “Scent: Smart Toolbox for Engaging Citizens into a People-Centric Observation Web”, Harris Georgiou, Thanos Konstantakis, Angelos Amditis, Athanasia Tsertou, et.al. 2017 SafeAthens: New technologies for Civil Protection services (SafeAthens 2017), 28-30 June 2017 @ Athens, Greece.

Relevant previous projects or activities

1. **SC5-17-2015-IA: SCENT – “Smart Toolbox for Engaging Citizens into a People-Centric Observation Web”** – EC Project (SC5-17-2015), Ref. 688930. Whilst citizen participation in environmental policy making is still in its infancy, there are signs of a growing level of interest. The majority of citizens, though, both as individuals and as groups often feel disengaged from influencing environmental policies. They also remain unaware of publicly available information, such as the GEOSS or Copernicus initiatives. The SCENT project will alleviate this barrier. It will enable citizens to become the ‘eyes’ of the policy makers by monitoring land-cover/use changes in their everyday activities. This is done through a constellation of smart collaborative technologies delivered by the SCENT toolbox in TRLs 6-8: i) low-cost and portable data collection tools, ii) an innovative crowd-sourcing platform, iii) serious gaming applications for a large-scale image collection and semantic annotation, iv) a powerful machine-learning based intelligence engine for image and text classification, v) an authoring tool for an easy customization by policy makers, vi) numerical models for mapping land-cover changes to quantifiable impact on flood risks and vii) a harmonization platform, consolidating data and adding it to GEOSS and national repositories as OGC-based observations. SCENT will be evaluated in two large scale demonstrations in Kifisos Attica and Danube Delta. Our consortium covers the complete stakeholder chain: industries in machine learning (IBM), SMEs in crowd-sourcing (U-Hopper), gaming (Xteam) and awareness raising (Carr), leading research institutes with expertise in hydrodynamic modelling (UNESCO-IHE), data harmonization and authoring tools (ICCS) and envi-

	<p>ronmental monitoring (DDNI), NGOs at the pilot sites (HRTA, SOR) and policy makers/public bodies (Region of Attica). The SCENT initiative will go beyond the current project and form a European-wide citizen movement, created and fostered by the SCENT stakeholders, that will ensure its sustainability and its complementarity with existing citizen partnerships. – https://scent-project.eu/, https://cordis.europa.eu/project/rcn/203260_en.html</p>
<p>Relevant significant infrastructure or equipment</p>	<p>Field-specific equipment available for SAR.</p>


4.1.21 Município de Grândola (MG)

<p>MUNICÍPIO DE GRÂNDOLA</p>	
<p>Website(s)</p>	<p>www.cm-grandola.pt</p>
<p>Description of the legal entity</p>	<p>MG is an entity of the local administration, with attributions in the areas of patrimony, culture and science and civil protection among many others. It is incumbent upon its executive body, the City Council, "to ensure, including the possibility of forming partnerships, the survey, classification, administration, maintenance, recovery and dissemination of the natural, cultural, landscape and urban heritage of the municipality, including the construction of monuments of municipal interest". The Municipality of Grândola is the entity that coordinates the Municipal Civil Protection Service and is responsible for the elaboration of the main planning instruments of the municipality of Grândola (826 km²).</p> <p>MG not only has a wide territory (826 km²), also has different realities:</p> <ul style="list-style-type: none"> – A continuous sand cost line with 43 km that starts in a river delta with a wide range of natural and man-made risks, like storms, floods (costal and river) and tsunamis; – Located in one of the most seismic areas of Portugal with an active fault; – The cost line is crossed by the major maritime transshipment routes towards Sines harbour with tens of thousands of cargos and dangerous materials, like crude oil and natural gas; – The territory is crossed by the most important communication routes in Portugal, both roads and railways, used not only by persons but also for the cargo that's arrives in the Sines harbour and for fuel (gasoline and diesel) stored and produced in the Sines refinery; – Crossed, from south to north, by natural gas pipeline; and – A wide forestry area highly exposed to forest fires. <p>As said, among the many tasks of the municipality, the Civil Protection coordination is one of the most important, mainly due to the wide range of risks that the territory and its inhabitants are exposed. The executive Civil Protection chief is the City Council President and among the main responsibilities are:</p> <ul style="list-style-type: none"> – The elaboration, update and execution of the Municipal Emergency Plan; – The elaboration, update and execution of the Municipal Plan for the Defence of Forestry Against Forest Fires; – Prevention and mitigation of risks and hazards; – Support to firefighters and security forces activities; – Coordination of external means in rescue and emergency operations; and

	– Support to emergency operations.
Role of the entity in the project	MG is an entity with responsibilities in civil protection and, as a FASTER end-user partner, will actively contribute with expert information and real-life expertise in all work packages. Also, MG will actively be involved in the pilot demonstrations and evaluation, leading the impact assessment and evaluation for first responder task (T10.4), and in the dissemination and exploitation work package (WP11), from the public bodies point of view.
Profile of key personnel	<p>Alcides Bizarro (♂), Degree in Management; Head of Division and Municipal International Cooperation responsible, namely by the twinning agreement between the Municipality of Grândola and the Municipality of Tarrafal – Cape Verde, and by the interchange projects between Grândola and the Neuss territory in Germany; coordination of Territorial Cooperation Project Sudoce I and II; coordination of the Cross-border Cooperation Program between Spain and Portugal Interrreg POCTEP; previous work in H2020 projects: STORM - Safeguarding Cultural Heritage through Technical and Organisational Resources Management.</p> <p>Luís Vital Alexandre (♂), Master in Computer Science; experience in GIS systems, computer and mobile applications; web applications, human-computer/machine interaction and computer networks and communications; vast experience in the Municipality of Grândola in areas of planning and city council support; responsible for European funds applications in the Municipality of Grândola; previous work in H2020 projects: STORM - Safeguarding Cultural Heritage through Technical and Organisational Resources Management.</p> <p>Rui Mateus (♂), Civil Protection Degree; responsible for the Municipal Civil Protection Service, with responsibilities in the implementation and execution of the Municipal Emergency Plan, emergency operations support, prevention and mitigation of risks and hazards, drill planning and execution and coordination with other Municipal Civil Protection Services in terms of planning and emergency response; previous work in H2020 projects: STORM - Safeguarding Cultural Heritage through Technical and Organisational Resources Management.</p> <p>Vera Antunes (♀), Postgraduate in Planning and Sociology; Knowledge of the area of strategic planning; Development of planning tools; Implementation, monitoring and evaluation of projects; Elaboration and application of questionnaires and respective statistical treatment; Elaboration of strategic documents; Participatory methodologies; Local social development; Work and animation of partnerships; Support in the design of projects and preparation of applications for financing instruments; previous work in H2020 projects: STORM - Safeguarding Cultural Heritage through Technical and Organisational Resources Management.</p> <p>Celia Costa (♀), Degree in Development and Cooperation; vast experience in the Municipality of Grândola in areas of Communication, Cooperation and Public Relations; previous work in H2020 projects: STORM - Safeguarding Cultural Heritage through Technical and Organizational Resources Management.</p> <p>Daniela Sousa (♀), Degree in History, Postgraduate in Archives, Libraries and Sciences of the Information, Master in Sciences of the Information and Documentation; team member of the Cross-border Cooperation Program between Spain and Portugal Interrreg POCTEP; team member of work group for the constitution of European Territorial Grouping of the Iberian Pyrite Belt; researcher in history, local heritage and ancient techniques; secretary of the General Assembly of the Living Science Centre of Lousal – Grândola.</p>
Relevant publications, products, services or achievements	<ol style="list-style-type: none"> 1. Municipality of Grândola, Municipal Emergency Plan 2. Municipality of Grândola, Municipal Plan for the Defence of Forestry Against Forest Fires
Relevant previous projects or activities	<ol style="list-style-type: none"> 1. STORM - Safeguarding Cultural Heritage through Technical and Organisational Resources Management
Relevant signifi-	The Municipality of Grândola has access to the training facilities and means of other agents

of the municipal civil protection (e.g. Grândola Firefighters). Other training facilities and means of the regional civil protection agents, may be available by request.

4.1.22 Consorzio per il Sistema Informativo (CSIP)

<p>CONSORZIO PER IL SISTEMA INFORMATIVO</p>	
<p>Website(s)</p>	<p>http://www.csipiemonte.it/</p>
<p>Description of the legal entity</p>	<p>CSI-Piemonte (Consortium for Information Systems) is a large ICT organisation, specialised in projects for the public administration, with nearly 40 years of experience. It has a turnover of about 125 M€, more than 1100 employees and 120 stakeholders among public administration authorities in Italy. It was founded by the Piedmont Region, the University of Turin and the Polytechnic of Turin in 1977 with the aim of promoting the modernisation of local administration by using the most advanced information and IT-based tools to create information services and systems. Nowadays, CSI is one of the largest Italian ICT companies developing projects for the public sector and operates in almost all the fields covered by public administration activity, including territory management, environment protection, emergency support, mobility services.</p> <p>CSI delivers more than 1900 services (320 on institutional portals), with an audience of 4,3 M citizens, 500.000 businesses, over 1300 PAs and authorities, over 1000 operational databases and manages a significant amount of geo-referenced and environmental data. CSI supports the PAs to achieve the priority goals of simplification, transparency and sharing, helping the organizations to improve their internal processes in order to guarantee efficiency and to create new systems based on interoperability and integrating different public services.</p> <p>CSI-Piemonte has participated and is currently involved in several European projects under different programmes such as Horizon 2020, FP6, FP7, CIP-ICT-PSP, e-contentplus, Central Europe, MED, coordinating activities as Project or WP leader; among these projects the following can be mentioned:</p> <ul style="list-style-type: none"> - eContentplus GIS4EU: standardisation of geographical data to ensure data harmonisation and interoperability according to the INSPIRE Directive, 2007-2010 - eContentplus EURADIN (EUROpean ADresses Infrastructure to develop an infrastructure to manage toponymy data at European level, in compliance with the INSPIRE Directive, 2007-2011 - CIP-ICT-PSP - ELF - European Location Framework - Open Geographic Information platforms, Inspire Directive implementation, 2013-2016 - CIP-ICT-PSP - Open-DAI - Opening Data Architectures and Infrastructures of European PAs (Topic “Innovative government”); 2012-2014, CSI Piemonte coordinator - MED Territorial Cooperation Programme - HOMER - Harmonising Open Data in the Mediterranean through Better Access and Reuse of Public Sector Information, 2012-2014, CSI Piemonte coordinator - 7th Framework Programme - OPTICITIES - Optimise Citizen Mobility and Freight Management in Urban Environments, 2013-2016.
<p>Role of the entity in the project</p>	<p>Thanks to the wide experience in the field of emergency management systems for local Public Administrations, CSI will give contributions in the definition of users requirements, integration with existing emergency systems, implementation of the demonstrator in the Torino metropolitan area in cooperation with the local partners.</p> <p>Furthermore, CSI will collaborate in the project by:</p>

	<ul style="list-style-type: none"> - involving the different Institutions, Authorities and decision makers, as well as the users communities at local level; - promoting and disseminating the project outcomes at local, national and international level.
Profile of key personnel	<p>Mauro Velluto (M) Mauro Velluto has a degree in Physics from the University of Turin. With a background in teaching and research, he has been working in CSI Piemonte since 2001 as a territorial information systems expert; he has coordinated the development and the management of the Civil Protection Information System of the Piedmont Region (SIPROC) and coordinated the ICT experts in the Civil Protection Control room.</p> <p>Marina Dragonieri (F) Marina Dragonieri is Graduated in Transportation Engineering and with a Master's degree in Environmental Engineering. Marina Dragonieri's experience began at the Centre for Studies on Transport Systems (CSST), focusing on traffic system modelling and on the evaluation of atmospheric emissions impact. For CSI-Piemonte, she has been working as a Project Manager, participating in the development of a road safety system for Public transport services. Marina Dragonieri's studying and working career have always focused on sustainable mobility issues.</p> <p>Marcella Ballerini (F) Marcella Ballerini has a degree in Natural Science from the University of Turin. She worked first as project manager in environmental management. Then, in 2005, she started working at CSI Piemonte as ICT Emergency manager for Civil Protection. She analysed the requirements for the implementation and evolution of the information system of Civil Protection and given direct support in the Control room activities.</p>
Relevant publications, products, services or achievements	<ul style="list-style-type: none"> - Riccardo Carlo CONTE, Franco DE GIGLIO, Andrea LAZZARI, Sandro PERESSIN, Herbert SARRI, Mauro VELLUTO - Regional programme for risk prevention and forecasting of Regione Piemonte: drafting thematic maps of vulnerability and risk - 11th National Conference ASITA, Centro Congressi Lingotto, Turin – November 6th, 2007 - Gianni Doria, Mauro Velluto - Construction of an ontology for semantic application development in the geographical field - 12th National Conference ASITA, L'Aquila, 2008
Relevant previous projects or activities	<ul style="list-style-type: none"> - Horizon 2020 - I-REACT - Improving Resilience to Emergencies through Advanced Cyber Technologies, 2016-2018 - INTERREG Italy/Switzerland Framework Programme - DESTINATION - Dangerous transport To New preventive Instruments, aiming at the definition of a risk analysis model of the land transportation of hazardous materials, 2007-2013 - ALCOTRA cooperation programme Italy /France - RISKNET - Support to the Metropolitan City of Turin in the realization of tools for emergency management, 2012-2014 - ALCOTRA cooperation programme Italy /France - RISKNET - Support to the Piedmont Region in the territorial multi-risk analysis, 2010-2012 - NO-RISK project (North West Risk) – Project funded under the first call for national e-government programme, aimed at implementing the natural and anthropic risk portal for the emergency management, with the participation of the Region of Liguria (project leader), the Piedmont Region and the Province of Turin, 2002-2004.
Relevant significant infrastructure or equipment	<p>SIPROC</p> <p>The Civil Protection Information System (SIPROC) supports the Regional Government of Piedmont in the Management of the Multi-Year Plan of the Civil Protection. The system is made by a set of interdependent applications, for the management of</p>

data and information coming from the Operational Room, that is the core of the activities related to prevention and management of emergencies. The “SIPROC Control Room Service” operated jointly by public authorities and CSI, manages the information system of the Civil Protection.

Started in 2000.

NO-RISK

Nord-Ovest Risk (NO-Risk), the Portal for natural and anthropic risk and emergency management, is the interregional single access point to the available knowledge assets related to civil protection. It provides information and support during all phases of the Civil Protection process (forecast, prevention, rescue, emergency management), eases data sharing among the several components of the Civil Protection system; regroups in an organic project the expertise matured by projects and systems realized by the cooperating partners. The Portal provides both front-end and back-office services.

Started in 2002.

4.1.23 Kwansei Gakuin Educational Foundation (KGU)

<p>KWANSEI GAKUIN EDUCATIONAL FOUNDATION</p>	
<p>Website(s)</p>	<p>www.kwansei.ac.jp/</p>
<p>Description of the legal entity</p>	<p>Founded in 1889, Kwansei Gakuin University (関西学院大学 Kansei Gakuin Daigaku), colloquially known as Kwangaku (関学), is a non-denominational Christian private and coeducational university in Japan. The university offers Bachelor’ s, Master’ s, and Doctoral degrees to around 25,000 students in almost 40 different disciplines across 11 undergraduate and 14 graduate programs. Kwansei Gakuin University has been selected for inclusion in the Japanese government’s Top Global University Project as a Type B (Global Traction) university. The university is often referred to as one of the four leading private universities in the Kansai greater area.</p> <p>The Intelligent Blockchain+ Innovation Research Center (IB+IRC) is a 5-year project founded in 2018 by Dr. Yuri Tijerino under the direct auspices of the university’s presidency. The aim of the IB+IRC is to promote applied multidisciplinary research in cutting-edge distributed-ledger (blockchain+) technologies to innovative solutions to solve real-world problems. The IB+IRC team is composed of 5 professors and their graduate and undergraduate students in fields such as computer science, engineering and business. The research center also has affiliated industry researchers from industry from companies such as Microsoft Japan and Deloitte Japan.</p> <p>Sitting at the edge of 3 continental plates and in the path of a major typhoon corridor, Japan is often hit with major earthquakes, tsunamis, volcanic eruptions, typhoons, landslides and other natural disasters. Despite Japan’s frequent natural disasters, it is still the world’s third leading economy due to its preparedness and resilience to major natural disasters. Dr. Tijerino has been personally experienced several major disasters in Japan and has thus been involved in promoting awareness and preparedness by applying technologies to education efforts in his research. As such one of the IB+IRC is to implement a resilient blockchain+ framework for coordination of emergency responders including first-responders, community leaders, rescuers, volunteers, government agencies, aid agencies, supply management and distribution, and much more.</p>
<p>Role of the entity in the project</p>	<p>IB+IRC is the leader of the T6.5 – Blockchain-based distributed network of trust for real-time needs and resource matching. Also, IB+IRC is involved in WP3, WP9, WP10 and WP11 respectively on the user and system specification including the system architecture, the integration, the experimentation and the exploitation of the project results.</p>
<p>Profile of key personnel</p>	<p>Dr. Yuri Tijerino (♂) has been living, studying and working in Japan for extended</p>

periods since 1981, Dr. Tijerino has experienced many natural disasters first hand. He is a survivor and has volunteered in recovery efforts in major events such as the 1995 Great Hanshin Earthquake, which had over 6,000 fatalities and immeasurable material loss. As such, Dr. Tijerino has developed a special affinity to applied research in disaster preparedness, mitigation and recovery. After the 2011 Great East Japan Earthquake and Tsunami, he served as CTO in an university sponsored project called Disaster Preparedness through Visualization, which applied advanced education techniques to prepare for and mitigate fatalities in the event of major earthquakes and tsunamis. He also volunteered in recovery efforts and helped coordinate student volunteer clean-up efforts, which continued months after the tsunami. Dr. Tijerino is also a serial entrepreneur and being a tenured faculty member of the Applied Informatics Department at Kwansai Gakuin University, has mostly focused on applied research to real-world products and has been part of or founded several startup companies since the late 1990's. During his tenure at Kwansai Gakuin University, Dr. Tijerino has also helped students develop their research ideas into products and companies, with one of the companies going IPO in the Japanese stock market in 2018. Dr. Tijerino's career has shifted between academia and research over the past 25 years. Dr. Tijerino obtained his bachelor's degree from Brigham Young University in Computer Information Systems and his master's and doctorate's degrees from Osaka University in Computer Science with emphasis on artificial intelligence. He is one of the pioneers in the fields of virtual and augmented reality, and ontology engineering. During his post-doctoral work at ATR International, a world renown research institution, he developed pioneering approaches for multimodal interaction with virtual worlds using hand gestures and speech recognition. After his postdoctoral work, he got involved with Silicon Valley companies in the early days of desktop virtual reality platforms and is currently developing applications for systems such as the HTC Vibe, Oculus Rift, Microsoft Hololens and Magic Leap One. It is also notable to mention that Dr. Tijerino was one of the original team members which developed the Siri artificial intelligence agent, which is now part of the many Apple products throughout the world.

All of Dr. Tijerino's prior experience mentioned is highly relevant to complete the tasks and work that the KGU will be involved with in this proposal.

Mr. Koushi Ashida (♂) Mr. Ashida is a civil engineer who has been involved in multiple emergency preparedness and mitigation activities since the Great Hanshin Earthquake in 1995. In addition, Mr. Ashida has many licenses and certifications relevant to the call which make him a unique source of subject-matter expertise in the area of disaster prevention, response and mitigation. Mr. Ashida is an active community leader in the Kansai Area, who actively promotes his mission of Disaster Preparedness and Mitigation awareness throughout the region. Being a civil engineer, Mr. Ashida also actively takes part in government disaster prevention and mitigation efforts by designing, planning, and supervising the building of special mudslide dams, excess rain water systems, riverbank and shore retaining walls and so forth. Mr. Ashida also has actively participated in many rescue and volunteer efforts throughout the years in various major Japanese disasters. Mr. Ashida is also founding leader and CEO of the NPO Corporation "Kurashini Yasashii Bousai/Gensai" (Livelihood-Friendly Disaster Prevention and Mitigation) <http://bou31gen31.org/wp/>. Mr. Ashida actively publishes disaster prevention and mitigation brochures, self-help guides and other materials. Mr. Ashida also holds lectures throughout Japan at schools, community associations, municipalities and many other organizations. Mr. Ashida is a invited researcher at the KGU

Mr. Shuji Ishii (♂) Mr. Ishii is a invited researcher at the KGU. Mr. Ishii obtained his bachelors at Kwansai Gakuin University and has been a AI researcher and authentication expert. For many years. Mr. Ishii has held important positions at Fuji Xerox and Microsoft Corporation, Japan, where he specializes on Customer Support and Field Engineering for Windows Server (Networking and Active Directory) and ID Management System. Mr. Ishii is a Microsoft Certified IT Professional (Windows Enterprise Administrator 2008) Microsoft Certified Solution Expert (Server Infrastructure 2012), he successfully com-

	<p>pleted the Information Technology Engineer examination in Japan (Fundamental Information Technology, Network Technical Engineer, Information Security Specialist ,Project Manager and IT Service Manager).</p> <p>Mr. Kota Togami (♂). Mr. Togami is a invited researcher at the KGU. He obtained his bachelors at Kwansei Gakuin University and has obtained the much coveted Certified Public Account certification. He currently works at Deloitte Japan as a CPA and is a valuable member of the KGU because of his expertise in accounting.</p> <p>Mr. Daisuke Emoto (♂). Mr. Emoto is a MSc student at Kwansei Gakuin University and has been developing smart contracts for various blockchain platforms.</p> <p>Mr. Kai Hunter-Yamashita (♂). Mr. Hunter-Yamashita is a MSc student at Kwansei Gakuin University and has been developing smart contracts for various blockchain platforms.</p>
<p>Relevant publications, products, services or achievements</p>	<ol style="list-style-type: none"> 1. Yuri A. Tijerino, Shinji Abe, Tsutomu Miyasato and Fumio Kishino (1994). What you say is what yousee--interactive generation, manipulation and modification of 3-D shapes based on verbal descriptions, Artificial Intelligence Review, Vol. 8, pp. 215-234. 2. Yuri A. Tijerino (1996) Multimodal Multimedia. In MULTIMEDIA COMPUTING* - Supporting Creative Human Activities - Tadao Ichikawa and Atsuo Yoshitaka (Eds.) "bit" special edition, Summer 1996, Kyoritsu Publishing Co., Tokyo, Japan, Chapter 3.3. pp.120-130 (Japanese) 3. Tijerino, Y.A., Embley, D.W., Lonsdale, D.W. et al. World Wide Web (2005) 8: 261. https://doi.org/10.1007/s11280-005-0360-8 4. Develop Natural Language Component for recognition of dates and time currently being used by Siri worldwide on iPhones (English version). 5. Certified Blockchain Expert Certification DateJun 2018 – Present License 11639122 By the Blockchain Council
<p>Relevant previous projects or activities</p>	<ol style="list-style-type: none"> 1. Survivor of the 1995 Great Hanshin-Awaji Earthquake and many typhoons in Japan. 2. (2010-2014). As CTO for at Disaster Preparedness through Visualization, a Public Service NPO, Dr. Tijerino developed multi-platform application with a permanent multi-modal kiosk component, a smartphone component and a table component. The kiosk component used Google Earth and Google Maps Plugins (ArcGIS, JavaScript, KML, iOS) for a custom multitouch-screen display at permanent exhibits at major malls in Japan, intended to raise awareness as to what to expect during major natural disasters, what to do, not to do and how to prepare. 3. (2018/5 ~ present) Dr. Tijerino is the founder and director of the Intelligent Blockchain+ Innovation Research Center (IB+IRC) at Kwansei Gakuin University. One of the main focus of the center is the apply cutting-edge distributed ledger technologies to implement a resilient blockchain+ framework for coordination of emergency responders including first-responders, community leaders, rescuers, volunteers, government agencies, aid agencies, supply management and distribution, and much more. 4. Often volunteers for disaster recovery efforts in Japan. Also coordinates and supports disaster relief volunteers (mainly students) through the university. 5. Holds classes on Blockchain, Unity3D, Blender 3D, and other 3D technologies for development of VR and AR applications. Students often demonstrate applications at undergraduate and graduate research fairs at the university.
<p>Relevant significant infrastructure or equipment</p>	<p>The IB+IRC consists of a 400 square meter, state of the art research lab and a 50 square meter workshop, located in state-of-the art building with high-speed internet connection, redundant power systems and security systems. The IB+IRC shares its facilities</p>

with the School of Policy Studies, a multidisciplinary school with top-notch faculty from around the world. The School of Policy Studies motto being “Think Globally and Act Locally” captures the mission of the school, which is to educate next-generation leaders with multidisciplinary skills that can contribute to the international community through their work and volunteer efforts. In addition, Kwansai Gakuin University motto’s is “Mastery for Service”, which aims at promoting professionals that can serve society after graduating from the university. As such, graduate and undergraduate students attending the university are encouraged to participate in volunteer efforts across multiple disciplines and more specially in recovery efforts after major disasters. With this mentality and motivation, graduate and undergraduate students that will take part in this project are already highly motivated to contribute to the project and apply their real-world experience in disaster recovery efforts.

The IB+IRC equipment consists of 20+ high-end computing workstations 6 of which are MacOS X, 14 Windows 10, Color and Black & White printers, 3D printers, 3D simulation equipment. The IB+IRC also has access to meeting rooms, video conferencing equipment, a fully equipped sound and video production studio, a fully equipped multimedia and 3D development lab and a state-of-the-art library. The IB+IRC also has a budget to invite visiting professors and researchers from other countries for collaborative research activities.

4.2 THIRD PARTIES INVOLVED IN THE PROJECT (INCLUDING USE OF THIRD PARTY RESOURCES)

Answers to all questions in the tables below are ‘No’ except for:

- Partner Servicio Madrileño De Salud (SERMAS) - Servicio De Urgencias Médicas De La Comunidad De Madrid (SUMMA112), and
- Regione Piemonte (RP),

who answered ‘Yes’ to the second question (linked third parties).

4.2.1 Centre for Research and Technology Hellas (CERTH)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be subcontracted)	No
<i>If yes, please describe and justify the tasks to be subcontracted</i>	
Does the participant envisage that part of its work is performed by linked third parties	No
<i>If yes, please describe the third party, the link of the participant to the third party, and describe and justify the foreseen tasks to be performed by the third party</i>	
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	No
<i>If yes, please describe the third party and their contributions</i>	
Does the participant envisage that part of the work is performed by International Partners (Article 14a of the General Model Grant Agreement)?	No
<i>If yes, please describe the International Partner(s) and their contributions</i>	

4.2.2 Engineering Ingegneria Informatica (ENG)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be subcontracted)	No
<i>If yes, please describe and justify the tasks to be subcontracted</i>	
Does the participant envisage that part of its work is performed by linked third parties	No
<i>If yes, please describe the third party, the link of the participant to the third party, and describe and justify the foreseen tasks to be performed by the third party</i>	
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	No
<i>If yes, please describe the third party and their contributions</i>	
Does the participant envisage that part of the work is performed by International Partners (Article 14a of the General Model Grant Agreement)?	No

If yes, please describe the International Partner(s) and their contributions

4.2.3 HELLENIC TELECOMMUNICATIONS ORGANIZATION S.A. (OTE)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be subcontracted)	No
<i>If yes, please describe and justify the tasks to be subcontracted</i>	
Does the participant envisage that part of its work is performed by linked third parties	No
<i>If yes, please describe the third party, the link of the participant to the third party, and describe and justify the foreseen tasks to be performed by the third party</i>	
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	No
<i>If yes, please describe the third party and their contributions</i>	
Does the participant envisage that part of the work is performed by International Partners (Article 14a of the General Model Grant Agreement)?	No
<i>If yes, please describe the International Partner(s) and their contributions</i>	

4.2.4 DIGINEXT (DXT)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be subcontracted)	No
<i>If yes, please describe and justify the tasks to be subcontracted</i>	
Does the participant envisage that part of its work is performed by linked third parties	No
<i>If yes, please describe the third party, the link of the participant to the third party, and describe and justify the foreseen tasks to be performed by the third party</i>	
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	No
<i>If yes, please describe the third party and their contributions</i>	
Does the participant envisage that part of the work is performed by International Partners (Article 14a of the General Model Grant Agreement)?	No
<i>If yes, please describe the International Partner(s) and their contributions</i>	

4.2.5 Crisisplan BV (CPLAN)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be subcontracted)	No
<i>If yes, please describe and justify the tasks to be subcontracted</i>	
Does the participant envisage that part of its work is performed by linked third parties	No
<i>If yes, please describe the third party, the link of the participant to the third party, and describe and justify the foreseen tasks to be performed by the third party</i>	
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	No
<i>If yes, please describe the third party and their contributions</i>	
Does the participant envisage that part of the work is performed by International Partners (Article 14a of the General Model Grant Agreement)?	No
<i>If yes, please describe the International Partner(s) and their contributions</i>	

4.2.6 Drone Hopper, S.L. (DH)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be subcontracted)	No
<i>If yes, please describe and justify the tasks to be subcontracted</i>	
Does the participant envisage that part of its work is performed by linked third parties	No
<i>If yes, please describe the third party, the link of the participant to the third party, and describe and justify the foreseen tasks to be performed by the third party</i>	
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	No
<i>If yes, please describe the third party and their contributions</i>	
Does the participant envisage that part of the work is performed by International Partners (Article 14a of the General Model Grant Agreement)?	No

If yes, please describe the International Partner(s) and their contributions

4.2.7 Robotnik (ROB)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be subcontracted)	No
<i>If yes, please describe and justify the tasks to be subcontracted</i>	
Does the participant envisage that part of its work is performed by linked third parties	No
<i>If yes, please describe the third party, the link of the participant to the third party, and describe and justify the foreseen tasks to be performed by the third party</i>	
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	No
<i>If yes, please describe the third party and their contributions</i>	
Does the participant envisage that part of the work is performed by International Partners (Article 14a of the General Model Grant Agreement)?	No
<i>If yes, please describe the International Partner(s) and their contributions</i>	

4.2.8 Synelixis Solutions S.A. (SYN)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be subcontracted)	No
<i>If yes, please describe and justify the tasks to be subcontracted</i>	
Does the participant envisage that part of its work is performed by linked third parties	No
<i>If yes, please describe the third party, the link of the participant to the third party, and describe and justify the foreseen tasks to be performed by the third party</i>	
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	No
<i>If yes, please describe the third party and their contributions</i>	
Does the participant envisage that part of the work is performed by International Partners (Article 14a of the General Model Grant Agreement)?	No
<i>If yes, please describe the International Partner(s) and their contributions</i>	

4.2.9 Inov Inesc Inovacao - Instituto De Novas Tecnologias (INOV)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be subcontracted)	No
<i>If yes, please describe and justify the tasks to be subcontracted</i>	
Does the participant envisage that part of its work is performed by linked third parties	No
<i>If yes, please describe the third party, the link of the participant to the third party, and describe and justify the foreseen tasks to be performed by the third party</i>	
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	No
<i>If yes, please describe the third party and their contributions</i>	
Does the participant envisage that part of the work is performed by International Partners (Article 14a of the General Model Grant Agreement)?	No
<i>If yes, please describe the International Partner(s) and their contributions</i>	

4.2.10 Istituto Superiore Mario Boella (ISMB)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be subcontracted)	No
<i>If yes, please describe and justify the tasks to be subcontracted</i>	
Does the participant envisage that part of its work is performed by linked third parties	No
<i>If yes, please describe the third party, the link of the participant to the third party, and describe and justify the foreseen tasks to be performed by the third party</i>	
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	No
<i>If yes, please describe the third party and their contributions</i>	
Does the participant envisage that part of the work is performed by International Partners (Article 14a of the General Model Grant Agreement)?	No

If yes, please describe the International Partner(s) and their contributions

4.2.11 Kpeople Research Foundation (KPRF)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be subcontracted)	No
<i>If yes, please describe and justify the tasks to be subcontracted</i>	
Does the participant envisage that part of its work is performed by linked third parties	No
<i>If yes, please describe the third party, the link of the participant to the third party, and describe and justify the foreseen tasks to be performed by the third party</i>	
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	No
<i>If yes, please describe the third party and their contributions</i>	
Does the participant envisage that part of the work is performed by International Partners (Article 14a of the General Model Grant Agreement)?	No
<i>If yes, please describe the International Partner(s) and their contributions</i>	

4.2.12 Kajaani University of Applied Sciences (KAMK)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be subcontracted)	No
<i>If yes, please describe and justify the tasks to be subcontracted</i>	
Does the participant envisage that part of its work is performed by linked third parties	No
<i>If yes, please describe the third party, the link of the participant to the third party, and describe and justify the foreseen tasks to be performed by the third party</i>	
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	No
<i>If yes, please describe the third party and their contributions</i>	
Does the participant envisage that part of the work is performed by International Partners (Article 14a of the General Model Grant Agreement)?	No
<i>If yes, please describe the International Partner(s) and their contributions</i>	

4.2.13 Vrije Universiteit Brussel (VUB)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be subcontracted)	No
<i>If yes, please describe and justify the tasks to be subcontracted</i>	
Does the participant envisage that part of its work is performed by linked third parties	No
<i>If yes, please describe the third party, the link of the participant to the third party, and describe and justify the foreseen tasks to be performed by the third party</i>	
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	No
<i>If yes, please describe the third party and their contributions</i>	
Does the participant envisage that part of the work is performed by International Partners (Article 14a of the General Model Grant Agreement)?	No
<i>If yes, please describe the International Partner(s) and their contributions</i>	

4.2.14 University of West Attica (UWA)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be subcontracted)	No
<i>If yes, please describe and justify the tasks to be subcontracted</i>	
Does the participant envisage that part of its work is performed by linked third parties	No
<i>If yes, please describe the third party, the link of the participant to the third party, and describe and justify the foreseen tasks to be performed by the third party</i>	
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	No
<i>If yes, please describe the third party and their contributions</i>	
Does the participant envisage that part of the work is performed by International Partners (Article 14a of the General Model Grant Agreement)?	No

If yes, please describe the International Partner(s) and their contributions

4.2.15 Ayuntamiento De Madrid - Policia Municipal (ADM-POL)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted)	No
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If yes, please describe and justify the tasks to be subcontracted

Does the participant envisage that part of its work is performed by linked third parties	No
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If yes, please describe the third party, the link of the participant to the third party, and describe and justify the foreseen tasks to be performed by the third party

Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	No
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If yes, please describe the third party and their contributions

Does the participant envisage that part of the work is performed by International Partners (Article 14a of the General Model Grant Agreement)?	No
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If yes, please describe the International Partner(s) and their contributions

4.2.16 Servicio Madrileño De Salud (SERMAS) - Servicio De Urgencias Médicas De La Comunidad De Madrid (SUMMA)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted)	No
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If yes, please describe and justify the tasks to be subcontracted

Does the participant envisage that part of its work is performed by linked third parties ²⁹	Yes
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Part of the work of Partner SERMAS-SUMMA112 will be performed by the following linked third parties:

- Firefight forces of Autonomous Community of Madrid (CMFF)**, affiliated to SERMAS-SUMMA112 through ERICAM. ERICAM is a pre-existing network under which the two organizations work together, where ERICAM has been recognised as an INSARAG team (International Search and Rescue Advisory Group, <https://www.insarag.org/>) by the United Nations.
- Escuela Española de Salvamento y Detección con Perros (ESDP)**, affiliated to SERMAS-SUMMA112 through ERICAM. ERICAM is a pre-existing network under which ESDP and SERMAS-SUMMA112 work together, where ERICAM has been recognised as an INSARAG team (International Search and Rescue Advisory Group, <https://www.insarag.org/>) by the United Nations.
- Fundación para la Innovación y la Investigación Biomédica de la Comunidad de Madrid (FIIBAB)**, linked to SERMAS-SUMMA112. Specifically, FIIBAB provides support to SERMAS-SUMMA112 European (and International) projects, being a public non-profit Foundation.

The linked 3rd parties have significant added value, representing different First Responders (Medical emergency, Firefighters, K9 dogs). All linked third parties will implement the action tasks attributed to them in Annex 1. The linked third parties will declare as eligible the costs they incur for implementing the action tasks in accordance with Article 6.3. In more detail:

Firefight forces of Autonomous Community of Madrid (CMFF) will contribute to the following FASTER activities covering the aspect of firefighters in emergency operations:

- Requirements identification (WP3);
- Resilient Solutions for First Responders (WP6);
- Coordination of T10.3 linked to WP10 Pilot demonstration and evaluation;
- Dissemination and Exploitation (WP11).

Escuela Española de Salvamento y Detección con Perros (ESDP) will contribute to the following FASTER activities covering the aspect of dogs (K9) in emergency operations:

- Requirements identification (WP3);
- Resilient Solutions for First Responders (WP6);
- Coordination of T10.3 linked to WP10 Pilot demonstration and evaluation;
- Dissemination and Exploitation (WP11).

Fundación para la Innovación y la Investigación Biomédica de la Comunidad de Madrid (FIIBAB) will contribute to:

- Manage support systems, resources and facilities for Madrid Region emergency team (WP10).

²⁹ A third party that is an affiliated entity or has a legal link to a participant implying a collaboration not limited to the action. (Article 14 of the [Model Grant Agreement](#)).

Legal Relation with main beneficiary

ERICAM (Emergencia y Respuesta Inmediata de la Comunidad de Madrid) is an emergency rescue team composed in 2007, under the General Directorate of Civil Protection and Emergencies/Madrid Regional Presidency Ministry, by several organizations that cooperate and coordinate when emergencies occur. In 2011, it was awarded the International Search and Rescue Advisory Group (INSARAG) classification by the UN. It combines (1) the fast response team of firefight forces of Madrid region, (2) the fast health response, SERMAS-SUMMA 112 and (3) the search and rescue dog services, ESDP. More details on ERICAM are provided in Section 4.1.16.

- **CMFF** is the funding member of ERICAM (former ERIC). Firefight forces and SERMAS-SUMMA112 have signed a collaboration agreement, including an intervention protocol, in 2011, for intervention in emergencies through the ERICAM network. Therefore, SERMAS-SUMMA112 and Firefight forces have a **legal link**.
- **ESDP** has signed an agreement with the Madrid Regional Presidency Ministry on April 26th, 2011 to cooperate with other ERICAM members (Firefighters and SERMAS-SUMMA 112) for intervention in emergencies. The cooperation agreement is on-going and beyond the FASTER project. Therefore, SERMAS-SUMMA112 and ESDP have a **legal link**.
- **FIIBAB** has signed a collaboration agreement with the Madrid Regional Presidency Ministry and the Madrid Regional Health Ministry on December 27th, 2017 to provide support to any public Madrid region organization (including SERMAS-SUMMA 112) involved in European projects, by means of which the former handles the financial and administrative aspects of the services involved in research projects, including all issues relating to the employment and payment of additional personnel, purchase of equipment and consumables, etc. Therefore, SERMAS-SUMMA112 and ESDP have a **legal link**.

Breakdown of activities (WP), effort (PM) and budget for the linked third parties

WP	SERMAS-SUMMA (main entity)	CMFF (linked third party #1)	ESDP (linked third party #2)	FIIBAB (linked third party #2)	Total
1	-	-	-	-	-
2	-	-	-	-	-
3	2	1	1	-	4
4	-	-	-	-	-
5	-	-	-	-	-
6	1	0.5	0.5	-	2
7	-	-	-	-	-
8	-	-	-	-	-
9	-	-	-	-	-
10	4	4	4	1	13
11	3	1.5	1.5	-	6
12	-	-	-	-	-
Total:	10	7	7	1	25

Participant	SERMAS	CMFF	ESDP	FIIBAP	TOTAL
PM	10	7	7	1	25
PM rate	5,200 €	5,200 €	5,200 €		
Equipment	6,666 €	6,667 €	6,667 €		20,000 €
Travel costs	6,666 €	6,667 €	6,667 €		20,000 €
(A) Direct Personnel costs	52,000 €	36,400 €	36,400 €	5,200 €	130,000 €
(B) Other direct costs / €	13,332 €	13,334 €	13,334 €	- €	40,000 €
(F) Indirect costs / € (= 0.25*(A+B-E))	16,333 €	12,433.50 €	12,433.50 €	1,300 €	42,500 €

(H) Total estimated eligible costs /€ (=A+B+C+D+F+G)	81,665 €	62,167.50 €	62,167.50 €	6,500 €	212,500 €		
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)							No
<i>If yes, please describe the third party and their contributions</i>							
Does the participant envisage that part of the work is performed by International Partners ³⁰ (Article 14a of the General Model Grant Agreement)?							No
<i>If yes, please describe the International Partner(s) and their contributions</i>							

4.2.17 French Academy for Fire, Rescue and Civil Protection Officers (ENSOSP)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be subcontracted)							No
<i>If yes, please describe and justify the tasks to be subcontracted</i>							
Does the participant envisage that part of its work is performed by linked third parties							No
<i>If yes, please describe the third party, the link of the participant to the third party, and describe and justify the foreseen tasks to be performed by the third party</i>							
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)							No
<i>If yes, please describe the third party and their contributions</i>							
Does the participant envisage that part of the work is performed by International Partners (Article 14a of the General Model Grant Agreement)?							No
<i>If yes, please describe the International Partner(s) and their contributions</i>							

4.2.18 Police Academy in Szczytno (WSPOL)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be subcontracted)							No
<i>If yes, please describe and justify the tasks to be subcontracted</i>							
Does the participant envisage that part of its work is performed by linked third parties							No
<i>If yes, please describe the third party, the link of the participant to the third party, and describe and justify the foreseen tasks to be performed by the third party</i>							
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)							No
<i>If yes, please describe the third party and their contributions</i>							
Does the participant envisage that part of the work is performed by International Partners (Article 14a of the General Model Grant Agreement)?							No
<i>If yes, please describe the International Partner(s) and their contributions</i>							

4.2.19 Kajaani Kaupunki (KAJ)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be subcontracted)							No
<i>If yes, please describe and justify the tasks to be subcontracted</i>							
Does the participant envisage that part of its work is performed by linked third parties							No
<i>If yes, please describe the third party, the link of the participant to the third party, and describe and justify the foreseen tasks to be performed by the third party</i>							
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)							No
<i>If yes, please describe the third party and their contributions</i>							
Does the participant envisage that part of the work is performed by International Partners (Article 14a of the General Model Grant Agreement)?							No

³⁰ 'International Partner' is any legal entity established in a non-associated third country which is not eligible for funding under Article 10 of the Rules for Participation Regulation No 1290/2013.

If yes, please describe the International Partner(s) and their contributions

4.2.20 Hellenic Rescue Team Attica (HRTA)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be subcontracted)	No
<i>If yes, please describe and justify the tasks to be subcontracted</i>	
Does the participant envisage that part of its work is performed by linked third parties	No
<i>If yes, please describe the third party, the link of the participant to the third party, and describe and justify the foreseen tasks to be performed by the third party</i>	
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	No
<i>If yes, please describe the third party and their contributions</i>	
Does the participant envisage that part of the work is performed by International Partners (Article 14a of the General Model Grant Agreement)?	No
<i>If yes, please describe the International Partner(s) and their contributions</i>	

4.2.21 Município de Grândola (MG)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be subcontracted)	No
<i>If yes, please describe and justify the tasks to be subcontracted</i>	
Does the participant envisage that part of its work is performed by linked third parties	No
<i>If yes, please describe the third party, the link of the participant to the third party, and describe and justify the foreseen tasks to be performed by the third party</i>	
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	No
<i>If yes, please describe the third party and their contributions</i>	
Does the participant envisage that part of the work is performed by International Partners (Article 14a of the General Model Grant Agreement)?	No
<i>If yes, please describe the International Partner(s) and their contributions</i>	

4.2.22 Consorzio per il Sistema Informativo (CSIP)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be subcontracted)	No
<i>If yes, please describe and justify the tasks to be subcontracted</i>	
Does the participant envisage that part of its work is performed by linked third parties	Yes
<p>Piedmont is a region with ordinary autonomy of the Italian Republic; its legal and administrative operation began in 1970 in application of the constitutional dictate (Article 131) of 1948. Among the multiple functions and purposes assigned by law to the Italian regions, it is a matter of civil protection. The Civil Protection and Forest Fire Protection Sector (A.I.B.) is the regional structure specifically responsible for planning and coordination, forecasting, risk prevention, rescue of populations; planning, forecasting, prevention and active fight against forest fires; acquisition, organization and updating of databases for risk mitigation and management; PC and AIB planning; management of the Regional Operative Room and of the technological and informative systems organization of the warning system for the hydrogeological risk; training of administrators, operators and volunteers, information and training of citizens for self-protection and civil protection culture; development of emergency communication tools; promotion and support of civil protection volunteering and AIB, organization and management of the voluntary agreement, guidelines for the safety of operators; management and development of the Mobile Column of Regional Headquarters and High Capacity Pumping European Modules (HCP) and Technical Assistance Support Team (TAST) within the Civil Protection Union Mechanism; organization and management of terrestrial emergency telecommunications networks (Emercom.Net) and satellite networks to support institutions and the voluntary system; Coordination service for Bosch Forest Fires (AIB). Recently, an interdepartmental working group for emergency communication has been formalized, which supports Civil Protection in relations with the media and the population through the Internet and the social partners.</p> <p>Legal Relation with main beneficiary: The relations between the Region and the Consortium for the automatic processing of information (CSI Piemonte) are described by the regional law of Piemonte n.13 on March 15th, 1978. Therefore, CSIP and RP have a legal link.</p> <p>The contribution of the main beneficiary and the linked third party is described in detail below. CSIP will provide technical support in requirements definition, usability analysis, tools' development and pilot preparation to ensure that the FASTER tools will be integrated to the existing infrastructure of the Piemonte Region, providing feedback in all stages of the implementation. RP will perform its role as a First Responder providing, pilot scenarios, system validation and assessment, policy recommendations and participating to exploitation activities.</p>	

CSIP will contribute to:

- Transform user requirements into inputs for the analysis and development phases (WP3)
- Contribute to the design and development of mobile application for effective response management (WP8)
- Contribute in the development of mobile applications for first responders ensuring compatibility with existing systems installed and managed by CSIP (WP8)
- Contribute to integration planning to ensure successful integration with existing systems (WP9)
- Integration validation and technical testing of the system (WP9)
- System validation and testing in terms of user usability from the final user (WP9)
- Pilot preparation in terms of pilot facilities (WP10)
- Support in end-user training (WP10)
- Preparation of required infrastructure and technical support during the pilots (WP10)
- Technical assessment of the proposed system and its impact to the operations (WP10)
- Dissemination and communication activities (WP11)

RP will contribute to:

- User requirements and use cases to define the information flows necessary to run the operational procedures for emergency managers (WP3)
- Scenario definition and pilot planning (WP10)
- Pilot preparation in terms of engaging other First Responders (WP10)
- Impact assessment and evaluation for first responders (WP10)
- Exploitation, policy and recommendations (WP11)

WP	RP (linked third party)	CSIP (main party)	Total
1	-	-	-
2	-	-	-
3	1	1	2
4	-	-	-
5	-	-	-
6	-	-	-
7	-	-	-
8	-	3	3
9	-	2	2
10	2	11	13
11	2	1	3
12	-	-	-
Total:	5	18	23

Participant	RP	CSIP	TOTAL
PM	5	18	23
PM rate	5,400 €	5,400 €	
Equipment	-	10,000 €	10,000 €
Travel costs	6,000 €	14,000 €	20,000 €
Other costs	5,000 €	-	5,000 €
(A) Direct Personnel costs	27,000 €	97,200 €	124,200 €
(B) Other direct costs / €	11,000 €	24,000 €	35,000 €
(F) Indirect costs / € (= 0.25*(A+B-E))	9,500 €	30,300 €	39,800 €
(H) Total estimated eligible costs /€ (=A+B+C+D+F+G)	47,500 €	151,500 €	199,000 €

Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the Gen- No

eral Model Grant Agreement)	
<i>If yes, please describe the third party and their contributions</i>	
Does the participant envisage that part of the work is performed by International Partners (Article 14a of the General Model Grant Agreement)?	No
<i>If yes, please describe the International Partner(s) and their contributions</i>	

4.2.23 Kwansei Gakuin Educational Foundation (KGU)

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be subcontracted)	No
<i>If yes, please describe and justify the tasks to be subcontracted</i>	
Does the participant envisage that part of its work is performed by linked third parties	No
<i>If yes, please describe the third party, the link of the participant to the third party, and describe and justify the foreseen tasks to be performed by the third party</i>	
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	No
<i>If yes, please describe the third party and their contributions</i>	
Does the participant envisage that part of the work is performed by International Partners (Article 14a of the General Model Grant Agreement)?	No
<i>If yes, please describe the International Partner(s) and their contributions</i>	

4.3 PARTICIPANTS FULFILLING THE ADDITIONAL ELIGIBILITY AND ADMISSIBILITY CONDITIONS AS SPECIFIED IN THE WORK PROGRAMME

<i>Participant Short Name</i>	<i>Participant No. (as in administrative forms)</i>	<i>Country</i>	<i>Category of entity as required in the WP</i>	<i>Justification or comment</i>
ADM-POL	15	Spain	First responders' organisation from EU country #1	Law Enforcement Agency
SERMAS-SUMMA112	16	Spain	First responders' organisation from EU country #1	Emergency Medical Services
ENSOSP	17	France	First responders' organisation from EU country #2	Firefighters' Academy
WSPOL	18	Poland	First responders' organisation from EU country #3	Police Academy
KAJ	19	Finland	First responders' organisation from EU country #4	Regional Rescue Services
HRTA	20	Greece	First responders' organisation from EU country #5	Search and Rescue Team
MG	21	Portugal	First responders' organisation from EU country #6	Civil Protection

5 ETHICS AND SOCIETAL IMPACT

5.1 ETHICS

5.1.1 Introduction

The project FASTER seeks to develop an effective co-ordination and response system for first responders responding to critical and unpredictable situations. The project will take advantage of recent advances in ICT technologies and, especially, in mobile devices, wearable biosensors, big data analysis, artificial intelligence and machine learning techniques. It will also utilise and build upon advances that have been made in electronic health records and other records. The project therefore involves the potential use of sensitive data and relates to the delivery of health

care in a critical context. From this description the FASTER project proposal emerges as extremely challenging in terms of research ethics.

This section addresses the ethical issues ticked in the administrative part of the proposal FASTER, namely:

2. HUMANS (human participants);
4. PERSONAL DATA (personal data collection and processing);
 - a. collection and processing of sensitive personal data (biomedical data);
 - b. Privacy issue surrounding UAVs.
5. ANIMALS

This section explains how the consortium intends to address these issues, in particular as regards the research objectives, the methodology, and the management of the potential ethical and legal risks. The section concludes by explaining the ethics and data protection management structure of FASTER), highlighting the role and expertise of VUB (the project partner responsible for ethical coordination in the context of the SELP assessment), and giving information about potential members of the Ethical Advisory Board.

The “ethical and legal” engagements adopted by the consortium under this section during the first twelve months of the project are summarized in Table 1 below.

A list of templates for information to be provided to research candidates and piloting sites and consent forms is provided in the Annexes at the end of this section.

All issues here discussed will be reviewed with partners during the kick off meeting.

5.1.2 Human participants

During the FASTER project it will be necessary to simulate emergency situations that require a co-ordinated first responder response. Where possible, this will be done with simulated non-personal data. It is however possible that it may be necessary, in certain instances, to use personal data from real individuals on occasion. Where this occurs, it will be done using data provided from volunteers. It is anticipated that volunteers will be researchers working for consortium Members. Researchers will have to provide personal data and will not be subject to medical or other physical interventions. Volunteers will only participate by providing personal data for the purposes of simulation. The measures taken to ensure that this is done according to EU and national law are described in sections 5.1.3.5-9.

All participation will be strictly voluntary and open to refusal or revocation at any time.

As requested from the Ethics Screening report, in case the participation of humans is confirmed, templates of the final informed consent/assent forms and final information sheets (in language and terms intelligible to the participants) as well as the procedures and criteria that will be used to identify/recruit research participants will be submitted as deliverable D12.1

5.1.3 Personal data collection and processing

Data of the following types could conceivably be collected within the project.

5.1.3.1 Types of personal data

The personal data of research participants include data about:

- Non-Sensitive Personal Data
 - Name
 - Address
 - Date of Birth
 - Nationality
 - Location Found within
 - Facial features (from UAV)
 - Car Licence Number Plate (from UAV)
- Sensitive Personal Data
 - Data linked to electronic health record
 - Description of Injuries
 - Description of symptoms
 - Information relating to other observed medical conditions
 - Ethnicity/Religion (possibly)

In the demonstration phases of FASTER, artificial data will be used. This data will either be randomly generated or provided by researchers working on the project. Where the latter occurs data will only be collected where the respective individual has provided explicit consent in line with all applicable data protection law. The procedures to be used in doing this are outlined below.

In addition to wearable devices and tablets it is possible that personal data may be unintentionally captured by UAVs. This could be in the form of images of faces or car number plates. At present it is envisaged that only official volunteers (who will be researchers working on the FASTER project) will be present at trial sites. As is discussed below, given that sensitive personal data of such subjects may be used such volunteers will only take part on a voluntary basis and where they have provided explicit consent (see section 5.1.3.5). It is not anticipated therefore that any other individuals will incidentally be present at trial sites and therefore that any other individual's personal data would be incidentally captured. Despite this the FASTER project, to be certain, will place signs at test sites informing any potential passers-by that trials involving UAVs may be ongoing and that there is a theoretical chance that their personal data may be collected. Such signs will inform potentially concerned individuals in line with Article 13 GDPR (including details of data controllers and their data subject rights (see section 5.1.3.7)).

5.1.3.2 Personal data: FASTER principles, legal basis (consent), rights of data subjects

At the European level, legal protection of personal data is found in art 8 of the European Convention on Human Rights (ECHR)³¹ and in the Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data (No. 108).³² In the European Union, the protection of personal data is recognised in the Charter of the Fundamental Rights (CFR)³³, article 8, and in article 16 TFEU and 39 of the TEU. The EU constitutional provisions are further specified in secondary legislation. The centre piece legislation is the General Data Protection Regulation or GDPR (Regulation 2016/679 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data), which will apply from April 25th, 2018, repealing the incumbent 1995 Data Protection Directive.

In addition to European law, all countries involved in the project have promulgated laws in this area, which generally reflect the EU data protection framework. Under each jurisdiction, an independent supervisory authority is established. These authorities may be contacted to notify them of activities involving the processing of personal data. Prominent examples of the relevant legislations and supervisory authorities to be contacted are:

- (a) for Germany, the German Bundesdatenschutzgesetz (BDSG) or the Federal data protection act and the guidelines and the opinions of the Federal Commissioner for Data Protection and Freedom of Information (BfDI) and the acts and opinions of the Berliner Beauftragte für Datenschutz und Informationsfreiheit, An der Urania 4-10. 10787 Berlin Telefon: 030/138 89-0 Telefax: 030/215 50 50 mailbox {at} datenschutz-berlin {dot} de Homepage: <http://www.datenschutz-berlin.de>.
- (b) for the UK, the 2018 Data Protection Act and the acts and opinions of The Information Commissioner's Office Water Lane, Wycliffe House Wilmslow - Cheshire SK9 5AF Tel. +44 1625 545 745 e-mail: international.team@ico.org.uk Website: <https://ico.org.uk>.
- (c) for Belgium, The Privacy Act of 1992 and the acts of the Commission de la protection de la vie privée Rue de la Presse 35 1000 Bruxelles Tel. +32 2 274 48 00 Fax +32 2 274 48 35 e-mail: commission@privacycommission.be Website: <http://www.privacycommission.be/>.
- (d) for Italy, Law no. 675 Dec 31, 1996 – Protection of people and other subjects in the matter of personal data treatment (*Legge n. 675 del 31 dicembre 1996 - Tutela delle persone e di altri soggetti rispetto al trattamento dei dati personali.*) and the acts and opinions of Garante per la protezione dei dati personali Piazza di Monte Citorio, 121 00186 Roma Tel. +39 06 69677 1 Fax +39 06 69677 785 e-mail: garante@garanteprivacy.it Website: <http://www.garanteprivacy.it/>.

Furthermore, special legal frameworks, prohibitions or derogations may apply to the rights of data subjects or the processing of genetic, biometric and/or health data under the national legislation of the country where the research takes place. The consortium commits to submit a declaration of compliance with respective national legal framework(s) by M12 and in any case before any research activities involving genetic, biometric and/or health data commence (if they do indeed do so).

In addition, the consortium will ensure that the partners processing personal data of research participants have, where applicable under the General Data Protection Regulation 2016/679, appointed within their organisations a Data Protection Officer (DPO), the contact details of which will be made available to all data subjects involved in the research.

Beneficiaries that are not required, under the General Data Protection Regulation 2016/679 (GDPR), to appoint a DPO, will develop, with the assistance of VUB, a detailed data protection policy for the project FASTER specifically. The policies will be presented in a specific deliverable by M12 and be available to the Agency upon request.

³¹ Convention for the Protection of Human Rights and Fundamental Freedoms, as amended by Protocols No. 11 and No. 14, Rome, 4 November 1950, ETS No. 5. <http://conventions.coe.int/treaty/en/treaties/html/005.htm>

³² Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data, Strasbourg, 28 January 1981, ETS 181. <http://www.conventions.coe.int/Treaty/en/Treaties/Html/108.htm>

³³ Charter of Fundamental Rights of the European Union, OJ C 326, 26.10.2012, pp. 391–407.

In general, in FASTER no personal data is transferred outside the EU.

As requested from the Ethics Screening report, institutions that will host data collection will confirm that they have appointed a Data Protection Officer (DPO) and the contact details of the DPO will be made available to all data subjects involved in the research. For host institutions not required to appoint a DPO under the General Data Protection Regulation 2016/679, a detailed data protection policy for the project will be submitted as a deliverable. All this information will be detailed in D12.2.

5.1.3.3 Justification for the processing of sensitive personal data

The project FASTER foresees the processing of sensitive personal data, in particular health data (including potentially details of pre-existing conditions), description of injuries or symptoms and information revealing social-culture aspects of individuals. Under the General Data Protection Regulation (GDPR), the processing of these categories of data is in principle prohibited. To lift the prohibition, in addition to the existence of a legitimate basis (which is identified in the consent of the research participants, see below) the processing of these categories of data must be justified by FASTER innovation and research purpose.

Personal data (including sensitive personal data will only be used absolutely when “required”, that is, it would not be possible to attain the purpose of the project without their processing. According to the consortium’s self-assessment, the use of mock data (i.e., fake, non-personal, data artificially inserted into a piece of software), will in most cases be sufficient. Such data does not constitute personal and be freely processed.

Where personal data (including sensitive data) is required it will be secured by from researchers working for consortium members. This will be done on a voluntary only basis and in line with the principles outlines below.

5.1.3.4 Processing of sensitive or 'special' data

FASTER may process sensitive medical or health data. Sensitive medical data is a category of data for which stricter requirements apply in terms of the legal base that is necessary. Medical data are considered as sensitive categories of data in consideration of the risks that their disclosure or misuse may procure. For this reason, the legal regime is stricter and, in principle, prohibitive. Art. 9 (1) of the Regulation prohibits “*processing of personal data revealing racial or ethnic origin, political opinions, religious or philosophical beliefs, or trade-union membership, and the processing of genetic data, biometric data for the purpose of uniquely identifying a natural person, data concerning health or data concerning a natural person's sex life or sexual orientation.*” In addition to the special protection measures outlined in Art. 9, the processing of medical data must abide by the fundamental principles of data protection, notably data minimisation, described above.

Given the definition of personal data, described in art. 4 GDPR, the question arises as to which data should be considered medical data, whether they can be data about lifestyle or eating habits. According to the Article 29 Working Party (Article 29 Data Protection Working Party, 2007), given the potential breadth of this class of data it is probably wise, the Working Party suggests, to consider all data contained in medical documentation, in electronic health records and in EHR systems, including administrative data, social security number, and date of admission to treatment or to hospital, as “sensitive personal data”³⁴. When the processing of personal data relates to a person's health, such a processing activity requires special protection.

As mentioned above, the processing of personal data concerning health is, in principle, prohibited.³⁵ However, the necessity exists for sharing personal information in order to treat patients. Accordingly, certain derogations exist which permit processing of personal medical data. As these are derogations to the general prohibition rule, however, they must be construed in a narrow fashion and applied strictly.³⁶ The next section will highlight the most important derogation relating to the FASTER project.

5.1.3.5 Explicit consent

A derogation from the ban on the processing of personal medical data is allowed where “the data subject has given his explicit consent to the processing of those data”.³⁷ Consent is defined as “any freely given, specific, informed and unambiguous indication of the data subject's wishes by which he or she, by a statement or by a clear affirmative action, signifies agreement to the processing of personal data relating to him or her”.³⁸ Consent can therefore constitute a justification for the processing of sensitive data. To be valid, consent must be “freely given” and contain “specific and informed indication of the data subject’s wishes”³⁹. In addition to that, the processing that a per-

³⁴ This was a specific recommendation of the Article 29 Working Party.

³⁵ Art. 9 (1). A general prohibition is also required according to art. 6 of the Council of Europe Convention No. 108.

³⁶ The GDPR provides for mandatory derogations laid down in art. 9 (2) plus an optional exemption in art. 9 (3).

³⁷ This derogation cannot be used however where the general prohibition may not be lifted by the data subject's giving his explicit consent” – art. 9 (2) a)

³⁸ Art. 4 (11) GDPR

³⁹ Art. 2 (h) Directive.

son gives consent to must respect the principles of data processing, in primis data minimisation. This is what is known as opt-in. Explicit consent must be traceable; thus, a proof must be kept, and therefore it is given usually in written form (Article 29 Data Protection Working Party, 2011) [42]. In FASTER the use of explicit consent of the data subjects as a legal basis to process sensitive data is pivotal, as personal medical data of research participant can be processed solely based on their consent (though this will only where it is not feasible).

As requested from the Ethics Screening report, in case personal data processing is confirmed, the templates of the informed consent forms and information sheets with regard to processing of personal data (in language and terms intelligible to the participants) will be submitted as a deliverable D12.3.

5.1.3.6 *Technical and Organizational measures*

According to article 24 GDPR, “taking into account the nature, scope, context and purposes of processing as well as the risks of varying likelihood and severity for the rights and freedoms of natural persons, the controller shall implement appropriate technical and organisational measures to ensure and to be able to demonstrate that processing is performed in accordance with this Regulation.”

For each of the users’ group, the consortium will adopt a series of measures to ensure that the personal data collected during the demonstrations are stored securely and for no longer than the period necessary to attain the purpose of the collection.

Ensure that researchers involved in FASTER have a clean criminal record

Data Confidentiality Statement (art. 24 GDPR) – A document signed by all FASTER researchers committing to:

- keep all personal information and research information confidential;
- employ all reasonable safeguards to prevent any use, access or disclosure of the Data Set that would result in a breach of this Statement;
- protect all personal information stored on laptops or other personal devices, for instance using a password, or by storing it in a dedicated support;
- report, in writing, without unreasonable delay, (...) any incident of which I become aware relating to a breach of security and/or privacy of the data set;
- not use any personal information in any form or format after completion of the project.

Ethics Protocol for research participants (art.24 GDPR) – A document detailing the practices to be followed to:

- avoid procuring any harm, including emotional harm and risk of upset, as well as reputational damage
- respect any sign through which the research participant signifies that he or she does not want to continue the research.
- contingency plans: e.g., Before taking any initiative think about what might happen.
- protect participant confidentiality and anonymity within the study (see data confidentiality statement)

Data Security protocol (art. 24 GDPR) - a document, adopted by all partners and revised regularly, detailing:

- the anonymization and/or pseudonymisation measures adopted (Recitals 26-28 GDPR)
- Security measures for the safe storage of the data
- Data breach notification mechanism
- Period of storage

Data Transfer Protocol (art.24 GDPR) - a document, adopted by all partners and revised regularly, detailing

- the modalities for transfer data from demonstration sites
- the security measures, such as Encryption, used to transfer the data
- the means of transmission, e.g., through secured FTP protocol and/or other means
- the name of the partners and individual researchers allowed to access and process the data collected during the demonstrations.

As in previous cases, the Ethical Advisory Board will be consulted.

The ethical advisory Board will be informed about the procedures, adopted in each university research centres, according to the law of the country and the recognised standard practices of the institution involved, for obtaining consent from the individuals.

The partners will demonstrate that the nutritionist has also been contacted, informed about the project, and asked to advice about participation and engagement with the research activities by the person concerned.

Both the person concerned and his or her nutritionist will be asked to express their unambiguous consent to participate in the research.

Partners will be responsible to provide information to the research candidate who may volunteer to provide personal data:

1. research scope of the demonstration ad its voluntary nature;

2. an overall description of the FASTER and the fact that personal data will be collected, for which purpose and in which secured form;
3. the purpose of the demonstration; how RPs were selected;
4. expected duration of the demonstration and the participant's participation;
5. the right to ask any questions;
6. the incidental findings policy detailing what happens if something suspicious is detected;
7. The possibility to opt out at any time.
8. No advantage or inducement shall be offered.

The suitability of the procedures for obtaining consent of older persons will be assessed by VUB and by the Ethical Advisory Board.

The consent form will contain the information requirements for the fair processing of personal data collected during the demonstrations.

5.1.3.7 *Rights and obligations of the data subject*

As anticipated, the Data Protection Directive also recognises a number of subjective rights for data subjects such as the right to receive some information whenever data is collected, to access the data, to have data corrected, and to object to certain types of processing.⁴⁰

- **Right to be informed** – according to art. 12 GDPR the controller shall take appropriate measures to provide any information „to the data subject in a concise, transparent, intelligible and easily accessible form,⁴¹ using clear and plain language, in particular for any information addressed specifically to a child. The information shall be provided in writing, or by other means, including, where appropriate, by electronic means.”
- **Right to access** – „the data subject shall have the right to obtain from the controller confirmation as to whether or not personal data concerning him or her are being processed, and where that is the case, access to the personal data...”⁴² As the CJEU clarified in the Rijkeboer case, the right to access is necessary to enable the data subject to exercise his rights under art. 12 (b)
- **Right to rectification** – According to art. 16 „the data subject shall have the right to obtain from the controller without undue delay the rectification of inaccurate personal data concerning him or her. Taking into account the purposes of the processing, the data subject shall have the right to have incomplete personal data completed, including by means of providing a supplementary statement.”
- **Right to be forgotten** - The right to be forgotten⁴³ will grant the right to the data subject to have his personal data erased: “The data subject shall have the right to obtain from the controller the erasure of personal data concerning him or her without undue delay and the controller shall have the obligation to erase personal data without undue delay”.⁴⁴ The provision has an apparent effect in online environment since search engines must remove search results upon the request of the individual. Although it will be a newly expressed right in the GDPR, due to the decision of the Google Spain case, it is also derivable from the Directive.⁴⁵
- **Right to data portability** – According to art. 20 „the data subject shall have the right to receive the personal data concerning him or her, which he or she has provided to a controller, in a structured, commonly used and machine-readable format and have the right to transmit those data to another controller without hindrance from the controller to which the personal data have been provided.”
- **Right to object** – Art. 21 elaborates on the right to object: „The data subject shall have the right to object, on grounds relating to his or her particular situation, at any time to processing of personal data concerning him or her.” Data subject has the right to object not only relating to his or her particular situation, but against profiling or direct marketing purposes as well.
- **Right to a judicial remedy and the right to receive compensation** - where the data subject considers that his or her rights under this Regulation have been infringed as a result of the processing of his or her personal data in non-compliance with this Regulation, he or she has the right to an effective judicial remedy and the right to receive compensation.⁴⁶
- **The right to restriction of processing**⁴⁷ - This right will be a new form of exercising data protection rights. Data subjects will be able to affect the extension of the data processing by claiming its restriction.

⁴⁰ Art. 12

⁴¹ A detailed, comprehensive information is not always understandable, therefore the Working Party tried to find a balance and introduced in its opinion the so-called layered notices. It allows the data subject to decide which level of detail he prefers.

⁴² Art. 15 GDPR

⁴³ Art. 17 GDPR

⁴⁴ Art. 17 GDPR

⁴⁵ See C-131/12 *Google Spain SL and Google Inc. v Agencia Española de Protección de Datos (AEPD) and Mario Costeja González* [2014] [8]

⁴⁶ Art. 79 GDPR

⁴⁷ Art. 18 GDPR

Based on art. 18 (2) GDPR the conditions of restricted processing will be strict. Although it seems a technical solution, it will provide an interlocutory treatment of risk, while the data subjects decide the actual treatment (De Hert, Papakonstantinou, 2016) [24].

- **Stakeholder engagement** - The Regulation also provides a platform for data subjects to be heard: Art. 35 (9) GDPR says the controllers shall seek the views of data subjects on the processing operation. The engagement of external stakeholders to the development phase has a pivotal role in impact assessments

5.1.3.8 *Obligations of the data controller*

- **Record of processing activities** – The Regulation will require a detailed documentation about the controller, the processor (if any) and the processing operation. The documentation will help in the identification of risks both for the controller and for the supervisory authority (upon request, art. 30 (4)).
- **Data Security** – The controller shall implement appropriate technical and organisational measures to ensure a level of security appropriate to the risk.⁴⁸ “In assessing the appropriate level of security account shall be taken in particular of the risks that are presented by processing, in particular from accidental or unlawful destruction, loss, alteration, unauthorised disclosure of, or access to personal data transmitted, stored or otherwise processed.”⁴⁹
- **Data Protection by Design and by Default** – The principle determines the means for data processing at the time of its development. Along with the ‘by default’ principle⁵⁰ these provisions cause additional tasks and further development, thus further expenses for the data controller. The principle has a strong precautionary approach and motivates organisations to take proactive measures.
- **Personal data breach notification** – If a personal data breach occurs, the controller has to assess it and shall (in certain cases) notify the supervisory authority only or the data subjects as well. Although the layered approach of the provision allows data controller to keep the breach unnoticed for the authority or the data subjects, it is very unlikely that the controller will willingly share the documentation of the event, thus potentially lose trust.
- **Codes of conduct** – Although the Directive includes provisions relating to codes of conduct⁵¹, it focuses to the application of the Directive in specific sectors.⁵² In the regulation it will also provide an alternative help companies when they try to meet the requirements of the accountability principle.
- **Sanctions** - Under the Directive Member states had the autonomy to decide the system of sanctions, along with the amount of administrative fines. As art. 83 (1) explains, fines must be effective, proportionate and dissuasive. The proportionality of the fine depends on the interpretation of the imposing authority, and its effectiveness is directly proportional with its dissuasiveness.
- **Data Protection Impact Assessment** - Art. 35 requires the data controller to conduct an assessment of the impact of the envisaged processing operations on the protection of personal data, when a type of processing is likely to result in a high risk for the rights and freedoms of the individual. The goal of the legislator with DPIA was to facilitate compliant processing of personal data.⁵³

5.1.3.9 *Incidental findings policy*

In the course of the demonstrations, incidental findings may arise. By M3, the consortium will licence an incidental finding. These policies will address the procedures and the responsibilities for communicating to health care professionals and health care authorities. VUB will draft it and submit for approval to the Ethical Advisory Board for review.

As orienteering introduction, incidental findings are traditionally defined as “results that arise that are outside the original purpose for which the test or procedure was conducted”.⁵⁴ In the FASTER project, in the event of any incidental finding raising ethical concerns discovered throughout the execution of the project, the following policy will apply:

(1) In a first place, these incidental finding will be immediately referred to:

- the project’s Responsible partner for the demonstration (See 1.3.3.4 User Groups),
- person with the closest therapeutic link with the research participant,

⁴⁸ Art. 32 GDPR

⁴⁹ Art 32 (2) GDPR

⁵⁰ Art. 25 (2) GDPR

⁵¹ Art. 27 Directive

⁵² Such as the Federation of European Direct and Interactive Marketing (FEDMA). The code of conduct was approved by the Working Party. Read more at: Opinion 4/2010 of the Article 29 Data Protection Working Party on the European code of conduct of FEDMA for the use of personal data in direct marketing (WP174) 2010 < http://ec.europa.eu/justice/data-protection/article-29/documentation/opinion-recommendation/files/2010/wp174_en.pdf> [13/04/2016] [46]

⁵³ It should be underlined that some experts critically state that DPIA, in its current form, does not require controllers to carry out a proper impact assessment, as it facilitates a mere legal compliance check. Read more at: Roger Clarke, ‘Approaches to Impact Assessment’ Brussels, 22 January 2014 <<http://www.rogerclarke.com/SOS/IA-1401.html#RA>> [03/05/2016] [15]

⁵⁴ http://bioethics.gov/sites/default/files/FINALAnticipateCommunicate_PCSBI_0.pdf

- only if necessary, to the Ethical and Legal Manager (VUB, see below),
- only if necessary, to the External Advisory Board (EAB), and
- European Commission, in its funding agency capacity, via the project officer.

Here the incidental findings policy reflects on the ethical complications stemming from new forms of risk, threats and vulnerabilities and the multiple meanings and normative implications of emerging medical surveillance technologies.

(2) Secondly, the following rules will govern any incidental findings:

- individuals will give an informed consent to take part in the research;
- Deletion of any incidental findings will be considered by the bodies mentioned in (1);
- In case of incidental findings that include recording an illegal activity, the consortium will comply with all relevant local and international laws;
- In case of incidental findings that include any information of public interest, the bodies mentioned in (1) would make a decision about the need, means and timing of their communication to relevant stakeholders;

The incidental finding policies of FASTER should conform to these basic requirements. These requirements may be revised and adjusted throughout the lifetime of the FASTER project.

The objective of the ethics and data protection management structure is to assess the impacts of FASTER with respect to ethical standards, privacy and personal data protection, as well as social acceptance. This is done with the purpose of both monitoring the ethical and legal compliance of the demonstrations conducted, and of feeding non-technological but human requirements in the process of prototype/technology development (WP2).

VUB is also responsible for making research on the Ethical, Regulatory and Social Acceptance conditions and areas of concern for FASTER and to ensure compliance with EU and national legislation (see WP10). To anticipate the impacts of FASTER,

VUB applies a tailored version of an impact assessment (IA).⁵⁵

In sum, the FASTER IA process will include:

- Definition of a baseline: what societal concerns – e.g. applied ethics, privacy, data protection and/or societal acceptance – the project might raise? What (other) regulatory requirements might apply thereto?
- A risk review supported by a tailored down framework (methodology) for impact assessment (a questionnaire) and face to face meetings with technology partners.
- On-going monitoring and control on the conformity with ethical standards, guidelines and otherwise regulatory requirements of Horizon2020, compliance with personal data protection requirements, e.g. notifications, data sharing agreements, confidentiality letters, etc. during the whole lifecycle of the project.
- Advice on the matters concerning applied ethics, privacy, data protection and/or societal acceptance and inclusion of external viewpoints.

The scope of this impact assessment encompasses legal questions, such as privacy and personal data protection. These issues, however, do not address all societal concerns that stem from the increased potential of medical surveillance that FASTER and other modern technologies may procure: Will citizens accept being monitored continuously? Will technology be able to single out cultural groups? Will data be collected to ascertain the health status of the population?

The consortium will establish three oversight bodies.

1. The Ethical and Legal Management, responsible VUB, in the person of Prof Paul Quinn (paul.quinn@vub.ac.be) will be responsible for providing legal research and advice, documentations, such as approval of relevant authorities, consent forms, data sharing agreements, data transfer protocols, research ethics procedures, safeguarding principles, etc.

VUB will attend any meeting of the consortium and intervene should it consider the activities posing risks to the FASTER.

Frameworks (see WP10). VUB will also participate in the Security Advisory Board (SAB) meetings.

2. Legal and Ethics sub-Committee (established in M3): a subcommittee of the project's the Project Management Board, composed of all WP leaders, holding meetings at least every three months to discuss the progress of the individual WPs. The aim is to enable project members to recursively reflect on the impacts of FASTER against the requirements identified, as the FASTER is integrated, tested and demonstrated.
3. Legal and Ethics External Advisory Board (EAB, established in M6): a group of external experts who will: (a) assess and validate the measures adopted by the consortium to comply with ethical and legal standards; (b)

⁵⁵ This methodology is the result of more than five years of experience of the VUB, and a number of EU co-funded research projects. Kloza Dariusz, Van Dijk Niels, Gellert Raphaël, Maurice, Borocz Istvan Mate, Tanas Alessia, Mantovani Eugenio, Quinn Paul (2017) Data protection impact assessments in the European Union: complementing the new legal framework towards a more robust protection of individuals. d.pia.lab Policy Brief, pp. 1-4

provide external, independent expertise, flag areas of ethical or legal concern. The EAB will be chaired by the Legal and Ethical Manager (from VUB). The Legal and Ethics Manager will keep the EAB informed of the latest activities and developments in the project, periodically reporting on ethical issues or aspects that arise throughout the project life, including the issues that the consortium has discussed or faced internally which are not reflected in deliverables.

The European Commission suggests⁵⁶, Ethics Advisory Boards (EABs) should be seen as “*the EC fulfilling its obligations to help avoid public uneasiness towards science and to mitigate concerns where they exist*”.⁵⁷ A key prerequisite of EABs is independence, seen as objectivity and impartiality. For this reason, the EAB members will be free of any conflict of interest and their activity formally independent of the project’s work packages’. The Legal and Ethical Manager has no voting rights on EAB decisions.

5.1.3.10 Members of the EAB

Consortium agree on list of candidates at KOM and send invitations in M1. The list of members of the EAB (5-6) will be defined no later than M3. At least three members will have a background or proven experience in ethics and legal studies on the medical information technologies and in particular on innovative technologies for dietary assessment and support. Members may be chosen from the network developed by other projects, to which FASTER is related. Other members will come from different research areas familiar with themes of medical ethics and practice. The Legal and Ethical Manager will ensure that gender balance is respected.

5.1.4 Animals

The FASTER project may undergo trials with guide dogs. Such dogs will be typical domestic dogs (*Canis familiaris*). No at risk or endangered species will be used. Animals will not be put in a situation where there is anything more than a negligible risk. They will not be the subject of any physical impositions or testing. They may be required to act out certain scenarios that would simulate a first responder response. They will always be under the control and supervision of their usual professional handlers. Animals will not be used in any way that would be contrary to the normal ethical principles that are used by their professional operators.

5.1.5 Table of commitments for the first twelve months

This table summarises the engagements adopted by the consortium under this section during the first twelve months of the project.

Table 2: Summary of “ethical and legal” engagements adopted by the consortium during the first twelve months of the project.

Issue	Implementation	Due
<i>Review of ethical issues</i>	<i>Discussion with partners at KOM.</i>	<i>M1</i>
<i>Criminal records of researchers working in FASTER</i>	<i>VUB asks partners to confirm that FASTER researchers have no relevant criminal record.</i>	<i>M1</i>
<i>Invitation to Members of EAB</i>	<i>Consortium agree on list of candidates at KOM and send invitations.</i>	<i>M1-3</i>
<i>Ethical Advisory Board</i>	<i>The board is established and operational.</i>	<i>M6</i>
<i>Informed consent procedures</i> <i>Templates of the informed consent/assent forms and information sheets covering the voluntary participation and data protection issues</i>	<i>Detailed information on the informed consent procedures that will be implemented for the participation of individuals and in regard to data processing will be submitted as a deliverable.</i> <i>Templates of the informed consent/assent forms and information sheets covering the voluntary participation and data protection issues (in language and terms intelligible to the participants) will be kept on file in the project’s repository created by the project’s coordinator.</i>	<i>M12</i>
<i>Verify adequacy of parental consent forms for children, consent forms for disabled persons, consent forms for older persons user groups I</i>	<i>VUB submit the template forms and procedures to EAB for assessment and approval</i>	<i>M12</i>
<i>Incidental findings policy</i>	<i>VUB will draft it and submit for approval to the Security Board</i> <i>EAB will be asked to assess and validate incidental findings policy</i>	<i>M6</i> <i>M6</i>

⁵⁶ http://ec.europa.eu/research/participants/data/ref/h2020/other/hi/ethics-guide-advisors_en.pdf p, 2

⁵⁷ *ibid.* p, 1.

Annex 1 – Information to be provided to individuals participating in the research

Prior to participating in FASTER, candidate research participants) will receive the following information in form of “statements” or “descriptions”⁵⁸,

- A statement that the study involves research subjects and an explanation of the purposes of the research.
- The expected duration of the subject's participation.
- A description of the procedures to be followed and of the technology that is going to be tested, and an identification of any procedures which are experimental.
- A statement that participation is voluntary.
- Information about who is organising and funding the research.
- A description of any reasonably foreseeable risk, discomfort or disadvantages.
- A description of any benefits to the subject or to others which may reasonably be expected from the research avoiding inappropriate expectations.
- A disclosure of appropriate alternative procedures for treatment/diagnosis if any, that might be advantageous to the subject.
- A statement describing the procedures adopted for ensuring data protection/confidentiality/privacy including duration of storage of personal data.
- A description of how incidental findings are handled.
- For research involving more than minimal risk, an explanation as to whether there are any treatments or compensation if injury occurs and, if so, what they consist of, or where further information may be obtained. Insurance coverage should be mentioned.
- A reference to whom to contact for answers to pertinent questions about the research and research subjects' rights, and whom to contact in the event of a research-related injury to the subject.
- A statement offering the subject the opportunity to ask questions and to withdraw at any time from the research without consequences.
- An explanation of what will happen with the data or samples at the end of the research period and if the data/ samples are retained or sent/sold to a third party for further research.
- Information about what will happen to the results of the research.

Annex 2 – Informed consent form for participation in research

“I, undersigned [name] [date and place of birth – natural person; registry number – legal entities] [contact details] [if representing a minor: her/his name, date of birth, etc.], hereby give my consent to take part in the research carried out by the FASTER Research Consortium.

1. I have been informed that the FASTER project is a research project currently run under the Horizon 2020 Framework Programme under the grant agreement no. [number]. The co-ordinator of the project is [name] [registry number – legal entities] [contact details], who might be contacted with regard to any question regarding my participation.
2. I have been informed about the purposes of the project. I have had all my questions answered to my satisfaction.
3. My participation in the research will include [describe in detail]. Information obtained during the research will be used for [describe in detail]. My personal data will be made available only to the members of the FASTER Consortium.
4. I have been informed that I can also address any ethical questions or concerns arising from this research to the Ethics Manager (EM) of the project.
5. I understand that no further use of my personal information in the course of the project is foreseen.
6. [I require my participation remains anonymous, i.e. all possible efforts would be made to prevent the identification of myself and I will not be identified in any research results.]
7. I understand [I will / I will not] be paid for my participation.
8. I give this consent fully informed, freely and voluntarily and I understand that I am free to withdraw my consent and discontinue my participation at any time without any negative consequences.
9. [Are there any other conditions? E.g. Non-disclosure?]
10. The relevant laws of [country] shall apply.

Done in two copies, of which one is for the FASTER Consortium and one for the participant.

Done at [place] on [date].

⁵⁸ The list of informational requirements is adapted from http://ec.europa.eu/research/participants/data/ref/fp7/39807/informed-consent_en.pdf

Signature.

5.2 SOCIETAL IMPACT

The FASTER project accepts that it raises questions of societal impact. For this reason, it has created a work package (WP2) that is specifically dedicated to Social, Ethical and Legal Issues (SELP). This work package will fully consider all relevant societal issues and how the project can be conducted in a way that will reduce both harms and bring about improvements in terms of societal issues. It will use an impact assessment methodology to ensure that such issues are raised early in the project and considered throughout its lifecycle. Material from T2.1 and T2.2. will be used to draft a report on societal issues before the projects interim review.

In considering issues of societal importance the VUB as Legal and Ethical Manager of the project will consider *inter alia*:

Risks of Stigmatisation and Discrimination

Events use as natural disasters and terrorist attacks can evoke strong emotions amongst the general public. The emergency response, including by first responder is critical in reducing the chances of harmful outcomes. Responses must be tailored to take into account the needs and sensitivities of vulnerable groups and care must be taken so as to not give rise to misinformation that could give rise to or amplify harmful stereotypes concerning vulnerable groups.

Gender Issues

FASTER will endeavour not to use or take into account negative gender stereotypes. Such stereotypes could concern the delivery of healthcare in an emergency environment or the role of particular genders in the delivery of health care or as first responders. The creation or propagation of stereotypes could lead to issues of discrimination for particular genders or worsen the delivery of healthcare.

Effect on Health care delivery

The planning and implementation of complex responses to scenarios such as those that the FASTER project is concerned with requires the committal of significant resources. Given the limited budgets of national healthcare systems there is an ethical imperative to design new solutions (such as that envisaged in the FASTER project) in a manner that takes such issues into consideration.

Privacy issues and Risks

As the structure of WP2 makes clear, one of the main issues in this project is the need to design a first responder system that adequately minimizes privacy risks and safeguards the data protection rights of not only individuals that require medical protection but also those delivering it. Sensitivity to such issues must not only be considered from the individual perspective but also the societal. This is because new healthcare practices can give rise to new informational practices and new perceptions of what is normal and what is not. FASTER as a project will accordingly give adequate consideration to the larger scale impact that would occur should the project lead to the creation of an exploitable solution that can be deployed on a large scale. Such issues will be considered in WP 2 and referred to in the social issues report which will be delivered before the projects interim review.

6 SECURITY

This section does not apply to the FASTER project since it will not involve:

- Activities or results raising security issues
- ‘EU-classified information’ as background or results

See table below.

Please indicate if your project will involve: <ul style="list-style-type: none"> • Activities or results raising security issues: <i>if YES please complete sections 6.1, 6.3 and 6.4.</i> • ‘EU-classified information’ as background or results: <i>if YES please complete sections 6.2.2, 6.3 and 6.4.</i> 	<p style="text-align: right;">Yes / No</p> <p style="text-align: right;">Yes / No</p>
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6.1 LIMITED DISSEMINATION LIST

N/A

6.2 EU CLASSIFIED INFORMATION

N/A

6.2.1 Security aspects letter

N/A

6.2.2 Security classification guide

N/A

6.3 SECURITY STAFF

N/A

6.3.1 Project Security Officer

N/A

6.3.2 Security Advisory Board

N/A

6.4 OTHER PROJECT-SPECIFIC SECURITY MEASURES

N/A

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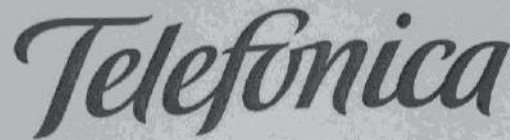
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ANNEX I – LETTERS OF SUPPORT

Telefónica



To: Dr. Petros Daras
CERTH/ITI
FASTER Coordinator

Organization name: Telefónica
Address: Distrito Telefónica, Ronda de la Comunicación s/n
Postcode: 28050
Town/city: Madrid
Country: Spain

Madrid, 13th August 2018

LETTER OF SUPPORT

Telefónica has been informed about the “**FASTER – First responder Advanced technologies for Safe and efficient Emergency Response**” proposal submitted under the topic **DRS-02-2018-Subtopic Open: Technologies for first responders**.

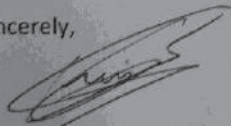
FASTER aims to offer a set of technologies that will significantly improve the operational capabilities of First Responders, while protecting them in hostile environments. Given the complex and demanding requirements of responding to a natural or man-made disaster incident, novel tools will be developed to assist responders enhance their capacity, adapt to difficult and chaotic conditions, and respond to unforeseen situations, providing both situational awareness, and reliable communications. More specifically, it will research on the areas of communication, unmanned vehicles, augmented reality capabilities and smart wearables and clothing.

The FASTER consortium includes several First Responders organizations from multiple European countries who will be involved in the evaluation of the project results on real-world use cases.

The envisaged work of FASTER is of significant interest and high relevance to our organization, which is emergency real time solutions based on UAVs, robots and augmented reality related to new connectivities (e.g. V2X-5G), and the further development of this project will create possibilities for collaboration in the above-mentioned fields.

Therefore, Telefónica strongly supports the FASTER proposal and is interested to scientifically collaborate with the FASTER consortium in the areas of interest, contribute with our expert advice whenever possible, have the possibility to attend the field tests, and facilitate the dissemination and communication activities of the project.

Sincerely,



Luis Simón Gómez Semeleder
New IoT Business and Innovation Manager
Madrid, 13th August 2018
Telefónica

ESTIMATED BUDGET FOR THE ACTION

Estimated eligible ¹ costs (per budget category)										EU contribution			Additional information				
A. Direct personnel costs				B. Direct costs of subcontracting	[C. Direct costs of fin. support]	D. Other direct costs		E. Indirect costs ²	Total costs	Reimbursement rate %	Maximum EU contribution ³	Maximum grant amount ⁴	Information for indirect costs	Information for auditors	Other information:		
A.1 Employees (or equivalent)		A.4 SME owners without salary				D.1 Travel	D.5 Costs of internally invoiced goods and services						Estimated costs of in-kind contributions not used on premises	Declaration of costs under Point D.4	Estimated costs of beneficiaries/ linked third parties not receiving funding/ international partners		
A.2 Natural persons under direct contract		A.5 Beneficiaries that are natural persons without salary				D.2 Equipment											
A.3 Seconded persons						D.3 Other goods and services											
[A.6 Personnel for providing access to research infrastructure]						[D.4 Costs of large research infrastructure]											
Form of costs ⁶	Actual	Unit ⁷	Unit ⁸		Actual	Actual	Actual	Unit ⁹	Flat-rate ¹⁰								
	a	Total b	No hours	Total c	d	[e]	f	Total g	25%	h = 0,25 x (a + b + c + f + g + [i1] ¹³ + [i2] ¹³ - n)	j = a + b + c + d + [e] + f + g + h + [i1] + [i2]	k	l	m	n	Yes/No	
1. CERTH	495 000.00	0.00	0.00	0.00	0.00	0.00	85 000.00	0.00	145 000.00		725 000.00	100.00	725 000.00	725 000.00	0.00	No	n/a
2. ENG	454 500.00	0.00	0.00	0.00	0.00	0.00	47 500.00	0.00	125 500.00		627 500.00	100.00	627 500.00	627 500.00	0.00	No	n/a
3. OTE	144 000.00	0.00	0.00	0.00	0.00	0.00	20 000.00	0.00	41 000.00		205 000.00	100.00	205 000.00	205 000.00	0.00	No	n/a
4. DXT	464 000.00	0.00	0.00	0.00	0.00	0.00	32 000.00	0.00	124 000.00		620 000.00	100.00	620 000.00	620 000.00	0.00	No	n/a
5. CPLAN	225 000.00	0.00	0.00	0.00	0.00	0.00	20 000.00	0.00	61 250.00		306 250.00	100.00	306 250.00	306 250.00	0.00	No	n/a
6. DH	156 000.00	0.00	0.00	0.00	0.00	0.00	50 000.00	0.00	51 500.00		257 500.00	100.00	257 500.00	257 500.00	0.00	No	n/a
7. ROB	264 000.00	0.00	0.00	0.00	0.00	0.00	40 000.00	0.00	76 000.00		380 000.00	100.00	380 000.00	380 000.00	0.00	No	n/a
8. SYN	223 100.00	0.00	0.00	0.00	0.00	0.00	20 000.00	0.00	60 775.00		303 875.00	100.00	303 875.00	303 875.00	0.00	No	n/a
9. INOV	262 200.00	0.00	0.00	0.00	0.00	0.00	35 000.00	0.00	74 300.00		371 500.00	100.00	371 500.00	371 500.00	0.00	No	n/a
10. LINKS	253 800.00	0.00	0.00	0.00	0.00	0.00	43 000.00	0.00	74 200.00		371 000.00	100.00	371 000.00	371 000.00	0.00	No	n/a
11. KPRF	302 400.00	0.00	0.00	0.00	0.00	0.00	36 000.00	0.00	84 600.00		423 000.00	100.00	423 000.00	423 000.00	0.00	No	n/a
12. KAMK	208 000.00	0.00	0.00	0.00	0.00	0.00	35 000.00	0.00	60 750.00		303 750.00	100.00	303 750.00	303 750.00	0.00	No	n/a
13. VUB	225 000.00	0.00	0.00	0.00	0.00	0.00	20 000.00	0.00	61 250.00		306 250.00	100.00	306 250.00	306 250.00	0.00	No	n/a
14. UWA	333 000.00	0.00	0.00	0.00	0.00	0.00	32 000.00	0.00	91 250.00		456 250.00	100.00	456 250.00	456 250.00	0.00	No	n/a
15. ADM-POL	97 500.00	0.00	0.00	0.00	0.00	0.00	30 000.00	0.00	31 875.00		159 375.00	100.00	159 375.00	159 375.00	0.00	No	n/a
16. SUMMA	52 000.00	0.00	0.00	0.00	0.00	0.00	13 332.00	0.00	16 333.00		81 665.00	100.00	81 665.00	81 665.00	0.00	No	n/a
- CMFF	36 400.00	0.00	0.00	0.00	0.00	0.00	13 334.00	0.00	12 433.50		62 167.50	100.00	62 167.50	62 167.50	0.00	No	n/a
- ESDP	36 400.00	0.00	0.00	0.00	0.00	0.00	13 334.00	0.00	12 433.50		62 167.50	100.00	62 167.50	62 167.50	0.00	No	n/a
- FIIBAP	5 200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1 300.00		6 500.00	100.00	6 500.00	6 500.00	0.00	No	n/a
Total beneficiary	130 000.00	0.00			0.00	0.00	40 000.00	0.00	42 500.00		212 500.00		212 500.00	212 500.00	n/a	n/a	0.00
17. ENSOSP	138 000.00	0.00	0.00	0.00	0.00	0.00	30 000.00	0.00	42 000.00		210 000.00	100.00	210 000.00	210 000.00	0.00	No	n/a
18. WSPOL	40 000.00	0.00	0.00	0.00	0.00	0.00	35 000.00	0.00	18 750.00		93 750.00	100.00	93 750.00	93 750.00	0.00	No	n/a
19. KAJ	93 600.00	0.00	0.00	0.00	0.00	0.00	30 000.00	0.00	30 900.00		154 500.00	100.00	154 500.00	154 500.00	0.00	No	n/a
20. HRTA	96 000.00	0.00	0.00	0.00	0.00	0.00	30 000.00	0.00	31 500.00		157 500.00	100.00	157 500.00	157 500.00	0.00	No	n/a
21. MG	90 000.00	0.00	0.00	0.00	0.00	0.00	35 000.00	0.00	31 250.00		156 250.00	100.00	156 250.00	156 250.00	0.00	No	n/a
22. CSIP	97 200.00	0.00	0.00	0.00	0.00	0.00	24 000.00	0.00	30 300.00		151 500.00	100.00	151 500.00	151 500.00	0.00	No	n/a
- RP	27 000.00	0.00	0.00	0.00	0.00	0.00	11 000.00	0.00	9 500.00		47 500.00	100.00	47 500.00	47 500.00	0.00	No	n/a
Total beneficiary	124 200.00	0.00			0.00	0.00	35 000.00	0.00	39 800.00		199 000.00		199 000.00	199 000.00	n/a	n/a	0.00
23. KGU Japan ¹⁴	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a		n/a	n/a	n/a	n/a	n/a	n/a	315 625.00
Total consortium	4 819 300.00	0.00		0.00	0.00	0.00	780 500.00	0.00	1 399 950.00		6 999 750.00		6 999 750.00	6 999 750.00			315 625.00

¹ See Article 6 for the eligibility conditions.

ESTIMATED BUDGET FOR THE ACTION

² Indirect costs already covered by an operating grant (received under any EU or Euratom funding programme; see Article 6.5.(b)) are ineligible under the GA. Therefore, a beneficiary/linked third party that receives an operating grant during the action's duration cannot declare indirect costs for the year(s)/reporting period(s) covered by the operating grant, unless it can demonstrate that the operating grant does not cover any costs of the action (see Article 6.2.E).

³ This is the theoretical amount of EU contribution that the system calculates automatically (by multiplying all the budgeted costs by the reimbursement rate). This theoretical amount is capped by the 'maximum grant amount' (that the Agency decided to grant for the action) (see Article 5.1).

⁴ The 'maximum grant amount' is the maximum grant amount decided by the Agency. It normally corresponds to the requested grant, but may be lower.

⁵ Depending on its type, this specific cost category will or will not cover indirect costs. Specific unit costs that include indirect costs are: costs for energy efficiency measures in buildings, access costs for providing trans-national access to research infrastructure and costs for clinical studies.

⁶ See Article 5 for the forms of costs.

⁷ Unit : hours worked on the action; costs per unit (hourly rate) : calculated according to the beneficiary's usual accounting practice.

⁸ See Annex 2a 'Additional information on the estimated budget' for the details (costs per hour (hourly rate)).

⁹ Unit and costs per unit : calculated according to the beneficiary's usual accounting practices.

¹⁰ Flat rate : 25% of eligible direct costs, from which are excluded: direct costs of subcontracting, costs of in-kind contributions not used on premises, direct costs of financial support, and unit costs declared under budget category F if they include indirect costs (see Article 6.2.E).

¹¹ See Annex 2a 'Additional information on the estimated budget' for the details (units, costs per unit).

¹² See Annex 2a 'Additional information on the estimated budget' for the details (units, costs per unit, estimated number of units, etc).

¹³ Only specific unit costs that do not include indirect costs.

¹⁴ See Article 9 for beneficiaries not receiving funding.

¹⁵ Only for linked third parties that receive funding.

ANNEX 2a

ADDITIONAL INFORMATION ON THE ESTIMATED BUDGET

- Instructions and footnotes in blue will not appear in the text generated by the IT system (since they are internal instructions only).
- For options [in square brackets]: the applicable option will be chosen by the IT system. Options not chosen will automatically not appear.
- For fields in [grey in square brackets] (even if they are part of an option as specified in the previous item): IT system will enter the appropriate data.

⚠ Transitory period: Until SyGMA fully supports Annex 2a, you must prepare it manually (using this template by choosing and deleting the options/entering the appropriate data).
For the 'unit cost tables': either fill them out manually or use currently existing tables from Annex 1 or the proposal.
The document can then be uploaded in SyGMA and attached to the grant agreement.

Unit cost for SME owners/natural beneficiaries without salary

1. Costs for a [SME owner]/[beneficiary that is a natural person] not receiving a salary

Units: hours worked on the action

Amount per unit ('hourly rate'): calculated according to the following formula:

{the monthly living allowance for researchers in MSCA-IF actions / 143 hours}
multiplied by
{country-specific correction coefficient of the country where the beneficiary is established}

The monthly living allowance and the country-specific correction coefficients are set out in the Work Programme (section 3 MSCA) in force at the time of the call:

- for calls *before* Work Programme 2018-2020:
 - for the monthly living allowance: **EUR 4 650**
 - for the country-specific correction coefficients: see Work Programme 2014-2015 and Work Programme 2016-2017 (available on the [Participant Portal Reference Documents](#) page)
- for calls *under* Work Programme 2018-2020:
 - for the monthly living allowance: **EUR 4 880**
 - for the country-specific correction coefficients: see Work Programme 2018-2020 (available on the [Participant Portal Reference Documents](#) page)

[additional OPTION for beneficiaries/linked third parties that have opted to use the unit cost (in the proposal/with an amendment): For the following beneficiaries/linked third parties, the amounts per unit (hourly rate) are fixed as follows:

- beneficiary/linked third party [short name]: EUR [insert amount]
 - beneficiary/linked third party [short name]: EUR [insert amount]
- [same for other beneficiaries/linked third parties, if necessary] /

Estimated number of units: see Annex 2

Energy efficiency measures unit cost

2. Costs for energy efficiency measures in buildings

Unit: m² of eligible ‘conditioned’ (i.e. built or refurbished) floor area

Amount per unit*: see (for each beneficiary/linked third party and BEST table) the ‘unit cost table’ attached

* Amount calculated as follows:
{EUR 0.1 x estimated total kWh saved per m² per year x 10}

Estimated number of units: see (for each beneficiary/linked third party and BEST table) the ‘unit cost table’ attached

Unit cost table (energy efficiency measures unit cost)¹

Short name beneficiary/linked third party	BEST No	Amount per unit	Estimated No of units	Total unit cost (cost per unit x estimated no of units)

¹ Data from the ‘building energy specification table (BEST)’ that is part of the proposal and Annex 1.

Research infrastructure unit cost

3. Access costs for providing trans-national access to research infrastructure

Units²: see (for each access provider and installation) the ‘unit cost table’ attached

Amount per unit^{*}: see (for each access provider and installation) the ‘unit cost table’ attached

* Amount calculated as follows:

$$\frac{\text{average annual total access cost to the installation (over past two years}^3)}{\text{average annual total quantity of access to the installation (over past two years}^4)}$$

Estimated number of units: see (for each access provider and installation) the ‘unit cost table’ attached

Unit cost table (access to research infrastructure unit cost)⁵

Short name access provider	Short name infrastructure	Installation		Unit of access	Amount per unit	Estimated No of units	Total unit cost (cost per unit x estimated no of units)
		No	Short name				

Clinical studies unit cost

4. Costs for clinical studies

Units: patients/subjects that participate in the clinical study

Amount per unit^{*}: see (for each sequence (if any), clinical study and beneficiary/linked third party) the ‘unit cost table’ attached

* Amount calculated, for the cost components of each task, as follows:

For **personnel costs**:

For personnel costs of doctors: ‘average hourly cost for doctors’, i.e.:

{certified or auditable total personnel costs for doctors for year N-1

{1720 * number of full-time-equivalent for doctors for year N-1}

multiplied by

estimated number of hours to be worked by doctors for the task (per participant)}

For personnel costs of other medical personnel: ‘average hourly cost for other medical personnel’, i.e.:

{certified or auditable total personnel costs for other medical personnel for year N-1

{1720 * number of full-time-equivalent for other medical personnel for year N-1}

² Unit of access (e.g. beam hours, weeks of access, sample analysis) fixed by the access provider in proposal.

³ In exceptional and duly justified cases, the Commission/Agency may agree to a different reference period.

⁴ In exceptional and duly justified cases, the Commission/Agency may agree to a different reference period.

⁵ Data from the ‘table on estimated costs/quantity of access to be provided’ that is part of the proposal and Annex 1.

H2020 Templates: Annex 2a (Additional information on the estimated budget)

multiplied by
estimated number of hours to be worked by other medical personnel for the task (per participant)}

For personnel costs of technical personnel: 'average hourly cost for technical personnel', i.e.:

$$\frac{\{\text{certified or auditable total personnel costs for technical personnel for year N-1}\}}{\{1720 * \text{number of full-time-equivalent for technical personnel for year N-1}\}}$$
multiplied by
estimated number of hours to be worked by technical personnel for the task (per participant)}

'total personnel costs' means actual salaries + actual social security contributions + actual taxes and other costs included in the remuneration, provided they arise from national law or the employment contract/equivalent appointing act

For **consumables**:

For each cost item: 'average price of the consumable', i.e.:

$$\frac{\{\{\text{certified or auditable total costs of purchase of the consumable in year N-1}\}\}}{\text{total number of items purchased in year N-1}}$$
multiplied by
estimated number of items to be used for the task (per participant)}

'total costs of purchase of the consumable' means total value of the supply contracts (including related duties, taxes and charges such as non-deductible VAT) concluded by the beneficiary for the consumable delivered in year N-1, provided the contracts were awarded according to the principle of best value- for-money and without any conflict of interests

For **medical equipment**:

For each cost item: 'average cost of depreciation and directly related services per unit of use', i.e.:

$$\frac{\{\{\text{certified or auditable total depreciation costs in year N-1} + \text{certified or auditable total costs of purchase of services in year N-1 for the category of equipment concerned}\}\}}{\text{total capacity in year N-1}}$$
multiplied by
estimated number of units of use of the equipment for the task (per participant)}

'total depreciation costs' means total depreciation allowances as recorded in the beneficiary's accounts of year N-1 for the category of equipment concerned, provided the equipment was purchased according to the principle of best value for money and without any conflict of interests + total costs of renting or leasing contracts (including related duties, taxes and charges such as non-deductible VAT) in year N-1 for the category of equipment concerned, provided they do not exceed the depreciation costs of similar equipment and do not include finance fees

For **services**:

For each cost item: 'average cost of the service per study participant', i.e.:

$$\frac{\{\text{certified or auditable total costs of purchase of the service in year N-1}\}}{\text{total number of patients or subjects included in the clinical studies for which the service was delivered in year N-1}}$$

'total costs of purchase of the service' means total value of the contracts concluded by the beneficiary (including related duties, taxes and charges such as non-deductible VAT) for the specific service delivered in year N-1 for the conduct of clinical studies, provided the contracts were awarded according to the principle of best value for money and without any conflict of interests

For **indirect costs**:

$$\{\{\{\text{cost component 'personnel costs'} + \text{cost component 'consumables'} + \text{cost component 'medical equipment'}\}\}$$

minus

$$\{\text{costs of in-kind contributions provided by third parties which are not used on the beneficiary's premises} + \text{costs of providing financial support to third parties (if any)}\}$$

multiplied by

$$25\%$$

H2020 Templates: Annex 2a (Additional information on the estimated budget)

The estimation of the resources to be used must be done on the basis of the study protocol and must be the same for all beneficiaries/linked third parties/third parties involved.

The year N-1 to be used is the last closed financial year at the time of submission of the grant application.

Estimated number of units: see (for each clinical study and beneficiary/linked third party) the ‘unit cost table’ attached

Unit cost table: clinical studies unit cost⁶

Task, Direct cost categories	Resource per patient	Costs year N-1 Beneficiary 1 [short name]	Costs year N-1 Linked third party 1a [short name]	Costs year N-1 Beneficiary 2 [short name]	Costs year N-1 Linked third party 2a [short name]	Costs year N-1 Third party giving in-kind contributions 1 [short name]
Sequence No. 1						
Task No. 1 Blood sample						
(a) Personnel costs: - Doctors	n/a					
- Other Medical Personnel	Phlebotomy (nurse), 10 minutes	8,33 EUR	11,59 EUR	10,30 EUR	11,00 EUR	9,49 EUR
- Technical Personnel	Sample Processing (lab technician), 15 minutes	9,51 EUR	15,68 EUR	14,60 EUR	15,23 EUR	10,78 EUR
(b) Costs of consumables:	Syringe	XX EUR	XX EUR	XX EUR	XX EUR	XX EUR
	Cannula	XX EUR	XX EUR	XX EUR	XX EUR	XX EUR
	Blood container	XX EUR	XX EUR	XX EUR	XX EUR	XX EUR
(c) Costs of medical equipment:	Use of -80° deep freezer, 60 days	XX EUR	XX EUR	XX EUR	XX EUR	XX EUR
	Use of centrifuge, 15 minutes	XX EUR	XX EUR	XX EUR	XX EUR	XX EUR
(d) Costs of services	Cleaning of XXX	XX EUR	XX EUR	XX EUR	XX EUR	XX EUR
(e) Indirect costs (25% flat-rate)		XX EUR	XX EUR	XX EUR	XX EUR	XX EUR
Task No. 2						
...						
Amount per unit (unit cost sequence 1):		XX EUR	XX EUR	XX EUR	XX EUR	XX EUR
Sequence No. 2						
Task No. 1						

⁶ Same table as in proposal and Annex 1.

H2020 Templates: Annex 2a (Additional information on the estimated budget)

XXX						
(a) Personnel costs:						
- Doctors	XXX	XX EUR	XX EUR	XX EUR	XX EUR	XX EUR
- Other Medical Personnel	XXX	XX EUR	XX EUR	XX EUR	XX EUR	XX EUR
- Technical Personnel	XXX	XX EUR	XX EUR	XX EUR	XX EUR	XX EUR
(b) Costs of consumables:	XXX	XX EUR	XX EUR	XX EUR	XX EUR	XX EUR
	XXX	XX EUR	XX EUR	XX EUR	XX EUR	XX EUR
	XXX	XX EUR	XX EUR	XX EUR	XX EUR	XX EUR
(c) Costs of medical equipment:	XXX	XX EUR	XX EUR	XX EUR	XX EUR	XX EUR
	XXX	XX EUR	XX EUR	XX EUR	XX EUR	XX EUR
(d) Costs of services	XXX	XX EUR	XX EUR	XX EUR	XX EUR	XX EUR
(e) Indirect costs (25% flat-rate)		XX EUR	XX EUR	XX EUR	XX EUR	XX EUR
Task No. 2						
...						
Amount per unit (unit cost sequence 2):		XX EUR	XX EUR	XX EUR	XX EUR	XX EUR
...						
Amount per unit (unit cost entire study):		XX EUR	XX EUR	XX EUR	XX EUR	XX EUR

/

ACCESSION FORM FOR BENEFICIARIES

ENGINEERING - INGEGNERIA INFORMATICA SPA (ENG), established in PIAZZALE DELL'AGRICOLTURA 24, ROMA 00144, Italy, VAT number: IT05724831002, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('2')

in Grant Agreement No 833507 ('the Agreement')

between ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS **and** the Research Executive Agency (REA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'First responder Advanced technologies for Safe and efficient Emergency Response (FASTER)'.
Response (FASTER)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

Orazio Viele with ECAS id n00224b3 signed in the Participant Portal on 30/04/2019 at 09:09:28 (transaction id SigId-85772-GUBIApYnvJTmvRqMjQcBsCtcGa1fYRfJC5G5zjw70vGS CD81N06DZuJzOJvxWP1zwKC0A9kcavb3W7QDXVbMj3 W-jpJZscgsw0KN09GwxKpZgW-JA68ggoR565Fj1UyrCRoK2KeVMICV0zuw4jShEqHISc).
Timestamp by third party at
Tue Apr 30 10:09:33 CEST 2019

ACCESSION FORM FOR BENEFICIARIES

HELLENIC TELECOMMUNICATIONS ORGANIZATION S.A. - OTE AE (ORGANISMOS TILEPIKOINONION TIS ELLADOS OTE AE) (OTE), established in KIFISSIAS AVENUE 99, Maroussi - Athens 15124, Greece, VAT number: EL094019245, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('3')

in Grant Agreement No 833507 ('the Agreement')

between ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS **and** the Research Executive Agency (REA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'First responder Advanced technologies for Safe and efficient Emergency Response (FASTER)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

Michael PAPAMICHAEL with ECAS id npapammi signed in the Participant Portal on 30/04/2019 at 17:06:21 (transaction id SigId-96884-w92KDkUWnilUY9oggPGqTRS6kLLShYzxzo7nrQRsZkECWFTivgtdzS1dlmNr83VA2XrPlqzHcq9J9JPXCoUwufe-jpJZscgsw0KN09GwxKpZgW-Dl1VivGlcD2deaFhYqzjaPILwFS8o4xv0fbXsZxIAN6).
Timestamp by third party at
Tue Apr 30 18:06:28 CEST 2019

ACCESSION FORM FOR BENEFICIARIES

DIGINEXT (DXT), established in 370 RUE RENE DESCARTES LES HAUTS DE LA DURANNE IMMEUBLES A ET B, AIX EN PROVENCE 13857, France, VAT number: FR70408225845, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('4')

in Grant Agreement No 833507 ('the Agreement')

between ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS **and** the Research Executive Agency (REA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'First responder Advanced technologies for Safe and efficient Emergency Response (FASTER)'.
'

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

Thomas FOURQUET with ECAS id nfourqth signed in the Participant Portal on 26/04/2019 at 19:14:15 (transaction id SigId-67738-iKCRH4zIirhmvDXcX6LzQ9uMzQjT9NgQj46B5tgzt96QoZA2DAnjZPxPdQEHOpB7y1cyOJLzOJkcfyE5gccFm6r-jpJZscgsw0KN09GwxKpZgW-Fp9g1WVrTcdztvUDRbvD1wnebj6gsa6zNSUgzZ1cqLzmm). Timestamp by third party at Fri Apr 26 20:14:20 CEST 2019

ACCESSION FORM FOR BENEFICIARIES

Crisiplan B.V. (CPLAN), established in Frambozenweg 123, Leiden 2321 KA, Netherlands, VAT number: NL812296692B01, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('5')

in Grant Agreement No 833507 ('the Agreement')

between ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS and the Research Executive Agency (REA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'First responder Advanced technologies for Safe and efficient Emergency Response (FASTER)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

Werner OVERDIJK with ECAS id noverdwe signed in the Participant Portal on 03/05/2019 at 09:19:28 (transaction id SigId-113352-41zpwlaJzXEbuMzwYw87kulbzyI9NNdeq3J7NsH5rCldwW62zpwCu1qANoFzOLFewTRiXExXMWodADjhCkvO4Qe0-jpJZscgsw0KN09GwxKpZgW-BinXt8AOxztEirXCZyWK2iGbxeuneRXX3mZbb288iKg).
Timestamp by third party at
Fri May 03 10:19:36 CEST 2019

ACCESSION FORM FOR BENEFICIARIES

DRONE HOPPER SL (DH), established in C MELENDEZ VALDES 61, MADRID 28015, Spain, VAT number: ESB87375960, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('6')

in Grant Agreement No 833507 ('the Agreement')

between ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS and the Research Executive Agency (REA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'First responder Advanced technologies for Safe and efficient Emergency Response (FASTER)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

Pablo FLORES with ECAS id nflrespa signed in the Participant Portal on 29/04/2019 at 08:34:11 (transaction id SigId-71056-Q6l7aQMwBvI5g8zXT4zQlab0i74j3OfcJs1iEVq13qegE1RTgOw2LfDPKBn0W6kXoqLvlUQzmDJKTAa4ToOSIYm-jpJZscgsw0KN09GwxKpZgW-tsipWxSVoKR9H1zXSASa6X45VcMzdhdVW9iRszTSrFrC). Timestamp by third party at Mon Apr 29 09:34:19 CEST 2019

ACCESSION FORM FOR BENEFICIARIES

ROBOTNIK AUTOMATION SLL (ROB), established in CARRER DE BARCELONA, 3-A. P.I. FUENTE DEL JARRO, PATERNA 46988, Spain, VAT number: ESB97223630, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('7')

in Grant Agreement No 833507 ('the Agreement')

between ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS **and** the Research Executive Agency (REA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'First responder Advanced technologies for Safe and efficient Emergency Response (FASTER)'.
'

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

Rafael LOPEZ with ECAS id nlopezre signed in the Participant Portal on 30/04/2019 at 09:02:39 (transaction id SigId-85636-vLGlxWxe2w6NVFDF7TvwDEYzwnIH0IzmS1DlslpeM7ybMypxZigJDztwzIEBpXYUNT0CBQmxxqw7GEi1NullU0q-jpJZscgsw0KN09GwxKpZgW-vUvuFCWJPDcdKFHWARUOQ2bQg8Wyx2n89TlxL25PB1q). Timestamp by third party at Tue Apr 30 10:02:47 CEST 2019

ACCESSION FORM FOR BENEFICIARIES

SYNELIXIS LYSEIS PLIROFORIKIS AUTOMATISMOU & TILEPIKOINONION ANONIMI ETAIRIA (SYN), established in FARMAKIDOU 10, CHALKIDA 34100, Greece, VAT number: EL998670366, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('8')

in Grant Agreement No 833507 ('the Agreement')

between ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS **and** the Research Executive Agency (REA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'First responder Advanced technologies for Safe and efficient Emergency Response (FASTER)'.
'

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

Theodore ZAHARIADIS with ECAS id nzaharth signed in the Participant Portal on 03/05/2019 at 09:25:11
(transaction id SigId-113495-8ZfqjY0UwUVaUHEtYhVtoLR47D59U7KF42zH32pLYdE
Dzne1p4a1mJSXc2g4fw95ezmciawAahfDPIUFa4dzZly-
jpJZscgsw0KN09GwxKpZgW-
VDrAok4TKon0vDRr6ToVoAXpDZx4lzfRuYshLAXb2uB).
Timestamp by third party at
Fri May 03 10:25:16 CEST 2019

ACCESSION FORM FOR BENEFICIARIES

INOV INESC INOVACAO - INSTITUTO DE NOVAS TECNOLOGIAS (INOV), established in RUA DE ALVES REDOL 9, LISBOA 1000-029, Portugal, VAT number: PT505002892, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('9')

in Grant Agreement No 833507 ('the Agreement')

between ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS **and** the Research Executive Agency (REA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'First responder Advanced technologies for Safe and efficient Emergency Response (FASTER)'.
'

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

Fernando MOREIRA with ECAS id nmeirfrn signed in the Participant Portal on 30/04/2019 at 08:33:57 (transaction id SigId-85086-XuNrVLzzVTX57D9NmFbXXhOusN5tu8zkmR97EXVQjPkV2C3f0vohYHRIFXngotxcX3rkmgByyYy9OCcKJrxBF7G- jpJZscgsw0KN09GwxKpZgW-ZMI9EgKDzlwklqR5lphsXUCapJoUzkrFXk4ZAb9PMKze).
Timestamp by third party at
Tue Apr 30 09:34:02 CEST 2019

ACCESSION FORM FOR BENEFICIARIES

FONDAZIONE LINKS - LEADING INNOVATION & KNOWLEDGE FOR SOCIETY (LINKS), established in VIA PIER CARLO BOGGIO 61, TORINO 10138, Italy, VAT number: IT11904960017, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('10')

in Grant Agreement No 833507 ('the Agreement')

between ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS **and** the Research Executive Agency (REA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'First responder Advanced technologies for Safe and efficient Emergency Response (FASTER)'.
'

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

Massimo Marcarini with ECAS id n002hc9f signed in the Participant Portal on 02/05/2019 at 11:55:15 (transaction id Sigld-105237-x2UTjdJbgAusbV86Xb0seZiiCAjq5Giv7OF2K6MZSOLDG MOAbeJkFMEJuYVYnH7PUfKd7wRrRktNvm9LqyoaFm-jpJZscgsw0KN09GwxKpZgW-cWTb0obNuVkpHimQRMGeVdezyzcA6r8Z4qJsZEMhDAjW). Timestamp by third party at Thu May 02 12:55:21 CEST 2019

ACCESSION FORM FOR BENEFICIARIES

KPEOPLE RESEARCH FOUNDATION (KPRF), established in CORNERSTONE BUSINESS CENTRE, SUITE 1, LEVEL 2, 16TH SEPTEMBER SQUARE, MOSTA MST 1180, Malta, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('11')

in Grant Agreement No 833507 ('the Agreement')

between ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS **and** the Research Executive Agency (REA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'First responder Advanced technologies for Safe and efficient Emergency Response (FASTER)'.
Response (FASTER)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

Fabio PEROSSINI with ECAS id nperosfa signed in the Participant Portal on 26/04/2019 at 17:59:55 (transaction id SigId-67506-CIY3Lc8zqA4ypgfjLTj9Y2plqYmrb6pq8tHpuXxybLeHpPhgPc0SpoBpXyWI0zjG60tzkM732k0EKAHpoqZTx7m-jpJZscgsw0KN09GwxKpZgW-eeKnRaFi8lmgfNtidTzXn6ilDvr76BIR5siC7qpSrLt).
Timestamp by third party at
Fri Apr 26 19:00:00 CEST 2019

ACCESSION FORM FOR BENEFICIARIES

KAJAANIN AMMATTIKORKEAKOULU OY (KAMK), established in KETUNPOLKU 3, KAJAANI 87100, Finland, VAT number: FI25536004, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('12')

in Grant Agreement No 833507 ('the Agreement')

between ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS **and** the Research Executive Agency (REA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'First responder Advanced technologies for Safe and efficient Emergency Response (FASTER)'.
'

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

Matti Sarén with ECAS id n002iqmg signed in the Participant Portal on 06/05/2019 at 08:46:47 (transaction id SigId-128419-9leCKMpPr295t6lvylsVnwDLOLzaBo5wEN3CKzXPvYyCJXk9oOahXxtHfHjjos5SyGt0is6or7r8onc8HOHPW1-jpJZscgsw0KN09GwxKpZgW-K0ULiwr43jqjSPHka16Kh7zZ0p3epMg8cqMdRUcgSS6).
Timestamp by third party at
Mon May 06 12:47:01 CEST 2019

ACCESSION FORM FOR BENEFICIARIES

VRIJE UNIVERSITEIT BRUSSEL (VUB), established in PLEINLAAN 2, BRUSSEL 1050, Belgium, VAT number: BE0449012406, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('13')

in Grant Agreement No 833507 ('the Agreement')

between ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS **and** the Research Executive Agency (REA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'First responder Advanced technologies for Safe and efficient Emergency Response (FASTER)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

Sonja Haesen with ECAS id n002k29d signed in the Participant Portal on 02/05/2019 at 07:48:44 (transaction id SigId-100111-xVakzPNG1oZk1iKzHfS23sJCIDhtePL9vXbOKXemNA3JrwrhmXTzp0Pghxog9W9XZQUxwV7aAhLDG9dk7G5vQf0-jpJZscgsw0KN09GwxKpZgW-XunvVq7QuxlwDDvmQ3FvatrpjCevTVrZchFXwXvqrLu).
Timestamp by third party at
Thu May 02 08:48:52 CEST 2019

ACCESSION FORM FOR BENEFICIARIES

PANEPISTIMIO DYTIKIS ATTIKIS (UWA), established in PETROY RALLI KAI THIVON, AIGALEO 122 44, Greece, VAT number: EL997018536, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('14')

in Grant Agreement No 833507 ('the Agreement')

between ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS **and** the Research Executive Agency (REA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'First responder Advanced technologies for Safe and efficient Emergency Response (FASTER)'.
'

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

Constantinos Moutzouris with ECAS id n00280an signed in the Participant Portal on 08/05/2019 at 08:18:11 (transaction id SigId-159290-1L6u7PeizH28VGQnt0meRyl8QdCDGCAzKxgO6zwsIqGUrvFyr16U6Sqd8IBvchKCPXwVU6QYwSPDEJXKuN5bZx0-jpJZscgsw0KN09GwxKpZgW-f341o6MWpT9hLU5FmrWdcAuSVZ3ZjzqsC5c6qm8CVZa)
. Timestamp by third party at
Wed May 08 09:18:16 CEST 2019

ACCESSION FORM FOR BENEFICIARIES

AYUNTAMIENTO DE MADRID (ADM-POL), established in PLAZA DE LA VILLA 4, MADRID 28005, Spain, VAT number: ESP2807900B, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('15')

in Grant Agreement No 833507 ('the Agreement')

between ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS **and** the Research Executive Agency (REA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'First responder Advanced technologies for Safe and efficient Emergency Response (FASTER)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

FRANCISCO JAVIER CRISTOBAL SANZ with ECAS id nsantoos signed in the Participant Portal on 26/04/2019 at 17:57:19 (transaction id Sigld-67492-6nziAXJ9qHBTbmkhifMfr7bzKwbKbnR1CIVhnuFlsFgOaqzRkzc4r7Slc7GjHihmzGYfscAzI33uAZ50crYNI2OW-jpJZscgsw0KN09GwxKpZgW-scHBuRtUWUJlrDgekzZEXyzPKYrDoXUiT1vAUenu4A4W). Timestamp by third party at Fri Apr 26 18:57:25 CEST 2019

ACCESSION FORM FOR BENEFICIARIES

SERVICIO MADRILENO DE SALUD (SUMMA), established in PLAZA CARLOS TRIAS BERTRAN 7, MADRID 28020, Spain, VAT number: ESQ2801221I, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('16')

in Grant Agreement No 833507 ('the Agreement')

between ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS **and** the Research Executive Agency (REA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'First responder Advanced technologies for Safe and efficient Emergency Response (FASTER)'.
'

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

Tomas GOMEZ with ECAS id ngomezur signed in the Participant Portal on 30/04/2019 at 07:45:57 (transaction id SigId-84341-WJgMILxLm6ziTy31vp5elazbDPGAuUAI8F4dKzun6OnohZP9fDNpt8gNI82T7VPet2Kh8VCN2fmxxyBraGT12C9m-jpJZscgsw0KN09GwxKpZgW-1moZYbVLTfVEwar5ArT56nWvn8VcMQEopgqKkzzepG). Timestamp by third party at Tue Apr 30 08:46:02 CEST 2019

ACCESSION FORM FOR BENEFICIARIES

ECOLE NATIONALE SUPERIEURE DES OFFICIERS DE SAPEURS-POMPIERS (ENSOSP) (ENSOSP), established in 1070 RUE DU LIEUTENANT PARAYRE, AIX EN PROVENCE 13798, France, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('17')

in Grant Agreement No 833507 ('the Agreement')

between ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS **and** the Research Executive Agency (REA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'First responder Advanced technologies for Safe and efficient Emergency Response (FASTER)'.
'

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

HERVE ENARD with ECAS id nenardhe signed in the Participant Portal on 30/04/2019 at 08:20:58 (transaction id SigId-84863-zguAbe3zr5S4iQicwIjvm2Mnt5UENjT7vRvp2suKBspiTNtZiWkbsRDcigLPeL48DQ3qkxc2Oc3aiBALeemVzG-jpJZscgsw0KN09GwxKpZgW-Z55u6ekl3ujZFImMSH1jvjAMblQf1fUSsKk6wsPKR3W).
Timestamp by third party at
Tue Apr 30 09:21:05 CEST 2019

ACCESSION FORM FOR BENEFICIARIES

WYZSZA SZKOŁA POLICJI W SZCZYTNIĘ (WSPOL), established in Marszałka J. Piłsudskiego 111, Szczytno 12-100, Poland, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('18')

in Grant Agreement No 833507 ('the Agreement')

between ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS **and** the Research Executive Agency (REA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'First responder Advanced technologies for Safe and efficient Emergency Response (FASTER)'.
'

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

Marek FALDOWSKI with ECAS id nfaldoma signed in the Participant Portal on 29/04/2019 at 08:14:02 (transaction id SigId-70719-szHVVoOVait8wCyOzv4qrE7KzuDcllgFA1xTyVoiBs5p04ixY2hgcBHCTrPlvFDYgputLW7ygdT11CPIQFtoCG-jpJZscgsw0KN09GwxKpZgW-UeUeakig3sLbTuMzzSBshsVbBNfHJghDLqH1za0cDgiy).
Timestamp by third party at
Mon Apr 29 09:14:11 CEST 2019

ACCESSION FORM FOR BENEFICIARIES

KAJAANIN KAUPUNKI (KAJ), established in POHJOLANKATU 13, KAJAANI 87100, Finland, VAT number: FI02149589, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('19')

in Grant Agreement No 833507 ('the Agreement')

between ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS **and** the Research Executive Agency (REA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'First responder Advanced technologies for Safe and efficient Emergency Response (FASTER)'.
'

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

Jari Tolonen with ECAS id n002j9gw signed in the Participant Portal on 08/05/2019 at 11:37:18 (transaction id SigId-164716-
liqtLn5MVSrrr17Lzzf6MmTzTRXny6KxNDe90WJh7E4G3h
bhYUOf98VizNFs2knKUA1poQRUVfOWnUzbOyyc3FW-
jpJZscgsw0KN09GwxKpZgW-
xkw1isYysRG0V0T1zVKdx0PfgJXL40IVd7O8M7amywA).
Timestamp by third party at
Wed May 08 12:37:23 CEST 2019

ACCESSION FORM FOR BENEFICIARIES

ELLINIKI OMADA DIASOSIS ATTIKIS (HRTA), established in AGONARIDOU 10-12, ATHINA 11744, Greece, VAT number: EL999802992, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('20')

in Grant Agreement No 833507 ('the Agreement')

between ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS **and** the Research Executive Agency (REA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'First responder Advanced technologies for Safe and efficient Emergency Response (FASTER)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

SPYROS XRYSANTHOPOULOS with ECAS id nxrysasp
signed in the Participant Portal on 08/05/2019 at 20:24:05
(transaction id SigId-450-
dVxzQ6SeAnh9oZR0GJP7UJIPybRAzSzfwa4zKK2ZKusz
JxZ9JQSRoVSzrDv4NTISwOvsWzzsgCqRph4mvzZNZEF
W-rS0vSrmBGYCAF7GxdOQa8O-
8B7s3VauXjzx1i7xHRDLHFKJ1BAzzaEEPqDzVzX4xOfd
W). Timestamp by third party at
Wed May 08 21:24:11 CEST 2019

ACCESSION FORM FOR BENEFICIARIES

MUNICIPIO DE GRANDOLA (MG), established in RUA DR JOSE PEREIRA BARRADAS, GRANDOLA 7570 281, Portugal, VAT number: PT506823318, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('21')

in Grant Agreement No 833507 ('the Agreement')

between ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS **and** the Research Executive Agency (REA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'First responder Advanced technologies for Safe and efficient Emergency Response (FASTER)'.
'

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

António MENDES with ECAS id nmdesant signed in the Participant Portal on 29/04/2019 at 09:35:20 (transaction id SigId-72322-iTmSpPyaOtcVuFMbDB4uHw1NSxqN5uK4qzxqvVZzTI8mZzep0qXSziyUO7QAigvWdCqzoedDGdx4STDAE3jdWUW-jpJZscgsw0KN09GwxKpZgW-BsiWwi6dbkN0BcuLn432DwMBt3kJHCtizzoit2btzuVMq).
Timestamp by third party at
Mon Apr 29 10:35:27 CEST 2019

ACCESSION FORM FOR BENEFICIARIES

CONSORZIO PER IL SISTEMA INFORMATIVO (CSI PIEMONTE) (CSIP), established in CORSO UNIONE SOVIETICA 216, TORINO 10134, Italy, VAT number: IT01995120019, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('22')

in Grant Agreement No 833507 ('the Agreement')

between ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS **and** the Research Executive Agency (REA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'First responder Advanced technologies for Safe and efficient Emergency Response (FASTER)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

Pietro PACINI with ECAS id nfeferu signed in the Participant Portal on 13/05/2019 at 09:47:09 (transaction id SigId-6002-1zSTPmtJEzUbd2mncXIo01LxM7b5RH8eJG6hJEzpgsanyqsBnCi500HuqEkZ9IBG2JV2EyGOWAJ9FznBugvTZeo-jpJZscgsw0K0Gq8XWOOM38-sIABKgvnMtzurvMxKMxPdd6cbpmXfeRLxIMgq5I51zcW).
Timestamp by third party at
Mon May 13 10:47:15 CEST 2019

ACCESSION FORM FOR BENEFICIARIES

KWANSEI GAKUIN EDUCATIONAL FOUNDATION (KGU Japan), established in 1-155 UEGAHARA ICHIBAN-CHO, NISHINOMIYA HYOGO 662 8501, Japan, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('23')

in Grant Agreement No 833507 ('the Agreement')

between ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS **and** the Research Executive Agency (REA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'First responder Advanced technologies for Safe and efficient Emergency Response (FASTER)'.
'

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

Masaaki HONJO with ECAS id n002k3xb signed in the Participant Portal on 27/04/2019 at 06:47:29 (transaction id SigId-68205-AKxk4raWCEW8u6LkXY1je1hDX28Wb3NWHizNdWS6nl24fD3iYtlN9ei0TJJkDj4n2DrhdZCToLCQUBqvFUAK44-jpJZscgsw0KN09GwxKpZgW-lBr6rbkckKLgXY0ANmp4DwVn0QwbrGoQkO2wcx39an4).
Timestamp by third party at
Sat Apr 27 07:47:35 CEST 2019

FINANCIAL STATEMENT FOR [BENEFICIARY [name]/ LINKED THIRD PARTY [name]] FOR REPORTING PERIOD [reporting period]

Eligible ¹ costs (per budget category)											Receipts		EU contribution			Additional information				
A. Direct personnel costs			B. Direct costs of subcontracting	[C. Direct costs of fin. support]	D. Other direct costs			E. Indirect costs ²		[F. Costs of ...]		Total costs	Receipts	Reimbursement rate %	Maximum EU contribution ³	Requested EU contribution	Information for indirect costs :			
A.1 Employees (or equivalent)		A.4 SME owners without salary		[C.1 Financial support]	D.1 Travel	[D.4 Costs of large research infrastructure]	D.5 Costs of internally invoiced goods and services		[F.1 Costs of ...]		[F.2 Costs of ...]		Receipts of the action, to be reported in the last reporting period, according to Article 5.3.3				Costs of in-kind contributions not used on premises			
A.2 Natural persons under direct contract		A.5 Beneficiaries that are natural persons without salary		[C.2 Prizes]	D.2 Equipment															
A.3 Seconded persons				[A.6 Personnel for providing access to research infrastructure]	D.3 Other goods and services															
Form of costs ⁴		Actual	Unit	Unit		Actual	Actual	Actual	Actual	Unit	Flat-rate ⁵	Unit	[Unit][Lump sum]							
		a	Total b	No hours	Total c	d	[e]	f	[g]	Total h	i=0,25 x (a+b+c+f+[g] + h+[j 1] ⁶ +[j2] ⁶ -p)	No units	Total [j1]	Total [j2]	k = a+b+c+d+[e] +f+[g] +h+ i + [j1] +[j2]	l	m	n	o	p
[short name beneficiary/linked third party]																				

The beneficiary/linked third party hereby confirms that:
 The information provided is complete, reliable and true.
 The costs declared are eligible (see Article 6).
 The costs can be substantiated by adequate records and supporting documentation that will be produced upon request or in the context of checks, reviews, audits and investigations (see Articles 17, 18 and 22).
 For the last reporting period: that all the receipts have been declared (see Article 5.3.3).

① Please declare all eligible costs, even if they exceed the amounts indicated in the estimated budget (see Annex 2). Only amounts that were declared in your individual financial statements can be taken into account lateron, in order to replace other costs that are found to be ineligible.

¹ See Article 6 for the eligibility conditions

² The indirect costs claimed must be free of any amounts covered by an operating grant (received under any EU or Euratom funding programme; see Article 6.2.E). If you have received an operating grant during this reporting period, you cannot claim indirect costs unless you can demonstrate that the operating grant does not cover any costs of the action.

³ This is the *theoretical* amount of EU contribution that the system calculates automatically (by multiplying the reimbursement rate by the total costs declared). The amount you request (in the column 'requested EU contribution') may be less,

⁴ See Article 5 for the forms of costs

⁵ Flat rate : 25% of eligible direct costs, from which are excluded: direct costs of subcontracting, costs of in-kind contributions not used on premises, direct costs of financial support, and unit costs declared under budget category F if they include indirect costs (see Article 6.2.E)

⁶ Only specific unit costs that do not include indirect costs

ANNEX 5

MODEL FOR THE CERTIFICATE ON THE FINANCIAL STATEMENTS

- For options [*in italics in square brackets*]: choose the applicable option. Options not chosen should be deleted.
- For fields in [grey in square brackets]: enter the appropriate data

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TERMS OF REFERENCE FOR AN INDEPENDENT REPORT OF FACTUAL FINDINGS ON COSTS DECLARED UNDER A GRANT AGREEMENT FINANCED UNDER THE HORIZON 2020 RESEARCH FRAMEWORK PROGRAMME

INDEPENDENT REPORT OF FACTUAL FINDINGS ON COSTS DECLARED UNDER A GRANT AGREEMENT FINANCED UNDER THE HORIZON 2020 RESEARCH FRAMEWORK PROGRAMME

Terms of Reference for an Independent Report of Factual Findings on costs declared under a Grant Agreement financed under the Horizon 2020 Research and Innovation Framework Programme

This document sets out the ‘**Terms of Reference (ToR)**’ under which

[*OPTION 1: [insert name of the beneficiary] (‘the Beneficiary’) [OPTION 2: [insert name of the linked third party] (‘the Linked Third Party’), third party linked to the Beneficiary [insert name of the beneficiary] (‘the Beneficiary’)]*]

agrees to engage

[**insert legal name of the auditor**] (‘the Auditor’)

to produce an independent report of factual findings (‘the Report’) concerning the Financial Statement(s)¹ drawn up by the [Beneficiary] [Linked Third Party] for the Horizon 2020 grant agreement [insert number of the grant agreement, title of the action, acronym and duration from/to] (‘the Agreement’), and

to issue a Certificate on the Financial Statements’ (‘CFS’) referred to in Article 20.4 of the Agreement based on the compulsory reporting template stipulated by the Commission.

The Agreement has been concluded under the Horizon 2020 Research and Innovation Framework Programme (H2020) between the Beneficiary and [*OPTION 1: the European Union, represented by the European Commission (‘the Commission’)] [OPTION 2: the European Atomic Energy Community (Euratom,) represented by the European Commission (‘the Commission’)] [OPTION 3: the [Research Executive Agency (REA)] [European Research Council Executive Agency (ERCEA)] [Innovation and Networks Executive Agency (INEA)] [Executive Agency for Small and Medium-sized Enterprises (EASME)] (‘the Agency’), under the powers delegated by the European Commission (‘the Commission’).]*

The [Commission] [Agency] is mentioned as a signatory of the Agreement with the Beneficiary only. The [European Union][Euratom][Agency] is not a party to this engagement.

1.1 Subject of the engagement

The coordinator must submit to the [Commission][Agency] the final report within 60 days following the end of the last reporting period which should include, amongst other documents, a CFS for each beneficiary and for each linked third party that requests a total contribution of EUR 325 000 or more, as reimbursement of actual costs and unit costs calculated on the basis of its usual cost accounting practices (see Article 20.4 of the Agreement). The CFS must cover all reporting periods of the beneficiary or linked third party indicated above.

The Beneficiary must submit to the coordinator the CFS for itself and for its linked third party(ies), if the CFS must be included in the final report according to Article 20.4 of the Agreement.

The CFS is composed of two separate documents:

- The Terms of Reference (‘the ToR’) to be signed by the [Beneficiary] [Linked Third Party] and the Auditor;

¹ By which costs under the Agreement are declared (see template ‘Model Financial Statements’ in Annex 4 to the Grant Agreement).

- The Auditor's Independent Report of Factual Findings ('the Report') to be issued on the Auditor's letterhead, dated, stamped and signed by the Auditor (or the competent public officer) which includes the agreed-upon procedures ('the Procedures') to be performed by the Auditor, and the standard factual findings ('the Findings') to be confirmed by the Auditor.

If the CFS must be included in the final report according to Article 20.4 of the Agreement, the request for payment of the balance relating to the Agreement cannot be made without the CFS. However, the payment for reimbursement of costs covered by the CFS does not preclude the Commission [Agency,] the European Anti-Fraud Office and the European Court of Auditors from carrying out checks, reviews, audits and investigations in accordance with Article 22 of the Agreement.

1.2 Responsibilities

The [Beneficiary] [Linked Third Party]:

- must draw up the Financial Statement(s) for the action financed by the Agreement in compliance with the obligations under the Agreement. The Financial Statement(s) must be drawn up according to the [Beneficiary's] [Linked Third Party's] accounting and book-keeping system and the underlying accounts and records;
- must send the Financial Statement(s) to the Auditor;
- is responsible and liable for the accuracy of the Financial Statement(s);
- is responsible for the completeness and accuracy of the information provided to enable the Auditor to carry out the Procedures. It must provide the Auditor with a written representation letter supporting these statements. The written representation letter must state the period covered by the statements and must be dated;
- accepts that the Auditor cannot carry out the Procedures unless it is given full access to the [Beneficiary's] [Linked Third Party's] staff and accounting as well as any other relevant records and documentation.

The Auditor:

- [Option 1 by default: is qualified to carry out statutory audits of accounting documents in accordance with Directive 2006/43/EC of the European Parliament and of the Council of 17 May 2006 on statutory audits of annual accounts and consolidated accounts, amending Council Directives 78/660/EEC and 83/349/EEC and repealing Council Directive 84/253/EEC or similar national regulations].
- [Option 2 if the Beneficiary or Linked Third Party has an independent Public Officer: is a competent and independent Public Officer for which the relevant national authorities have established the legal capacity to audit the Beneficiary].
- [Option 3 if the Beneficiary or Linked Third Party is an international organisation: is an [internal] [external] auditor in accordance with the internal financial regulations and procedures of the international organisation].

The Auditor:

- must be independent from the Beneficiary [and the Linked Third Party], in particular, it must not have been involved in preparing the [Beneficiary's] [Linked Third Party's] Financial Statement(s);
- must plan work so that the Procedures may be carried out and the Findings may be assessed;
- must adhere to the Procedures laid down and the compulsory report format;
- must carry out the engagement in accordance with this ToR;
- must document matters which are important to support the Report;
- must base its Report on the evidence gathered;
- must submit the Report to the [Beneficiary] [Linked Third Party].

The Commission sets out the Procedures to be carried out by the Auditor. The Auditor is not responsible for their suitability or pertinence. As this engagement is not an assurance engagement, the Auditor does not provide an audit opinion or a statement of assurance.

1.3 Applicable Standards

The Auditor must comply with these Terms of Reference and with²:

- the International Standard on Related Services ('ISRS') 4400 *Engagements to perform Agreed-upon Procedures regarding Financial Information* as issued by the International Auditing and Assurance Standards Board (IAASB);
- the *Code of Ethics for Professional Accountants* issued by the International Ethics Standards Board for Accountants (IESBA). Although ISRS 4400 states that independence is not a requirement for engagements to carry out agreed-upon procedures, the [Commission]/[Agency] requires that the Auditor also complies with the Code's independence requirements.

The Auditor's Report must state that there is no conflict of interests in establishing this Report between the Auditor and the Beneficiary [and the Linked Third Party], and must specify - if the service is invoiced - the total fee paid to the Auditor for providing the Report.

1.4 Reporting

The Report must be written in the language of the Agreement (see Article 20.7).

Under Article 22 of the Agreement, the Commission[, the Agency], the European Anti-Fraud Office and the Court of Auditors have the right to audit any work that is carried out under the action and for which costs are declared from [the European Union] [Euratom] budget. This includes work related to this engagement. The Auditor must provide access to all working papers (e.g. recalculation of hourly rates, verification of the time declared for the action) related to this assignment if the Commission [, the Agency], the European Anti-Fraud Office or the European Court of Auditors requests them.

1.5 Timing

The Report must be provided by [dd Month yyyy].

1.6 Other terms

[The [Beneficiary] [Linked Third Party] and the Auditor can use this section to agree other specific terms, such as the Auditor's fees, liability, applicable law, etc. Those specific terms must not contradict the terms specified above.]

[legal name of the Auditor]	[legal name of the [Beneficiary]/[Linked Third Party]]
[name & function of authorised representative]	[name & function of authorised representative]
[dd Month yyyy]	[dd Month yyyy]
Signature of the Auditor	Signature of the [Beneficiary]/[Linked Third Party]

² Supreme Audit Institutions applying INTOSAI-standards may carry out the Procedures according to the corresponding International Standards of Supreme Audit Institutions and code of ethics issued by INTOSAI instead of the International Standard on Related Services ('ISRS') 4400 and the Code of Ethics for Professional Accountants issued by the IAASB and the IESBA.

**Independent Report of Factual Findings on costs declared
under Horizon 2020 Research and Innovation Framework Programme**

(To be printed on the Auditor's letterhead)

To
[name of contact person(s)], [Position]
[[Beneficiary's] [Linked Third Party's] name]
[Address]
[dd Month yyyy]

Dear [Name of contact person(s)],

As agreed under the terms of reference dated [dd Month yyyy]

with [OPTION 1: [insert name of the beneficiary] ('the Beneficiary')] [OPTION 2: [insert name of the linked third party] ('the Linked Third Party'), third party linked to the Beneficiary [insert name of the beneficiary] ('the Beneficiary')],

we

[name of the auditor] ('the Auditor'),
established at
[full address/city/state/province/country],
represented by
[name and function of an authorised representative],

have carried out the procedures agreed with you regarding the costs declared in the Financial Statement(s)³ of the [Beneficiary] [Linked Third Party] concerning the grant agreement [insert grant agreement reference: number, title of the action and acronym] ('the Agreement'),

with a total cost declared of
[total amount] EUR,

and a total of actual costs and unit costs calculated in accordance with the [Beneficiary's] [Linked Third Party's] usual cost accounting practices' declared of

[sum of total actual costs and total direct personnel costs declared as unit costs calculated in accordance with the [Beneficiary's] [Linked Third Party's] usual cost accounting practices] EUR

and **hereby provide our Independent Report of Factual Findings ('the Report')** using the compulsory report format agreed with you.

The Report

Our engagement was carried out in accordance with the terms of reference ('the ToR') appended to this Report. The Report includes the agreed-upon procedures ('the Procedures') carried out and the standard factual findings ('the Findings') examined.

³ By which the Beneficiary declares costs under the Agreement (see template 'Model Financial Statement' in Annex 4 to the Agreement).

The Procedures were carried out solely to assist the [Commission] [Agency] in evaluating whether the [Beneficiary's] [Linked Third Party's] costs in the accompanying Financial Statement(s) were declared in accordance with the Agreement. The [Commission] [Agency] draws its own conclusions from the Report and any additional information it may require.

The scope of the Procedures was defined by the Commission. Therefore, the Auditor is not responsible for their suitability or pertinence. Since the Procedures carried out constitute neither an audit nor a review made in accordance with International Standards on Auditing or International Standards on Review Engagements, the Auditor does not give a statement of assurance on the Financial Statements.

Had the Auditor carried out additional procedures or an audit of the [Beneficiary's] [Linked Third Party's] Financial Statements in accordance with International Standards on Auditing or International Standards on Review Engagements, other matters might have come to its attention and would have been included in the Report.

Not applicable Findings

We examined the Financial Statement(s) stated above and considered the following Findings not applicable:

Explanation (to be removed from the Report):

If a Finding was not applicable, it must be marked as 'N.A.' ('Not applicable') in the corresponding row on the right-hand column of the table and means that the Finding did not have to be corroborated by the Auditor and the related Procedure(s) did not have to be carried out.

The reasons of the non-application of a certain Finding must be obvious i.e.

- i) if no cost was declared under a certain category then the related Finding(s) and Procedure(s) are not applicable;*
- ii) if the condition set to apply certain Procedure(s) are not met the related Finding(s) and those Procedure(s) are not applicable. For instance, for 'beneficiaries with accounts established in a currency other than euro' the Procedure and Finding related to 'beneficiaries with accounts established in euro' are not applicable. Similarly, if no additional remuneration is paid, the related Finding(s) and Procedure(s) for additional remuneration are not applicable.*

List here all Findings considered not applicable for the present engagement and explain the reasons of the non-applicability.

....

Exceptions

Apart from the exceptions listed below, the [Beneficiary] [Linked Third Party] provided the Auditor all the documentation and accounting information needed by the Auditor to carry out the requested Procedures and evaluate the Findings.

Explanation (to be removed from the Report):

- If the Auditor was not able to successfully complete a procedure requested, it must be marked as 'E' ('Exception') in the corresponding row on the right-hand column of the table. The reason such as the inability to reconcile key information or the unavailability of data that prevents the Auditor from carrying out the Procedure must be indicated below.*
- If the Auditor cannot corroborate a standard finding after having carried out the corresponding procedure, it must also be marked as 'E' ('Exception') and, where possible, the reasons why the Finding was not fulfilled and its possible impact must be explained here below.*

List here any exceptions and add any information on the cause and possible consequences of each exception, if known. If the exception is quantifiable, include the corresponding amount.

....

Example (to be removed from the Report):

1. *The Beneficiary was unable to substantiate the Finding number 1 on ... because*
2. *Finding number 30 was not fulfilled because the methodology used by the Beneficiary to calculate unit costs was different from the one approved by the Commission. The differences were as follows: ...*
3. *After carrying out the agreed procedures to confirm the Finding number 31, the Auditor found a difference of _____ EUR. The difference can be explained by ...*

Further Remarks

In addition to reporting on the results of the specific procedures carried out, the Auditor would like to make the following general remarks:

Example (to be removed from the Report):

1. *Regarding Finding number 8 the conditions for additional remuneration were considered as fulfilled because ...*
2. *In order to be able to confirm the Finding number 15 we carried out the following additional procedures:*

Use of this Report

This Report may be used only for the purpose described in the above objective. It was prepared solely for the confidential use of the [Beneficiary] [Linked Third Party] and the [Commission] [Agency], and only to be submitted to the [Commission] [Agency] in connection with the requirements set out in Article 20.4 of the Agreement. The Report may not be used by the [Beneficiary] [Linked Third Party] or by the [Commission] [Agency] for any other purpose, nor may it be distributed to any other parties. The [Commission] [Agency] may only disclose the Report to authorised parties, in particular to the European Anti-Fraud Office (OLAF) and the European Court of Auditors.

This Report relates only to the Financial Statement(s) submitted to the [Commission] [Agency] by the [Beneficiary] [Linked Third Party] for the Agreement. Therefore, it does not extend to any other of the [Beneficiary's] [Linked Third Party's] Financial Statement(s).

There was no conflict of interest⁴ between the Auditor and the Beneficiary [and Linked Third Party] in establishing this Report. The total fee paid to the Auditor for providing the Report was EUR [] (including EUR [] of deductible VAT).

We look forward to discussing our Report with you and would be pleased to provide any further information or assistance.

[legal name of the Auditor]

[name and function of an authorised representative]

[dd Month yyyy]

Signature of the Auditor

⁴ A conflict of interest arises when the Auditor's objectivity to establish the certificate is compromised in fact or in appearance when the Auditor for instance:

- was involved in the preparation of the Financial Statements;
- stands to benefit directly should the certificate be accepted;
- has a close relationship with any person representing the beneficiary;
- is a director, trustee or partner of the beneficiary; or
- is in any other situation that compromises his or her independence or ability to establish the certificate impartially.

Agreed-upon procedures to be performed and standard factual findings to be confirmed by the Auditor

The European Commission reserves the right to i) provide the auditor with additional guidance regarding the procedures to be followed or the facts to be ascertained and the way in which to present them (this may include sample coverage and findings) or to ii) change the procedures, by notifying the Beneficiary in writing. The procedures carried out by the auditor to confirm the standard factual finding are listed in the table below.

If this certificate relates to a Linked Third Party, any reference here below to ‘the Beneficiary’ is to be considered as a reference to ‘the Linked Third Party’.

The ‘result’ column has three different options: ‘C’, ‘E’ and ‘N.A.’:

- ‘C’ stands for ‘confirmed’ and means that the auditor can confirm the ‘standard factual finding’ and, therefore, there is no exception to be reported.
- ‘E’ stands for ‘exception’ and means that the Auditor carried out the procedures but cannot confirm the ‘standard factual finding’, or that the Auditor was not able to carry out a specific procedure (e.g. because it was impossible to reconcile key information or data were unavailable),
- ‘N.A.’ stands for ‘not applicable’ and means that the Finding did not have to be examined by the Auditor and the related Procedure(s) did not have to be carried out. The reasons of the non-application of a certain Finding must be obvious i.e. i) if no cost was declared under a certain category then the related Finding(s) and Procedure(s) are not applicable; ii) if the condition set to apply certain Procedure(s) are not met then the related Finding(s) and Procedure(s) are not applicable. For instance, for ‘beneficiaries with accounts established in a currency other than the euro’ the Procedure related to ‘beneficiaries with accounts established in euro’ is not applicable. Similarly, if no additional remuneration is paid, the related Finding(s) and Procedure(s) for additional remuneration are not applicable.

Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
A	ACTUAL PERSONNEL COSTS AND UNIT COSTS CALCULATED BY THE BENEFICIARY IN ACCORDANCE WITH ITS USUAL COST ACCOUNTING PRACTICE		
	<p>The Auditor draws a sample of persons whose costs were declared in the Financial Statement(s) to carry out the procedures indicated in the consecutive points of this section A.</p> <p><i>(The sample should be selected randomly so that it is representative. Full coverage is required if there are fewer than 10 people (including employees, natural persons working under a direct contract and personnel seconded by a third party), otherwise the sample should have a minimum of 10 people, or 10% of the total, whichever number is the highest)</i></p> <p>The Auditor sampled [] people out of the total of [] people.</p>		

Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
A.1	<p>PERSONNEL COSTS</p> <p><u>For the persons included in the sample and working under an employment contract or equivalent act (general procedures for individual actual personnel costs and personnel costs declared as unit costs)</u></p> <p>To confirm standard factual findings 1-5 listed in the next column, the Auditor reviewed following information/documents provided by the Beneficiary:</p> <ul style="list-style-type: none"> ○ a list of the persons included in the sample indicating the period(s) during which they worked for the action, their position (classification or category) and type of contract; ○ the payslips of the employees included in the sample; ○ reconciliation of the personnel costs declared in the Financial Statement(s) with the accounting system (project accounting and general ledger) and payroll system; ○ information concerning the employment status and employment conditions of personnel included in the sample, in particular their employment contracts or equivalent; ○ the Beneficiary’s usual policy regarding payroll matters (e.g. salary policy, overtime policy, variable pay); ○ applicable national law on taxes, labour and social security and ○ any other document that supports the personnel costs declared. <p>The Auditor also verified the eligibility of all components of the retribution (see Article 6 GA) and recalculated the personnel costs for employees included in the sample.</p>	<p>1) The employees were i) directly hired by the Beneficiary in accordance with its national legislation, ii) under the Beneficiary’s sole technical supervision and responsibility and iii) remunerated in accordance with the Beneficiary’s usual practices.</p> <p>2) Personnel costs were recorded in the Beneficiary's accounts/payroll system.</p> <p>3) Costs were adequately supported and reconciled with the accounts and payroll records.</p> <p>4) Personnel costs did not contain any ineligible elements.</p> <p>5) There were no discrepancies between the personnel costs charged to the action and the costs recalculated by the Auditor.</p>	
	<p><i>Further procedures if ‘additional remuneration’ is paid</i></p> <p>To confirm standard factual findings 6-9 listed in the next column, the Auditor:</p> <ul style="list-style-type: none"> ○ reviewed relevant documents provided by the Beneficiary (legal form, legal/statutory 	<p>6) The Beneficiary paying “additional remuneration” was a non-profit legal entity.</p>	

Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
	<p>obligations, the Beneficiary’s usual policy on additional remuneration, criteria used for its calculation, the Beneficiary’s usual remuneration practice for projects funded under national funding schemes...);</p> <ul style="list-style-type: none"> ○ recalculated the amount of additional remuneration eligible for the action based on the supporting documents received (full-time or part-time work, exclusive or non-exclusive dedication to the action, usual remuneration paid for projects funded by national schemes) to arrive at the applicable FTE/year and pro-rata rate (see data collected in the course of carrying out the procedures under A.2 ‘Productive hours’ and A.4 ‘Time recording system’). <p><i>‘ADDITIONAL REMUNERATION’ MEANS ANY PART OF THE REMUNERATION WHICH EXCEEDS WHAT THE PERSON WOULD BE PAID FOR TIME WORKED IN PROJECTS FUNDED BY NATIONAL SCHEMES.</i></p> <p><i>IF ANY PART OF THE REMUNERATION PAID TO THE EMPLOYEE QUALIFIES AS "ADDITIONAL REMUNERATION" AND IS ELIGIBLE UNDER THE PROVISIONS OF ARTICLE 6.2.A.1, THIS CAN BE CHARGED AS ELIGIBLE COST TO THE ACTION UP TO THE FOLLOWING AMOUNT:</i></p> <p><i>(A) IF THE PERSON WORKS FULL TIME AND EXCLUSIVELY ON THE ACTION DURING THE FULL YEAR: UP TO EUR 8 000/YEAR;</i></p> <p><i>(B) IF THE PERSON WORKS EXCLUSIVELY ON THE ACTION BUT NOT FULL-TIME OR NOT FOR THE FULL YEAR: UP TO THE CORRESPONDING PRO-RATA AMOUNT OF EUR 8 000, OR</i></p> <p><i>(C) IF THE PERSON DOES NOT WORK EXCLUSIVELY ON THE ACTION: UP TO A PRO-RATA AMOUNT CALCULATED IN ACCORDANCE TO ARTICLE 6.2.A.1.</i></p>	<p>7) The amount of additional remuneration paid corresponded to the Beneficiary’s usual remuneration practices and was consistently paid whenever the same kind of work or expertise was required.</p> <p>8) The criteria used to calculate the additional remuneration were objective and generally applied by the Beneficiary regardless of the source of funding used.</p> <p>9) The amount of additional remuneration included in the personnel costs charged to the action was capped at EUR 8,000 per FTE/year (up to the equivalent pro-rata amount if the person did not work on the action full-time during the year or did not work exclusively on the action).</p>	
	<p><i>Additional procedures in case “unit costs calculated by the Beneficiary in accordance with its usual cost accounting practices” is applied:</i></p> <p>Apart from carrying out the procedures indicated above to confirm standard factual findings 1-5 and, if applicable, also 6-9, the Auditor carried out following procedures to confirm standard</p>	<p>10) The personnel costs included in the Financial Statement were calculated in accordance with the Beneficiary’s usual cost accounting practice. This methodology was consistently</p>	

Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
	<p>factual findings 10-13 listed in the next column:</p> <ul style="list-style-type: none"> ○ obtained a description of the Beneficiary's usual cost accounting practice to calculate unit costs; ○ reviewed whether the Beneficiary's usual cost accounting practice was applied for the Financial Statements subject of the present CFS; ○ verified the employees included in the sample were charged under the correct category (in accordance with the criteria used by the Beneficiary to establish personnel categories) by reviewing the contract/HR-record or analytical accounting records; ○ verified that there is no difference between the total amount of personnel costs used in calculating the cost per unit and the total amount of personnel costs recorded in the statutory accounts; ○ verified whether actual personnel costs were adjusted on the basis of budgeted or estimated elements and, if so, verified whether those elements used are actually relevant for the calculation, objective and supported by documents. 	<p>used in all H2020 actions.</p> <p>11) The employees were charged under the correct category.</p> <p>12) Total personnel costs used in calculating the unit costs were consistent with the expenses recorded in the statutory accounts.</p> <p>13) Any estimated or budgeted element used by the Beneficiary in its unit-cost calculation were relevant for calculating personnel costs and corresponded to objective and verifiable information.</p>	
	<p><u>For natural persons included in the sample and working with the Beneficiary under a direct contract other than an employment contract, such as consultants (no subcontractors).</u></p> <p>To confirm standard factual findings 14-17 listed in the next column the Auditor reviewed following information/documents provided by the Beneficiary:</p> <ul style="list-style-type: none"> ○ the contracts, especially the cost, contract duration, work description, place of work, ownership of the results and reporting obligations to the Beneficiary; ○ the employment conditions of staff in the same category to compare costs and; ○ any other document that supports the costs declared and its registration (e.g. invoices, accounting records, etc.). 	<p>14) The natural persons worked under conditions similar to those of an employee, in particular regarding the way the work is organised, the tasks that are performed and the premises where they are performed.</p> <p>15) The results of work carried out belong to the Beneficiary, or, if not, the Beneficiary has obtained all necessary rights to fulfil its obligations as if those</p>	

Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
		results were generated by itself.	
		16) Their costs were not significantly different from those for staff who performed similar tasks under an employment contract with the Beneficiary.	
		17) The costs were supported by audit evidence and registered in the accounts.	
	<p><u>For personnel seconded by a third party and included in the sample (not subcontractors)</u></p> <p>To confirm standard factual findings 18-21 listed in the next column, the Auditor reviewed following information/documents provided by the Beneficiary:</p> <ul style="list-style-type: none"> ○ their secondment contract(s) notably regarding costs, duration, work description, place of work and ownership of the results; ○ if there is reimbursement by the Beneficiary to the third party for the resource made available (in-kind contribution against payment): any documentation that supports the costs declared (e.g. contract, invoice, bank payment, and proof of registration in its accounting/payroll, etc.) and reconciliation of the Financial Statement(s) with the accounting system (project accounting and general ledger) as well as any proof that the amount invoiced by the third party did not include any profit; ○ if there is no reimbursement by the Beneficiary to the third party for the resource made available (in-kind contribution free of charge): a proof of the actual cost borne by the Third Party for the resource made available free of charge to the Beneficiary such as a statement of costs incurred by the Third Party and proof of the registration in the Third Party's accounting/payroll; 	18) Seconded personnel reported to the Beneficiary and worked on the Beneficiary's premises (unless otherwise agreed with the Beneficiary).	
		19) The results of work carried out belong to the Beneficiary, or, if not, the Beneficiary has obtained all necessary rights to fulfil its obligations as if those results were generated by itself..	
		<p><i>If personnel is seconded against payment:</i></p> <p>20) The costs declared were supported with documentation and recorded in the</p>	

Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
	<ul style="list-style-type: none"> ○ any other document that supports the costs declared (e.g. invoices, etc.). 	Beneficiary’s accounts. The third party did not include any profit.	
		<p><i>If personnel is seconded free of charge:</i></p> <p>21) The costs declared did not exceed the third party's cost as recorded in the accounts of the third party and were supported with documentation.</p>	
A.2	<p>PRODUCTIVE HOURS</p> <p>To confirm standard factual findings 22-27 listed in the next column, the Auditor reviewed relevant documents, especially national legislation, labour agreements and contracts and time records of the persons included in the sample, to verify that:</p> <ul style="list-style-type: none"> ○ the annual productive hours applied were calculated in accordance with one of the methods described below, ○ the full-time equivalent (FTEs) ratios for employees not working full-time were correctly calculated. <p>If the Beneficiary applied method B, the auditor verified that the correctness in which the total number of hours worked was calculated and that the contracts specified the annual workable hours.</p> <p>If the Beneficiary applied method C, the auditor verified that the ‘annual productive hours’ applied when calculating the hourly rate were equivalent to at least 90 % of the ‘standard annual workable hours’. The Auditor can only do this if the calculation of the standard annual workable</p>	<p>22) The Beneficiary applied method [<i>choose one option and delete the others</i>]</p> <p>[A: 1720 hours]</p> <p>[B: the ‘total number of hours worked’]</p> <p>[C: ‘standard annual productive hours’ used correspond to usual accounting practices]</p> <p>23) Productive hours were calculated annually.</p> <p>24) For employees not working full-time the full-time equivalent (FTE) ratio was correctly applied.</p>	

Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
	<p>hours can be supported by records, such as national legislation, labour agreements, and contracts.</p> <p><i>BENEFICIARY'S PRODUCTIVE HOURS' FOR PERSONS WORKING FULL TIME SHALL BE ONE OF THE FOLLOWING METHODS:</i></p> <p><i>A. 1720 ANNUAL PRODUCTIVE HOURS (PRO-RATA FOR PERSONS NOT WORKING FULL-TIME)</i></p> <p><i>B. THE TOTAL NUMBER OF HOURS WORKED BY THE PERSON FOR THE BENEFICIARY IN THE YEAR (THIS METHOD IS ALSO REFERRED TO AS 'TOTAL NUMBER OF HOURS WORKED' IN THE NEXT COLUMN). THE CALCULATION OF THE TOTAL NUMBER OF HOURS WORKED WAS DONE AS FOLLOWS: ANNUAL WORKABLE HOURS OF THE PERSON ACCORDING TO THE EMPLOYMENT CONTRACT, APPLICABLE LABOUR AGREEMENT OR NATIONAL LAW PLUS OVERTIME WORKED MINUS ABSENCES (SUCH AS SICK LEAVE OR SPECIAL LEAVE).</i></p> <p><i>C. THE STANDARD NUMBER OF ANNUAL HOURS GENERALLY APPLIED BY THE BENEFICIARY FOR ITS PERSONNEL IN ACCORDANCE WITH ITS USUAL COST ACCOUNTING PRACTICES (THIS METHOD IS ALSO REFERRED TO AS 'STANDARD ANNUAL PRODUCTIVE HOURS' IN THE NEXT COLUMN). THIS NUMBER MUST BE AT LEAST 90% OF THE STANDARD ANNUAL WORKABLE HOURS.</i></p> <p><i>'ANNUAL WORKABLE HOURS' MEANS THE PERIOD DURING WHICH THE PERSONNEL MUST BE WORKING, AT THE EMPLOYER'S DISPOSAL AND CARRYING OUT HIS/HER ACTIVITY OR DUTIES UNDER THE EMPLOYMENT CONTRACT, APPLICABLE COLLECTIVE LABOUR AGREEMENT OR NATIONAL WORKING TIME LEGISLATION.</i></p>	<p><i>If the Beneficiary applied method B.</i></p> <p>25) The calculation of the number of 'annual workable hours', overtime and absences was verifiable based on the documents provided by the Beneficiary.</p> <p>25.1) The Beneficiary calculates the hourly rates per full financial year following procedure A.3 (method B is not allowed for beneficiaries calculating hourly rates per month).</p> <p><i>If the Beneficiary applied method C.</i></p> <p>26) The calculation of the number of 'standard annual workable hours' was verifiable based on the documents provided by the Beneficiary.</p>	

Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
		27) The ‘annual productive hours’ used for calculating the hourly rate were consistent with the usual cost accounting practices of the Beneficiary and were equivalent to at least 90 % of the ‘annual workable hours’.	
A.3	<p>HOURLY PERSONNEL RATES</p> <p><u>I) For unit costs calculated in accordance to the Beneficiary's usual cost accounting practice (unit costs):</u></p> <p>If the Beneficiary has a "Certificate on Methodology to calculate unit costs " (CoMUC) approved by the Commission, the Beneficiary provides the Auditor with a description of the approved methodology and the Commission’s letter of acceptance. The Auditor verified that the Beneficiary has indeed used the methodology approved. If so, no further verification is necessary.</p> <p>If the Beneficiary does not have a "Certificate on Methodology" (CoMUC) approved by the Commission, or if the methodology approved was not applied, then the Auditor:</p> <ul style="list-style-type: none"> ○ reviewed the documentation provided by the Beneficiary, including manuals and internal guidelines that explain how to calculate hourly rates; ○ recalculated the unit costs (hourly rates) of staff included in the sample following the results of the procedures carried out in A.1 and A.2. <p><u>II) For individual hourly rates:</u></p> <p>The Auditor:</p> <ul style="list-style-type: none"> ○ reviewed the documentation provided by the Beneficiary, including manuals and internal guidelines that explain how to calculate hourly rates; 	<p>28) The Beneficiary applied [<i>choose one option and delete the other</i>]:</p> <p>[Option I: “Unit costs (hourly rates) were calculated in accordance with the Beneficiary’s usual cost accounting practices”]</p> <p>[Option II: Individual hourly rates were applied]</p> <p><i>For option I concerning unit costs and if the Beneficiary applies the methodology approved by the Commission (CoMUC):</i></p> <p>29) The Beneficiary used the Commission-approved methodology to calculate hourly rates. It corresponded to the organisation's usual cost accounting practices and was applied consistently for all</p>	

Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
	<ul style="list-style-type: none"> ○ recalculated the hourly rates of staff included in the sample (recalculation of all hourly rates if the Beneficiary uses annual rates, recalculation of three months selected randomly for every year and person if the Beneficiary uses monthly rates) following the results of the procedures carried out in A.1 and A.2; ○ (only in case of monthly rates) confirmed that the time spent on parental leave is not deducted, and that, if parts of the basic remuneration are generated over a period longer than a month, the Beneficiary has included only the share which is generated in the month. <p><u>“UNIT COSTS CALCULATED BY THE BENEFICIARY IN ACCORDANCE WITH ITS USUAL COST ACCOUNTING PRACTICES”:</u> <i>IT IS CALCULATED BY DIVIDING THE TOTAL AMOUNT OF PERSONNEL COSTS OF THE CATEGORY TO WHICH THE EMPLOYEE BELONGS VERIFIED IN LINE WITH PROCEDURE A.1 BY THE NUMBER OF FTE AND THE ANNUAL TOTAL PRODUCTIVE HOURS OF THE SAME CATEGORY CALCULATED BY THE BENEFICIARY IN ACCORDANCE WITH PROCEDURE A.2.</i></p> <p><u>HOURLY RATE FOR INDIVIDUAL ACTUAL PERSONAL COSTS:</u> <i>IT IS CALCULATED FOLLOWING ONE OF THE TWO OPTIONS BELOW:</i></p> <p><i>A) [OPTION BY DEFAULT] BY DIVIDING THE ACTUAL ANNUAL AMOUNT OF PERSONNEL COSTS OF AN EMPLOYEE VERIFIED IN LINE WITH PROCEDURE A.1 BY THE NUMBER OF ANNUAL PRODUCTIVE HOURS VERIFIED IN LINE WITH PROCEDURE A.2 (FULL FINANCIAL YEAR HOURLY RATE);</i></p> <p><i>B) BY DIVIDING THE ACTUAL MONTHLY AMOUNT OF PERSONNEL COSTS OF AN EMPLOYEE VERIFIED IN LINE WITH PROCEDURE A.1 BY 1/12 OF THE NUMBER OF ANNUAL PRODUCTIVE HOURS VERIFIED IN LINE WITH PROCEDURE A.2.(MONTHLY HOURLY RATE).</i></p>	<p>activities irrespective of the source of funding.</p> <p><i>For option I concerning unit costs and if the Beneficiary applies a methodology not approved by the Commission:</i></p> <p>30) The unit costs re-calculated by the Auditor were the same as the rates applied by the Beneficiary.</p> <p><i>For option II concerning individual hourly rates:</i></p> <p>31) The individual rates re-calculated by the Auditor were the same as the rates applied by the Beneficiary.</p> <p>31.1) The Beneficiary used only one option (per full financial year or per month) throughout each financial year examined.</p> <p>31.2) The hourly rates do not include additional remuneration.</p>	

Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
A.4	<p>TIME RECORDING SYSTEM</p> <p>To verify that the time recording system ensures the fulfilment of all minimum requirements and that the hours declared for the action were correct, accurate and properly authorised and supported by documentation, the Auditor made the following checks for the persons included in the sample that declare time as worked for the action on the basis of time records:</p> <ul style="list-style-type: none"> ○ description of the time recording system provided by the Beneficiary (registration, authorisation, processing in the HR-system); ○ its actual implementation; ○ time records were signed at least monthly by the employees (on paper or electronically) and authorised by the project manager or another manager; ○ the hours declared were worked within the project period; ○ there were no hours declared as worked for the action if HR-records showed absence due to holidays or sickness (further cross-checks with travels are carried out in B.1 below) ; ○ the hours charged to the action matched those in the time recording system. <p><i>ONLY THE HOURS WORKED ON THE ACTION CAN BE CHARGED. ALL WORKING TIME TO BE CHARGED SHOULD BE RECORDED THROUGHOUT THE DURATION OF THE PROJECT, ADEQUATELY SUPPORTED BY EVIDENCE OF THEIR REALITY AND RELIABILITY (SEE SPECIFIC PROVISIONS BELOW FOR PERSONS WORKING EXCLUSIVELY FOR THE ACTION WITHOUT TIME RECORDS).</i></p>	32) All persons recorded their time dedicated to the action on a daily/ weekly/ monthly basis using a paper/computer-based system. <i>(delete the answers that are not applicable)</i>	
		33) Their time-records were authorised at least monthly by the project manager or other superior.	
		34) Hours declared were worked within the project period and were consistent with the presences/absences recorded in HR-records.	
		35) There were no discrepancies between the number of hours charged to the action and the number of hours recorded.	
	<p><u>If the persons are working exclusively for the action and without time records</u></p> <p>For the persons selected that worked exclusively for the action without time records, the Auditor verified evidence available demonstrating that they were in reality exclusively dedicated to the action and that the Beneficiary signed a declaration confirming that they have worked exclusively for the action.</p>	36) The exclusive dedication is supported by a declaration signed by the Beneficiary and by any other evidence gathered.	

Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
B	COSTS OF SUBCONTRACTING		
B.1	<p>The Auditor obtained the detail/breakdown of subcontracting costs and sampled [redacted] cost items selected randomly <i>(full coverage is required if there are fewer than 10 items, otherwise the sample should have a minimum of 10 item, or 10% of the total, whichever number is highest).</i></p> <p>To confirm standard factual findings 37-41 listed in the next column, the Auditor reviewed the following for the items included in the sample:</p> <ul style="list-style-type: none"> ○ the use of subcontractors was foreseen in Annex 1; ○ subcontracting costs were declared in the subcontracting category of the Financial Statement; ○ supporting documents on the selection and award procedure were followed; ○ the Beneficiary ensured best value for money (key elements to appreciate the respect of this principle are the award of the subcontract to the bid offering best price-quality ratio, under conditions of transparency and equal treatment. In case an existing framework contract was used the Beneficiary ensured it was established on the basis of the principle of best value for money under conditions of transparency and equal treatment). <p>In particular,</p> <ol style="list-style-type: none"> i. if the Beneficiary acted as a contracting authority within the meaning of Directive 2004/18/EC (or 2014/24/EU) or of Directive 2004/17/EC (or 2014/25/EU), the Auditor verified that the applicable national law on public procurement was followed and that the subcontracting complied with the Terms and Conditions of the Agreement. ii. if the Beneficiary did not fall under the above-mentioned category the Auditor verified that the Beneficiary followed their usual procurement rules and respected the Terms and Conditions of the Agreement.. 	<p>37) The use of claimed subcontracting costs was foreseen in Annex 1 and costs were declared in the Financial Statements under the subcontracting category.</p> <p>38) There were documents of requests to different providers, different offers and assessment of the offers before selection of the provider in line with internal procedures and procurement rules. Subcontracts were awarded in accordance with the principle of best value for money.</p> <p><i>(When different offers were not collected the Auditor explains the reasons provided by the Beneficiary under the caption “Exceptions” of the Report. The Commission will analyse this information to evaluate whether these costs might be accepted as eligible)</i></p> <p>39) The subcontracts were not awarded to other Beneficiaries</p>	

Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
	<p>For the items included in the sample the Auditor also verified that:</p> <ul style="list-style-type: none"> ○ the subcontracts were not awarded to other Beneficiaries in the consortium; ○ there were signed agreements between the Beneficiary and the subcontractor; ○ there was evidence that the services were provided by subcontractor; 	<p>of the consortium.</p> <p>40) All subcontracts were supported by signed agreements between the Beneficiary and the subcontractor.</p> <p>41) There was evidence that the services were provided by the subcontractors.</p>	
C	COSTS OF PROVIDING FINANCIAL SUPPORT TO THIRD PARTIES		
C.1	<p>The Auditor obtained the detail/breakdown of the costs of providing financial support to third parties and sampled [] cost items selected randomly <i>(full coverage is required if there are fewer than 10 items, otherwise the sample should have a minimum of 10 item, or 10% of the total, whichever number is highest).</i></p> <p>The Auditor verified that the following minimum conditions were met:</p> <ul style="list-style-type: none"> a) the maximum amount of financial support for each third party did not exceed EUR 60 000, unless explicitly mentioned in Annex 1; b) the financial support to third parties was agreed in Annex 1 of the Agreement and the other provisions on financial support to third parties included in Annex 1 were respected. 	<p>42) All minimum conditions were met</p>	

D	OTHER ACTUAL DIRECT COSTS		
D.1	<p>COSTS OF TRAVEL AND RELATED SUBSISTENCE ALLOWANCES</p> <p>The Auditor sampled [] cost items selected randomly (<i>full coverage is required if there are fewer than 10 items, otherwise the sample should have a minimum of 10 item, or 10% of the total, whichever number is the highest</i>).</p> <p>The Auditor inspected the sample and verified that:</p> <ul style="list-style-type: none"> ○ travel and subsistence costs were consistent with the Beneficiary's usual policy for travel. In this context, the Beneficiary provided evidence of its normal policy for travel costs (e.g. use of first class tickets, reimbursement by the Beneficiary on the basis of actual costs, a lump sum or per diem) to enable the Auditor to compare the travel costs charged with this policy; ○ travel costs are correctly identified and allocated to the action (e.g. trips are directly linked to the action) by reviewing relevant supporting documents such as minutes of meetings, workshops or conferences, their registration in the correct project account, their consistency with time records or with the dates/duration of the workshop/conference; ○ no ineligible costs or excessive or reckless expenditure was declared (see Article 6.5 MGA). 	43) Costs were incurred, approved and reimbursed in line with the Beneficiary's usual policy for travels.	
		44) There was a link between the trip and the action.	
		45) The supporting documents were consistent with each other regarding subject of the trip, dates, duration and reconciled with time records and accounting.	
		46) No ineligible costs or excessive or reckless expenditure was declared.	
D.2	<p>DEPRECIATION COSTS FOR EQUIPMENT, INFRASTRUCTURE OR OTHER ASSETS</p> <p>The Auditor sampled [] cost items selected randomly (<i>full coverage is required if there are fewer than 10 items, otherwise the sample should have a minimum of 10 item, or 10% of the total, whichever number is the highest</i>).</p> <p>For “equipment, infrastructure or other assets” [from now on called “asset(s)”] selected in the sample the Auditor verified that:</p> <ul style="list-style-type: none"> ○ the assets were acquired in conformity with the Beneficiary's internal guidelines and procedures; 	47) Procurement rules, principles and guides were followed.	
		48) There was a link between the grant agreement and the asset charged to the action.	
		49) The asset charged to the action was traceable to the accounting records and the underlying documents.	

	<ul style="list-style-type: none"> ○ they were correctly allocated to the action (with supporting documents such as delivery note invoice or any other proof demonstrating the link to the action) ○ they were entered in the accounting system; ○ the extent to which the assets were used for the action (as a percentage) was supported by reliable documentation (e.g. usage overview table); <p>The Auditor recalculated the depreciation costs and verified that they were in line with the applicable rules in the Beneficiary’s country and with the Beneficiary’s usual accounting policy (e.g. depreciation calculated on the acquisition value).</p> <p>The Auditor verified that no ineligible costs such as deductible VAT, exchange rate losses, excessive or reckless expenditure were declared (see Article 6.5 GA).</p>	50) The depreciation method used to charge the asset to the action was in line with the applicable rules of the Beneficiary's country and the Beneficiary's usual accounting policy.	
		51) The amount charged corresponded to the actual usage for the action.	
		52) No ineligible costs or excessive or reckless expenditure were declared.	
D.3	<p>COSTS OF OTHER GOODS AND SERVICES</p> <p>The Auditor sampled [redacted] cost items selected randomly (<i>full coverage is required if there are fewer than 10 items, otherwise the sample should have a minimum of 10 item, or 10% of the total, whichever number is highest</i>).</p> <p>For the purchase of goods, works or services included in the sample the Auditor verified that:</p> <ul style="list-style-type: none"> ○ the contracts did not cover tasks described in Annex 1; ○ they were correctly identified, allocated to the proper action, entered in the accounting system (traceable to underlying documents such as purchase orders, invoices and accounting); ○ the goods were not placed in the inventory of durable equipment; ○ the costs charged to the action were accounted in line with the Beneficiary’s usual accounting practices; ○ no ineligible costs or excessive or reckless expenditure were declared (see Article 6 GA). <p>In addition, the Auditor verified that these goods and services were acquired in conformity with</p>	53) Contracts for works or services did not cover tasks described in Annex 1.	
		54) Costs were allocated to the correct action and the goods were not placed in the inventory of durable equipment.	
		55) The costs were charged in line with the Beneficiary’s accounting policy and were adequately supported.	
		56) No ineligible costs or excessive or reckless expenditure were declared. For internal invoices/charges only the cost element was charged, without any mark-ups.	

	<p>the Beneficiary's internal guidelines and procedures, in particular:</p> <ul style="list-style-type: none"> ○ if Beneficiary acted as a contracting authority within the meaning of Directive 2004/18/EC (or 2014/24/EU) or of Directive 2004/17/EC (or 2014/25/EU), the Auditor verified that the applicable national law on public procurement was followed and that the procurement contract complied with the Terms and Conditions of the Agreement. ○ if the Beneficiary did not fall into the category above, the Auditor verified that the Beneficiary followed their usual procurement rules and respected the Terms and Conditions of the Agreement. <p>For the items included in the sample the Auditor also verified that:</p> <ul style="list-style-type: none"> ○ the Beneficiary ensured best value for money (key elements to appreciate the respect of this principle are the award of the contract to the bid offering best price-quality ratio, under conditions of transparency and equal treatment. In case an existing framework contract was used the Auditor also verified that the Beneficiary ensured it was established on the basis of the principle of best value for money under conditions of transparency and equal treatment); <p><i>SUCH GOODS AND SERVICES INCLUDE, FOR INSTANCE, CONSUMABLES AND SUPPLIES, DISSEMINATION (INCLUDING OPEN ACCESS), PROTECTION OF RESULTS, SPECIFIC EVALUATION OF THE ACTION IF IT IS REQUIRED BY THE AGREEMENT, CERTIFICATES ON THE FINANCIAL STATEMENTS IF THEY ARE REQUIRED BY THE AGREEMENT AND CERTIFICATES ON THE METHODOLOGY, TRANSLATIONS, REPRODUCTION.</i></p>	<p>57) Procurement rules, principles and guides were followed. There were documents of requests to different providers, different offers and assessment of the offers before selection of the provider in line with internal procedures and procurement rules. The purchases were made in accordance with the principle of best value for money.</p> <p><i>(When different offers were not collected the Auditor explains the reasons provided by the Beneficiary under the caption “Exceptions” of the Report. The Commission will analyse this information to evaluate whether these costs might be accepted as eligible)</i></p>	
<p>D.4</p>	<p>AGGREGATED CAPITALISED AND OPERATING COSTS OF RESEARCH INFRASTRUCTURE</p> <p>The Auditor ensured the existence of a positive ex-ante assessment (issued by the EC Services) of the cost accounting methodology of the Beneficiary allowing it to apply the guidelines on direct costing for large research infrastructures in Horizon 2020.</p>	<p>58) The costs declared as direct costs for Large Research Infrastructures (in the appropriate line of the Financial Statement) comply with the methodology described in the positive ex-ante assessment report.</p>	

	<p><i>In the cases that a positive ex-ante assessment has been issued (see the standard factual findings 58-59 on the next column),</i> The Auditor ensured that the beneficiary has applied consistently the methodology that is explained and approved in the positive ex ante assessment;</p> <p><i>In the cases that a positive ex-ante assessment has NOT been issued (see the standard factual findings 60 on the next column),</i> The Auditor verified that no costs of Large Research Infrastructure have been charged as direct costs in any costs category;</p> <p><i>In the cases that a draft ex-ante assessment report has been issued with recommendation for further changes (see the standard factual findings 60 on the next column),</i></p> <ul style="list-style-type: none"> • The Auditor followed the same procedure as above (when a positive ex-ante assessment has NOT yet been issued) and paid particular attention (testing reinforced) to the cost items for which the draft ex-ante assessment either rejected the inclusion as direct costs for Large Research Infrastructures or issued recommendations. 	<p>59) Any difference between the methodology applied and the one positively assessed was extensively described and adjusted accordingly.</p>	
<p>D.5</p>	<p>Costs of internally invoiced goods and services</p> <p>The Auditor sampled cost items selected randomly (<i>full coverage is required if there are fewer than 10 items, otherwise the sample should have a minimum of 10 item, or 10% of the total, whichever number is highest</i>).</p> <p>To confirm standard factual findings 61-65 listed in the next column, the Auditor:</p> <ul style="list-style-type: none"> ○ obtained a description of the Beneficiary's usual cost accounting practice to calculate costs of internally invoiced goods and services (unit costs); ○ reviewed whether the Beneficiary's usual cost accounting practice was applied for the Financial Statements subject of the present CFS; ○ ensured that the methodology to calculate unit costs is being used in a consistent manner, based on objective criteria, regardless of the source of funding; ○ verified that any ineligible items or any costs claimed under other budget categories, in particular indirect costs, have not been taken into account when calculating the costs of 	<p>61) The costs of internally invoiced goods and services included in the Financial Statement were calculated in accordance with the Beneficiary's usual cost accounting practice.</p>	
		<p>62) The cost accounting practices used to calculate the costs of internally invoiced goods and services were applied by the Beneficiary in a consistent manner based on objective criteria regardless of the source of funding.</p>	
		<p>63) The unit cost is calculated using the actual costs for the good or service recorded in the Beneficiary's accounts, excluding any ineligible cost or costs included in other</p>	

	<p>internally invoiced goods and services (see Article 6 GA);</p> <ul style="list-style-type: none"> ○ verified whether actual costs of internally invoiced goods and services were adjusted on the basis of budgeted or estimated elements and, if so, verified whether those elements used are actually relevant for the calculation, and correspond to objective and verifiable information. ○ verified that any costs of items which are not directly linked to the production of the invoiced goods or service (e.g. supporting services like cleaning, general accountancy, administrative support, etc. not directly used for production of the good or service) have not been taken into account when calculating the costs of internally invoiced goods and services. ○ verified that any costs of items used for calculating the costs internally invoiced goods and services are supported by audit evidence and registered in the accounts. 	<p>budget categories.</p>	
		<p>64) The unit cost excludes any costs of items which are not directly linked to the production of the invoiced goods or service.</p>	
		<p>65) The costs items used for calculating the actual costs of internally invoiced goods and services were relevant, reasonable and correspond to objective and verifiable information.</p>	
E	USE OF EXCHANGE RATES		
E.1	<p><u>a) For Beneficiaries with accounts established in a currency other than euros</u></p> <p>The Auditor sampled [redacted] cost items selected randomly and verified that the exchange rates used for converting other currencies into euros were in accordance with the following rules established in the Agreement (full coverage is required if there are fewer than 10 items, otherwise the sample should have a minimum of 10 item, or 10% of the total, whichever number is highest):</p> <p><i>COSTS RECORDED IN THE ACCOUNTS IN A CURRENCY OTHER THAN EURO SHALL BE CONVERTED INTO EURO AT THE AVERAGE OF THE DAILY EXCHANGE RATES PUBLISHED IN THE C SERIES OF OFFICIAL JOURNAL OF THE EUROPEAN UNION (https://www.ecb.int/stats/exchange/eurofxref/html/index.en.html), DETERMINED OVER THE CORRESPONDING REPORTING PERIOD.</i></p> <p><i>IF NO DAILY EURO EXCHANGE RATE IS PUBLISHED IN THE OFFICIAL JOURNAL OF THE EUROPEAN UNION FOR THE CURRENCY IN QUESTION, CONVERSION SHALL BE MADE AT THE AVERAGE OF THE MONTHLY ACCOUNTING RATES ESTABLISHED BY THE COMMISSION AND PUBLISHED ON ITS WEBSITE (http://ec.europa.eu/budget/contracts_grants/info_contracts/inforeuro/inforeuro_en.cfm),</i></p>	<p>66) The exchange rates used to convert other currencies into Euros were in accordance with the rules established of the Grant Agreement and there was no difference in the final figures.</p>	

	<i>DETERMINED OVER THE CORRESPONDING REPORTING PERIOD.</i>		
	<p>b) For Beneficiaries with accounts established in euros</p> <p>The Auditor sampled [] cost items selected randomly and verified that the exchange rates used for converting other currencies into euros were in accordance with the following rules established in the Agreement (full coverage is required if there are fewer than 10 items, otherwise the sample should have a minimum of 10 item, or 10% of the total, whichever number is highest):</p> <p><i>COSTS INCURRED IN ANOTHER CURRENCY SHALL BE CONVERTED INTO EURO BY APPLYING THE BENEFICIARY'S USUAL ACCOUNTING PRACTICES.</i></p>	<p>67) The Beneficiary applied its usual accounting practices.</p>	

[legal name of the audit firm]

[name and function of an authorised representative]

[dd Month yyyy]

<Signature of the Auditor>

ANNEX 6

MODEL FOR THE CERTIFICATE ON THE METHODOLOGY

- For options [*in italics in square brackets*]: choose the applicable option. Options not chosen should be deleted.
- For fields in [grey in square brackets]: enter the appropriate data.

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TERMS OF REFERENCE FOR AN AUDIT ENGAGEMENT FOR A METHODOLOGY CERTIFICATE IN CONNECTION WITH ONE OR MORE GRANT AGREEMENTS FINANCED UNDER THE HORIZON 2020 RESEARCH AND INNOVATION FRAMEWORK PROGRAMME

INDEPENDENT REPORT OF FACTUAL FINDINGS ON THE METHODOLOGY CONCERNING GRANT AGREEMENTS FINANCED UNDER THE HORIZON 2020 RESEARCH AND INNOVATION FRAMEWORK PROGRAMME

**Terms of reference for an audit engagement for a methodology certificate
in connection with one or more grant agreements financed
under the Horizon 2020 Research and Innovation Framework Programme**

This document sets out the ‘**Terms of Reference (ToR)**’ under which

[OPTION 1: *[insert name of the beneficiary]* (*‘the Beneficiary’*)] [OPTION 2: *[insert name of the linked third party]* (*‘the Linked Third Party’*), *third party linked to the Beneficiary* *[insert name of the beneficiary]* (*‘the Beneficiary’*)]

agrees to engage

[insert legal name of the auditor] (*‘the Auditor’*)

to produce an independent report of factual findings (*‘the Report’*) concerning the *[Beneficiary’s]* *[Linked Third Party’s]* usual accounting practices for calculating and claiming direct personnel costs declared as unit costs (*‘the Methodology’*) in connection with grant agreements financed under the Horizon 2020 Research and Innovation Framework Programme.

The procedures to be carried out for the assessment of the methodology will be based on the grant agreement(s) detailed below:

[title and number of the grant agreement(s)] (*‘the Agreement(s)’*)

The Agreement(s) has(have) been concluded between the Beneficiary and [OPTION 1: *the European Union, represented by the European Commission* (*‘the Commission’*)] [OPTION 2: *the European Atomic Energy Community (Euratom), represented by the European Commission* (*‘the Commission’*)] [OPTION 3: *the [Research Executive Agency (REA)] [European Research Council Executive Agency (ERCEA)] [Innovation and Networks Executive Agency (INEA)] [Executive Agency for Small and Medium-sized Enterprises (EASME)]* (*‘the Agency’*), under the powers delegated by the European Commission (*‘the Commission’*)].

The *[Commission]* *[Agency]* is mentioned as a signatory of the Agreement with the Beneficiary only. The *[European Union]* *[Euratom]* *[Agency]* is not a party to this engagement.

1.1 Subject of the engagement

According to Article 18.1.2 of the Agreement, beneficiaries *[and linked third parties]* that declare direct personnel costs as unit costs calculated in accordance with their usual cost accounting practices may submit to the *[Commission]* *[Agency]*, for approval, a certificate on the methodology (*‘CoMUC’*) stating that there are adequate records and documentation to prove that their cost accounting practices used comply with the conditions set out in Point A of Article 6.2.

The subject of this engagement is the CoMUC which is composed of two separate documents:

- the Terms of Reference (*‘the ToR’*) to be signed by the *[Beneficiary]* *[Linked Third Party]* and the Auditor;
- the Auditor’s Independent Report of Factual Findings (*‘the Report’*) issued on the Auditor’s letterhead, dated, stamped and signed by the Auditor which includes; the standard statements (*‘the Statements’*) evaluated and signed by the *[Beneficiary]* *[Linked Third Party]*, the agreed-upon procedures (*‘the Procedures’*) performed by the Auditor and the standard factual findings

(‘the Findings’) assessed by the Auditor. The Statements, Procedures and Findings are summarised in the table that forms part of the Report.

The information provided through the Statements, the Procedures and the Findings will enable the Commission to draw conclusions regarding the existence of the *[Beneficiary’s] [Linked Third Party’s]* usual cost accounting practice and its suitability to ensure that direct personnel costs claimed on that basis comply with the provisions of the Agreement. The Commission draws its own conclusions from the Report and any additional information it may require.

1.2 Responsibilities

The parties to this agreement are the *[Beneficiary] [Linked Third Party]* and the Auditor.

The *[Beneficiary] [Linked Third Party]*:

- is responsible for preparing financial statements for the Agreement(s) (‘the Financial Statements’) in compliance with those Agreements;
- is responsible for providing the Financial Statement(s) to the Auditor and enabling the Auditor to reconcile them with the *[Beneficiary’s] [Linked Third Party’s]* accounting and bookkeeping system and the underlying accounts and records. The Financial Statement(s) will be used as a basis for the procedures which the Auditor will carry out under this ToR;
- is responsible for its Methodology and liable for the accuracy of the Financial Statement(s);
- is responsible for endorsing or refuting the Statements indicated under the heading ‘Statements to be made by the Beneficiary/ Linked Third Party’ in the first column of the table that forms part of the Report;
- must provide the Auditor with a signed and dated representation letter;
- accepts that the ability of the Auditor to carry out the Procedures effectively depends upon the *[Beneficiary] [Linked Third Party]* providing full and free access to the *[Beneficiary’s] [Linked Third Party’s]* staff and to its accounting and other relevant records.

The Auditor:

- *[Option 1 by default: is qualified to carry out statutory audits of accounting documents in accordance with Directive 2006/43/EC of the European Parliament and of the Council of 17 May 2006 on statutory audits of annual accounts and consolidated accounts, amending Council Directives 78/660/EEC and 83/349/EEC and repealing Council Directive 84/253/EEC or similar national regulations].*
- *[Option 2 if the Beneficiary or Linked Third Party has an independent Public Officer: is a competent and independent Public Officer for which the relevant national authorities have established the legal capacity to audit the Beneficiary].*
- *[Option 3 if the Beneficiary or Linked Third Party is an international organisation: is an [internal] [external] auditor in accordance with the internal financial regulations and procedures of the international organisation].*

The Auditor:

- must be independent from the Beneficiary *[and the Linked Third Party]*, in particular, it must not have been involved in preparing the Beneficiary’s *[and Linked Third Party’s]* Financial Statement(s);
- must plan work so that the Procedures may be carried out and the Findings may be assessed;
- must adhere to the Procedures laid down and the compulsory report format;
- must carry out the engagement in accordance with these ToR;
- must document matters which are important to support the Report;
- must base its Report on the evidence gathered;
- must submit the Report to the *[Beneficiary] [Linked Third Party]*.

The Commission sets out the Procedures to be carried out and the Findings to be endorsed by the Auditor. The Auditor is not responsible for their suitability or pertinence. As this engagement is not an assurance engagement the Auditor does not provide an audit opinion or a statement of assurance.

1.3 Applicable Standards

The Auditor must comply with these Terms of Reference and with¹:

- the International Standard on Related Services ('ISRS') 4400 *Engagements to perform Agreed-upon Procedures regarding Financial Information* as issued by the International Auditing and Assurance Standards Board (IAASB);
- the *Code of Ethics for Professional Accountants* issued by the International Ethics Standards Board for Accountants (IESBA). Although ISRS 4400 states that independence is not a requirement for engagements to carry out agreed-upon procedures, the Commission requires that the Auditor also complies with the Code's independence requirements.

The Auditor's Report must state that there was no conflict of interests in establishing this Report between the Auditor and the Beneficiary *[and the Linked Third Party]* that could have a bearing on the Report, and must specify – if the service is invoiced - the total fee paid to the Auditor for providing the Report.

1.4 Reporting

The Report must be written in the language of the Agreement (see Article 20.7 of the Agreement).

Under Article 22 of the Agreement, the Commission, *[the Agency]*, the European Anti-Fraud Office and the Court of Auditors have the right to audit any work that is carried out under the action and for which costs are declared from *[the European Union] [Euratom]* budget. This includes work related to this engagement. The Auditor must provide access to all working papers related to this assignment if the Commission*[, the Agency]*, the European Anti-Fraud Office or the European Court of Auditors requests them.

1.5 Timing

The Report must be provided by [dd Month yyyy].

1.6 Other Terms

[The [Beneficiary] [Linked Third Party] and the Auditor can use this section to agree other specific terms, such as the Auditor's fees, liability, applicable law, etc. Those specific terms must not contradict the terms specified above.]

[legal name of the Auditor]
[name & title of authorised representative]
[dd Month yyyy]
Signature of the Auditor

[legal name of the [Beneficiary] [Linked Third Party]]
[name & title of authorised representative]
[dd Month yyyy]
Signature of the *[Beneficiary] [Linked Third Party]*

¹ Supreme Audit Institutions applying INTOSAI-standards may carry out the Procedures according to the corresponding International Standards of Supreme Audit Institutions and code of ethics issued by INTOSAI instead of the International Standard on Related Services ('ISRS') 4400 and the Code of Ethics for Professional Accountants issued by the IAASB and the IESBA.

Independent report of factual findings on the methodology concerning grant agreements financed under the Horizon 2020 Research and Innovation Framework Programme

(To be printed on letterhead paper of the auditor)

To

[name of contact person(s)], [Position]
[[Beneficiary's] [Linked Third Party's] name]
[Address]
[dd Month yyyy]

Dear [Name of contact person(s)],

As agreed under the terms of reference dated [dd Month yyyy]

with [OPTION 1: [insert name of the beneficiary] ('the Beneficiary')] [OPTION 2: [insert name of the linked third party] ('the Linked Third Party'), third party linked to the Beneficiary [insert name of the beneficiary] ('the Beneficiary')],

we

[name of the auditor] ('the Auditor'),

established at

[full address/city/state/province/country],

represented by

[name and function of an authorised representative],

have carried out the agreed-upon procedures ('the Procedures') and provide hereby our Independent Report of Factual Findings ('the Report'), concerning the [Beneficiary's] [Linked Third Party's] usual accounting practices for calculating and declaring direct personnel costs declared as unit costs ('the Methodology').

You requested certain procedures to be carried out in connection with the grant(s)

[title and number of the grant agreement(s)] ('the Agreement(s)').

The Report

Our engagement was carried out in accordance with the terms of reference ('the ToR') appended to this Report. The Report includes: the standard statements ('the Statements') made by the [Beneficiary] [Linked Third Party], the agreed-upon procedures ('the Procedures') carried out and the standard factual findings ('the Findings') confirmed by us.

The engagement involved carrying out the Procedures and assessing the Findings and the documentation requested appended to this Report, the results of which the Commission uses to draw conclusions regarding the acceptability of the Methodology applied by the [Beneficiary] [Linked Third Party].

H2020 Model Grant Agreements: H2020 General MGA — Multi: v5.0 – dd.mm.2017

The Report covers the methodology used from [dd Month yyyy]. In the event that the [Beneficiary] [Linked Third Party] changes this methodology, the Report will not be applicable to any Financial Statement¹ submitted thereafter.

The scope of the Procedures and the definition of the standard statements and findings were determined solely by the Commission. Therefore, the Auditor is not responsible for their suitability or pertinence.

Since the Procedures carried out constitute neither an audit nor a review made in accordance with International Standards on Auditing or International Standards on Review Engagements, we do not give a statement of assurance on the costs declared on the basis of the [Beneficiary's] [Linked Third Party's] Methodology. Had we carried out additional procedures or had we performed an audit or review in accordance with these standards, other matters might have come to its attention and would have been included in the Report.

Exceptions

Apart from the exceptions listed below, the [Beneficiary] [Linked Third Party] agreed with the standard Statements and provided the Auditor all the documentation and accounting information needed by the Auditor to carry out the requested Procedures and corroborate the standard Findings.

List here any exception and add any information on the cause and possible consequences of each exception, if known. If the exception is quantifiable, also indicate the corresponding amount.

.....

Explanation of possible exceptions in the form of examples (to be removed from the Report):

- i. the [Beneficiary] [Linked Third Party] did not agree with the standard Statement number ... because...;*
- ii. the Auditor could not carry out the procedure ... established because (e.g. due to the inability to reconcile key information or the unavailability or inconsistency of data);*
- iii. the Auditor could not confirm or corroborate the standard Finding number ... because*

Remarks

We would like to add the following remarks relevant for the proper understanding of the Methodology applied by the [Beneficiary] [Linked Third Party] or the results reported:

Example (to be removed from the Report):

- Regarding the methodology applied to calculate hourly rates ...*
- Regarding standard Finding 15 it has to be noted that ...*
- The [Beneficiary] [Linked Third Party] explained the deviation from the benchmark statement XXIV concerning time recording for personnel with no exclusive dedication to the action in the following manner:*
- ...*

Annexes

Please provide the following documents to the auditor and annex them to the report when submitting this CoMUC to the Commission:

¹ Financial Statement in this context refers solely to Annex 4 of the Agreement by which the Beneficiary declares costs under the Agreement.

H2020 Model Grant Agreements: H2020 General MGA — Multi: v5.0 – dd.mm.2017

1. Brief description of the methodology for calculating personnel costs, productive hours and hourly rates;
2. Brief description of the time recording system in place;
3. An example of the time records used by the [Beneficiary] [Linked Third Party];
4. Description of any budgeted or estimated elements applied, together with an explanation as to why they are relevant for calculating the personnel costs and how they are based on objective and verifiable information;
5. A summary sheet with the hourly rate for direct personnel declared by the [Beneficiary] [Linked Third Party] and recalculated by the Auditor for each staff member included in the sample (the names do not need to be reported);
6. A comparative table summarising for each person selected in the sample a) the time claimed by the [Beneficiary] [Linked Third Party] in the Financial Statement(s) and b) the time according to the time record verified by the Auditor;
7. A copy of the letter of representation provided to the Auditor.

Use of this Report

This Report has been drawn up solely for the purpose given under Point 1.1 Reasons for the engagement.

The Report:

- is confidential and is intended to be submitted to the Commission by the [Beneficiary] [Linked Third Party] in connection with Article 18.1.2 of the Agreement;
- may not be used by the [Beneficiary] [Linked Third Party] or by the Commission for any other purpose, nor distributed to any other parties;
- may be disclosed by the Commission only to authorised parties, in particular the European Anti-Fraud Office (OLAF) and the European Court of Auditors.
- relates only to the usual cost accounting practices specified above and does not constitute a report on the Financial Statements of the [Beneficiary] [Linked Third Party].

No conflict of interest² exists between the Auditor and the Beneficiary [and the Linked Third Party] that could have a bearing on the Report. The total fee paid to the Auditor for producing the Report was EUR [] (including EUR [] of deductible VAT).

We look forward to discussing our Report with you and would be pleased to provide any further information or assistance which may be required.

Yours sincerely

[legal name of the Auditor]
[name and title of the authorised representative]
[dd Month yyyy]
Signature of the Auditor

² A conflict of interest arises when the Auditor's objectivity to establish the certificate is compromised in fact or in appearance when the Auditor for instance:

- was involved in the preparation of the Financial Statements;
- stands to benefit directly should the certificate be accepted;
- has a close relationship with any person representing the beneficiary;
- is a director, trustee or partner of the beneficiary; or
- is in any other situation that compromises his or her independence or ability to establish the certificate impartially.

Statements to be made by the Beneficiary/Linked Third Party (‘the Statements’) and Procedures to be carried out by the Auditor (‘the Procedures’) and standard factual findings (‘the Findings’) to be confirmed by the Auditor

The Commission reserves the right to provide the auditor with guidance regarding the Statements to be made, the Procedures to be carried out or the Findings to be ascertained and the way in which to present them. The Commission reserves the right to vary the Statements, Procedures or Findings by written notification to the Beneficiary/Linked Third Party to adapt the procedures to changes in the grant agreement(s) or to any other circumstances.

If this methodology certificate relates to the Linked Third Party’s usual accounting practices for calculating and claiming direct personnel costs declared as unit costs any reference here below to ‘the Beneficiary’ is to be considered as a reference to ‘the Linked Third Party’.

<i>Please explain any discrepancies in the body of the Report.</i>	
Statements to be made by Beneficiary	Procedures to be carried out and Findings to be confirmed by the Auditor
<p>A. Use of the Methodology</p> <p>I. The cost accounting practice described below has been in use since /dd Month yyyy/.</p> <p>II. The next planned alteration to the methodology used by the Beneficiary will be from [dd Month yyyy/.</p>	<p>Procedure:</p> <p>✓ The Auditor checked these dates against the documentation the Beneficiary has provided.</p> <p>Factual finding:</p> <p>1. The dates provided by the Beneficiary were consistent with the documentation.</p>
<p>B. Description of the Methodology</p> <p>III. The methodology to calculate unit costs is being used in a consistent manner and is reflected in the relevant procedures.</p> <p><i>[Please describe the methodology your entity uses to calculate <u>personnel</u> costs, productive hours and hourly rates, present your description to the Auditor and annex it to this certificate]</i></p> <p><i>[If the statement of section “B. Description of the methodology” cannot be endorsed by the Beneficiary or there is no written methodology to calculate unit costs it should be listed here below and reported as exception by the Auditor in the main Report of Factual Findings:</i></p> <p>- ...]</p>	<p>Procedure:</p> <p>✓ The Auditor reviewed the description, the relevant manuals and/or internal guidance documents describing the methodology.</p> <p>Factual finding:</p> <p>2. The brief description was consistent with the relevant manuals, internal guidance and/or other documentary evidence the Auditor has reviewed.</p> <p>3. The methodology was generally applied by the Beneficiary as part of its usual costs accounting practices.</p>

<i>Please explain any discrepancies in the body of the Report.</i>	
Statements to be made by Beneficiary	Procedures to be carried out and Findings to be confirmed by the Auditor
<p>C. Personnel costs</p> <p><u>General</u></p> <p>IV. The unit costs (hourly rates) are limited to salaries including during parental leave, social security contributions, taxes and other costs included in the remuneration required under national law and the employment contract or equivalent appointing act;</p> <p>V. Employees are hired directly by the Beneficiary in accordance with national law, and work under its sole supervision and responsibility;</p> <p>VI. The Beneficiary remunerates its employees in accordance with its usual practices. This means that personnel costs are charged in line with the Beneficiary’s usual payroll policy (e.g. salary policy, overtime policy, variable pay) and no special conditions exist for employees assigned to tasks relating to the European Union or Euratom, unless explicitly provided for in the grant agreement(s);</p> <p>VII. The Beneficiary allocates its employees to the relevant group/category/cost centre for the purpose of the unit cost calculation in line with the usual cost accounting practice;</p> <p>VIII. Personnel costs are based on the payroll system and accounting system.</p> <p>IX. Any exceptional adjustments of actual personnel costs resulted from relevant budgeted or estimated elements and were based on objective and verifiable information. <i>[Please describe the ‘budgeted or estimated elements’ and their relevance to personnel costs, and explain how they were reasonable and based on objective and verifiable information, present your explanation to the Auditor and annex it to this certificate].</i></p> <p>X. Personnel costs claimed do not contain any of the following ineligible costs: costs related to return on capital; debt and debt service charges; provisions for future losses or debts; interest owed; doubtful debts; currency exchange losses; bank costs charged by the Beneficiary’s bank for transfers from the Commission/Agency; excessive or reckless expenditure; deductible VAT or costs incurred during suspension of the implementation of the action.</p> <p>XI. Personnel costs were not declared under another EU or Euratom grant</p>	<p>Procedure:</p> <p><i>The Auditor draws a sample of employees to carry out the procedures indicated in this section C and the following sections D to F.</i> <i>[The Auditor has drawn a random sample of 10 employees assigned to Horizon 2020 action(s). If fewer than 10 employees are assigned to the Horizon 2020 action(s), the Auditor has selected all employees assigned to the Horizon 2020 action(s) complemented by other employees irrespective of their assignments until he has reached 10 employees.]</i> For this sample:</p> <ul style="list-style-type: none"> ✓ the Auditor reviewed all documents relating to personnel costs such as employment contracts, payslips, payroll policy (e.g. salary policy, overtime policy, variable pay policy), accounting and payroll records, applicable national tax , labour and social security law and any other documents corroborating the personnel costs claimed; ✓ in particular, the Auditor reviewed the employment contracts of the employees in the sample to verify that: <ul style="list-style-type: none"> i. they were employed directly by the Beneficiary in accordance with applicable national legislation; ii. they were working under the sole technical supervision and responsibility of the latter; iii. they were remunerated in accordance with the Beneficiary’s usual practices; iv. they were allocated to the correct group/category/cost centre for the purposes of calculating the unit cost in line with the Beneficiary’s usual cost accounting practices; ✓ the Auditor verified that any ineligible items or any costs claimed under other costs categories or costs covered by other types of grant or by other grants financed from the European Union budget have not been taken into account when calculating the personnel costs; ✓ the Auditor numerically reconciled the total amount of personnel costs used to calculate the unit cost with the total amount of personnel costs recorded in the statutory accounts and the payroll system.

<i>Please explain any discrepancies in the body of the Report.</i>	
Statements to be made by Beneficiary	Procedures to be carried out and Findings to be confirmed by the Auditor
<p>(including grants awarded by a Member State and financed by the EU budget and grants awarded by bodies other than the Commission/Agency for the purpose of implementing the EU or Euratom budget in the same period, unless the Beneficiary can demonstrate that the operating grant does not cover any costs of the action).</p> <p><u>If additional remuneration as referred to in the grant agreement(s) is paid</u></p> <p>XII. The Beneficiary is a non-profit legal entity;</p> <p>XIII. The additional remuneration is part of the beneficiary’s usual remuneration practices and paid consistently whenever the relevant work or expertise is required;</p> <p>XIV. The criteria used to calculate the additional remuneration are objective and generally applied regardless of the source of funding;</p> <p>XV. The additional remuneration included in the personnel costs used to calculate the hourly rates for the grant agreement(s) is capped at EUR 8 000 per full-time equivalent (reduced proportionately if the employee is not assigned exclusively to the action).</p> <p><i>[If certain statement(s) of section “C. Personnel costs” cannot be endorsed by the Beneficiary they should be listed here below and reported as exception by the Auditor in the main Report of Factual Findings:</i> - ...]</p>	<ul style="list-style-type: none"> ✓ to the extent that actual personnel costs were adjusted on the basis of budgeted or estimated elements, the Auditor carefully examined those elements and checked the information source to confirm that they correspond to objective and verifiable information; ✓ if additional remuneration has been claimed, the Auditor verified that the Beneficiary was a non-profit legal entity, that the amount was capped at EUR 8 000 per full-time equivalent and that it was reduced proportionately for employees not assigned exclusively to the action(s). ✓ the Auditor recalculated the personnel costs for the employees in the sample. <p>Factual finding:</p> <ol style="list-style-type: none"> 4. All the components of the remuneration that have been claimed as personnel costs are supported by underlying documentation. 5. The employees in the sample were employed directly by the Beneficiary in accordance with applicable national law and were working under its sole supervision and responsibility. 6. Their employment contracts were in line with the Beneficiary’s usual policy; 7. Personnel costs were duly documented and consisted solely of salaries, social security contributions (pension contributions, health insurance, unemployment fund contributions, etc.), taxes and other statutory costs included in the remuneration (holiday pay, thirteenth month’s pay, etc.); 8. The totals used to calculate the personnel unit costs are consistent with those registered in the payroll and accounting records; 9. To the extent that actual personnel costs were adjusted on the basis of budgeted or estimated elements, those elements were relevant for calculating the personnel costs and correspond to objective and verifiable information. The budgeted or estimated elements used are: — (indicate the elements and their values). 10. Personnel costs contained no ineligible elements; 11. Specific conditions for eligibility were fulfilled when additional

<i>Please explain any discrepancies in the body of the Report.</i>	
Statements to be made by Beneficiary	Procedures to be carried out and Findings to be confirmed by the Auditor
	remuneration was paid: a) the Beneficiary is registered in the grant agreements as a non-profit legal entity; b) it was paid according to objective criteria generally applied regardless of the source of funding used and c) remuneration was capped at EUR 8000 per full-time equivalent (or up to up to the equivalent pro-rata amount if the person did not work on the action full-time during the year or did not work exclusively on the action).
<p>D. Productive hours</p> <p>XVI. The number of productive hours per full-time employee applied is <i>[delete as appropriate]</i>:</p> <p>A. 1720 productive hours per year for a person working full-time (corresponding pro-rata for persons not working full time).</p> <p>B. the total number of hours worked in the year by a person for the Beneficiary</p> <p>C. the standard number of annual hours generally applied by the beneficiary for its personnel in accordance with its usual cost accounting practices. This number must be at least 90% of the standard annual workable hours.</p> <p><u>If method B is applied</u></p> <p>XVII. The calculation of the total number of hours worked was done as follows: annual workable hours of the person according to the employment contract, applicable labour agreement or national law plus overtime worked minus absences (such as sick leave and special leave).</p> <p>XVIII. ‘Annual workable hours’ are hours during which the personnel must be working, at the employer’s disposal and carrying out his/her activity or duties under the employment contract, applicable collective labour agreement or national working time legislation.</p> <p>XIX. The contract (applicable collective labour agreement or national working time legislation) do specify the working time enabling to calculate the annual workable hours.</p>	<p>Procedure (same sample basis as for Section C: Personnel costs):</p> <ul style="list-style-type: none"> ✓ The Auditor verified that the number of productive hours applied is in accordance with method A, B or C. ✓ The Auditor checked that the number of productive hours per full-time employee is correct. ✓ If method B is applied the Auditor verified i) the manner in which the total number of hours worked was done and ii) that the contract specified the annual workable hours by inspecting all the relevant documents, national legislation, labour agreements and contracts. ✓ If method C is applied the Auditor reviewed the manner in which the standard number of working hours per year has been calculated by inspecting all the relevant documents, national legislation, labour agreements and contracts and verified that the number of productive hours per year used for these calculations was at least 90% of the standard number of working hours per year. <p>Factual finding:</p> <p><u>General</u></p> <p>12. The Beneficiary applied a number of productive hours consistent with method A, B or C detailed in the left-hand column.</p> <p>13. The number of productive hours per year per full-time employee was accurate.</p> <p><u>If method B is applied</u></p> <p>14. The number of ‘annual workable hours’, overtime and absences was</p>

<i>Please explain any discrepancies in the body of the Report.</i>	
Statements to be made by Beneficiary	Procedures to be carried out and Findings to be confirmed by the Auditor
<p><u>If method C is applied</u></p> <p>XX. The standard number of productive hours per year is that of a full-time equivalent.</p> <p>XXI. The number of productive hours per year on which the hourly rate is based i) corresponds to the Beneficiary’s usual accounting practices; ii) is at least 90 % of the standard number of workable (working) hours per year.</p> <p>XXII. Standard workable (working) hours are hours during which personnel are at the Beneficiary’s disposal performing the duties described in the relevant employment contract, collective labour agreement or national labour legislation. The number of standard annual workable (working) hours that the Beneficiary claims is supported by labour contracts, national legislation and other documentary evidence.</p> <p><i>[If certain statement(s) of section “D. Productive hours” cannot be endorsed by the Beneficiary they should be listed here below and reported as exception by the Auditor: - ...]</i></p>	<p>verifiable based on the documents provided by the Beneficiary and the calculation of the total number of hours worked was accurate.</p> <p>15. The contract specified the working time enabling to calculate the annual workable hours.</p> <p><u>If method C is applied</u></p> <p>16. The calculation of the number of productive hours per year corresponded to the usual costs accounting practice of the Beneficiary.</p> <p>17. The calculation of the standard number of workable (working) hours per year was corroborated by the documents presented by the Beneficiary.</p> <p>18. The number of productive hours per year used for the calculation of the hourly rate was at least 90 % of the number of workable (working) hours per year.</p>
<p>E. Hourly rates</p> <p>The hourly rates are correct because:</p> <p>XXIII. Hourly rates are correctly calculated since they result from dividing annual personnel costs by the productive hours of a given year and group (e.g. staff category or department or cost centre depending on the methodology applied) and they are in line with the statements made in section C. and D. above.</p> <p><i>[If the statement of section ‘E. Hourly rates’ cannot be endorsed by the Beneficiary they should be listed here below and reported as exception by the Auditor: - ...]</i></p>	<p>Procedure</p> <ul style="list-style-type: none"> ✓ The Auditor has obtained a list of all personnel rates calculated by the Beneficiary in accordance with the methodology used. ✓ The Auditor has obtained a list of all the relevant employees, based on which the personnel rate(s) are calculated. <p>For 10 employees selected at random (same sample basis as Section C: Personnel costs):</p> <ul style="list-style-type: none"> ✓ The Auditor recalculated the hourly rates. ✓ The Auditor verified that the methodology applied corresponds to the usual accounting practices of the organisation and is applied consistently for all activities of the organisation on the basis of objective criteria irrespective of the source of funding. <p>Factual finding:</p>

<i>Please explain any discrepancies in the body of the Report.</i>	
Statements to be made by Beneficiary	Procedures to be carried out and Findings to be confirmed by the Auditor
	19. No differences arose from the recalculation of the hourly rate for the employees included in the sample.
<p>F. Time recording</p> <p>XXIV. Time recording is in place for all persons with no exclusive dedication to one Horizon 2020 action. At least all hours worked in connection with the grant agreement(s) are registered on a daily/weekly/monthly basis <i>[delete as appropriate]</i> using a paper/computer-based system <i>[delete as appropriate]</i>;</p> <p>XXV. For persons exclusively assigned to one Horizon 2020 activity the Beneficiary has either signed a declaration to that effect or has put arrangements in place to record their working time;</p> <p>XXVI. Records of time worked have been signed by the person concerned (on paper or electronically) and approved by the action manager or line manager at least monthly;</p> <p>XXVII. Measures are in place to prevent staff from:</p> <ul style="list-style-type: none"> i. recording the same hours twice, ii. recording working hours during absence periods (e.g. holidays, sick leave), iii. recording more than the number of productive hours per year used to calculate the hourly rates, and iv. recording hours worked outside the action period. <p>XXVIII. No working time was recorded outside the action period;</p> <p>XXIX. No more hours were claimed than the productive hours used to calculate the hourly personnel rates.</p> <p><i>[Please provide a brief description of the <u>time recording system</u> in place together with the measures applied to ensure its reliability to the Auditor and annex it to the</i></p>	<p>Procedure</p> <ul style="list-style-type: none"> ✓ The Auditor reviewed the brief description, all relevant manuals and/or internal guidance describing the methodology used to record time. <p>The Auditor reviewed the time records of the random sample of 10 employees referred to under Section C: Personnel costs, and verified in particular:</p> <ul style="list-style-type: none"> ✓ that time records were available for all persons with not exclusive assignment to the action; ✓ that time records were available for persons working exclusively for a Horizon 2020 action, or, alternatively, that a declaration signed by the Beneficiary was available for them certifying that they were working exclusively for a Horizon 2020 action; ✓ that time records were signed and approved in due time and that all minimum requirements were fulfilled; ✓ that the persons worked for the action in the periods claimed; ✓ that no more hours were claimed than the productive hours used to calculate the hourly personnel rates; ✓ that internal controls were in place to prevent that time is recorded twice, during absences for holidays or sick leave; that more hours are claimed per person per year for Horizon 2020 actions than the number of productive hours per year used to calculate the hourly rates; that working time is recorded outside the action period; ✓ the Auditor cross-checked the information with human-resources records to verify consistency and to ensure that the internal controls have been effective. In addition, the Auditor has verified that no more hours were charged to Horizon 2020 actions per person per year than the number of productive hours per year used to calculate the hourly rates, and verified that

<i>Please explain any discrepancies in the body of the Report.</i>	
Statements to be made by Beneficiary	Procedures to be carried out and Findings to be confirmed by the Auditor
<p><i>present certificate¹].</i></p> <p><i>[If certain statement(s) of section “F. Time recording” cannot be endorsed by the Beneficiary they should be listed here below and reported as exception by the Auditor: - ...]</i></p>	<p>no time worked outside the action period was charged to the action.</p> <p>Factual finding:</p> <ol style="list-style-type: none"> 20. The brief description, manuals and/or internal guidance on time recording provided by the Beneficiary were consistent with management reports/records and other documents reviewed and were generally applied by the Beneficiary to produce the financial statements. 21. For the random sample time was recorded or, in the case of employees working exclusively for the action, either a signed declaration or time records were available; 22. For the random sample the time records were signed by the employee and the action manager/line manager, at least monthly. 23. Working time claimed for the action occurred in the periods claimed; 24. No more hours were claimed than the number productive hours used to calculate the hourly personnel rates; 25. There is proof that the Beneficiary has checked that working time has not been claimed twice, that it is consistent with absence records and the number of productive hours per year, and that no working time has been claimed outside the action period. 26. Working time claimed is consistent with that on record at the human-resources department.

¹ The description of the time recording system must state among others information on the content of the time records, its coverage (full or action time-recording, for all personnel or only for personnel involved in H2020 actions), its degree of detail (whether there is a reference to the particular tasks accomplished), its form, periodicity of the time registration and authorisation (paper or a computer-based system; on a daily, weekly or monthly basis; signed and countersigned by whom), controls applied to prevent double-charging of time or ensure consistency with HR-records such as absences and travels as well as its information flow up to its use for the preparation of the Financial Statements.

Grant Agreement number: [insert number] [insert acronym] [insert call identifier]

H2020 Model Grant Agreements: H2020 General MGA — Multi: v5.0 – dd.mm.2017

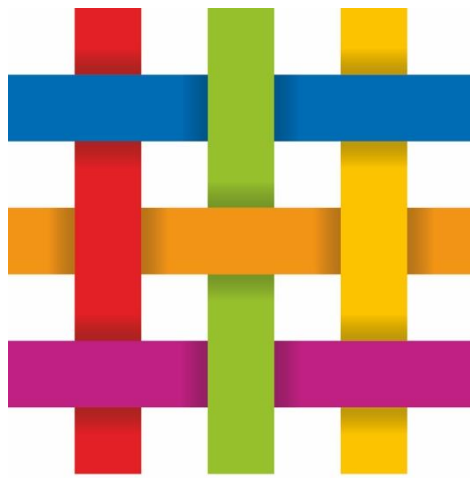
<i>Please explain any discrepancies in the body of the Report.</i>	
Statements to be made by Beneficiary	Procedures to be carried out and Findings to be confirmed by the Auditor
<i>[official name of the [Beneficiary] [Linked Third Party]]</i>	<i>[official name of the Auditor]</i>
<i>[name and title of authorised representative]</i>	<i>[name and title of authorised representative]</i>
<i>[dd Month yyyy]</i>	<i>[dd Month yyyy]</i>
<i><Signature of the [Beneficiary] [Linked Third Party]></i>	<i><Signature of the Auditor></i>



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DESCA

**Horizon 2020 Model
Consortium Agreement
www.DESCA-2020.eu**

For

FASTER

Version 0.5, 10 April 2019

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CONSORTIUM AGREEMENT

THIS CONSORTIUM AGREEMENT is based upon

REGULATION (EU) No 1290/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 December 2013 laying down the rules for the participation and dissemination in “Horizon 2020 – the Framework Programme for Research and Innovation (2014-2020)” (hereinafter referred to as “Rules for Participation”), and the European Commission Multi-beneficiary General Model Grant Agreement and its Annexes, and is made on 01/05/2019 hereinafter referred to as the Effective Date

BETWEEN:

1 ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS (CERTH),
the Coordinator

2 ENGINEERING - INGEGNERIA INFORMATICA SPA (ENG)

3 HELLENIC TELECOMMUNICATIONS ORGANIZATION S.A. - OTE AE (ORGANISMOS TILEPIKOINONION TIS ELLADOS OTE AE) (OTE)

4 DIGINEXT (DXT)

5 Crisisplan B.V. (CPLAN)

6 DRONE HOPPER SL (DH)

7 ROBOTNIK AUTOMATION SLL (ROB)

8 SYNELIXIS LYSEIS PLIROFORIKIS AUTOMATISMOU & TILEPIKOINONION ANONIMI ETAIRIA (SYN)

9 INOV INESC INOVACAO - INSTITUTO DE NOVAS TECNOLOGIAS (INOV)

10 FONDAZIONE LINKS - LEADING INNOVATION & KNOWLEDGE FOR SOCIETY (LINKS) – formerly mentioned as Istituto Superiore Mario Boella (ISMB)

11 Kpeople Reasearch Foundation (KPRF)

12 KAJAANIN AMMATTIKORKEAKOULU OY (KAMK)

13 VRIJE UNIVERSITEIT BRUSSEL (VUB)

14 PANEPISTIMIO DYTIKIS ATTIKIS (UniWA) – formerly mentioned with the short name UWA

15 AYUNTAMIENTO DE MADRID (ADM-POL)

16 SERVICIO MADRILENO DE SALUD (SUMMA)

17 ECOLE NATIONALE SUPERIEURE DES OFFICIERS DE SAPEURS-POMPIERS (ENSOSP)

18 WYZSZA SZKOLA POLICJI W SZCZYTNIIE (WSPOL)

19 KAJAANIN KAUPUNKI (KAJ)

20 ELLINIKI OMADA DIASOSIS ATTIKIS (HRTA)

21 MUNICIPIO DE GRANDOLA (MG)

22 CONSORZIO PER IL SISTEMA INFORMATIVO (CSI PIEMONTE)

23 KWANSEI GAKUIN EDUCATIONAL FOUNDATION (KGU Japan)

hereinafter, jointly or individually, referred to as "Parties" or "Party"

relating to the Action entitled

First responder Advanced technologies for Safe and efficient Emergency Response

in short

FASTER

hereinafter referred to as "Project"

WHEREAS:

The Parties, having considerable experience in the field concerned, have submitted a proposal for the Project to the Funding Authority as part of the Horizon 2020 – the Framework Programme for Research and Innovation (2014-2020), under the call H2020-SU-SEC-2018-2019-2020.

The Parties wish to specify or supplement binding commitments among themselves in addition to the provisions of the specific Grant Agreement 833507 to be signed by the Parties and the Funding Authority (hereinafter "Grant Agreement").

The Parties are aware that this Consortium Agreement is based upon the DESCA model consortium agreement.

NOW, THEREFORE, IT IS HEREBY AGREED AS FOLLOWS:

1 Definitions

1.1 Definitions

Words beginning with a capital letter shall have the meaning defined either herein or in the Rules for Participation or in the Grant Agreement including its Annexes.

1.2 Additional Definitions

"Access Rights"

Access Rights means rights to use Results or Background under the terms and conditions laid down in this Agreement.

"Background"

Background means any data, know-how or information — whatever its form or nature (tangible or intangible), including any rights such as intellectual property rights — that:

(a) is held by the Parties before they acceded to the Agreement, and

(b) is needed to implement the action or exploit the results.

"Consortium Body"

Consortium Body means any management body described in the Governance Structure section of this Consortium Agreement.

"Consortium Plan"

Consortium Plan means the description of the action and the related agreed budget as first defined in the Grant Agreement and which may be updated by the General Assembly.

"Funding Authority"

Funding Authority means the body awarding the grant for the Project.

"Defaulting Party"

Defaulting Party means a Party which the General Assembly has identified to be in breach of this Consortium Agreement and/or the Grant Agreement as specified in Section 4.2 of this Consortium Agreement.

"Fair and Reasonable Conditions"

Fair and Reasonable Conditions means appropriate conditions including possible financial terms or royalty-free conditions, taking into account the specific circumstances of the request for access, for example the actual or potential value of the Results or Background to which access is requested and/or the scope, duration or other characteristics of the Exploitation envisaged.

“Needed”

means:

For the implementation of the Project:

Access Rights are Needed if, without the grant of such Access Rights, carrying out the tasks assigned to the recipient Party would be technically or legally impossible, significantly delayed, or require significant additional financial or human resources.

For Exploitation of own Results:

Access Rights are Needed if, without the grant of such Access Rights, the Exploitation of own Results would be technically or legally impossible.

"Results"

Results means any (tangible or intangible) output of the action such as data, knowledge or information — whatever its form or nature, whether it can be protected or not — that is generated in the action, as well as any rights attached to it, including intellectual property rights.

“Software”

Software means sequences of instructions to carry out a process in, or convertible into, a form executable by a computer and fixed in any tangible medium of expression.

2 Purpose

The purpose of this Consortium Agreement is to specify with respect to the Project the relationship among the Parties, in particular concerning the organisation of the work between the Parties, the management of the Project and the rights and obligations of the Parties concerning inter alia liability, Access Rights and dispute resolution.

3 Entry into force, duration and termination

3.1 Entry into force

An entity becomes a Party to this Consortium Agreement upon signature of this Consortium Agreement by a duly authorised representative.

This Consortium Agreement shall have effect from the Effective Date identified at the beginning of this Consortium Agreement.

A new entity becomes a Party to the Consortium Agreement upon signature of the accession document (Attachment 2) by the new Party and the Coordinator. Such accession shall have effect from the date identified in the accession document.

3.2 Duration and termination

This Consortium Agreement shall continue in full force and effect until complete fulfilment of all obligations undertaken by the Parties under the Grant Agreement and under this Consortium Agreement.

However, this Consortium Agreement or the participation of one or more Parties to it may be terminated in accordance with the terms of this Consortium Agreement.

If

- the Grant Agreement is not signed by the Funding Authority or a Party, or
- the Grant Agreement is terminated, or

- a Party's participation in the Grant Agreement is terminated, this Consortium Agreement shall automatically terminate in respect of the affected Party/ies, subject to the provisions surviving the expiration or termination under Section 3.3 of this Consortium Agreement.

3.3 Survival of rights and obligations

The provisions relating to Access Rights, Dissemination and confidentiality, for the time period mentioned therein, as well as for liability, applicable law and settlement of disputes shall survive the expiration or termination of this Consortium Agreement.

Termination shall not affect any rights or obligations of a Party leaving the Consortium incurred prior to the date of termination, unless otherwise agreed between the General Assembly and the leaving Party. This includes the obligation to provide all input, deliverables and documents for the period of its participation.

4 Responsibilities of Parties

4.1 General principles

Each Party undertakes to take part in the efficient implementation of the Project, and to cooperate, perform and fulfil, promptly and on time, all of its obligations under the Grant Agreement and this Consortium Agreement as may be reasonably required from it and in a manner of good faith as prescribed by Belgian law.

Each Party undertakes to notify promptly, in accordance with the governance structure of the Project, any significant information, fact, problem or delay likely to affect the Project.

Each Party shall promptly provide all information reasonably required by a Consortium Body or by the Coordinator to carry out its tasks.

Each Party shall take reasonable measures to ensure the accuracy of any information or materials it supplies to the other Parties.

4.2 Breach

In the event that a responsible Consortium Body identifies a breach by a Party of its obligations under this Consortium Agreement or the Grant Agreement (e.g. improper implementation of the project), the Coordinator or, if the Coordinator is in breach of its obligations, the Party appointed by the General Assembly, will give formal notice to such Party requiring that such breach will be remedied within 30 calendar days from the date of receipt of the written notice by the Party.

If such breach is substantial and is not remedied within that period or is not capable of remedy, the General Assembly may decide to declare the Party to be a Defaulting Party and to decide on the consequences thereof which may include termination of its participation.

4.3 Involvement of third parties

A Party that enters into a subcontract or otherwise involves third parties (including but not limited to Affiliated Entities) in the Project remains responsible for carrying out its relevant part of the Project and for such third party's compliance with the provisions of this Consortium Agreement and of the Grant Agreement. It has to ensure that the involvement of third parties does not affect the rights and obligations of the other Parties under this Consortium Agreement and the Grant Agreement.

5 Liability towards each other

5.1 No warranties

In respect of any information or materials (incl. Results and Background) supplied by one Party to another under the Project, no warranty or representation of any kind is made, given or implied as to the sufficiency or fitness for purpose nor as to the absence of any infringement of any proprietary rights of third parties.

Therefore,

- the recipient Party shall in all cases be entirely and solely liable for the use to which it puts such information and materials, and
- no Party granting Access Rights shall be liable in case of infringement of proprietary rights of a third party resulting from any other Party (or its Affiliated Entities) exercising its Access Rights.

5.2 Limitations of contractual liability

No Party shall be responsible to any other Party for any indirect or consequential loss or similar damage such as, but not limited to, loss of profit, loss of revenue or loss of contracts, provided such damage was not caused by a wilful act or a breach of confidentiality.

For any remaining contractual liability, a Party's aggregate liability towards the other Parties collectively shall be limited to once the Party's share of the total costs of the Project as identified in Annex 2 of the Grant Agreement provided such damage was not caused by a wilful act or gross negligence.

The terms of this Consortium Agreement shall not be construed to amend or limit any Party's statutory liability.

5.3 Damage caused to third parties

Each Party shall be solely liable for any loss, damage or injury to third parties resulting from the performance of the said Party's obligations by it or on its behalf under this Consortium Agreement or from its use of Results or Background.

5.4 Force Majeure

No Party shall be considered to be in breach of this Consortium Agreement if it is prevented from fulfilling its obligations under the Consortium Agreement by Force Majeure.

Each Party will notify the competent Consortium Bodies of any Force Majeure without undue delay. If the consequences of Force Majeure for the Project are not overcome within 6 weeks after such notification, the transfer of tasks - if any - shall be decided by the competent Consortium Bodies.

6 Governance structure

6.1 General structure

The organisational structure of the Consortium shall comprise the following Consortium Bodies:

The General Assembly (GA), chaired by the PC, is the ultimate decision-making body of the project. It is responsible for major administrative decisions that require a vote, decides on potential disputes and conducts IPR and IPR framework management. Each partner is represented with one person. It will meet at least every 10 months and can be called to extraordinary session at the request of the PMC. The GA will be involved in the overall plans, the alleviation of any bottlenecks and the resolution of conflicts. It decides and approves project-wise

changes including the approval of major changes in the work plan according to PMC or TMC proposals, and the managing of integration or withdrawal of partners and personnel for selected activities.

The **Project Management Committee (PMC)**, led by the PC, is the supervisory body of the execution of the Project, which shall report to the General Assembly. It will meet face-to-face or by conference call at least every three months, for the following tasks: approval of the financial plan and work plan for the next project period; evaluation of progress since the last project period; discuss any issues concerning management or the smooth running of the project; resolve sensitive technical, administrative or contractual issues; monitor coherence and integration in the project; identify and analyse potential risk factors, and determine the necessary measures to minimise them, recording this in a risk register; discuss and propose internal changes in the consortium if necessary; take decisions on proposed changes to the contract or to the Consortium Agreement; deal with conflict resolution. The PMC will comprise one representative from each partner, the PC and the TC. The PMC reports to the GA.

The **Technical Management Committee (TMC)** has the duty of ensuring timely progress of the project and high quality of results. The TMC reports to the PMC. It will meet (either face to face or by teleconference) every month and constantly stay in contact, mainly using e-mail and online collaboration tools. Its responsibilities are: reviewing the work plan and the overall project progress; approving the reference architecture of the FASTER platform; defining the detailed responsibilities for software components; setting the detailed scope for technical work; following up the timely achievement of milestones and production of deliverables; managing the day-to-day activity of the WPs; coordinating the integration of the activities according to the work plan; ensuring technical consistency and maximum synergy between work packages, in particular between the use case/requirements, conceptual modelling and technical work packages; maintaining a quality plan to ensure deliverables are of adequate quality; analysing the technical environment to assess risks to project impacts; forming ad-hoc Technical Task Forces, if necessary. The TMC is chaired by the TC and made of all WP Leaders, along with the PC.

The **Project Coordinator (PC)** carries out the overall coordination and ensures daily supervision and monitoring of operations as well as official communication with the European Commission and other parties. The PC chairs the PMC and has the overall responsibility including financial and contractual obligations defined in the contract with the Commission. The PC (with the support of the PMC, see below) will have the duty to prepare reports, cost statements and project documents, as well as to prepare a summary of the efforts and budget expenses and plan. The PC will make sure IPR terms and conditions specified by the Consortium Agreement are properly interpreted and adhered to. The PC will also provide a Project Office (PO) comprising staff familiar with administrative, legal, financial, communication and IPR issues; it will support the several operational groups in all their responsibilities.

The **Technical Coordinator (TC)** has the overall responsibility of ensuring content synchronisation between the different FASTER outcomes and alignment to the overall goals. TC will ensure the appropriate integration and overall consistency among the different work packages, coordinating and overseeing their activities to ease the integration and exploitability of the technical results.

The **User Community Manager (UCM)** is a key role since is the central contact point for end users and is responsible of their interaction with the FASTER researchers and technicians. Specifically, the UCM will also manage how smooth the involvement of the FASTER interdisciplinary teams from the different FR organisations (e.g. medical emergency services, law enforcement team, civil protection and firefighter professionals and association of volunteers) in the project activities.

The **Innovation Manager (IM)** will coordinate the results of the project, making sure they are exploitable and relevant with respect to the reference markets. The IM will also be in charge of coordinating activities with the relevant standardization bodies.

Work Package Leaders (WPL): each work package has a WPL, who is the contact person and has the responsibility for organising the work within individual work packages, including detailed planning of tasks and activities, technical solutions and management of personnel responsible for specific activities. In addition, they ensure delivery of outcomes against milestones and deadlines. The WPL team will communicate regularly among themselves (face-to-face work meetings or workshops, or by remote conference call), but also with the teams of related WPs. FASTER WP leaders have been designated based on their technical, managerial and relevant competences and specific expertise, ensuring optimum coordination of their activities within the project life cycle.

The **User Community Board (UCB)** has the assignment of ensuring clarity and consistency in communicating with the end users, including their systematic participation to the project activities with regard to in the disaster risk reduction and management, the emergency management, the safety, preparedness and resilience enactment. It will also be responsible for the involvement of the end-users in the pilot definition and planning along with the pilot preparation and execution in relevant environments. Moreover, it will be collecting the evaluation and assessment feedback information flowing between pilots and design phases. The UCB reports to the PMC. It will meet (either face to face or by teleconference) every six months. It will permanently stay in contact, mainly using e-mail, online tools and regular teleconferences. Its responsibilities are: reviewing the pilots' approach and deployment plan; reviewing the feedback from each pilot phase and presenting it to the GA and to the TMC as needed; monitoring pilot results and ensuring consistency across reporting approaches from trials; acting as primary point of contact to channel information from end users to technical partners; highlighting dissemination and training opportunities towards end users. The UCB will be chaired by the UCM and include only the FASTER end-users.

6.2 General operational procedures for all Consortium Bodies

6.2.1 Representation in meetings

Any Party which is a member of a Consortium Body (hereinafter referred to as "Member"):

- should be present or represented at any meeting;
- may appoint a substitute or a proxy to attend and vote at any meeting;

and shall participate in a cooperative manner in the meetings.

6.2.2 Preparation and organisation of meetings

6.2.2.1 Convening meetings

The chairperson of a Consortium Body shall convene meetings of that Consortium Body.

	Ordinary meeting	Extraordinary meeting
General Assembly	At least every 10 months	At any time upon written request of the Project Management Committee or 1/3 of the Members of the General Assembly
Project Management	At least	At any time upon written request of any Member of the

Committee	quarterly	Project Management Committee
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6.2.2.2 Notice of a meeting

The chairperson of a Consortium Body shall give notice in writing of a meeting to each Member of that Consortium Body as soon as possible and no later than the minimum number of days preceding the meeting as indicated below.

	Ordinary meeting	Extraordinary meeting
General Assembly	45 calendar days	15 calendar days
Other Consortium Bodies	14 calendar days	7 calendar days

6.2.2.3 Sending the agenda

The chairperson of a Consortium Body shall prepare and send each Member of that Consortium Body a written (original) agenda no later than the minimum number of days preceding the meeting as indicated below.

General Assembly	21 calendar days, 10 calendar days for an extraordinary meeting
Other Consortium Bodies	7 calendar days

6.2.2.4 Adding agenda items:

Any agenda item requiring a decision by the Members of a Consortium Body must be identified as such on the agenda.

Any Member of a Consortium Body may add an item to the original agenda by written notification to all of the other Members of that Consortium Body up to the minimum number of days preceding the meeting as indicated below.

General Assembly	14 calendar days, 7 calendar days for an extraordinary meeting
Other Consortium Bodies	2 calendar days

6.2.2.5

During a meeting the Members of a Consortium Body present or represented can unanimously agree to add a new item to the original agenda

6.2.2.6

Meetings of each Consortium Body may also be held by teleconference or other telecommunication means.

6.2.2.7

Decisions will only be binding once the relevant part of the Minutes has been accepted according to Section 6.2.5.

6.2.2.8

Any decision may also be taken without a meeting if the Coordinator circulates to all Members of the Consortium Body a written document, which is then agreed by the defined majority (see

Section 6.2.3) of all Members of the Consortium Body. Such document shall include the deadline for responses.

Decisions taken without a meeting shall be considered as accepted if, within the period set out in article 6.2.4.4, no Member has sent an objection in writing to the chairperson. The decisions will be binding after the chairperson sends to all Members of the Consortium Body and to the Coordinator a written notification of this acceptance.

6.2.3 Voting rules and quorum

6.2.3.1

Each Consortium Body shall not deliberate and decide validly unless two-thirds (2/3) of its Members are present or represented (quorum). If the quorum is not reached, the chairperson of the Consortium Body shall convene another ordinary meeting within 15 calendar days. If in this meeting the quorum is not reached once more, the chairperson shall convene an extraordinary meeting which shall be entitled to decide even if less than the quorum of Members are present or represented.

6.2.3.2

Each Member of a Consortium Body present or represented in the meeting shall have one vote.

6.2.3.3

A Party which the General Assembly has declared according to Section 4.2 to be a Defaulting Party may not vote.

6.2.3.4

Decisions shall be taken by a majority of two-thirds (2/3) of the votes cast. In case of a tied vote the Coordinator has a casting vote.

6.2.4 Veto rights

6.2.4.1

A Member which can show that its own work, time for performance, costs, liabilities, intellectual property rights or other legitimate interests would be severely affected by a decision of a Consortium Body may exercise a veto with respect to the corresponding decision or relevant part of the decision.

6.2.4.2

When the decision is foreseen on the original agenda, a Member may veto such a decision during the meeting only.

6.2.4.3

When a decision has been taken on a new item added to the agenda before or during the meeting, a Member may veto such decision during the meeting and within 15 calendar days after the draft minutes of the meeting are sent. A Party that is not a Member of a particular Consortium Body may veto a decision within the same number of calendar days after the draft minutes of the meeting are sent.

6.2.4.4

When a decision has been taken without a meeting a Member may veto such decision within 15 calendar days after written notification by the chairperson of the outcome of the vote.

6.2.4.5

In case of exercise of veto, the Members of the related Consortium Body shall make every effort to resolve the matter which occasioned the veto to the general satisfaction of all its Members.

6.2.4.6

A Party may neither veto decisions relating to its identification to be in breach of its obligations nor to its identification as a Defaulting Party. The Defaulting Party may not veto decisions relating to its participation and termination in the consortium or the consequences of them.

6.2.4.7

A Party requesting to leave the consortium may not veto decisions relating thereto.

6.2.5 Minutes of meetings

6.2.5.1

The chairperson of a Consortium Body shall produce written minutes of each meeting which shall be the formal record of all decisions taken. He/she shall send the draft minutes to all Members within 10 calendar days of the meeting.

6.2.5.2

The minutes shall be considered as accepted if, within 15 calendar days from sending, no Member has sent an objection in writing to the chairperson with respect to the accuracy of the draft of the minutes.

6.2.5.3

The chairperson shall send the accepted minutes to all the Members of the Consortium Body and to the Coordinator, who shall safeguard them. If requested the Coordinator shall provide authenticated duplicates to Parties.

6.3 Specific operational procedures for the Consortium Bodies

6.3.1 General Assembly

In addition to the rules described in Sections 6.1 and 6.2, the following rules apply:

6.3.1.1 Members

6.3.1.1.1

The General Assembly shall consist of one representative of each Party (hereinafter General Assembly Member).

6.3.1.1.2

Each General Assembly Member shall be deemed to be duly authorised to deliberate, negotiate and decide on all matters listed in Section 6.3.1.2 of this Consortium Agreement.

6.3.1.1.3

The Coordinator shall chair all meetings of the General Assembly, unless decided otherwise in a meeting of the General Assembly.

6.3.1.1.4

The Parties agree to abide by all decisions of the General Assembly. This does not prevent the Parties to submit a dispute to resolution in accordance with the provisions of Settlement of disputes in Section 11.8.

6.3.1.2 Decisions

The General Assembly shall be free to act on its own initiative to formulate proposals and take decisions in accordance with the procedures set out herein. In addition, all proposals made by the Project Management Committee (PMC) shall also be considered and decided upon by the General Assembly.

The following decisions shall be taken by the General Assembly:

Content, finances and intellectual property rights

- Proposals for changes to Annexes 1 and 2 of the Grant Agreement to be agreed by the Funding Authority
- Changes to the Consortium Plan
- Modifications to Attachment 1 (Background Included)
- Additions to Attachment 3 (List of Third Parties for simplified transfer according to Section 0)
- Additions to Attachment 4 (Identified Affiliated Entities)

Evolution of the consortium

- Entry of a new Party to the consortium and approval of the settlement on the conditions of the accession of such a new Party
- Withdrawal of a Party from the consortium and the approval of the settlement on the conditions of the withdrawal
- Identification of a breach by a Party of its obligations under this Consortium Agreement or the Grant Agreement
- Declaration of a Party to be a Defaulting Party
- Remedies to be performed by a Defaulting Party
- Termination of a Defaulting Party's participation in the consortium and measures relating thereto
- Proposal to the Funding Authority for a change of the Coordinator
- Proposal to the Funding Authority for suspension of all or part of the Project
- Proposal to the Funding Authority for termination of the Project and the Consortium Agreement

6.3.2 Project Management Committee (PMC)

In addition to the rules in Sections 6.1 and 6.2, the following rules shall apply:

6.3.2.1 Members

The PMC shall consist of the Coordinator, the TM, the SM and one representative from each Party (hereinafter Executive Members).

The Coordinator shall chair all meetings of the PMC, unless decided otherwise by a majority of two-thirds.

6.3.2.2 Minutes of meetings

Minutes of PMC meetings, once accepted, shall be sent by the Coordinator to the General Assembly Members for information.

6.3.2.3 Tasks

6.3.2.3.1

The PMC shall prepare the meetings, propose decisions and prepare the agenda of the General Assembly according to Section 6.3.1.2.

6.3.2.3.2

The PMC shall seek a consensus among the Parties.

6.3.2.3.3

The PMC shall be responsible for the proper execution and implementation of the decisions of the General Assembly.

6.3.2.3.4

The PMC shall monitor the effective and efficient implementation of the Project.

6.3.2.3.5

In addition, the PMC shall collect information at least every 6 months on the progress of the Project, examine that information to assess the compliance of the Project with the Consortium Plan and, if necessary, propose modifications of the Consortium Plan to the General Assembly.

6.3.2.3.6

The PMC shall:

- support the Coordinator in preparing meetings with the Funding Authority and in preparing related data and deliverables
- prepare the content and timing of press releases and joint publications by the consortium or proposed by the Funding Authority in respect of the procedures of the Grant Agreement Article 29.

6.3.2.3.7

In the case of abolished tasks as a result of a decision of the General Assembly, the PMC shall advise the General Assembly on ways to rearrange tasks and budgets of the Parties concerned. Such rearrangement shall take into consideration the legitimate commitments taken prior to the decisions, which cannot be cancelled.

6.4 Coordinator

6.4.1

The Coordinator shall be the intermediary between the Parties and the Funding Authority and shall perform all tasks assigned to it as described in the Grant Agreement and in this Consortium Agreement.

6.4.2

In particular, the Coordinator shall be responsible for:

- monitoring compliance by the Parties with their obligations
- keeping the address list of Members and other contact persons updated and available

- collecting, reviewing to verify consistency and submitting reports, other deliverables (including financial statements and related certifications) and specific requested documents to the Funding Authority
- transmitting documents and information connected with the Project to any other Parties concerned
- administering the financial contribution of the Funding Authority and fulfilling the financial tasks described in Section 7.3
- providing, upon request, the Parties with official copies or originals of documents that are in the sole possession of the Coordinator when such copies or originals are necessary for the Parties to present claims.

If one or more of the Parties is late in submission of any project deliverable, the Coordinator may nevertheless submit the other 'Parties' project deliverables and all other documents required by the Grant Agreement to the Funding Authority in time.

6.4.3

If the Coordinator fails in its coordination tasks, the General Assembly may propose to the Funding Authority to change the Coordinator.

6.4.4

The Coordinator shall not be entitled to act or to make legally binding declarations on behalf of any other Party or of the consortium, unless explicitly stated otherwise in the Grant Agreement or this Consortium Agreement.

6.4.5

The Coordinator shall not enlarge its role beyond the tasks specified in this Consortium Agreement and in the Grant Agreement.

7 Financial provisions

7.1 General Principles

7.1.1 Distribution of Financial Contribution

The financial contribution of the Funding Authority to the Project shall be distributed by the Coordinator according to:

- the Consortium Plan
- the approval of reports by the Funding Authority, and
- the provisions of payment in Section 7.3.

A Party shall be funded only for its tasks carried out in accordance with the Consortium Plan.

7.1.2 Justifying Costs

In accordance with its own usual accounting and management principles and practices, each Party shall be solely responsible for justifying its costs with respect to the Project towards the

Funding Authority. Neither the Coordinator nor any of the other Parties shall be in any way liable or responsible for such justification of costs towards the Funding Authority.

7.1.3 Funding Principles

A Party that spends less than its allocated share of the budget as set out in the Consortium Plan or – in case of reimbursement via unit costs - implements less units than foreseen in the Consortium Plan will be funded in accordance with its actual duly justified eligible costs only.

A Party that spends more than its allocated share of the budget as set out in the Consortium Plan will be funded only in respect of duly justified eligible costs up to an amount not exceeding that share.

7.1.4 Return of excess payments; receipts

7.1.4.1

In any case of a Party having received excess payments, the Party has to return the relevant amount to the Coordinator without undue delay.

7.1.4.2

In case a Party earns any receipt that is deductible from the total funding as set out in the Consortium Plan, the deduction is only directed toward the Party earning such income. The other Parties' financial share of the budget shall not be affected by one Party's receipt. In case the relevant receipt is more than the allocated share of the Party as set out in the Consortium Plan, the Party shall reimburse the funding reduction suffered by other Parties.

7.1.5 Financial Consequences of the termination of the participation of a Party

A Party leaving the consortium shall refund all payments it has received except the amount of contribution accepted by the Funding Authority or another contributor. Furthermore, a Defaulting Party shall, within the limits specified in Section 5.2 of this Consortium Agreement, bear any reasonable and justifiable additional costs occurring to the other Parties in order to perform its and their tasks.

7.2 Budgeting

The budget set out in the Consortium Plan shall be valued in accordance with the usual accounting and management principles and practices of the respective Parties.

7.3 Payments

7.3.1 Payments to Parties are the exclusive tasks of the Coordinator.

In particular, the Coordinator shall:

- notify the Party concerned promptly of the date and composition of the amount transferred to its bank account, giving the relevant references
- perform diligently its tasks in the proper administration of any funds and in maintaining financial accounts

- undertake to keep the Funding Authority's financial contribution to the Project separated from its normal business accounts, its own assets and property, except if the Coordinator is a Public Body or is not entitled to do so due to statutory legislation.
- With reference to Articles 21.2 and 21.3.2 of the Grant Agreement, no Party shall before the end of the Project receive more than its allocated share of the maximum grant amount from which the amounts retained by the Funding Authority for the Guarantee Fund and for the final payment have been deducted.

7.3.2 Payment schedule

The payment schedule, which contains the transfer of pre-financing and interim payments to Parties, will be handled according to the following:

Funding of costs included in the Consortium Plan will be paid to Parties after receipt from the Funding Authority without undue delay and in conformity with the provisions of the Grant Agreement. Costs accepted by the Funding Authority will be paid to the Party concerned.

The Coordinator is entitled to withhold any payments due to a Party identified by a responsible Consortium Body to be in breach of its obligations under this Consortium Agreement or the Grant Agreement or to a Beneficiary which has not yet signed this Consortium Agreement.

The Coordinator is entitled to recover any payments already paid to a Defaulting Party. The Coordinator is equally entitled to withhold payments to a Party when this is suggested by or agreed with the Funding Authority.

8 Results

8.1 Ownership of Results

Results are owned by the Party that generates them.

For the avoidance of doubt, it is agreed that cooperation on defining jointly Software specifications or other tasks as validation, evaluation, collection of requirements – which do not involve writing of source code – shall not be considered as a joint ownership.

8.2 Joint ownership

Where several Parties have jointly generated Results and where their respective contribution to the Results cannot be ascertained or where it is not possible to separate them for the purpose of applying for, obtaining or maintaining their protection, they shall, unless otherwise agreed in writing, have joint ownership of such Results (hereinafter "**Joint Results**").

Joint ownership is governed by Grant Agreement Article 26.2 with the following additions:

Unless otherwise agreed:

- each of the joint owners shall be entitled to use their jointly owned Results for non-commercial research activities on a royalty-free basis, and without requiring the prior consent of the other joint owner(s), and
- each of the joint owners shall be entitled to otherwise Exploit the jointly owned Results and to grant non-exclusive licenses to third parties (without any right to sub-license), if
 - (a) the other joint owners are given:
 - at least 45 calendar days advance notice; and
 - Fair and Reasonable compensation; and
 - (b) No patent application procedures are affected

The joint owners shall in good faith agree on all protection measures, and the division of the costs thereof in advance. Where a joint owner wishes to register any Intellectual Property Rights (e.g. patent or design rights) or otherwise protect Results through registration, but neither the other joint owner(s) nor the inventors (being the natural person or natural persons who made the invention concerned) wish to participate in such protection, each joint owner that has decided not to take part in the registration, shall conclude a written agreement with the other joint owner on the reasonable conditions under which the transfer of ownership of its share in the joint Results shall take place. The joint owner(s) transferring its/their ownership rights however retain(s) a non-transferable, non-exclusive, royalty-free and fully paid-up license, without the right to grant sub-licenses, for any and all purpose, for the lifetime of the Intellectual Property Rights in or for the countries or territories concerned.

8.3 Transfer of Results

8.3.1

Each Party may transfer ownership of its own Results following the procedures of the Grant Agreement Article 30.

8.3.2

It may identify specific third parties it intends to transfer the ownership of its Results to in Attachment (3) to this Consortium Agreement. The other Parties hereby waive their right to prior notice and their right to object to a transfer to listed third parties according to the Grant Agreement Article 30.1.

8.3.3

The transferring Party shall, however, at the time of the transfer, inform the other Parties of such transfer and shall ensure that the rights of the other Parties will not be affected by such transfer. Any addition to Attachment (3) after signature of this Agreement requires a decision of the General Assembly.

8.3.4

The Parties recognize that in the framework of a merger or an acquisition of an important part of its assets, it may be impossible under applicable EU and national laws on mergers and acquisitions for a Party to give the full 45 calendar days prior notice for the transfer as foreseen in the Grant Agreement.

8.3.5

The obligations above apply only for as long as other Parties still have - or still may request - Access Rights to the Results.

8.4 Dissemination

8.4.1

For the avoidance of doubt, nothing in this Section 8.4 has impact on the confidentiality obligations set out in Section 10.

8.4.2 Dissemination of own Results

8.4.2.1

During the Project and for a period of 1 year after the end of the Project, the dissemination of own Results by one or several Parties including but not restricted to publications and presentations,

shall be governed by the procedure of Article 29.1 of the Grant Agreement subject to the following provisions.

Prior notice of any planned publication shall be given to the other Parties at least 45 calendar days before the publication. Any objection to the planned publication shall be made in accordance with the Grant Agreement in writing to the Coordinator and to the Party or Parties proposing the dissemination within 30 calendar days after receipt of the notice. If no objection is made within the time limit stated above, the publication is permitted.

8.4.2.2

An objection is justified if

- (a) the protection of the objecting Party's Results or Background would be adversely affected
- (b) the objecting Party's legitimate interests in relation to the Results or Background would be significantly harmed.

The objection has to include a precise request for necessary modifications.

8.4.2.3

If an objection has been raised the involved Parties shall discuss how to overcome the justified grounds for the objection on a timely basis (for example by amendment to the planned publication and/or by protecting information before publication) and the objecting Party shall not unreasonably continue the opposition if appropriate measures are taken following the discussion.

8.4.2.4

The objecting Party can request a publication delay of not more than 90 calendar days from the time it raises such an objection. After 90 calendar days the publication is permitted.

8.4.3 Dissemination of another Party's unpublished Results or Background

A Party shall not include in any dissemination activity another Party's Results or Background without obtaining the owning Party's prior written approval, unless they are already published.

8.5 Cooperation obligations

The Parties undertake to cooperate to allow the timely submission, examination, publication and defence of any dissertation or thesis for a degree that includes their Results or Background subject to the confidentiality and publication provisions agreed in this Consortium Agreement.

8.6 Use of names, logos or trademarks

Nothing in this Consortium Agreement shall be construed as conferring rights to use in advertising, publicity or otherwise the name of the Parties or any of their logos or trademarks without their prior written approval.

9 Access Rights

9.1 Background included

9.1.1.

In Attachment 1, the Parties have identified and agreed on the Background for the Project and have also, where relevant, informed each other that Access to specific Background is subject to legal restrictions or limits.

Anything not identified in Attachment 1 shall not be the object of Access Right obligations regarding Background.

9.1.2

Any Party may add further own Background to Attachment 1 during the Project by written notice to the other Parties. However, approval of the General Assembly is needed should a Party wish to modify or withdraw its Background in Attachment 1.

9.2 General Principles

9.2.1

Each Party shall implement its tasks in accordance with the Consortium Plan and shall bear sole responsibility for ensuring that its acts within the Project do not knowingly infringe third party property rights.

9.2.2

Any Access Rights granted expressly exclude any rights to sublicense unless expressly stated otherwise.

9.2.3

Access Rights shall be free of any administrative transfer costs.

9.2.4

Access Rights are granted on a non-exclusive basis.

9.2.5

Results and Background shall be used only for the purposes for which Access Rights to it have been granted.

9.2.6

All requests for Access Rights shall be made in writing. The granting of Access Rights may be made conditional on the acceptance of specific conditions aimed at ensuring that these rights will be used only for the intended purpose and that appropriate confidentiality obligations are in place.

9.2.7

The requesting Party must show that the Access Rights are Needed.

9.3 Access Rights for implementation

Access Rights to Results and Background Needed for the performance of the own work of a Party under the Project shall be granted on a royalty-free basis, unless otherwise agreed for Background in Attachment 1.

9.4 Access Rights for Exploitation

9.4.1 Access Rights to Results

Access Rights to Results if Needed for Exploitation of a Party's own Results shall be granted on Fair and Reasonable conditions.

Access Rights to Results for internal research activities shall be granted on Fair and Reasonable conditions.

9.4.2

Access Rights to Background if Needed for Exploitation of a Party's own Results, including for research on behalf of a third party, shall be granted on Fair and Reasonable conditions.

9.4.3

A request for Access Rights may be made up to 12 months after the end of the Project or, in the case of Section 9.7.2.1.2, after the termination of the requesting Party's participation in the Project.

9.5 Access Rights for Affiliated Entities

Affiliated Entities have Access Rights under the conditions of the Grant Agreement Articles 25.4 and 31.4. if they are identified in Attachment 4 (Identified Affiliated Entities) to this Consortium Agreement.

Such Access Rights must be requested by the Affiliated Entity from the Party that holds the Background or Results. Alternatively, the Party granting the Access Rights may individually agree with the Party requesting the Access Rights to have the Access Rights include the right to sublicense to the latter's Affiliated Entities [listed in Attachment 4]. Access Rights to Affiliated Entities shall be granted on conditions as agreed between the Parties and upon written bilateral agreement.

Affiliated Entities which obtain Access Rights in return fulfil all confidentiality and other obligations accepted by the Parties under the Grant Agreement or this Consortium Agreement as if such Affiliated Entities were Parties.

Access Rights may be refused to Affiliated Entities if such granting is contrary to the legitimate interests of the Party which owns the Background or the Results.

Access Rights granted to any Affiliated Entity are subject to the continuation of the Access Rights of the Party to which it is affiliated and shall automatically terminate upon termination of the Access Rights granted to such Party.

Upon cessation of the status as an Affiliated Entity, any Access Rights granted to such former Affiliated Entity shall lapse.

Further arrangements with Affiliated Entities may be negotiated in separate agreements.

9.6 Additional Access Rights

For the avoidance of doubt any grant of Access Rights not covered by the Grant Agreement or this Consortium Agreement shall be at the absolute discretion of the owning Party and subject to such terms and conditions as may be agreed between the owning and receiving Parties.

9.7 Access Rights for Parties entering or leaving the consortium

9.7.1 New Parties entering the consortium

As regards Results developed before the accession of the new Party, the new Party will be granted Access Rights on the conditions applying for Access Rights to Background.

9.7.2 Parties leaving the consortium

9.7.2.1.1 Defaulting Party

Access Rights granted to a Defaulting Party and such Party's right to request Access Rights shall cease immediately upon receipt by the Defaulting Party of the formal notice of the decision of the General Assembly to terminate its participation in the consortium.

9.7.2.1.2 *Non-defaulting Party*

A non-defaulting Party leaving voluntarily and with the other Parties' consent shall have Access Rights to the Results developed until the date of the termination of its participation.

It may request Access Rights within the period of time specified in Section 0.

9.7.2.2 **Access Rights to be granted by any leaving Party**

Any Party leaving the Project shall continue to grant Access Rights pursuant to the Grant Agreement and this Consortium Agreement as if it had remained a Party for the whole duration of the Project.

9.8 **Specific Provisions for Access Rights to Software**

9.8.1 **Definitions relating to Software**

“Application Programming Interface”

means the application programming interface materials and related documentation containing all data and information to allow skilled Software developers to create Software interfaces that interface or interact with other specified Software.

"Controlled Licence Terms" means terms in any licence that require that the use, copying, modification and/or distribution of Software or another work ("Work") and/or of any work that is a modified version of or is a derivative work of such Work (in each case, "Derivative Work") be subject, in whole or in part, to one or more of the following:

- a) (where the Work or Derivative Work is Software) that the Source Code or other formats preferred for modification be made available as of right to any third party on request, whether royalty-free or not;
- b) that permission to create modified versions or derivative works of the Work or Derivative Work be granted to any third party;
- c) that a royalty-free licence relating to the Work or Derivative Work be granted to any third party.

For the avoidance of doubt, any Software licence that merely permits (but does not require any of) the things mentioned in (a) to (c) is not a Controlled Licence (and so is an Uncontrolled Licence).

“**Object Code**” means software in machine-readable, compiled and/or executable form including, but not limited to, byte code form and in form of machine-readable libraries used for linking procedures and functions to other software.

“**Software Documentation**” means software information, being technical information used, or useful in, or relating to the design, development, use or maintenance of any version of a software programme.

“**Source Code**” means software in human readable form normally used to make modifications to it including, but not limited to, comments and procedural code such as job control language and scripts to control compilation and installation.

9.8.2 **General principles**

For the avoidance of doubt, the general provisions for Access Rights provided for in this Section 9 are applicable also to Software as far as not modified by this Section 9.88.

Parties' Access Rights to Software do not include any right to receive Source Code or Object Code ported to a certain hardware platform or any right to receive Source Code, Object Code or respective Software Documentation in any particular form or detail, but only as available from the Party granting the Access Rights.

The intended introduction of Intellectual Property (including, but not limited to Software) under Controlled Licence Terms in the Project requires the approval of the General Assembly to implement such introduction into the Consortium Plan.

9.8.3 Access to Software

Access Rights to Software that is Results shall comprise:

- Access to the Object Code; and, where normal use of such an Object Code requires an Application Programming Interface (hereafter API),
- Access to the Object Code and such an API; and, if a Party can show that the execution of its tasks under the Project or the Exploitation of its own Results is technically or legally impossible without Access to the Source Code,
- Access to the Source Code to the extent necessary.

Background shall only be provided in Object Code unless otherwise agreed between the Parties concerned.

9.8.4 Software licence and sublicensing rights

9.8.4.1 Object Code

9.8.4.1.1 Results - Rights of a Party

Where a Party has Access Rights to Object Code and/or API that is Results for Exploitation, such Access shall, in addition to the Access for Exploitation foreseen in Section 9.4, as far as Needed for the Exploitation of the Party's own Results, comprise the right:

- to make an unlimited number of copies of Object Code and API; and
- to distribute, make available, market, sell and offer for sale such Object Code and API alone or as part of or in connection with products or services of the Party having the Access Rights;

provided however that any product, process or service has been developed by the Party having the Access Rights in accordance with its rights to exploit Object Code and API for its own Results.

If it is intended to use the services of a third party for the purposes of this Section 9.8.4.1.1, the Parties concerned shall agree on the terms thereof with due observance of the interests of the Party granting the Access Rights as set out in Section 9.2 of this Consortium Agreement.

9.8.4.1.2 Results - Rights to grant sublicenses to end-users

In addition, Access Rights to Object Code shall, as far as Needed for the Exploitation of the Party's own Results, comprise the right to grant in the normal course of the relevant trade to end-user customers buying/using the product/services, a sublicense to the extent as necessary for the normal use of the relevant product or service to use the Object Code alone or as part of or in connection with or integrated into products and services of the Party having the Access Rights and, as far as technically essential:

- to maintain such product/service;

- to create for its own end-use interacting interoperable software in accordance with the Directive 2009/24/EC of the European Parliament and of the Council of 23 April 2009 on the legal protection of computer programs

9.8.4.1.3 Background

For the avoidance of doubt, where a Party has Access Rights to Object Code and/or API that is Background for Exploitation, Access Rights exclude the right to sublicense. Such sublicensing rights may, however, be negotiated between the Parties.

9.8.4.2 Source Code

9.8.4.2.1 Results - Rights of a Party

Where, in accordance with Section 9.8.3, a Party has Access Rights to Source Code that is Results for Exploitation, Access Rights to such Source Code, as far as Needed for the Exploitation of the Party's own Results, shall comprise a worldwide right to use, to make copies, to modify, to develop, to adapt Source Code for research, to create/market a product/process and to create/provide a service.

If it is intended to use the services of a third party for the purposes of this Section 9.8.4.2.1, the Parties shall agree on the terms thereof, with due observance of the interests of the Party granting the Access Rights as set out in Section 9.2 of this Consortium Agreement.

9.8.4.2.2 Results – Rights to grant sublicenses to end-users

In addition, Access Rights, as far as Needed for the Exploitation of the Party's own Results, shall comprise the right to sublicense such Source Code, but solely for purpose of adaptation, error correction, maintenance and/or support of the Software.

Further sublicensing of Source Code is explicitly excluded.

9.8.4.2.3 Background

For the avoidance of doubt, where a Party has Access Rights to Source Code that is Background for Exploitation, Access Rights exclude the right to sublicense. Such sublicensing rights may, however, be negotiated between the Parties.

9.8.5 Specific formalities

Each sublicense granted according to the provisions of Section 9.8.4 shall be made by a traceable agreement specifying and protecting the proprietary rights of the Party or Parties concerned.

10 Non-disclosure of information

10.1

All information in whatever form or mode of communication, which is disclosed by a Party (the "Disclosing Party") to any other Party (the "Recipient") in connection with the Project during its implementation and which has been explicitly marked as "confidential" at the time of disclosure, or when disclosed orally has been identified as confidential at the time of disclosure and has been confirmed and designated in writing within 15 calendar days from oral disclosure at the latest as confidential information by the Disclosing Party, is "Confidential Information".

10.2

The Recipients hereby undertake in addition and without prejudice to any commitment on non-disclosure under the Grant Agreement, for a period of 4 years after the end of the Project:

- Not to use Confidential Information otherwise than for the purpose for which it was disclosed;
- not to disclose Confidential Information without the prior written consent by the Disclosing Party;
- to ensure that internal distribution of Confidential Information by a Recipient shall take place on a strict need-to-know basis; and
- to return to the Disclosing Party, or destroy, on request all Confidential Information that has been disclosed to the Recipients including all copies thereof and to delete all information stored in a machine readable form to the extent practically possible. The Recipients may keep a copy to the extent it is required to keep, archive or store such Confidential Information because of compliance with applicable laws and regulations or for the proof of on-going obligations provided that the Recipient comply with the confidentiality obligations herein contained with respect to such copy for as long as the copy is retained.

10.3

The recipients shall be responsible for the fulfilment of the above obligations on the part of their employees or third parties involved in the Project and shall ensure that they remain so obliged, as far as legally possible, during and after the end of the Project and/or after the termination of the contractual relationship with the employee or third party.

10.4

The above shall not apply for disclosure or use of Confidential Information, if and in so far as the Recipient can show that:

- the Confidential Information has become or becomes publicly available by means other than a breach of the Recipient's confidentiality obligations;
- the Disclosing Party subsequently informs the Recipient that the Confidential Information is no longer confidential;
- the Confidential Information is communicated to the Recipient without any obligation of confidentiality by a third party who is to the best knowledge of the Recipient in lawful possession thereof and under no obligation of confidentiality to the Disclosing Party;
- the disclosure or communication of the Confidential Information is foreseen by provisions of the Grant Agreement;
- the Confidential Information, at any time, was developed by the Recipient completely independently of any such disclosure by the Disclosing Party;
- the Confidential Information was already known to the Recipient prior to disclosure, or
- the Recipient is required to disclose the Confidential Information in order to comply with applicable laws or regulations or with a court or administrative order, subject to the provision Section 0 hereunder.

10.5

The Recipient shall apply the same degree of care with regard to the Confidential Information disclosed within the scope of the Project as with its own confidential and/or proprietary information, but in no case less than reasonable care.

10.6

Each Party shall promptly advise the other Party in writing of any unauthorised disclosure, misappropriation or misuse of Confidential Information after it becomes aware of such unauthorised disclosure, misappropriation or misuse.

10.7

If any Party becomes aware that it will be required, or is likely to be required, to disclose Confidential Information in order to comply with applicable laws or regulations or with a court or administrative order, it shall, to the extent it is lawfully able to do so, prior to any such disclosure

- notify the Disclosing Party, and
- comply with the Disclosing Party's reasonable instructions to protect the confidentiality of the information.

11 Miscellaneous

11.1 Attachments, inconsistencies and severability

This Consortium Agreement consists of this core text and

Attachment 1 (Background included)

Attachment 2 (Accession document)

Attachment 3 (List of Third Parties for simplified transfer according to Section 0)

Attachment 4 (Identified Affiliated Entities)

In case the terms of this Consortium Agreement are in conflict with the terms of the Grant Agreement, the terms of the latter shall prevail. In case of conflicts between the attachments and the core text of this Consortium Agreement, the latter shall prevail.

Should any provision of this Consortium Agreement become invalid, illegal or unenforceable, it shall not affect the validity of the remaining provisions of this Consortium Agreement. In such a case, the Parties concerned shall be entitled to request that a valid and practicable provision be negotiated that fulfils the purpose of the original provision.

11.2 No representation, partnership or agency

Except as otherwise provided in Section 0, no Party shall be entitled to act or to make legally binding declarations on behalf of any other Party or of the consortium. Nothing in this Consortium Agreement shall be deemed to constitute a joint venture, agency, partnership, interest grouping or any other kind of formal business grouping or entity between the Parties.

11.3 Notices and other communication

Any notice to be given under this Consortium Agreement shall be in writing to the addresses and recipients as listed in the most current address list kept by the Coordinator.

Formal notices:

If it is required in this Consortium Agreement (Sections 4.2, 9.7.2.1.1, and 11.4) that a formal notice, consent or approval shall be given, such notice shall be signed by an authorised representative of a Party and shall either be served personally or sent by mail with recorded delivery or telefax with receipt acknowledgement.

Other communication:

Other communication between the Parties may also be effected by other means such as e-mail with acknowledgement of receipt, which fulfils the conditions of written form.

Any change of persons or contact details shall be notified immediately by the respective Party to the Coordinator. The address list shall be accessible to all Parties.

11.4 Assignment and amendments

Except as set out in Section 8.3, no rights or obligations of the Parties arising from this Consortium Agreement may be assigned or transferred, in whole or in part, to any third party without the other Parties' prior formal approval. Amendments and modifications to the text of this Consortium Agreement not explicitly listed in section 6.3.1.2. require a separate written agreement to be signed between all Parties.

11.5 Mandatory national law.

Nothing in this Consortium Agreement shall be deemed to require a Party to breach any mandatory statutory law under which the Party is operating.

11.6 Language

This Consortium Agreement is drawn up in English, which language shall govern all documents, notices, meetings, arbitral proceedings and processes relative thereto.

11.7 Applicable law

This Consortium Agreement shall be construed in accordance with and governed by the laws of Belgium excluding its conflict of law provisions.

11.8 Settlement of disputes

The parties shall endeavour to settle their disputes amicably.

All disputes arising out of or in connection with this Consortium Agreement, which cannot be solved amicably, shall be finally settled under the Rules of Arbitration of the International Chamber of Commerce by one or more arbitrators appointed in accordance with the said Rules.

The place of arbitration shall be Brussels if not otherwise agreed by the conflicting Parties; however the place of arbitration shall be Osaka, Japan in case KGU Japan is the respondent.

The award of the arbitration will be final and binding upon the Parties.

Nothing in this Consortium Agreement shall limit the Parties' right to seek injunctive relief in any applicable competent court.

12 Signatures

AS WITNESS:

The Parties have caused this Consortium Agreement to be duly signed by the undersigned authorised representatives in separate signature pages the day and year first above written. The original copy of this Consortium Agreement will be archived by the Coordinator. The Coordinator will provide a scanned copy of the original document to the Parties.

1 - ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS (CERTH)

Signature(s)

Name(s)

Title(s)

Date

2 - ENGINEERING INGEGNERIA INFORMATICA SPA (ENG)

Signature(s)

Name(s)

Title(s)

Date

3 - HELLENIC TELECOMMUNICATIONS ORGANIZATION S.A. - OTE AE (ORGANISMOS TILEPIKOINONION TIS ELLADOS OTE AE) (OTE)

Signature(s)

Name(s)

Title(s)

Date

4 - DIGINEXT (DXT)

Signature(s)

Name(s)

Title(s)

Date

5 - Crisisplan B.V. (CPLAN)

Signature(s)

Name(s)

Title(s)

Date

6 - DRONE HOPPER SL (DH)

Signature(s)

Name(s)

Title(s)

Date

7 - ROBOTNIK AUTOMATION SLL (ROB)

Signature(s)

Name(s)

Title(s)

Date

8 - SYNELIXIS LYSEIS PLIROFORIKIS AUTOMATISMOU & TILEPIKOINONION ANONIMI
ETAIRIA (SYN)

Signature(s)

Name(s)

Title(s)

Date

9 - INOV INESC INOVACAO - INSTITUTO DE NOVAS TECNOLOGIAS (INOV)

Signature(s)

Name(s)

Title(s)

Date

10 - FONDAZIONE LINKS - LEADING INNOVATION & KNOWLEDGE FOR SOCIETY (LINKS)

Signature(s)

Name(s) Massimo Marcarini

Title(s) Managing Director

Date

11 - Kpeople Reasearch Foundation (KPRF)

Signature(s)

Name(s)

Title(s)

Date

12 - KAJAANIN AMMATTIKORKEAKOULU OY (KAMK)

Signature(s)

Name(s)

Title(s)

Date

13 - VRIJE UNIVERSITEIT BRUSSEL (VUB)

Signature(s)

Name(s)

Title(s)

Date

14 - PANEPISTIMIO DYTIKIS ATTIKIS (UniWA)

Signature(s)

Name(s)

Title(s)

Date

15 - AYUNTAMIENTO DE MADRID (ADM-POL)

Signature(s)

Name(s)

Title(s)

Date

16 - SERVICIO MADRILENO DE SALUD (SUMMA)

Signature(s)

Name(s)

Title(s)

Date

17 - ECOLE NATIONALE SUPERIEURE DES OFFICIERS DE SAPEURS-POMPIERS
(ENSOSP)

Signature(s)

Name(s)

Title(s)

Date

18 - WYZSZA SZKOLA POLICJI W SZCZYTNIIE (WSPOL)

Signature(s)

Name(s)

Title(s)

Date

19 - KAJAANIN KAUPUNKI (KAJ)

Signature(s)

Name(s)

Title(s)

Date

20 - ELLINIKI OMADA DIASOSIS ATTIKIS (HRTA)

Signature(s)

Name(s)

Title(s)

Date

21 - MUNICIPIO DE GRANDOLA (MG)

Signature(s)

Name(s)

Title(s)

Date

22 - CONSORZIO PER IL SISTEMA INFORMATIVO (CSI PIEMONTE)

Signature(s)

Name(s)

Title(s)

Date

23 KWANSEI GAKUIN EDUCATIONAL FOUNDATION (KGU Japan)

Signature(s)

Name(s)

Title(s)

Date

13 Attachment 1: Background included

According to the Grant Agreement (Article 24) Background is defined as “data, know-how or information (...) that is needed to implement the action or exploit the results”. Because of this need, Access Rights have to be granted in principle, but Parties must identify and agree amongst them on the Background for the project. This is the purpose of this attachment.

PARTY 1 - ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS (CERTH),

As to ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS (CERTH), it is agreed between the Parties that, to the best of their knowledge the following background is hereby identified and agreed upon for the Project. Specific limitations and/or conditions, shall be as mentioned hereunder:

Describe Background	Specific limitations and/or conditions for implementation (Article 25.2 Grant Agreement)	Specific limitations and/or conditions for Exploitation (Article 25.3 Grant Agreement)
Computer vision technologies for real-time pose estimation, tracking, localisation and mapping for augmented reality applications	If necessary, the access to the assets owned by CERTH will be granted by making available to consortium members the compiled code and it will be limited to the project duration. The sharing of source code is not envisaged at this stage but it could be discussed if needed and protected through a Non-Disclosure Agreement.	The exploitation of both background and foreground IP shall be based on a licensing scheme or on the IP buyout. Other forms of IP transferring must be mutually agreed.

This represents the status at the time of signature of this Consortium Agreement.

PARTY 2 - ENGINEERING - INGEGNERIA INFORMATICA SPA (ENG)

As to ENGINEERING - INGEGNERIA INFORMATICA SPA (ENG), it is agreed between the Parties that, to the best of their knowledge no data, know-how or information of ENGINEERING - INGEGNERIA INFORMATICA SPA shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Party’s Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

PARTY 3 - HELLENIC TELECOMMUNICATIONS ORGANIZATION S.A. - OTE AE (ORGANISMOS TILEPIKOINONION TIS ELLADOS OTE AE) (OTE)

As to HELLENIC TELECOMMUNICATIONS ORGANIZATION S.A. - OTE AE (ORGANISMOS TILEPIKOINONION TIS ELLADOS OTE AE) (OTE), it is agreed between the Parties that, to the best of their knowledge no data, know-how or information of OTE shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Party's Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

PARTY 4 - DIGINEXT (DXT)

As to DIGINEXT (DXT), it is agreed between the Parties that, to the best of their knowledge the following background is hereby identified and agreed upon for the Project. Specific limitations and/or conditions, shall be as mentioned hereunder:

Describe Background	Specific limitations and/or conditions for implementation (Article 25.2 Grant Agreement)	Specific limitations and/or conditions for Exploitation (Article 25.3 Grant Agreement)
Vertigo: a C++ software for the development of 3D distributed interactive applications	Access Right granted for the duration of the Project and only for implementation of the Project. No access to Source Code	No commercial exploitation during and after the Project
VirtualGeo: a standalone application for the 3D visualisation of GIS datasets.	Access Right granted for the duration of the Project and only for implementation of the Project. No access to Source Code	No commercial exploitation during and after the Project
Inscape: A decision support and scenario authoring system, including the whole software suite Inscape, Inscape Pro, Inscape AR	Access Right granted for the duration of the Project and only for implementation of the Project. No access to Source Code	No commercial exploitation during and after the Project
CRIMSON: a software suite, including a 3D Common Operational Picture, for the supervision of sites and events and crisis management	Access Right granted for the duration of the Project and only for implementation of the Project. No access to Source Code	No commercial exploitation during and after the Project

This represents the status at the time of signature of this Consortium Agreement.

PARTY 5 - Crisisplan B.V. (CPLAN)

As to Crisisplan B.V. (CPLAN), it is agreed between the Parties that, to the best of their knowledge no data, know-how or information of CPLAN shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Party's Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

PARTY 6 - DRONE HOPPER SL (DH)

As to DRONE HOPPER SL (DH), it is agreed between the Parties that, to the best of their knowledge no data, know-how or information of DRONE HOPPER shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Party's Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

PARTY 7 - ROBOTNIK AUTOMATION SLL (ROB)

As to ROBOTNIK AUTOMATION SLL (ROB), it is agreed between the Parties that, to the best of their knowledge no data, know-how or information of ROB shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Party's Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

PARTY 8 - SYNELIXIS LYSEIS PLIROFORIKIS AUTOMATISMOU & TILEPIKOINONION ANONIMI ETAIRIA (SYN)

As to SYNELIXIS LYSEIS PLIROFORIKIS AUTOMATISMOU & TILEPIKOINONION ANONIMI ETAIRIA (SYN) it is agreed between the Parties that, to the best of their knowledge no data, know-how or information of Synelixis Solutions S.A. shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Party's Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

PARTY 9 - INOV INESC INOVACAO - INSTITUTO DE NOVAS TECNOLOGIAS (INOV)

As to INOV INESC INOVACAO - INSTITUTO DE NOVAS TECNOLOGIAS (INOV), it is agreed between the Parties that, to the best of their knowledge no data, know-how or information of INOV shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Party's Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

PARTY 10 - FONDAZIONE LINKS - LEADING INNOVATION & KNOWLEDGE FOR SOCIETY (LINKS)

As to FONDAZIONE LINKS - LEADING INNOVATION & KNOWLEDGE FOR SOCIETY (LINKS), it is agreed between the Parties that, to the best of their knowledge the following background is hereby identified and agreed upon for the Project. Specific limitations and/or conditions, shall be as mentioned hereunder:

Describe Background	Specific limitations and/or conditions for implementation (Article 25.2 Grant Agreement)	Specific limitations and/or conditions for Exploitation (Article 25.3 Grant Agreement)
LINKS foundation has developed and holds all rights of the design, the implementation and the documentation of the I-REACT mobile application and its associated services. Specifically, the background assets include the Android and iOS mobile applications, the front-end for management and data visualization, and the backend, which includes the APIs, the database, the service logic and algorithms.	If necessary, the access to the assets owned by LINKS will be granted by making available to consortium members the compiled code and it will be limited to the project duration. The sharing of source code is not envisaged at this stage but it could be discussed if needed and protected through a Non-Disclosure Agreement.	The exploitation of both background and foreground IP shall be based on a licensing scheme or on the IP buyout. Other forms of Ip transferring must be mutually agreed.

This represents the status at the time of signature of this Consortium Agreement.

PARTY 11 - Kpeople Reasearch Foundation (KPRF)

As to Kpeople Reasearch Foundation (KPRF), it is agreed between the Parties that, to the best of their knowledge no data, know-how or information of KPRF shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Party's Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

PARTY 12 - KAJAANIN AMMATTIKORKEAKOULU OY (KAMK)

As to KAJAANIN AMMATTIKORKEAKOULU OY (KAMK), it is agreed between the Parties that, to the best of their knowledge no data, know-how or information of KAMK shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Party's Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

PARTY 13 - VRIJE UNIVERSITEIT BRUSSEL (VUB)

As to VRIJE UNIVERSITEIT BRUSSEL (VUB), it is agreed between the Parties that, to the best of their knowledge no data, know-how or information of VUB shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Party's Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

PARTY 14 - PANEPISTIMIO DYTIKIS ATTIKIS (UniWA)

As to PANEPISTIMIO DYTIKIS ATTIKIS (UniWA), it is agreed between the Parties that, to the best of their knowledge the following background is hereby identified and agreed upon for the Project. Specific limitations and/or conditions, shall be as mentioned hereunder:

Describe Background	Specific limitations and/or conditions for implementation	Specific limitations and/or conditions for Exploitation
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	(Article 25.2 Grant Agreement)	(Article 25.3 Grant Agreement)
For the development of the project UniWA will use an early prototype of an Emergency Communication Box, which was developed by UniWA in previous research activities.	As needed for the implementation of the project. As far as participation of other beneficiaries in the research involving the design and development of an early prototype of an Emergency Communication Box is not previewed or needed according to the Action plan, providing access of other beneficiaries to the background in question is not anticipated.	The property and the use of the Emergency Communication Box and its components are reserved to UniWA. The Action plan does not contain activities in the area of the design and development of an early prototype of an Emergency Communication Box in which UniWA generates new results jointly with other beneficiaries, no condition for joint ownership arises, and the ownership of the results in the area of the design and development of an early prototype of an Emergency Communication Box and rights of their exploitation will belong exclusively to UniWA.
For the development of the project UniWA will use an early prototype of a wearable device for productive animals, which was developed by UniWA in previous research activities.	As needed for the implementation of the project. As far as participation of other beneficiaries in the research involving the design and development of an early prototype of a wearable device for productive animals is not previewed or needed according to the Action plan, providing access of other beneficiaries to the background in question is not anticipated.	The property and the use of a wearable device for productive animals and its components are reserved to UniWA. The Action plan does not contain activities in the area of the design and development of an early prototype of a wearable device for productive animals in which UniWA generates new results jointly with other beneficiaries, no condition for joint ownership arises, and the ownership of the results in the area of the design and development of an early prototype of a wearable device for productive animals and rights of their exploitation will belong exclusively to UniWA.
For the development of the project UniWA will use a wearable application for	As needed for the implementation of the project. As far as participation of other	The property and the use of a wearable application for smartwatches and its

<p>smartwatches, which was developed by UniWA in previous research activities.</p>	<p>beneficiaries in the research involving the wearable application for smartwatches is not previewed or needed according to the Action plan, providing access of other beneficiaries to the background in question is not anticipated.</p>	<p>components are reserved to UniWA.</p> <p>The Action plan does not contain activities in the area of wearable application for smartwatches in which UniWA generates new results jointly with other beneficiaries, no condition for joint ownership arises, and the ownership of the results in the area of wearable application for smartwatches and rights of their exploitation will belong exclusively to UniWA.</p>
<p>For the development of the project UWA will use textile wearables that can measure biometrics inside the First Responders uniform – developed by UniWA in previous research activities.</p>	<p>As needed for the implementation of the project.</p> <p>As far as participation of other beneficiaries in the research involving the textile wearables that can measure biometrics inside the First Responders uniform is not previewed or needed according to the Action plan, providing access of other beneficiaries to the background in question is not anticipated.</p>	<p>The property and the use of the textile wearables that can measure biometrics inside the First Responders uniform and its components are reserved to UniWA.</p> <p>The Action plan does not contain activities in the area of textile wearables that can measure biometrics inside the First Responders uniform in which UniWA generates new results jointly with other beneficiaries, no condition for joint ownership arises, and the ownership of the results in the area of textile wearables that can measure biometrics inside the First Responders uniform and rights of their exploitation will belong exclusively to UniWA.</p>

This represents the status at the time of signature of this Consortium Agreement.

PARTY 15 - AYUNTAMIENTO DE MADRID (ADM-POL)

As to AYUNTAMIENTO DE MADRID (ADM-POL), it is agreed between the Parties that, to the best of their knowledge no data, know-how or information of ADM-POL shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Party's Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

PARTY 16 - SERVICIO MADRILENO DE SALUD (SUMMA)

As to SERVICIO MADRILENO DE SALUD (SUMMA), it is agreed between the Parties that, to the best of their knowledge no data, know-how or information of SUMMA shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Party's Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

PARTY 17 - ECOLE NATIONALE SUPERIEURE DES OFFICIERS DE SAPEURS-POMPIERS (ENSOSP)

As to ECOLE NATIONALE SUPERIEURE DES OFFICIERS DE SAPEURS-POMPIERS (ENSOSP), it is agreed between the Parties that, to the best of their knowledge no data, know-how or information of ENSOSP shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Party's Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

PARTY 18 - WYZSZA SZKOLA POLICJI W SZCZYTNIE (WSPOL)

As to WYZSZA SZKOLA POLICJI W SZCZYTNIE (WSPOL), it is agreed between the Parties that, to the best of their knowledge no data, know-how or information of WSPOL shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Party's Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

PARTY 19 - KAJAANIN KAUPUNKI (KAJ)

As to KAJAANIN KAUPUNKI (KAJ), it is agreed between the Parties that, to the best of their knowledge no data, know-how or information of KAJ shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Party's Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

PARTY 20 - ELLINIKI OMADA DIASOSIS ATTIKIS (HRTA)

As to ELLINIKI OMADA DIASOSIS ATTIKIS (HRTA), it is agreed between the Parties that, to the best of their knowledge no data, know-how or information of HRTA shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Party's Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

PARTY 21 - MUNICIPIO DE GRANDOLA (MG)

As to MUNICIPIO DE GRANDOLA (MG), it is agreed between the Parties that, to the best of their knowledge, no data, know-how or information of [NAME OF THE PARTY] shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Party's Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

PARTY 22 - CONSORZIO PER IL SISTEMA INFORMATIVO (CSI PIEMONTE)

As to CONSORZIO PER IL SISTEMA INFORMATIVO (CSI PIEMONTE), it is agreed between the Parties that, to the best of their knowledge no data, know-how or information of CSI PIEMONTE shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Party's Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

PARTY 23 - KWANSEI GAKUIN EDUCATIONAL FOUNDATION (KGU Japan)

As to KWANSEI GAKUIN EDUCATIONAL FOUNDATION (KGU Japan), it is agreed between the Parties that, to the best of their knowledge, no data, know-how or information of KGU Japan shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Party's Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

14 Attachment 2: Accession document

ACCESSION

of a new Party to

[FASTER] Consortium Agreement, version [..., YYYY-MM-DD]

[OFFICIAL NAME OF THE NEW PARTY AS IDENTIFIED IN THE Grant Agreement]

hereby consents to become a Party to the Consortium Agreement identified above and accepts all the rights and obligations of a Party starting [date].

[OFFICIAL NAME OF THE COORDINATOR AS IDENTIFIED IN THE Grant Agreement]

hereby certifies that the consortium has accepted in the meeting held on [date] the accession of [the name of the new Party] to the consortium starting [date].

This Accession document has been done in 2 originals to be duly signed by the undersigned authorised representatives.

[Date and Place]

[INSERT NAME OF THE NEW PARTY]

Signature(s)

Name(s)

Title(s)

[Date and Place]

[INSERT NAME OF THE COORDINATOR]

Signature(s)

Name(s)

Title(s)

15 Attachment 3: List of Third Parties for simplified transfer according to Section 8.3.2.

- 1) SERVICIO MADRILENO DE SALUD (SUMMA)
 - a) COMUNIDAD DE MADRID
 - b) Escuela Española de Salvamento y Detección con Perros
 - c) FUNDACIÓN PARA LA INVESTIGACIÓN E INNOVACIÓN BIOMÉDICA DE ATENCIÓN PRIMARIA
- 2) CONSORZIO PER IL SISTEMA INFORMATIVO (CSI PIEMONTE)
 - a) REGIONE PIEMONTE (RP)

16 Attachment 4: Identified Affiliated Entities according to Section 9.5

- 1) SERVICIO MADRILENO DE SALUD (SUMMA)
 - a) COMUNIDAD DE MADRID
 - b) Escuela Española de Salvamento y Detección con Perros
 - c) FUNDACIÓN PARA LA INVESTIGACIÓN E INNOVACIÓN BIOMÉDICA DE ATENCIÓN PRIMARIA
- 2) CONSORZIO PER IL SISTEMA INFORMATIVO (CSI PIEMONTE)
 - a) REGIONE PIEMONTE (RP)