

# iProcure Security PCP

Pre-Commercial Procurement of Innovative Triage Management Systems Strengthening Resilience and Interoperability of Emergency Medical Services



# D2.1 Requirements for Triage Management Systems for Emergency Medical Services



This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No 101022061.

# Project

Acronym	iProcureSecurity PCP
Title	Pre-Commercial Procurement of Innovative Triage Management Systems Strengthening Resilience and Interoperability of Emergency Medical Services
Coordinator	SYNYO GmbH
Reference	101022061
Туре	Pre-commercial procurement (PCP)
Programme	HORIZON 2020
Торіс	H2020-SU-SEC-2020
Start	01.09.2021
Duration	36 months
Website	https://pcp.iprocuresecurity.eu/
Consortium	SYNYO GMBH (SYNYO), Austria
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Acknowledgement: This project has received funding	Disclaimer: The content of this publication is the sole
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and Innovation Programme under Grant Agreement	represents the view of the European Commission or
No 101022061.	its services.

# Deliverable

Number	D2.1
Title	Requirements for Triage Management Systems for Emergency Medical Services
Lead beneficiary	SYNYO
Work package	WP2
Dissemination level	Public (PU)
Nature	Report (RE)
Due date	31.01.2022
Submission date	13.02.2022
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# **Document history**

Version	Date	Comments
0.1	08.11.2021	First draft and structure
0.2	14.12.2021	Updated requirements collection
0.3	15.12.2021	Updated desk research
0.4	23.12.2021	Updated requirements collection (workshop inputs)
0.5	14.01.2022	Finalized desk research inputs
0.6	21.01.2022	Updated requirements
0.7	28.01.2022	Additional partner feedback and check by QA Lead KEMEA
0.8	04.02.2022	Harmonization of terms according partner feedback
1.0	13.02.2022	Final Version submitted (SYNYO)

# **Executive Summary**

Deliverable 2.1 outlines 240 requirements identified by the procurers of the iProcureSecurity PCP consortium. The deliverable incorporates the results of the Tasks 2.1, 2.2 and 2.3, having as basis the preliminary results of the iProcureSecurity CSA. The latter have been re-elaborated and have been enlarged with additional research and inputs, provided by the project procurers.

The deliverable 2.1 "Requirement for Triage Management System for Emergency Medical Services", together with the deliverable 2.2 "Use Case Process Model for Triage Management System for Emergency Medical Services", will serve as grounded basis to shape the Call for Tender and thus, to put the suppliers in the conditions of advancing proper and well-suited technical solutions.

The report firstly drafts the vision of the project, highlighting the challenges and shortcomings gathered through the work done in collaboration with the procurers; it then reviews the methodology applied and finally reports all initial requirements identified for the scope of the project.

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# **1** Introduction

This report presents the main outcomes of the initial tasks T2.1, T2.2 and T2.3 of the iProcureSecurity PCP project. The task "T2.1 Elicitation of user requirements" reviewed the outcomes of the iProcureSecurity CSA project and collected further data from procurers in the project and through additional desk research. The main goal was to identify prevalent requirements among key subgroups of users (including paramedics, emergency physicians, nurses, emergency medical technicians, field coordinators).

As part of Tasks "T2.2 Elicitation of procurer organisation requirements" a uniform template was developed to collect the procurers' current situation according Triage Management. The internal screening and structured data collection provided an in-depth understanding of main gaps and challenges of the current processes and used tools and thereby built an essential baseline for subsequently eliciting functional and especially non-functional requirements. The collection template covered several key domains: business-related, organisational, technical, legal and regulatory characteristics.

Information on requirements for Triage Management Systems for Emergency Medical Services was collated and reviewed through iterative approaches using a mix of methods including structured data screening, interviews, workshops and focus groups at each procurers' site. In an additional step, the procurers prioritized the identified requirements and discussed during several workshops the importance of each requirement to ensure that all partners share the same understanding.

Finally, as part of task "T2.3 Requirements engineering for the Triage Management Systems for Emergency Medical Services" all collected input from T2.1 and T2.2 were translated into a comprehensive list of requirements, including functional, non-functional, legal and regulatory as well as organisational, staff and business requirements. The initial list of requirements will be constantly improved during the following steps which include the creation of use cases and service process models.

#### **1.1 Definitions**

#### **Functional requirement**

Functional requirements capture the intended behaviour of the system, i.e., what the system is expected to do.

#### Legal requirement

Legal requirements (e.g., data protection) include regulatory and standard aspects of the system.

#### Non-functional requirement

Non-functional requirements, or system qualities, capture required properties of the system, i.e., how well a given behavioural or structural aspect of the system should be accomplished.

#### Use case

Tabular description of the interaction between a role and a system to achieve a goal. The actor can be a human or other external system.

#### Service process model

A visual representation of a process of an enterprise developed with the purpose of analysis and potential improvement.

#### 1.2 Abbreviations and Acronyms

- API Application Programming Interface
- EHR Electronic Health Record
- EMS Emergency Medical Services
- ICT Information and Communication Technologies
- MCI Mass Casualty Incident
- PCP Pre-commercial Procurement

# 2 Vision

The vision of iProcureSecurity PCP builds the foundation for the development of novel triage management systems that are able to overcome fundamental shortcomings of currently used systems and which will allow to digitalize key processes and thereby strongly contribute to an improved quality of the service for all involved stakeholders.

This section elaborates on the shortcomings of the current state of the art and thus elucidates why existing solutions do not meet the needs of the EMS organisations in the field and a PCP process is needed to acquire new R&D services. Starting from the findings collected and analysed during the iProcureSecurity CSA project and in-depth assessments during the first months of the iProcureSecurity PCP project it can be stated that an innovative system must be developed in a way to enable **planning** and **decision-making**, taking into account all the existing variables faced by the EMS practitioners at the site of the incidence.

Likewise, the **allocation of resources** must be as efficient as possible to reduce the cost of each intervention while always ensuring casualty safety. In general, all emergency professionals the project consortium engaged with, claimed that the current **practices in the area of triage management** need to be improved and the development that is carried out by the industry has to go beyond the current state of the art.

A system that truly has an impact on the work of the emergency teams should connect the EMS practitioners with the other stakeholders in the EMS ecosystem enabling continuous and reliable communication with the EMCC and the hospital where the casualty is going to be transferred to as well as a quick access to the casualty's medical history. The aforementioned necessity implies that the triage system must exchange data directly with the other information systems of the EMS organizations involved. This **interoperability** has to be implemented in a way that **data transmission** is possible and **sustainable** to allow seamless updates and improvements in the future.

A system for triage management that meets the challenges faced by the EMS practitioners across Europe should be digital and able to provide data that facilitates the **evaluation** of interventions between different teams on national or European levels. However, to achieve this the solution needs to demonstrate the capability of **reproducing** interventions and decisions. Finally, as the health data of casualties that is transferred and updated between the different actors is concerned, **data protection** must be guaranteed at all times supported by putting in place all the necessary **cybersecurity** measures. The following table gives a brief overview on current shortcomings of available systems in the mentioned areas:

Area	Shortcoming
Planning and decision making	<ul> <li>Lack of clarity for the head of operations on the ground and for command-and-control structures and dispatch centres in the background based on missing or unclear data.</li> <li>Missing innovative geolocation and cartographic tools for onsite planning.</li> <li>Missing information on environmental conditions (traffic conditions and weather conditions).</li> <li>No data for decision support to improve resource allocation and casualty transport.</li> <li>Lack of centralized clinical information that would allow an early distribution of casualties according to their pathology and the availability of hospital resources.</li> <li>The information flow directly depends on human performance. In a stressful situation the professional can forget important data or be easily distracted by tasks that do not generate value.</li> <li>Lack of integrated solutions for the management of major events.</li> <li>Miscoordination in deciding which units to deploy depending on the event – i.e., how many persons, types and number of ambulances, other devices, logistic resources, which stakeholders to activate.</li> </ul>
On-Site Data	<ul> <li>Lack of proper information of the location, i.e., which size of the area should be isolated, how many people are in the area, what is the accessibility of the area.</li> <li>Lack of risk assessment of the emergency area.</li> <li>Lack of mapping of the location</li> </ul>
Resource allocation	<ul> <li>Resource allocation is sometimes inefficient due to missing interoperability of used systems</li> </ul>
	<ul> <li>An exhaustive analysis of the data generated in the incident is required, both in real time and afterwards, in order to improve resource allocation.</li> <li>Automated monitoring of already assessed casualties can free up human resources to care for other casualties.</li> </ul>
Triage practice	<ul> <li>Current triage is not very flexible e.g., START algorithm is used in scenarios or cases where it doesn't fit e.g., for children, blast injuries because of ease of use.</li> </ul>

	<ul> <li>Improvement of re-triage, i.e., a monitoring of the condition and vital signs of already triaged casualties on site, setting up a common platform for the data interchange with electro medical equipment (defib-monitor, ultrasound etc) and triage system to improve interoperability on the field and in hospital.</li> <li>Missing ability to connect with telemedicine applications.</li> <li>Currently there is a high clinical variability in the triage process. Turning it into a homogeneous process increases casualty safety and serves the professional as a support for clinical decision making.</li> <li>Triage practice is a handwritten process and therefore slow, unreliable, and not efficient.</li> </ul>
Identification	<ul> <li>Lack of access to the casualty medical history.</li> </ul>
Data transmission	<ul> <li>In many cases it is still necessary for the staff on the ground to collect the handwritten information and report this information via radio. In some cases, information is still forwarded through so called "runners", who transport paper-based information from one place to another.</li> <li>Communication between different first responders is based on telephone or radio, and could be improved and less time consuming if those organizations share a common information exchange platform, including the vision of the scene at different levels.</li> <li>TETRA messages are prone to confusion and only one casualty data can be transmitted at a time.</li> <li>Currently there is no ideal alternative to TETRA or telephony.</li> <li>Outage of usual communication network (mobile communication), due to overwhelmed networks or critical geographical locations.</li> </ul>
Interoperability	<ul> <li>Missing interoperability (missing APIs) between existing EMS systems.</li> <li>Missing interoperability between all the actors participating in the emergency (both EMS professionals and law enforcement).</li> <li>The clinical information generated in MCIs currently cannot be easily shared with other healthcare providers, even in the same region.</li> <li>Missing interoperability with national Electronic Health Record systems.</li> </ul>
Usability	<ul> <li>Available systems are not providing necessary ergonomics and usability.</li> <li>Many systems can only be operated by professionals after intensive training.</li> </ul>
Evaluation	<ul> <li>Missing performance and risk assessment during incidents due to missing, incomplete or unavailable data.</li> <li>Lack of benchmarking to provide accurate performance evaluations.</li> <li>Missing systems which allow to record what is happening in the emergency areas in order to use the data for evaluation and training.</li> </ul>

Sustainability	<ul> <li>Isolated applications create a lock-in situation which hinders EMS to seamlessly connect them with current and potential future applications.</li> </ul>
Reproducibility	<ul> <li>Lack of protocols that make the procedures ad hoc and too much cultural dependent.</li> <li>Lack of common vocabulary and terminology in different relief units.</li> </ul>
Data Protection	<ul> <li>Missing complete compliance with the dispositions of the GDPR: 1. Authentication and authorization; 2. Pseudonymisation and Encryption; 3. Backups and Business Continuity; 4. Infrastructure security (physical protection); 5. Applications security.</li> <li>Missing compliance to cybersecurity vulnerabilities and risks.</li> </ul>

The image below gives a basic overview of involved actors, connections and interfaces of an envisaged flexible and highly modular triage management system that can be applied and adapted to different approaches and connected to existing systems in every of the procurers' country or region.





To reach the desired quality and efficiency improvements suppliers will have to take into account several aspects and make use of and combine innovative aspects and concepts in several domains. A critical success factor is to establish a balanced understanding for the technology components, the involved data domains, and the organisational processes and structures which build on the former. The focus areas of the technology perspective include means to continuously capture and update triage information, which is consolidated to streamline the triage management, including the handover of casualties to healthcare organisations. The aspect of "site intelligence" seeks to utilise the capabilities of modern sensor technologies, to aid in casualty tracking and treatment, but also identification of potential threats, as well as providing a data foundation for further decision support. The cross-cutting aspects for technologies are the functional capabilities of technology components, their usability and practicality for a field deployment, as well as interoperability from a technical standpoint.

The concept of operations examines the roles and structures established for an incident response, the concrete initial and re-triage processes, relevant process interfaces to other EMS organisations, EMCC and hospitals, as well as the collaboration under different constellations, especially in large scale incidents with heterogenous EMS from different nationalities involved. This also covers the aspects of a consistent incident documentation, the feedback of lessons learned into training concepts, but also the (potentially diverging) terminology and taxonomy used by involved organisations.

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The data perspective covers the aspect of incident information, to understand the scope and impact of the situation, which is necessary to plan a suitable incident resolution and identify additional resource needs on site. Particular emphasis is also on any data regarding the casualties, which ranges from their triage history, the treatment they received, but also the potential of retrieving a casualty record or capacity data from healthcare organisations to further improve the routines on site. Due to the sensitive nature of the involved information, the aspect of data protection is an important crosscutting aspect. Of similar importance is the semantic interoperability of data, which ties in with the syntactic interoperability for technical components, and the terminology and taxonomy established in the concept of operations.

The triage management system can be considered as one of the core components for digitalisation, as it has the vital role of receiving data from the involved endpoints (sensors, services, applications), complements it with contextual data and distributes it to downstream systems, while providing information to decision makers on- and off-site to support the management of the incident situation.

Multiple challenges were identified, which have to be addressed by the triage management system:

- The tracking of the triage situation involves information on the number of casualties, their classification, their treatment and their status. Carried out manually, it is a challenging task to collect the information for an initial overview, and to maintain it as the situation involves, as it requires multiple roles on-site to continuously update this information. Outdated information or mistakes influence and delay decision making on an operational, tactical and strategic level, which can lead to a misallocation of resources, a delayed delivery of supplies or equipment, or subsequent mistakes in the management and treatment of casualties. By maintaining a digital record of each triaged casualty, beginning with the initial primary triage, up to the handover to the hospital, a permanently updated data baseline is available for decision makers to produce an overview which satisfies a demand for an overall situational awareness, but also is rich in detail to be suitable for specific use cases (such as the treatment or transportation) or to be further processed by downstream systems.
- Data interoperability between different organisations on-site, especially if multiple nationalities are involved, is a challenging aspect. Triage information is relevant for other organisations to aggregate a holistic overview of the incident situation, to keep track of the resolution of the incident, to react to unexpected changes of the situation, or to flexibly change priorities in resource allocation if bottlenecks are identified. A digitalisation of the triage procedure provides a reliable data basis for other organisations to work with and does not bind personnel on-site (such as liaison or communication officers) to convey this information. On a broader scale, this structured information is also an important factor to plan out the transportation logistics towards hospital facilities, or identify additional supplies, vehicles or specialised equipment required at the incident location.
- The handover procedure of a casualty for transportation also includes information on their triage classification and treatment history. This is of relevance for the paramedic in the transportation vehicle to ensure a correct, continuous treatment of the casualty during transportation, and remains equally important in the handover from the transportation to the hospital facility for a hospital triage and further treatment. The objective for the information handover is to be as accurate as possible, while also consuming as little time as possible for the personnel involved, which can be a challenging task if factors such as a manually written or transcribed documentation, proprietary systems and potentially semantic or taxonomic

difficulties are involved. A distribution of digitalised triage information to any authorised data consumer is efficient, consistent and reliable and does not bind human resources of the involved organisations. It also has the inherent advantage of providing a larger amount of information than what is strictly necessary for the supported process step, which would be well beyond the scope of an efficient manual handover. This way, information can be purposefully narrowed down or retrieved depending on the usage scenario, providing an appropriate flexibility to adjust to an evolving MCI situation.

In a large-scale incident, the situation can evolve rapidly, involving multiple organisations, carrying out a large subset of routines involving multiple decision points. A manual documentation of these activities is challenging, as it binds valuable resources and is often carried out under stress, impacting the accuracy, thoroughness and correctness of captured information. A digitalisation provides a consistent, chronological, documentation on the triage classification, the treatment received on site, and the handover for transportation. By using consistent reference objects and adhering to standardised data formats, a comprehensive data basis is created throughout an incident, which supports the analysis on how the incident situation evolved on site, and derive insights on how to continuously improve the triage procedure from a long-term perspective. These insights can also feed back into the training of EMS personnel, or provide profound information which future research activities can build on.

Based on these aspects the iProcureSecurity PCP consortium summarized the main challenge to be tackled as follows:

Improve triage scenarios through a flexible triage management system that provides:

a) quick and accurate overview of casualties and their status,

b) decision support for better allocation of available resources and quicker support for casualties,

- c) improved interoperability with other first responders and relevant actors,
- d) reduced handover times between ambulance transport and hospitals, and
- e) insights for quality assurance and training measures.

# 3 Methodology

The identification, discussion and prioritization of the requirements can be considered as central elements which will directly impact all further activities of the project such as elaboration of use cases and process models. Thereby, the consortium decided to make use of a mix of data gathering methods to retrieve data from various sources while allowing all partners to keep a complete overview on all relevant aspects and ensure they can also learn from each other's insights. Main aspects and outcomes of the used methods can be found in the following sub chapters.

#### 3.1 Literature Review and Desk Research

Based on the conducted insights of the completed iProcureSecurity CSA project the literature review and desk research were revised and extended with a focus on triage management. The screened elements include solutions, suppliers/R&D providers, projects, procurers, multipliers and events.

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Especially the gathered information on solutions and projects informed the discussions on the relevant requirements for a novel solution. The other elements of the screening (suppliers, procurers, multipliers, events) will strongly contribute to activities taking place in WP3 (e.g., Open Market Consultations). However, also here an initial overview is briefly presented.

#### 3.1.1 Solutions

To understand the current status of available solutions in the triage management domain an in-depth screening of the market was conducted. The collection of relevant solutions includes products which are already available on the market. To identify the solutions, different methods were applied and combined including literature research, keyword search in different search engines and patent search. For an effective worldwide patent search the online tool IPlytics was used as it provides a vast access to all relevant patent databases worldwide and allows to make use of complex filter queries and to establish lists of relevant patents. The initial search provided more than 5 800 documents. Based on a consequent screening and manual cleaning of the data the list was shortened to around 375 relevant patents for the selected challenge. The abstracts of the patents were screened to assess if they in general fit with the related topic. It was checked if they deal with a full system for triage management or consist at least main elements that comprise relevant functionalities. Due to the fact that a modern IT solution is at the heart of the common challenge, patents older than ten years were discarded.

For each identified solution following information was collected: name of solution, short description, features, supplier name, country, solution URL, supplier contact information

The collection contains solutions that cover different aspects of triage management including but not limited to vital parameter tracking, real time event detection, tactical planning, staff collaboration, logistics, resource tracking, disaster management, decision support, data visualisation, data handover procedures and telemedicine.

ID Name of solution	Short Description	Features	Supplier	Country	Supplier URL	Solution URL
1 Inmarsat Safe Triage Pro	Safe Triage Pro is a fully automated triage solution for the en	ner emergency services, delivering secure, real-tim	l Inmarsat	UK	https://www.inmarsat.com/	https://www.inmarsat.com/en/solutions-servi
2 RescueWave	RescueWave is a completely new system that allows ambula	nce Priority score, status info, location info	VOMATEC Innovations	Germany	https://rescuewave.de/?lang=en	https://rescuewave.de/products-and-services,
3 Panacea Cloud	communication and coordination tool in disaster situations	Dashboard, Video feeds, IoT integration	University of Missouri-Columbia	US	https://missouri.edu/	https://panaceascloud.wordpress.com/
4 Adashi C&C	management platform designed to help EMS practitioners ha	and real-time collaboration, tactical planning, resource	Adashi Systems	US	https://www.adashi.com/	https://www.adashi.com/incident-command-s
5 Adashi RollCall	Adashi RollCall was designed specifically to help Fire, Police,	EN minimize labor costs, ensure compliance with unio	Adashi Systems	US	https://www.adashi.com/	https://www.adashi.com/rollcall/
6 Adashi FirstResponse MDT	Adashi FirstResponse MDT is a revolutionary emergency resp	oor fast, coordinated, and intelligent response	Adashi Systems	US	https://www.adashi.com/	https://www.adashi.com/mdt-software/
7 Adashi Alert	The alerting system is designed to give firefighters access to	crit Real-time alerts, common operating picture, impro	Adashi Systems	US	https://www.adashi.com/	https://www.adashi.com/alert/
8 Bioharness 3 physiological monitoring	chest belt with gps sensor to track position and vital parame	nte Measurement of heart rate, breathing rate, core bo	y Jjstech	US	https://www.jistech.com/	https://www.iistech.com/rae-039-bh01-001.ht
9 Hexoskin smart shirt	The Hexoskin ProShirt comes with built-in textile ECG & Resp	ira Vital paramenter tracking	Hexoskin	CA	https://www.hexoskin.com/?gclid=	https://www.hexoskin.com/collections/kits/pr
10 Quadiocore heart rate monitor	Smart wearable chest belt	Vital parameter tracking and synchronizing data wi	t Qardio	US	https://www.gardio.com/	https://www.pardio.com/gardiocore-wearable
11 Dataminr Pulse	Dataminr Pulse gives you the earliest indications of high-imp	act real-time event detection	Dataminr	US	https://www.dataminr.com/	https://www.dataminr.com/pulse
12 Iris Core	IRIS is a software that centralises all data and tools in one sin	gle real-time event detection	Unblur	Spain	https://www.unblur.co/	https://www.unblur.co/iris/
13 CityGIS Navigator	CityGIS Navigator is a control room-driven and POS-specific r	nav POS Map, POS Navigation and POS integration	CityGIS	Netherlands	https://www.citvzis.ni/en/	https://www.citvgis.nl/en/mobile-en/navigatio
14 Emergency Mobile Location	Emergency Mobile Location, or EML, is a mobile localization	me Emergency location detection	ELI Technology	Canada	https://eli-technology.com/	https://eli-technology.com/what-is-eml
15 MDgo	Meet MDgo Tag. The smart sensor designed for driver adopt	for SaaStags, sensors, dashboards		Israel	https://www.mdgo.jo/	https://www.mdgo.io/product
16 LUCAS	The LUCAS device has been shown to improve quality of che	st c Compression, Suction cup, Ventilation	Jolife AB	Sweden	https://www.lucas-cor.com/	https://www.lucas-cpr.com/product_specificat
17 Solution Ray-X Chest AI.N	A suite of radiological computer-aided traige and notification	n sc Automatically analyze image, adapt workflow for r	a Nanox Al	Israel	https://www.nanox.vision/	https://www.nanox.vision/ai#Al-solutions
18 ENGAGE IMS/CAD	ENGAGE IMS/CAD suite is an integrated Call-Center solution	for Call Taking	Satways	Greece	https://www.satways.net/	https://www.satways.net/products-sw/engage
19 Smart First Aid	Establish a unified quick-response IoT platform based on 5G	tec IoT Equipment + Platform	BOE	China	https://www.boe.com/en/	https://www.boe.com/en/Enterprise/SmartFir
20 fiResponse®	Enterprise incident management, dispatching and resource t	rac dispatching, resource tracking	Tecnosylva	Spain	https://tecnosylva.es/en	https://tecnosylva.es/en/products
21 DISP	HITEC Luxembourg Dynamic Information Sharing Platform (D	ISF Track and trace different important situational info	r HITEC Luxembourg	Luxembourg	https://www.hitec.lu/	https://www.hitec.lu/mission-critical/
22 Corpuls.mission	corpuls.mission is not just a telemedicine solution - it is a me	dic Telemedicine solution, exchange vital parameters,	E Corpuls	Germany	https://corpuls.world/	https://corpuls.world/produkte/corpuls.missic
23 Leitstellensystem	ServicePlus is the system for Service providers in ambulance	tra Dashboard, Alerting, Management	Leitstellen-Informations-System	Germany	https://lis-gmbh.com/	https://lis-gmbh.com/leitsysteme/leitstellensy
24 ACE	Being in a highly competitive environment, time does really of	cos Automatically capture handwritting in forms	Anoto	Sweden	https://www.anoto.com/solutions/	https://www.anoto.com/
25 PulsePoint	The lifesaving potential of PulsePoint is only available in	n c solution for emergency response	PulsePoint	US	https://www.pulsepoint.org/founds	https://www.pulsepoint.org/
26 Code Blue	React to events in an instant with our preconfigured mass no	otifi incident response	Code Blue Corporation	US	https://codeblue.com/about-us/	https://codeblue.com/products/
27 Prometech triage system	We are able to provide a stand alone or integrated system of	tri Tag & Trace Casualty Tags	Prometech	Netherlands	https://prometech.eu/	https://prometech.eu/commercial/triage-syste
28 VITAL-First Responder	VerdaSee's solution helps protect and preserve the lives of F	irst incident response	VerdaSee	US	http://verdasee.com/	http://verdasee.com/products/
29 Secuware Massive Casualty Response System	Massive Casualty Response System : System that can Sort/Ca	stej e-Triage	Secuware	Republic of Korea	http://www.secuware.co.kr/	http://www.secuware.co.kr/en/solutions
30 TOD	5VS is committed to identifying, prioritizing and initiating life	sav Triage-On-Demand biosensor	Five Vital Signs SVS		https://fivevitalsigns.com/	https://fivevitalsigns.com/

#### Figure 2: Solutions list (excerpt)

The created list holds currently 80 solutions. However, the list will be further extended in case further solutions are identified through other measures (e.g., Open Market Consultations).

Main elements of the solutions' list can be found in the ANNEX.

#### 3.1.2 Projects

Besides available solutions running and completed R&D&I projects that are connected to different aspects of triage management are of interest. These projects are of relevance due to several aspects.

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Project outcomes can be of interest directly for the sought solution (e.g., based on the used approaches or technologies). The iProcureSecurity PCP project is looking for an open triage management system that can be later on connected to several other systems that can further improve EMS activities. Getting a better understanding of R&D&I projects dealing for instance with situational awareness of EMS staff, UMVs or telemedicine can be of relevance to ensure the sought solution will be able in future to connect with other upcoming developments. In addition, there are relevant R&D&I providers among the partners of these projects that have been include in the long list of suppliers and R&D&I providers.

To identify projects especially national and international R&D funding programmes were screened. In addition, an intensive keyword search has been performed in search engines and social media.

For each project following information was collected: project acronym, title, abstract, funding program (if any), start and end date, URL, contact and social media information.

ID	Project Acronym	Project Title	Abstract	Funding programme	Start Date	End Date	URL
1	ETIMan	ETIMan: Emergency and Tria	During mass casualties' incidents (MCI), emergency staff, medical teams	SME-1 (H2020)	08/2019	01/2020	https://cordis.euro
2	DosiKit	DosiKit, a first portable field	There is currently a lack of irradiation biodosimetry tools that can be us	SME-1 (H2020)	08/2019	01/2020	
3	DRIVER+	DRiving InnoVation in crisis	DRIVER+ starts from the experience that neither successful R&D nor stre	CP-IP (FP7)	05/2014	04/2020	https://www.drive
4	INGENIOUS	The First Responder (FR) of	First responders are the first to arrive to an emergency. They include the	H2020-EU.3.7.	09/2019	02/2023	https://ingenious-
5	VALKYRIES	Harmonization and Pre-Stan	A methodology for tracking and analysing the needs for standardization	H2020-EU.3.7.	10/2021	09/2023	
6	FIRE-IN	Fire and Rescue Innovation	FIRE-IN has been designed to raise the security level of EU citizens by im	H2020	05/2017	04/2022	https://fire-in.eu/
7	SAYSO	Standardisation of situationa	Current Situational Awareness (SA) solutions are not adapted to operate		05/2017	04/2019	https://cordis.euro
8	SECONDS	On Time Emergency Respon	Delayed arrivals and long response times represent a critical issue for er	SME-1 (H2020)	03/2019	06/2019	https://www.stokl
9	IN-PREP	An INtegrated next generation	European countries confront the rising specter of transboundary crises,	IA (H2020)	09/2017	02/2021	https://www.in-pr
10	RAMSES	Remote access to medical in	The RAMSES consortium is working toward commercialising the Emerge	EIT	2019	2020	https://eithealth.e
11	Landrettung	Landrettung	As in all European health care systems, German medical practitioners ar				https://land-rettu
12	SAEPP	Smart Ambulance: Europear	The objective of this project is to create and collate a consensus of agre	CSA (H2020)	01/2015	08/2015	https://cordis.eure
13	MOMENTUM	MOMENTUM	The goal of the project is the development of integrated medical techno	BMBF under 16KIS1031			https://momentui
14	SAYSO	Standardisation of situationa	Handling the crises faced by modern societies often requires the coordi	CSA (H2020)	05/2017	06/2019	https://cordis.euro
15	RESPONDRONE	NOVEL INTEGRATED SOLUT	In case of a disaster, the rapid, effective and efficient response of first re	RIA (H2020)	05/2019	04/2022	https://respondro
16	ASSISTANCE	ADAPTED SITUATION AWAR	Crisis management depends on a set of prerequisites such as proactivity	RIA (H2020)	05/2019	07/2022	https://assistance
17	CoP1stRespond	Secured Collaboration Platfo	Security forces - from campus security and guarded communities to em	SME-1 (H2020)	08/2019	01/2020	
18	FS-UNIT	FS-UNIT: Light-weight, porta	Cardiac arrests can be fatal if not treated immediately. In many cases, ai	SME-1 (H2020)	05/2019	08/2019	https://cordis.eure
19	ABDRONE4LIFE	An electronic drone pilot and	Up to now, helicopters and vehicles have been widely used to transport	SME-1 (H2020)	08/2019	11/2019	https://cordis.euro
20	ZENEO	ZENEO® Adrenaline Needle-	Anaphylactic shock is an extreme allergic reaction that needs to be treat	SME-1 (H2020)	08/2019	11/2019	https://cordis.euro
21	EGM	A disruptive life-saving solut	Heart failure (HF) causes lung fluid congestion and pulmonary oedema	SME-1 (H2020)	02/2019	05/2019	https://cordis.euro
22	MrDoc	Development and commercia	The potential for artificial intelligence in healthcare is growing. When it	SME-1 (H2020)	08/2019	01/2020	https://cordis.euro
23	NO FEAR	Network Of practitioners For	NO-FEAR proposes to bring together a pan-European network of practit	H2020	06/2018	05/2023	https://cordis.euro
24	BroadWay	Innovation activity to develo	the BroadWay project will take the first procurement steps to enable 'in	H2020	05/2018	04/2022	https://cordis.euro
25	NG112	Next Generation 112	The NG112 architecture enables the modernisation of emergency comm	EENA	2019	05/2020	https://eena.org/e
26	EMYNOS	nExt generation eMergencY	Current emergency systems and 112 services are based on legacy teleco	RIA (H2020)	09/2015	02/2018	https://www.emv
27	NIGHTINGALE	Connecting Patients and Car	Safest, reliable, individualised care of patients at-risk of deterioration ne	RIA (H2020)	11/2016	09/2021	https://www.nigh
28	Medical Express	Optimal use of healthcare re	Delivering services with high quality in the most cost effective and effici	SME-2 (H2020)	12/2019	11/2021	https://cordis.euro
29	ARCSAR	Arctic and North Atlantic See	Mediterranean practitioners' network capacity building for effective res	H2020	09/2018	08/2023	https://cordis.euro

#### Figure 3: Project list (excerpt)

The initial search has revealed more than 80 projects of relevance. The project list will be further updated also to ensure good collaboration with upcoming projects during the iProcureSecurity PCP lifetime.

Main elements of the list can be found in the ANNEX.

#### 3.1.3 Suppliers & R&D Providers

To approach as many suppliers as possible during the Open Market Consultation a list of potential suppliers was established. This includes all kind of IT and Health IT providers that could be interested (independently if they already have an existing solution in place or not). It also includes R&D providers e.g., companies that work on relevant projects in the domain. To identify these suppliers, different methods were applied and combined including literature research, keyword search in different search engines and patent search.

For each supplier or R&D provider following information was collected: name of solution, type, sector, product categories, country, URL, contact and social media information.

ID	Supplier Name	Туре	Sector	Category examples (products)	Country	URL	Contact Email
1	L Treelogic	SME	IT	Intelligent assistance software for the S	Spain	https://www.treelogic.com/en/Health.htm	administracion@treetk.com
	2 Emergo Train		Ambulance Services	Triage training systems	Sweden	https://www.emergotrain.com/	
	8 Philips	LE	Medical Equipment		Netherlands	www.philips.com	
4	4 EID		Systems Engineering	Communication systems	Portugal	http://www.eid.pt/	
	5 OriginalSoft		Ambulance Services	Integrated administration and telecomr	Spain	http://original-soft.com/en/	web@original-soft.com
	5 Ortivus		IT	decision support, cloud	Sweden	https://www.ortivus.com/	info@ortivus.com
1	7 Siemens Healthineers	LE	IT, Medical equipment, Infrastr		Germany	https://www.siemens-healthineers.com/	https://www.siemens-healthineers.com/h
8	BIBM	LE	IT		US	https://www.ibm.com/at-de	https://www.ibm.com/de-de/marketing/c
9	9 Telefonica	LE	Telecommunication		Spain	https://www.telefonica.com/en/	https://www.telefonica.com/en/contact-u
10	Atos	LE	IT	Finance, Healthcare, Manufacturing	France	https://atos.net/es/spain	https://atos.net/en/contact-us
11	I Inmarssat	SME	Telecommunication	Emergency response, Disaster relief,	UK		https://www.inmarsat.com/en/support-an
13	2 VOMATEC Innovations	SME	IT	Security management, pandemic mana	Germany	https://rescuewave.de/?lang=en	info@rescuewave.de
13	3 ITK Engineering	SME	IT	AAL, Medical Apps, Medical Early warni	Germany	https://www.itk-engineering.de/en/indust	info@itk-engineering.de
14	4 Adashi Systems	SME	Public safety	First reponders systems	USA	https://www.adashi.com/	info@adashi.com
15	5 Schiller Medical		Healthcare IT	Emergency monitoring	Switzerland	https://www.schiller-medical.com/en	sales@schiller.ch
16	5 Dataminr	LE	IT	real-time event detection	US	https://www.dataminr.com/	info@dataminr.com
17	7 LIS GmbH		IT	emergency software systems	DE	https://lis-gmbh.com/	info@lis-gmbh.com
18	8 Unblur		IT	intelligent assistents for situational awa	Spain	https://www.unblur.co/	irene.schreiber@unblur.co
19	Airbus	LE	Aerospace, Security		France	https://www.airbus.com/en	
20	CityGIS		IT	geographic coordination & information	Netherlands	https://www.citygis.nl/en/	info@citygis.nl
21	L ELi Technology		IT	dispatchable location information	Canada	https://eli-technology.com/	info@eli-technology.com
22	2 MDgo		IT	sensors, tags, dashboards	Israel	https://www.mdgo.io/	
23	8 NEC Software Solutions		IT	tracking systems	UK	https://www.necsws.com/	
24	4 Avaya		IT	IT solutions	υк	https://www.avaya.com/en/	
25	BAYOOMED		IT	medical software solutions	DE	https://www.bayoomed.com/	info@bayoo.net
26	5 i5Health	SME	IT	decision support	UK	http://www.i5health.com/index.html	information@i5health.com

#### Figure 4: Suppliers and R&D providers list (excerpt)

Firstly, a long list was established that holds around 2000 organisations that had patents that were in general of relevance to the topic. Secondly, a short list of around 250 organisations was derived from the long list that hold patents or have products which were directly connected with triage management. The list will be constantly updated.

#### 3.1.4 Procurers

In addition, further relevant procurers across the EU, from the EMS domain were collected. This will be of relevance due to the fact that the iProcureSecurity PCP project established a growing Observer Board that will be able to get direct insights on the solutions that will be developed as well as gain more insights on the actual PCP process. Therefore, a longlist of EMS organisations and other potential public procurers (e.g., fire rescue, military that supports disaster resilience, health ministries or ministries in charge of disaster resilience) was created.

To identify further procurers an intensive keyword search has been performed in search engines and social media. Furthermore, also other projects have been screened for relevant procurers.

For each procurer following information was collected: procurer name, type, country, URL, contact and social media information.

ID	Procurer Name	Туре	Country	URL	Twitter	Facebook	YouTube	LinkedIn	Instagram
1	SUMMA112	EMS	Spain	https://www.comunidad.ma	https://www.twitter.co	-	https://www.yout	-	https://www.insta
2	EPES061	EMS	Spain	http://www.epes.es/	https://twitter.com/sa	https://www.face	https://www.yout	-	-
3	Transportes Sanitarios Sur de Córd	EMS	Spain	https://tsconline.es/		https://www.facel	https://www.yout	-	-
4	Frederiksborg Fire and Rescue	Fire Rescue	Denmark	https://fbbr.dk/					
5	SOS IATROI	EMS	Greece	https://www.sosiatroi.gr/en		https://www.facel	https://www.yout	https://www.linke	https://www.insta
6	First Aid Ambulance	EMS	Greece	https://www.firstaidambula					
7	Euro Ambulance	EMS	Greece	https://www.euroambulanc		https://www.facel			https://www.insta
8	Hellas Assistance	EMS	Greece	https://healthassistance.gr/		https://www.facel			https://www.insta
9	Ambulance 365	EMS	Greece	http://www.asthenofora365					
10	Express Ambulance	EMS	Greece	https://asthenoforaexpress.		https://www.face	https://www.yout	https://www.linke	
11	Ioannina Ambulance	EMS	Greece	https://www.asthenoforaioa					
12	Life Support	EMS	Greece	https://lifesupport.gr/		https://el-gr.faceb			
13	Hellenic Ambulance	EMS	Greece	https://www.hellenicambula					
14	HYGEIA	EMS	Greece	https://www.hygeia.gr/		https://www.face	https://www.yout	https://www.linke	https://www.insta
15	Falck	EMS	Denmark	https://www.falck.com/				https://www.linke	https://www.insta
16	Luxembourg Air Ambulance S.A.	EMS	Luxembourg	https://www.air-ambulance				https://www.linke	
17	Johanniter International	EMS	Belgium	https://johanniter.org/	https://twitter.com/JC		https://www.yout	https://www.linke	
18	Die Johanniter	EMS	Austria	https://www.johanniter.at/h					
19	IRC (Italian Resuscitation Council)	EMS	Italy	https://www.ircouncil.it/	https://twitter.com/ire	https://www.face	https://www.yout	https://www.linke	https://www.insta
20	European Air Ambulance (EAA)	EMS	Luxembourg	https://www.air-ambulance				https://www.linke	
21	ARES 118	EMS	Italy	https://www.ares118.it/		https://www.face			
22	Bundesministerium des Innern un	Ministry	Germany	https://www.bmi.bund.de/	https://twitter.com/Bl		https://www.yout		

Figure 5: Procurer list (excerpt)

The initial search has revealed more than 70 relevant procurers. The list will be further extended during the upcoming project activities.

#### 3.1.5 Multipliers

As additional part of the desk research, so-called multipliers were screened. This includes any cluster, network, association or other type of organisation that can help to spread the word about the project, the Open Market Consultations and the Call for Tender. This can be Health-IT clusters, as well as networks on disaster resilience as well as multipliers/competence centres that mainly focusing on innovation procurement of any kind.

To identify multipliers an intensive keyword search has been performed in search engines and social media. Furthermore, also other projects have been screened for relevant organisations.

For each multiplier following information was collected: name, type, aim, country, URL, contact and social media information.

ID	Name	Туре	Aim and Abstract	Country	URL		Facebook	YouTube	LinkedIn	Instagram
	1 European Resuscitation Council	EMS	The European Resuscitation Counc	Europe	https://www.erc.e	https://twitter.com	https://www.facel	https://www.yout		
	2 Cirulo de la Sanidad	IT Health	Non-profit association of individua	Spain	https://circulodela	https://twitter.com	-	-	https://www.linke	
	3 American Heart Association	Association	For nearly 100 years, the American	US	https://www.hear	http://www.twitte	https://www.facel	https://www.yout	https://www.linke	http://instagram.c
	4 British Heart Foundation	Foundation	Our vision is a world free from the	UK	https://www.bhf.c	https://twitter.com	https://www.facel		https://www.linke	https://www.insta
	5 European Risk & Resilience Institute (EU-VRi)	Organisation	European Risk & Resilience Institut	Germany	https://www.eu-v					
	6 INERIS-DEVELOPPEMENT	Network	INERIS DEVELOPPEMENT is a simp	France	https://en.ineris-c	https://twitter.com		https://www.yout	https://www.linke	
	7 Public Safety Communications Europe Forum	Organisation	PSCE, the Public Safety Communic	Belgium	https://www.psc-	https://twitter.com	https://www.facel	https://www.yout	https://www.linke	
	8 I-S-A-R Germany Stiftung	Foundation	The I · S · A · R Germany Foundatio	Germany	https://isar-germa	https://twitter.com	https://www.facel	https://www.yout		
	9 Safety Region South Holland South ( VRZHZ )	Organisation	The Safety Region South Holland S	Netherlands	https://www.zhzv	https://twitter.com	https://www.facel	https://www.yout	https://www.linke	
	10 International Fire Association	Association	CTIF was founded in 1900 in Paris	Slovenia	https://www.ctif.c		https://www.facel			
	11 Federation of EUropean fire officers (FEU)	Federation	The FEU is the independent profes	Luxembourg	https://www.f-e-u	https://twitter.com	https://www.facel		https://www.linke	
	12 European Emergency Number Association (EENA)	Association	Today, the EENA community includ	Belgium	https://eena.org/	https://twitter.com	https://www.facel	https://www.yout	https://www.linke	
	13 European Organisation for Security (EOS)	Organisation	The European Organisation for Sec	Belgium	http://www.eos-e	https://twitter.com			https://www.linke	
	14 Rescue Training Organisation	Organisation	Rescue Training International (R.T.I	Cyprus	https://rescuetral	https://twitter.com	https://www.facel	https://www.yout	https://www.linke	
	15 Hellenic Society of Emergency Prehospital Care	Organisation	Our initiative for the establishmen	Greece	https://eeepf.gr/					
	16 European Medical Association	Association	Created in 1990 by doctors from th	Europe	https://emanet.or	https://twitter.com	https://m.faceboo			
	17 Austrian Association of Emergency Medicine	Association	It is an organisation of doctors wor	Austria	https://www.aaer					
	18 ÖVKT	Association	"Association of Austrian Hospital E	Austria	http://www.oevkt					
	19 Belgian Society of Emergency and Disaster Medicine	Organisation	It is an organisation of doctors wor	Belgium	http://besedim.be	https://twitter.com	https://www.facel	https://www.yout	https://www.linke	
	20 Bulgarian Emergency Medical Services Association	Association	It is an organisation of doctors wor	Bulgaria	https://narsmpbg	https://twitter.com	https://www.facel	https://www.yout	https://www.linke	
	21 European Society for Trauma and Emergency Surger	Organisation	Our aim is to promote interest, know	Austria	https://www.este					
	22 Paramedic Association of Canada	Association	PAC is committed to leading the pr	Canada	https://www.para	https://twitter.com	https://www.facel		https://www.linke	
	23 Croatian Society of Emergency Medicine	Organisation	It is an organisation of doctors wor	Croatia	https://eusem.org	https://twitter.com	https://www.facel	https://www.yout	https://www.linke	
	24 Czech Society for Emergency and Disaster Medicine	Organisation	It is an organisation of doctors wor	Czech Republic		https://twitter.com	https://www.facel	https://www.yout	https://www.linke	
	25 Danish Society for Emergency Medicine	Organisation	It is an organisation of doctors wor	Denmark	https://www.dase	https://twitter.com	https://www.facel	https://www.yout	https://www.linke	
	26 Estonian Society of Emergency Physicians	Organisation	It is an organisation of doctors wor	Estonia	http://kiirabi.ee/ii	https://twitter.com	https://www.facel	https://www.yout	https://www.linke	
	27 Union of Estonian Medical Emergency	Organisation	It is an organisation of doctors wor	Estonia	https://euraxess.e		https://www.facel			
	28 International Federation of Hospital Engineers	Association	Association of European Hospital E	Europe	https://www.ifhe.					
	29 Finnish Society of Emergency Physicians	Organisation	It is an organisation of doctors wor	Finland	https://www.akuu					

#### Figure 6: Multiplier list (excerpt)

The initial search has revealed more than 115 relevant organisations. The list will be further extended during the upcoming project activities.

#### 3.1.6 Events

Furthermore, the desk research included relevant events that will allow the iProcureSecurity PCP consortium to reach out to all important target groups during the particular project phases, especially to announce the Open Market Consultations, the Call for Tender and later on also to highlight important outcomes and attract further procurers to the Observer Board. Events that attract EMS stakeholders, IT-industry as well as the innovation procurement sector were of special interest.

To identify events an intensive keyword search was performed in search engines and social media.

For each event following information was collected: date, name, country, city, organiser, type of event type of audience estimated impact and URL.

#### D2.1 Requirements for Triage Management Systems for Emergency Medical Services

ID Dat	Name of Event	Country (City)	Organiser	Type of Event	Type of	Estimated Impact		URL
YYYY-MM-DD(-DD in case					Audience	(Persons reached)		
of multiple days	)							
1 2022-01-15-19	International Meeting on Simulation in Heal	t US (Los Angeles)	SSH	Conference	All healthcare sta		500	https://imsh2022.org/about
2 2022-01-24-27	Arab Health	United Arab Emirates (Dubai)	Informa	Conference & Exhibition	All healthcare sta		5000	https://www.arabhealthonline.com/en/Home.html
3 2022-02-09-10	Intelligent Health AI	United Kingdom (England)	Intelligent Health AI	Conference	All healthcare sta		300	https://london.intelligenthealth.ai/
4 2022-03-15-16	Future Health Innovations	United Kingdom (England)	https://futurehealthinnovations.c	Conference	All healthcare sta		500	https://futurehealthinnovations.com/
5 2022-03-2	5 Chief medical doctor Spring meeting	Austria	ARC - Austrian Red Cross	Conference	MD		25	
6 2022-04-2	1 Spring meeting of commanders in charge	Austria	ARC - Austrian Red Cross	Conference	EMS		25	
7 2022-04-27-29	EENA2022	France/Marseille	European Emergency Number Ass	Conference	ALI healthcare sta		500	https://eena.org/
8 2022-05-03-05	GENEVA HEALTH FORUM	Hybrid (Switzerland)	Geneva Health Forum	Forum				https://dev.ghf2020.org/
9 2022-05-03-05	MedTech Forum 2022	Hybrid (Spain)	MedTech Europe	Forum	Potential supplier	s (medtech industry)		https://www.themedtechforum.eu/
10 2022-05-04-06	EMS Europe	United Kingdom (Scotland)	EMS Leadership Network	Conference	EMS		500	https://emseurope.org/
11 2022-05-04-07	Exposanità - 22nd international exhibition at	Italy	Bologna Fiere S.p.A. e Senaf S.r.l https://www.exposanita.it/it/org	Conference & Exhibition	All healthcare sta		4000	https://www.exposanita.it/en/
12 2022-05-17-19	Vitalis 2022 (the largest eHealth event in Sca	Sweden	The Swedish Exhibition & Congres	Conference				https://en.vitalis.nu/
13 2022-06-14-19	International Conference on Emergency Mer	Hybrid (Australia)	IFEM	Conference				https://icem2022.com/
14 2022-06-16-17	ICPDMCMD 2022	Canada/ Toronto	World Academy of Science Engine	Conference	All healthcare sta		2000	https://waset.org/prehospital-and-disaster-medicine-cris
15 2022-06-8-10	World Health Care Congress 2022	United States of America (National H	World Congress	Conference	All healthcare sta		500	https://www.worldhealthcarecongress.com/
16 2022-08-16-17	International Conference on Emergency Mer	Turkey	World Academy of Science, Engine	Conference				https://waset.org/emergency-medicine-conference-in-au
17 2022-08-26-27	ICEMSROHSE 2022: 16. International Confer	France	World Academy of Science, Engine	eering and Technology				https://waset.org/emergency-medical-services-research
18 2022-09-26-27	HEALTHCARE AUTOMATION AND DIGITALIZA	Switzerland (Zurich)	BGSgroup	Conference	All healthcare sta		500	https://2022.automahealth.com/
19 2022-01-19-20-21	Forum Interdisciplinary Intensive Care Media	Germany (Berlin)	MCN Medizinische Congressorgar	Congress	All healthcare sta	kholders		https://www.ai-online.info/kongresskalender/7663/forum
20 2022-03-10-11	13th German Interdisciplinary Emergency M	Germany (Koblenz)	MCN Medizinische Congressorgan	Congress	All healthcare sta	kholders		http://www.dink-kongress.de/allgemeine-hinweise.php
21 2022-03-21-22	Emergency Surgery Course	Austria (Graz)	ESTES	Course/Congress				https://www.estesonline.org/event-calendar/
22 2022-10-06-07	11th Interdisciplinary Course - Polytrauma C	Swiss (Zurich)	University Hospital Zurich	Course/Congress				https://www.usz.ch/veranstaltung/11th-interdisciplinary
23 2022-06-28-30	AirMed 2022	Austria (Salzburg)	OEAMTC Air Rescue Service	Congress	EMS			https://www.airmed2022.eu/#
24 2022-09-20-23	Security Essen	Germany (Essen)	Security Essen	Exhibition	Potential supplier	s (medtech industry)		https://www.security-essen.de/impulsgeber/
25 2022-11-20-23	Texas EMS Conference	US (Austin)	Sladek Conference Services	Conference	EMS			https://texasemsconference.com/

#### Figure 7: Events list (excerpt)

The initial search revealed around 40 relevant events. The list will be further extended during the upcoming project activities.

#### **3.2 Procurer Current Status Screening**

During the first months of the project the procurers were asked to capture the current status of triage management and main elements that have to be considered for a new solution. The goal was to identify all main aspects of the current situation to have a solid foundation that can be used during the upcoming steps (e.g., for the focus groups to identify requirements and to build individual use cases and process models further on).

All procurers were provided with a structured template that allowed them to internally collect relevant data on the current triage management processes. This was done through interviews and workshops based on typical scenarios that have to be handled (e.g., train, bus, plane accidents, earthquakes, floods etc).

#### Table 2: Involved contributors per procurer

	ARC	AREU	ASLBN	EKAB	HRC	EPES	IBB	SERMAS
Persons involved in data collection (interviews/workshops/etc.)	21	12	14	20	20	17	25	21

Following aspects were screened by each procurer:

Scenarios: Brief description of different scenarios where triage management took place.

ID	Name	Description	Specifics	Comment
1	Train derails in Limito, near the city of Milan (25	Commuter train with some 350 passengers	3 women dead, 46 people were injured.	Many difficulties in finding and accessing
	January 2018)	derails in countryside near Milan	Many more passengers in shock	the precise site of the accident situated in open country.
2	2 Small plane hits Pirelli skyscraper in Milano (18 April	A Rockwell Commander 112 airplane crashed	The crash resulted in the death of the pilot	Side effect of debris fall from the impact
	2002)	into the upper floors of the Pirelli Tower in	and two lawyers in the building. Sixty other	place on a big area surrounding the building
		Milan during office hours	people were injured in the building and on the ground.	with more possible injured peaople
3	Airplanes collision during take-off at Linate Airport	a MD-87 airliner carrying 110 people collided on	118 victims: passengers and crew	Major difficulties in communicating from
	of Milano (8 October 2001)	take-off with a Cessna Citation CJ2 with 4 people		the accident site due to congestion of
				communication lines
4	Building collapses due to gas leak explosion (30	Following a methane gas explosion in one of the	7 victims 13 injured	
	September 1994)	flats, the building in Viale Monza, 112, Milan, collapses		
5	Collapse of the Morandi bridge in Genoa (14 August	210-metre section of the viaduct Morandi in	43 victims, 16 injured	A large area under the bridge involved in
	2018)	Genoa collapsed during a rainstorm (14 August		the disaster with possible cascading
		2018)		consequences

#### Figure 8: List of Scenarios AREU (example)

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**Timeline of events:** Description of one scenario in detail. From the moment of the event to the final debriefing.

Time Code	Description of Event	Description of EMS activity	Involved roles	Comment
00:00	Train derails near the city of Milan (Limito)			
00:00	Many passengers start calling all emergency numbers (112, 113, 115, 118). All calls are routed to the Unified Response Centre (Milano PSAP)			
00:01	The first call arrives at the PSAP in Milan and is classified as a medical emergency.	Milano 1° level PSAP operators receive the calls, try to locate them, classify the nature of the emergency (medical, technical, crime, or a mix)	1st level PSAP operators	This is a first step in recognizing an event and a possible first hint to classify it as a Major Accident
00:01	Line dropped and the PSAP operator only transmitted the contact card to the EMS Control Centre	Milano 1° level PSAP operators transmit the call and collected data to the appropriate emergency operations centre (EMS, FB, LE)	PSAP operator and EMS Control Centre operator	It's crucial the swift availability of location information to the EMS CC in order to alert the right team
00:01	EMS Operator calls back the citizen and understands better the situation	Milano EMS Control Centre operators try to collect as many data as possible directly from the site of the event		
00:01	The second call arrived at the PSAP MI, it is classified as a road accident with injuries and forwarded to EMS Control Centre, and for information to the Fire Brigade Centre	Milano 1° level PSAP operators change classification and include fire brigade in emergency communication		
00:02	Many calls arrive within the next hour at one minute intervals and are forwarded to EMS Control Centre, and for information to the Fire Brigade Centre			too many duplicate calls divert the operators' attention from handling the event

#### Figure 9: Timeline of event AREU (example)

**Roles:** List of all roles that are involved in procurer organisation when it comes to triage scenario. Also, roles were considered that are essential for preparation and training actions.

ID	Role	Profession	Main Tasks during Triage	Education
1	1 Director of Medical Rescue (DSS)	Emergency Doctor	He is the doctor responsible for any medical	Medical Doctor. Resuscitation and
			intervention in the areas of operations.	intensive care specialist
2	2 Major Incident Coordinator (CIM)	Emergency operator: doctor / technician / nurse	Collaborates in the technical-sanitary	profession-specific
			management of the event. Together with the DSS	
			it coordinates operational staff and relations with	
			other rescue agencies	
3	3 Triage Director	Emergency nurse	A nurse in charge of coordinating	
			triage.responsibility covers:the performance of	
			triage, the sectorialization, supervision of	Emergency Medicine, Disaster
			operations, communications, definition of usage	Medicine
			of the Advanced Medical Post, coordinate the	
			supply of resources	
4	4 Transport Director	Emergency rescuer / technician / nurse	Determine the position of the checkpoint(s): the	
			compulsory point of passage for all vehicles	
			entering and leaving the site. Taking stock of the	
			available resources by communicating and	
			adjusting their movement according to the	Technical / Engineer
			requests of the Advanced Medical Post and the	
			DSS; taking stock of the available human resources	
			Registering incoming and outgoing vehicles using	
			special forms and more.	

#### Figure 10: Roles AREU (example)

**Vehicles:** List of all vehicles that are available for the procurer and would/could be used during triage scenarios. This also includes different versions of similar vehicles (e.g., ambulance car with different equipment configurations).

ID		Vehicle Name	Туре	Staff (roles and number of people on board)	Short Description
	1	Basic Life Support Vehicle	Ambulance	2 or 3 Rescuers	Ambulance with standard equipment and basic support crew: only
			(Van)		rescuers.
	2	Advanced Life Support Vehicle	Car/Ambulance	1 Doctor + 1 nurse + 1 Rescuer	Vehicle (car or van) with medical equipment: e.g. patient monitor,
					ultrasound machine and at lesat 1 doctor
	3	Middle Life Support Vehicle	Car/Ambulance	1 Nurse + 1 or 2 Rescuers	Vehicle (car or van) with medical equipment: e.g. patient monitor,
					ultrasound machine and at lesat 1 nurse
	4	HEMS	Helicopter	2 Pilots + 1 Doctor +1 Nurse + 1 Rescuers + 1 Alpine	Helicopter with full equipment aimed to operate in specific territories
				Technician	(e.g. alpine) ot to carry out specific rescue manoeuvres. The presence of
					a specilized technician permits to operate winch manoeuvres also in an
					urban environment
	5	Specialized Vehicles	Van	Specialized Teams	Van equipped with specific tools aimed to counteract critical situations
					like NBC.
	6	Emergency Train	Train	Various Doctor + Nurse + Rescuers and Train	A train ready to be moved near t an emergency place. Every single
				drivers	carriage is equipped with 4 intensive care beds.

Figure 11: Vehicles AREU (example)

ID Name	Туре	Example
11 Instruction Envelop	Paper Card	
12 Triage Wristband Box	Colorful plastic bracelets and containment box	
13 Triage Registration Cards	Paper Card	

#### Equipment: List of typical equipment that is used specifically during triage scenarios.

#### Figure 12: Equipment AREU (example)

**Stakeholders:** List of all other stakeholders which are involved during triage management scenarios. Especially the ones that the procurer organisation has to be in contact with.

ID	Organisation	Department	Role	Main Tasks
	1 Fire Brigades	Interior Ministry	Technical Rescue	Various depending on the real situation and on the nature of the emergency
	2 Low Enforcement	Interior Ministry	Secure the scene	Insure that the rescuers are able to operate in a secured situation
	Prefecture	Interior Ministry	Responsible of the emergency	High level responsibility of the emrgency situation
	4 Healthcare Local Authority	Regional Healthcare Authority	Healthcare situation supervision	Monitoring the situation and provide hospital and other healthcare resources
	5 Regional Healthcare Authority	Regional Government	High level monitoring	Assure all the resources outside the normality

#### Figure 13: Stakeholders AREU (example)

**Communication hardware:** Description of general lines of communication between different roles during the triage scenario and a list of hardware (e.g., radio, mobile phones etc.) that is used between these roles.

ID	Hardware Name	Туре	Format	Used mainly (by which roles)	to communicate with whom	Special features
	1 Radio	Tetra	Audio and simple data	everyone	Between them and Control Centre	Single network at Regional Level and connected to neighbours region
	2 Mobile Phones / Smartphone	Mainly Android phones	Audio Video and data	everyone	Between them and Control Centre	
	3 Communication App	Mobile App	Data	rescuers	EMS Control Centre	
	4 Remore workstation	Laptop	Everything	technician	EMS Control Centre	Remote station of CAD system
	5 LTE Public Safety	Network	Audio Video and data	experimental	EMS Control Centre	Special usage of public Mobile Network

Figure 14: Communication Hardware AREU (example)

**Data sources:** List of data sources that are used or potentially could be used during triage scenarios (e.g., weather forecast, traffic reports, patient records) and which roles need to have access to it during the scenario.

ID	Digital Data Source Name	Description	Who needs the data?	Restricted access
1	L Internal Early Warning System	A function included in the PSAP CAD system able to early spot possble critical big stuations	Every stakeholder interested in Emergency	YES
2	2 Wether Now Casting	Centro Meteo Lombardo	PSAPs EMS Control Centre, Teams on the field	NO
3	8 Regional Hospital & ER Dashboard	EUOL (Emergenza Urgenza On Line) is a sstem collectin automaticaly the data and information related to the load of any single Er in the region, as well as the situation of critical hospital reasources (Ors, CathLab, ICUS etc.)	EMS Control Centre and Coordinators at the Field	YES
2	Public Safety Common Dashboard (E015)	A dashboard managed by the Prefecture showing the situation of the territory	EMS Control Centre and Coordinators at the Field	YES
5	Media broadcating	TV - Radio - WWW	All	NO

#### Figure 15: Data Sources AREU (example)

**Triage algorithm(s):** Description of the triage algorithm that is currently used and if it differs based on incident type.

Description	Comment
The triage system used in the Lombardy Region is the S.T.A.R.T. system	The START results are substantially overtriaged. This overtriage is
The questions that arise are:	compensated for by the ease of application by most operators. START has
1) The patient walks/is able to walk	many positive aspects, such as being easy to teach and simple to use in the
2) The patient is breathing, and if so, respiratory acts will be assessed.	field. When performing START, the only treatment manoeuvres to be done
3) The patient has a radial pulse	are opening the airway in the non-breathing patient and direct compression
4) The patient carries out simple orders (consciousness)	of an external haemorrhage.

#### Figure 16: Triage Algorithm AREU (example)

**Legal and regulatory rules:** List of legal and regulatory rules that have influence on the triage management process.

 ID
 Name

 2
 Official Gazette no.109 of 12 May 2001 - D.P.C.M. February 13, 2001: "General criteria for the organization of medical aid in disasters"

 3
 Official Gazette No. 196 of 25 August 2003: "General criteria for the provision of drugs and medical devices" of a second level Advanced Medical Post that can be used in the event of a catastrophe ".

 4
 Official Gazette No. 200 of 29 August 2006 - Directive of the President of the Council of Ministers 13 June 2006: "General criteria on psychosocial interventions to be implemented in disasters".

 5
 Official Gazette No. 91 of 17 April 2008 - Directive of the President of the Council of Ministers 13 December 2007: "Procedure and forms of health triage in disasters".

#### Figure 17: Legal and regulatory rules ASLBN (example)

**Standards:** List of standards that are related to activities, equipment, communication etc. in triage scenarios.

ID	Name	Туре	Short Description
	1 EN 1789		Equipment of ambulance cars of different types
	2 Guidelines for triage card system	internal framework	how to use the patient card and the way of injured and non injured during a mass casualty scenario
	3 Guidelines for mass casualty managment	internal framework	structure, personal, leading functions, triage, control and command, material

#### Figure 18: Standards ASLBN (example)

**Cost types:** List of cost types that are related to triage scenarios.

ID	Туре	Name	Description
	1 Staff and volunteers	Personnel Costs	Cost per hour
	2 Cars		purchase
	3 Cars		running costs (petrol, insurance,

#### Figure 19: Cost Types ARC (example)

#### **3.3 Focus Groups**

The purpose of conducting Focus Groups with each procurer was to ensure that initially collected information on the current status of triage management is enriched and discussed between main persons/roles involved in typical triage scenarios. Based on discussing specific real scenarios, participants were able to identify from their experience and different perspectives what are currently the most relevant problems during the process but also identify what works well.

Based on the discussion of the current status of triage management as well as the current problems participants were asked to formulate a wishlist with their expectations of what a new triage management system should be able to do. This information was collected and structured. The outcome of this Focus Group also showed where additional insights from individual roles was necessary (e.g., technical interfaces, standards, regulation, processes etc.).

Each procurer performed at least 2 Focus Group. Each Focus Group involved around 6 – 10 participants. The Greek procurers EKAB and HRC conducted the Focus Groups together due to the fact that they already work closely together. The Focus Groups were conducted with a mix of relevant roles that are involved in triage management (e.g., practitioners working in the field during tirage, decision makers at higher levels, administrative staff, technical staff, medical staff, etc.). Follow-up focus groups/meetings/interviews then emphasised on particular aspects in detail (where this was necessary).

#### Table 3: Focus Group Participants per procurer

	ARC	AREU	ASLB	EKAB	HRC	EPES	IBB	SERMAS
Total Participants at Focus Groups	15	12	14	20	20	17	25	18

The procurers were provided with a clear guideline (see ANNEX) to ensure all data is collected in a standardized and consistent way. The guideline highlighted important aspects such as preparation, conduction and reporting of the focus groups. Below the general agenda to be followed by the procurers is shown. For each step additional information (e.g., introduction texts, presentations, reporting template) was provided. The focus groups were conducted in the local language to avoid language barriers.

#### 3.3.1 Focus Group Agenda

#### **Focus Group Agenda**

#### 1. Introduction [10min]

- □ Explain briefly what is the iProcureSecurity PCP project about
- Explain scope and goal of the Focus Group

#### 2. Tour the table [10min]

□ Short tour of the table: Who are the participants and what is their background?

#### 3. Presentation Triage Scenario [15min]

- □ Make a brief presentation of a "typical" mass casualty incident where triage was conducted by your organisation
- □ If possible, use some visualisations
- □ This will help the participants to think about their experience in such situations and will facilitate the discussion

#### 4. Discussion on Completeness of Scenario [15min]

- Ask the group if they think the provided description and shown steps show a complete picture or if anything should be added.
- □ Each participant should have the opportunity to add points from their professional role.

#### 5. Collection of problems / gaps / best practices of current practice [40min]

- □ When the group agrees on that the scenario is well represented the group should collect inputs from each role/area on following aspects:
- During which steps in the scenario improvement is needed, what is not working, where are often main problems coming up?
- What is working well and probably should not be changed?
- □ The inputs are collected in a structured way for everyone visible (flip chart / virtual whiteboard / reporting template)
- 6. Break [20min]
- 7. Wishlist [50min]
  - □ **Based on the collected inputs participants should formulate a Wishlist: "**I want a system that ..." (e.g., shows me how many casualties are at the location)
  - □ Each input should be connected with the role (and where possible also with the steps during the event)
  - □ The participants should indicate WHAT they expect from the system NOT how the system will do it.

#### 8. Sorting [15-20min]

□ The group will finally go through the wish list and try to sort it/ structure it according to basic criteria.

#### 9. End of Focus Group

#### 3.3.2 Reporting

To ensure all inputs from the focus groups were collected in a consistent manner the procurers were provided with a detail structured spreadsheet that collected all relevant information including:

- **Organisational aspects:** ID, number of participants, start and end time, audio/video recordings, moderator name;

- **Focus Group participants:** role, background information, work experience (in years) for each role;
- Scenario: timeline of the discussed scenario;
- **Critical Discussion points:** highlighting all important discussion topics, insights on challenges and problems;
- **Wishlist:** collected challenges and problems as well as innovation needs and expectations to a new triage management system as well as a first indication of the connected priority (must have / should have / nice to have).

ID	Challenges / Problem	I want a system that	Role (who formulates the wish/requirement)	Area	Priority
	Many calls arrive to the 1 <sup>°</sup> level PSAP answered by multiple operators. Each operator forward the call to the EMS without any link to the other related calls	A tool to help operators to link different emergency calls as related to a single event. An example is a synoptic cartographic view	Collected from event reports	Organisational / Technical	Should have
	Position provided to the PSAP by the cell 2 based location system is too rough to be useful in countryside situation	Provide automatically a precise position of the caller	Collected from event reports and from technician	Technical	Must have
	3 Coordination of PSAP1 operator	Identify calls very related each-other	ICT senior professional	Organisational / Technical	Should have
	In big event situation the communication system between Control Centre and 4 emergency fleet has to be elastic in order to make it possible to feed the crew with additional information	Is able to receive specific structured information related to the nature of the event	Doctor and Maxi coordinator	Technical	Must have
	It is very important to reduce redundant direct communication between the different stakeholder. Also the press and information media have to be controlled	Give the access to a common platform directly from the application used in the field to provide automatically the data to be shared	Doctor and Maxi coordinator	Organisational / Technical	Must have

Figure 20: Wishlist AREU (excerpt)

## 3.4 Requirements Mapping and Prioritization

All collected inputs from the procurers were translated to English and aggregated in one large overview to clearly map and discuss the requirements with all procurers in the next step.

The requirements were allocated according the project main challenges:

- Quick and accurate overview of casualties and their status,
- Decision support for better allocation of available resources and quicker support for casualties,
- Improved interoperability internally and with other first responders and relevant actors,
- Reduced handover times between ambulance transport and hospitals, and
- Insights for quality assurance and training measures.

ID	Торіс	Challenges / Problem	I want a system that	Role (who formulates the wish/requirement)	Area	Priority	ARC	AREU	ASLBN	EKAB/HRC	EPES	IBB	SERMAS
	Data sharing EMS/ Hospitals	Complicated to connect with hospitals to assign where which victims can be transported.	Gives an automatic status of available/occupied capacititles at relevant hospitals (including ICU beds, operating theaters)				x				x		
	Data sharing EMS/ Hospitals	Waste of time and inability to make the right decision	It should be possible to see which hospital is appropriate for the transfer of the patients who have undergone triage, according to the current hospital emergency department density.	Medical Doctor	Medical	Nice to have						x	
	Data sharing EM5/ Hospitals	Early Hospital alert but no plausible estimate of casualties could be a problem? High hospital response =means high hospital expectation of casualties to be managed and therefore reduce the routine activity? Alert even uninvolved hospitals?	Stable and reliable connection between the site and the EMS CC in charge to alert the hospitals a system that can send easily all the clinical information to the HQ and receiving hospitals before the arrival of the patients	Doctor and Maxi coordinator	Medical / Organisatio nal / Technical	Must have		x	x				
	Data sharing EMS/ Hospitals	Clinical information from the field is difficult to be sent to the headquarters of EKAB / hospitals	a system that can send easily all the clinical information to the HQ and receiving hospitals before the arrival of the patients Establishes models of coordination with the hospitals that receive the patient, so that the process is agile and mortality and morbidity are reduced.			Must have				x			x
	Data sharing EMS/ Hospitals	Right decision and right treatment	There should be a system that is sending applications from the scene to the cloud system. So that the right information can be accessed in the next stages (transport, emergency service, operating room)	Paramedic	Medical	Nice to have						x	
	6 Data sharing EMS/ Hospitals	Continuity of care	It has triage systems adapted to those existing in hospital emergencies										×
	Data sharing EMS/ Hospitals 7	Continuity of care	Optimizes the continuity of care between primary care, hospital and emergencies, achieving a functioning as a system										×

Figure 21: Aggregated Requirements (excerpt)

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In the next step the long list of aggregated requirements was cleaned up. Duplicates of entries were removed and entries that mentioned several aspects split up into individual requirements to ensure consistency and avoid ambiguity.

In addition to the procurer requirements also the gathered requirements that were found during the previous iProcureSecurity CSA project were screened and those which weren't mentioned by procurers were included to be further discussed with the partners if they are of relevance to them.

ID	Торіс	I want a system that	Priority>>	ARC	AREU	ASLBN	EKAB/HRC	EPES
			0 - 10 0 = not applicable 10 = highest priority (must have)					
Qui	ck and accurate overview of c	casualties and their status						
	Overview on victims							
		gives an overview on number of victims		10	10	10	10	10
		gives an overview on victim status (e.g. white, green, yellow, red, black)		10	10	10	10	10
		gives an overview on victim process step (e.g. field, triage tent, waiting for transport, in transport, hospital)		9	9	9	10	10
	Patient Tracking /Location							
		that shows the actual GPS position of the victim (e.g. on a map)		5	8	8	8	7
		allows to see the phase in which the victim is at the moment (field, triage tent, waiting for transport, transport, hospital)		7	9	10	10	10
		uses maps for visualisation		5	8	8	8	7
		provides cartographic tools		5	5	6	7	7
	Patient Identification							
		is able to ensure each victim has a unique identifier		10	10	10	10	10
		has the possibility to scan ID Cards of victims		8	7	8	8	10
		has the possibility of face recognition		7	5	6	5	5
		has the possibility of retina reading		1	5	3	0	5
		can access patients medical history/EHR (electronic health record)		5	5	8	5	10
		can include a photo of the victim		7	7	7	8	7
	Triage cards/Triage tags							
	Rasirs	is easy compact and chean and can replace paper based triage tags		6	7	8	10	10
		includes a device that can be attached to the victim		10	10	10	10	10
		automatically provides a unique identifier for the victim		7	10	10	10	10
		shows that the victim was triaged		10	10	10	10	10
		shows the current status/color of the victim		10	10	10	10	10
		is visible in dark environments		6	9	8	9	6
		is visible from afar		6	6	6	5	6
		is unaffected by environmental conditions (e.g. dust, liquid, impact)		5	9	10	10	10
		is reusable after use, easy to clean and non-allergic (skin contact)		8	8	10	10	10
		is not interfering with the treatment		5	7	9	10	10
		can recognize voice commands		5	6	6	6	6

#### Figure 22: Requirements Prioritization (excerpt)

After the list was cleaned up each procurer was asked to conduct internally a prioritization with their team. Each requirement was given a priority between 0 - 10. 0 represents not applicable and 10 represents the highest priority (must have). Finally, this led to a long list of 240 requirements. Essential requirements do not indicate a priority.

To ensure all partners have the same understanding of each requirement, each entry was discussed during a series of virtual workshops. This ensured that no requirement was missed, allowed to further specify requirements where needed, add new requirements that came up during the discussion and discard requirements which were not of relevance. The final list was then screened once more by each procurer to allow them to update prioritization based on new insights of the discussion.

In depth discussion of all requirements was time consuming but extremely important as it led to a better common understanding of what a new solution could look like and which features it should cover to best support the involved EMS roles in the process. In addition, it built the baseline for the next steps which focus on the creation of use cases and process models.

## **4** Structured Requirements

The following sections present an overview of initial requirements that were identified by the consortium. Each requirement consists of an ID, name, a clear description and the defined priority for the Buyers Group. Most requirements are common, but there are also some procurer-specific requirements included in the list (e.g., language requirements). The functional requirements were structured according to the main challenges of the project. Non-functional requirements were © 2022 iProcureSecurity PCP | H2020-SU-SEC-2020 | 101022061

allocated to one of the following categories: interoperability, connectivity, usability, performance, scalability, language. Furthermore, an initial set of parameters and measures that have to be taken into account were outlined. The section legal and regulatory requirements include aspects such as privacy, security and international regulations to be considered. The section organisational, staff and business requirements focus on topics such as installation of prototypes, procurement reporting and pilot feedback.

During the creation of the requirements the consortium partners agreed to use the term "casualty" in order to align the different partners' terminology. The latter is, in fact, different from country to country and this would have caused confusion and misunderstanding throughout the implementation of the activities. Thus, we increased the consistency of the document prepared by the consortium to avoid misinterpretation among relevant stakeholders (e.g., suppliers, experts). The consortium also works on a basic vocabulary to ensure similar understanding of additional relevant terms that might be named differently across European EMS systems.

The presented requirements in the following section are subject to adjustment as work relating to use cases and process models progresses.

## **4.1Functional Requirements**

ID	Requirement Name	The iProcureSecurity PCP solution shall	Priority
R 1.1.1	Role Management	differentiate between casualties and EMS practitioners, and between different roles of EMS practitioners.	10.0
R 1.1.2	Number of Casualties	display the number of casualties live, as they are being registered in the system.	10.0
R 1.1.3	Casualties Status	give an overview on casualty status (e.g., white, green, yellow, red, black).	10.0
R 1.1.4	Casualties Process Steps	give an overview on casualty process step (e.g., field, triage tent, waiting for transport, in transport, hospital)	9.6
R 1.1.5	Location of casualties- Geolocation	show the actual geolocation of each registered casualty (e.g., on a map).	9.6
R 1.1.6	Casualty Identification - Scan ID Card	provide the possibility to scan ID Cards of casualties (e.g., after initial triage, before transport).	7.3
R 1.1.7	Casualty Identification - Save ID Photo	allow to include a photo of the casualty.	6.3
R 1.1.8	Casualty Identification - EHR Access	access casualties' medical history/EHR (electronic health record).	6.1
R 1.1.9	Triage Tags - Basics - Device	include a device that can be attached easily to the casualty in any condition.	10.0
R 1.1.10	Triage Tags - Basics - Triage Conducted	show if the casualty was already triaged.	10.0
R 1.1.11	Triage Tags - Basics - Triage Status	show the current status/colour of the casualty.	10.0
R 1.1.12	Triage Tags - Basics - Allocate Unique ID	automatically provide a unique identifier for each casualty (one casualty one ID).	9.9

#### 4.1.1 Quick and accurate overview of casualties and their status

R 1.1.13	Triage Tags - Basics - Visible Dark	be visible in dark environments.	8.3
R 1.1.14	Triage Tags - Basics - Visible Afar	be visible from afar.	7.0
R 1.1.15	Triage Tags - Basics - Voice Commands	recognize voice commands.	6.6
R 1.1.16	Treatment - Central Information Hub	allow that the collected data on the casualty is sent to a central information hub (to be further visualised and processed).	10.0
R 1.1.17	Treatment - Triage Guidance	guide the user (e.g., paramedic) through the triage algorithm.	9.6
R 1.1.18	Treatment - Dashboard	show the relevant information to EMS staff (primary triage, treatment, transfer).	9.6
R 1.1.19	Treatment - Triage Suggestion	suggest triage algorithm based on vital signs.	8.9
R 1.1.20	Treatment - Triage Status Change	change status/colour based on vital signs.	8.6
R 1.1.21	Treatment - Triage History Offline Mode	have an integrated medical history of the case documenting all triage steps which can also be accessed when there is no network connection.	8.6
R 1.1.22	Treatment - Capture Vital Signs	be able to determine the casualties' vital signs (such as respiratory, circulation and consciousness status).	8.3
R 1.1.23	Treatment - Vital Sign Change Alert	be able to alert EMS staff in case of status or vital signs get worse.	8.3
R 1.1.24	Treatment - EHR Connection	be able to connect to and include information of EHR if available.	7.1
R 1.1.25	Treatment - Store Casualty Injury Photos	be able to store photos of casualties and their injuries.	6.3
R 1.1.26	Treatment - Speech to Text Recording	be able to perform speech to text/ natural language processing (e.g., to support the documentation)	5.9
R 1.1.27	Treatment - Audio Warnings	provide audio warnings (e.g., casualty was already triaged).	5.7
R 1.1.28	Treatment - Blood Loss Alert	be able to indicate if casualty suffers from blood loss/internal bleeding.	5.4
R 1.1.29	Treatment - Augment Photos with Comments	be able to highlight photos of casualty with additional comments.	5.3
R 1.1.30	Triage Tag Essential Information	provide essential information directly visible and readable off of the triage tag.	10.0
R 1.1.31	Triage Tag Extended Information	provide additional information through the interface of device that reads/writes data on the triage tag.	10.0
R 1.1.32	Triage Algorithm - Switch Algorithm	be able to perform different standard algorithms for adults and children (START, JumpSTART etc.).	10.0
R 1.1.33	Triage Algorithm - Adapt Algorithm	allow procurer to easily adapt triage algorithm according to own needs (incl. using own terminology).	10.0

R 1.1.34	Triage Algorithm - Step by Step	be able to perform triage algorithms step by step.	9.3
R 1.1.35	Triage Algorithm - Select Algorithm	allow procurer to select from existing triage algorithms.	8.0

## 4.1.2 Decision support for better allocation of available resources and quicker support for casualties

ID	Requirement Name	The iProcureSecurity PCP solution shall	Priority
R 1.2.1	User Preferences	allow users to set preferences (e.g., language) which are stored with the user account and / or as cookies.	10.0
R 1.2.2	User Enrolment	allow the enrolment of new users when necessary.	10.0
R 1.2.3	Onsite Management - Highlight Areas	automatically highlight areas to go / not to go.	10.0
R 1.2.4	Onsite Management - Central Data Collection/Access	collect all relevant data and allow particular roles to access it.	9.7
R 1.2.5	Onsite Management - Display Casualties Vital Signs	display the vital signs of the casualty (e.g., SpO2, EtcCO2, blood pressure, body temperature, EKD D2 derivation).	9.1
R 1.2.6	Onsite Management - Roles Checklist	include checklists of important actions and things to take into account for EMS staff onsite.	9.1
R 1.2.7	Onsite Management - Aggregated Information	provide a dashboard with main information (e.g., casualties, staff, resources).	9.1
R 1.2.8	Onsite Management - Save/Display Casualty Journey	captures and saves data from beginning of triage until casualties arrive in hospital (hand over process).	8.9
R 1.2.9	Onsite Management - Save/Display Location	show the exact location of the emergency.	8.7
R 1.2.10	Onsite Management - Save/Display Resources/Materials	provide an overview on all resources coming in and go out.	8.6
R 1.2.11	Onsite Management - Map Tool	provide cartographic tools using aerial images for onsite planning (e.g., to mark important areas).	8.3
R 1.2.12	Onsite Management - Save/Display Location of Resources/Materials	geolocate all resources and visualise them on a map.	8.3
R 1.2.13	Onsite Management - Collect/Display Information on Place	provide information on the place (e.g., possible accesses, recommended traffic detours, existence of inhabited, industrial places, waterways).	7.9
R 1.2.14	Onsite Management - Share Information on Place	provide information on the scene (e.g., area designated, boundaries, Advanced Medical Post with tents for each category, etc) also to other actors at the scene.	7.9
R 1.2.15	Onsite Management - Request new Resources/Materials	allow to request new materials and operational resources.	7.4

R 1.2.16	Onsite Management - Map Triage Point	clearly show the triage point.	7.4
R 1.2.17	Onsite Management - Save/Display Radio Channel Allocation	help to determine the operational channels of the Tetra Communications System for Emergencies, Security and Rescue to be used in the emergency.	7.4
R 1.2.18	Onsite Management - Save/Display Scenario Guidelines	highlight specific approaches/guidelines to be considered for different scenarios.	7.3
R 1.2.19	Onsite Management - Save/Display Staff Objectives	indicate objectives and priorities to the different Action Groups.	7.1
R 1.2.20	Onsite Management - Guide PMA Setup	support the setup and maintenance of Advanced Medical Post (small hospital) at the scene.	7.1
R 1.2.21	Onsite Management - Display Casualties Injuries	display photos of casualties and their injuries.	7.0
R 1.2.22	Onsite Management - Share Information on Surroundings	provide a connection to other FRs to inform persons living in the surrounding.	6.7
R 1.2.23	Onsite Management - Display Secondary Transport	provide information for secondary transport.	6.4
R 1.2.24	Onsite Management - Display Weather Conditions	provide information on weather conditions.	6.4
R 1.2.25	Onsite Management - Display Traffic Conditions	provide information on traffic conditions.	6.3
R 1.2.26	Onsite Management - Prepare Messages	trigger messages to inform public during event (e.g., instructions for inhabitants of the area)	5.6
R 1.2.27	Decision Support - Casualties Status	provide decision support on status based on condition of the casualty.	10.0
R 1.2.28	Decision Support - Required Hospitals	provide decision support on required type of hospital infrastructure (e.g., specialists for particular emergency/injuries).	10.0
R 1.2.29	Decision Support - Transportation	provide decision support which means of transportation (land, air) should be used.	9.4
R 1.2.30	Decision Support - Number of Hospitals	provide decision support on required number hospital infrastructure (e.g., ICU beds).	9.4
R 1.2.31	Decision Support - Number of Vehicles	provide decision support on required number of vehicles.	9.0
R 1.2.32	Decision Support - Types of Vehicles	provide decision support on required types of vehicles.	7.7
R 1.2.33	Decision Support - Number of Personnel	provide decision support on required number of personnel.	7.6
R 1.2.34	Decision Support - Type of Personnel	provide decision support on required types of personnel.	7.1

R 1.2.35	Decision Support - Quantity of Resources	provide decision support on required quantity of logistic resources (supplies).	6.9
R 1.2.36	Decision Support - Type of Resources	provide decision support on required type of logistic resources (supplies).	6.9
R 1.2.37	Decision Support - Environmental Conditions	provide decision support based on environmental conditions (e.g., weather).	6.4
R 1.2.38	Decision Support - Surroundings	provide decision support based on surrounding population, buildings and other vulnerable elements.	6.3
R 1.2.39	Decision Support - Perimeter	propose the perimeter of the area to be isolated.	6.3
R 1.2.40	Decision Support - Suggest Zones	support the establishment of the emergency intervention zoning (e.g., distinction between red and green zone).	6.3
R 1.2.41	Decision Support - Display Incident Assessment	automatically make an assessment of the incident based on type of event, location and environmental conditions (e.g., weather, traffic).	6.0
R 1.2.42	Staff Management - Display Staff Location	visualize the position of staff in the area on a map (only onsite during triage management).	8.0
R 1.2.43	Staff Management - Define Staff Types	be able to capture special groups, staff and volunteers.	6.4
R 1.2.44	Staff Management - Check-in/Check-out Staff of Location	provide the possibility to register (check-in/check-out) staff entering or leaving the site.	5.9
R 1.2.45	Staff Guidance - Read/Write Checklist/Guidance Cards	allow to check off completed tasks (interactive checklists with alerts).	9.4
R 1.2.46	Staff Guidance - Display Staff Guidance	give easy to follow "first-aid" guidance for staff.	9.4
R 1.2.47	Staff Guidance - Task Reminder	trigger certain tasks from the checklist and remind staff.	9.3
R 1.2.48	Staff Guidance - Adapt Checklist/Guidance Cards	provide digital version of guidance cards and checklists for all roles.	9.1
R 1.2.49	Logistics - Updates	help to update the logistics department to provide new supplies.	7.0
R 1.2.50	Logistics - Database Connection	be able to connect to material database and synchronize with incident management system.	7.0
R 1.2.51	Logistics - Display Resource Overview	provide real time information on available materials.	6.9
R 1.2.52	Logistics - Supply Chain Support	help the supply chain.	6.7
R 1.2.53	Logistics - Write Resource Usage	record usage of materials for each casualty.	5.4

ID	Requirement Name	The iProcureSecurity PCP solution shall	Priority
R 1.3.1	Data Sharing with EMS - Record Casualty Journey	record all steps performed with the casualties.	10.0
R 1.3.2	Data Sharing with EMS - Share Information Red Zone	share information about red zones / danger zones.	8.4
R 1.3.3	Data Sharing with EMS - EMCC	be able to store and exchange images (e.g., to share it with EMCC).	7.9
R 1.3.4	Communication - Push to Talk	provide push to talk functionality.	7.4
R 1.3.5	Communication - Fail Safety Store Data	store messages/data when communication is blocked.	10.0
R 1.3.6	Communication - Fail Safety Timestamps	show clear timestamps for all main information.	9.0
R 1.3.7	Communication/Fail Safety Timestamp Alert	highlight if timestamps are outdated (e.g., due to missing network connection).	7.9

#### 4.1.3 Improved interoperability internally and with other first responders and relevant actors

#### 4.1.4 Reduced handover times between ambulance transport and hospitals

ID	Requirement Name	The iProcureSecurity PCP solution shall	Priority
R 1.4.1	Data Sharing with EMS - Share Information on Hospitals	show available hospital infrastructure (number, types).	10.0
R 1.4.2	Data Sharing with EMS - Share Information on Hospital Capacity	show current capacity of hospitals (e.g., free ICU beds, operating theatres etc.).	10.0
R 1.4.3	Data Sharing with EMS - Alert Hospitals	alert hospitals which casualties are transported to them.	9.0
R 1.4.4	Data Sharing with EMS - Share Information on Casualties	be able to send clinical information of casualties to hospitals before they arrive.	9.0
R 1.4.5	Data Sharing with EMS - Share Information on Treatment	provide remote medical guidance to healthcare teams in the field.	6.6

#### 4.1.5 Insights for quality assurance and training measures

ID	Requirement Name	The iProcureSecurity PCP solution shall	Priority
R 1.5.1	Evaluation - Report Number of Casualties	reports on number of casualties and their status.	10.0
R 1.5.2	Evaluation - Store Data	store all data that allows evaluation after incident.	10.0

R 1.5.3	Evaluation - Store Internal Communication	document/report internal communication.	10.0
R 1.5.4	Evaluation - Report Hospital Number and Type	be able to report on the available/used hospitals in the area, their occupancy rate and their focus for certain injuries/treatments.	10.0
R 1.5.5	Evaluation - Report Event Timeline	be able to store and visualize the timeline of event.	9.1
R 1.5.6	Evaluation - Automatic Standardized Reports Internal	provide automatically a standardized report after the end of the event.	8.6
R 1.5.7	Evaluation - Store External Communication	document/report external communication (e.g., with other First Responders).	8.3
R 1.5.8	Evaluation - Automatic Standardized Reports External	create automatic reports that can be shared with externals (e.g., civil protection board).	8.3
R 1.5.9	Evaluation - Map View	be able to show a map of the scene with allocation of different areas (e.g., triage tent, transport etc.).	7.7
R 1.5.10	Evaluation - Report Vehicle Number and Type	be able to report on the number and type of vehicles used in the event.	7.6
R 1.5.11	Evaluation - Operational Structure	report on the operational structure that was applied.	7.6
R 1.5.12	Evaluation - Environmental Factors	report on environmental factors (e.g., areas that are hard to reach, weather, routes/traffic).	6.6
R 1.5.13	Evaluation - Voice Commands	be able to collect data also by voice commands.	6.6
R 1.5.14	Evaluation - Report Equipment	report on the used equipment.	5.9
R 1.5.15	Evaluation - Store/Display Scene Images	show in the report images from the scene.	5.4
R 1.5.16	Evaluation - Store/Display Emergency Calls	be able to save the number of emergency calls for the event.	4.4
R 1.5.17	Evaluation - Operation Efficiency	report on the efficiency of the operation.	3.6
R 1.5.18	Evaluation - Operation Role Performance	report on the performance of particular roles.	3.4
R 1.5.19	Training - Interactive Checklists	use interactive checklists for training.	7.7
R 1.5.20	Training - Simulation of Event	offer data for disaster simulation to be used on the training field.	7.7
R 1.5.21	Training - AR Training Solutions	offer data to be used for artificial vision/augmented reality training solutions.	6.4

# **4.2Non-Functional Requirements**

## 4.2.1 Interoperability

ID	Requirement Name	The iProcureSecurity PCP solution shall	Priority
R 2.1.1	Interoperability - Harmonized Terminology	use a harmonized terminology.	9.7
R 2.1.2	Interoperability - API Legacy Systems	be able to communicate through APIs with existing/legacy systems.	9.7
R 2.1.3	Interoperability - Central Information Hub API Endpoint	be able to instantly share information with all other EMS stakeholders via a central platform.	9.6
R 2.1.4	Interoperability - Information Flows	improve information flows between the different levels of care (primary care, specialized care and emergencies).	9.6
R 2.1.5	Interoperability - Mobile Application	allow to collect data with a mobile application.	9.4
R 2.1.6	Interoperability - Data Sharing Hospital	ensure a quick and complete handover of data to the hospital.	9.4
R 2.1.7	Interoperability - Real- Time Updates	constantly update the data based on the evolution of the scenario.	9.4
R 2.1.8	Interoperability - Data Sharing EMCC	have real time connection with EMCC.	9.3
R 2.1.9	Interoperability - Data Sharing EMS	have an integrated communication system for emergency management.	9.1
R 2.1.10	Interoperability - Automatised Data Collection	facilitate automatisation of data collection to prepare/manage the site.	9.0
R 2.1.11	Interoperability - Data Sharing EMS Crews	support handover processes between EMS crews.	8.7
R 2.1.12	Interoperability - Data Sharing Other First Responders	collect harmonized data.	8.7
R 2.1.13	Interoperability - Data Sharing Other First Responders	be able to instantly share information with other First Responders (e.g., fire rescue, police, military).	8.0
R 2.1.14	Interoperability - Telemedicine Tools	be able to connect to existing telemedicine and e diagnostic tools.	7.7
R 2.1.15	Interoperability - Telemedicine Support	allow medical support of healthcare teams in the field.	6.6
R 2.1.16	Interoperability - EHR	provide connection with available EHR.	6.3
R 2.1.17	Interoperability - Pilot Servers	be hosted on servers physically located in EU and/or the countries of the pilots according to GDPR and national laws.	10.0
R 2.1.18	Interoperability - Pilot API Legacy Systems	be able to exchange information (read and write data) with the systems of the Austrian/Greek/Italian /Spanish/Turkish procurers.	10.0

R 2.1.19	Interoperability - Pilot	be compatible with existing software in the procurers'	10.0
	API Legacy Systems	organizations.	

## 4.2.2 Connectivity

ID	Requirement Name	The iProcureSecurity PCP solution shall	Priority
R 2.2.1	Connectivity - Mobile Network	use available mobile networks.	10.0
R 2.2.2	Connectivity - Local Network	be able to run without public networks (e.g., can establish local network).	9.7
R 2.2.3	Connectivity - 5G	be compatible with 5G.	9.0

#### 4.2.3 Usability

ID	Requirement Name	The iProcureSecurity PCP solution shall	Priority
R 2.3.1	Usability - Device Support	run on mobile phones and tablets.	10.0
R 2.3.2	Usability - Ease of use	be easy to use.	10.0
R 2.3.3	Usability - No Training	be used without the need for special training.	10.0
R 2.3.4	Usability - Flexible Scenarios	be usable in any kind of scenario.	10.0
R 2.3.5	Usability - Triage Tag Robustness	be unaffected by environmental conditions (e.g., dust, liquid, impact).	9.6
R 2.3.6	Usability - Triage Tag Reusability	be reusable after use.	9.4
R 2.3.7	Usability - Triage Tag Hygiene	be easy to clean.	9.4
R 2.3.8	Usability - Triage Tag Non-Allergic	be non-allergic (skin contact).	9.4
R 2.3.9	Usability - Visualizations	offer all data in a visual easy to digest way.	9.4
R 2.3.10	Usability - Quick Decision Making	support quick decision making.	9.4
R 2.3.11	Usability - Flexible Checklists	provide an easily adaptable checklist.	9.4
R 2.3.12	Usability - Central Monitoring	allow central monitoring of all data (e.g., to minimize staff for re-triage).	9.3
R 2.3.13	Usability - Triage Tag Environmental Conditions	be unaffected by environmental conditions (works in dark, can get wet, dusty etc.).	9.1
R 2.3.14	Usability - Triage Tag Undisturbing	not interfere with the treatment.	8.7
R 2.3.15	Usability - Triage Tag Small Size	have a small size/form factor (especially the triage tag).	8.7

R 2.3.16	Usability - Language	provide multi language support.	8.3
R 2.3.17	Usability - Primary and Secondary Triage	be used for primary and secondary triage.	7.9
R 2.3.18	Usability - Guide Triage	provide advice to the staff performing triage steps.	7.6
R 2.3.19	Usability - Scenario Evaluation	shall support optimization of handling Mass Casualty Incidents (MCIs).	7.6

## 4.2.4 Performance

ID	Requirement Name	The iProcureSecurity PCP solution shall
R 2.4.1	Performance - Capacity Users	support a sufficient number of simultaneous users accessing the solution.
R 2.4.2	Performance - Capacity Data (any)	support a sufficient number of data entries of any kind without loss of data and without restrictions to any user type.
R 2.4.3	Performance - Latency and Response Time	be usable with delay no greater than 0.5 ms.
R 2.4.4	Performance - Actors	support different roles/actors.
R 2.4.5	Performance - Offline Behaviour	work well when there is no internet connection; e.g., caching of changes.

#### 4.2.5 Scalability

ID	Requirement Name	The iProcureSecurity PCP solution shall
R 2.5.1	Scalability - Extendibility	be able to allow for new functionality (e.g., adding a new parameter) to be included in one or more parts of the solution.
R 2.5.2	Scalability - Instantiating	be able to be reproduced in a similar setting in form of a new instance (e.g., another EMS provider).
R 2.5.3	Scalability - Reproducibility	be easily reproducible/replicable to large amounts of users across different geographic regions.
R 2.5.4	Scalability - Interfaces	provide the necessary interfaces based on the different user roles (as defined in the use cases).

## 4.2.6 Language

ID	Requirement Name	The iProcureSecurity PCP solution shall
R 2.6.1	Language - English	be available in English.
R 2.6.2	Language - German	be available in German.
R 2.6.3	Language - Greek	be available in Greek.
R 2.6.4	Language - Italian	be available in Italian.
R 2.6.5	Language - Spanish	be available in Spanish.
R 2.6.6	Language - Turkish	be available in Turkish.
R 2.6.7	Language - Flexibility	allow to add additional languages easily.

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R 2.6.8	Language -	allow to change terminology easily.
	Terminology	

## **4.3**Parameter and Measuring Units Requirements

ID	Parameter	Measure
R 3.1.1	Casualty Assessment	Evaluate ABCDE (Airway, Breathing, Circulation, Disability, Exposure)
R 3.1.2	Casualty Respiration	Yes/No
R 3.1.3	Casualty Respiratory Rate	Breaths per minute (bpm)
R 3.1.4	Casualty Airway Condition	Patent /Not Patent
R 3.1.5	Casualty Radial Pulse	Yes/No
R 3.1.6	Casualty Capillary Refill	Less than 2s/ More than 2s
R 3.1.7	Casualty Follow Simple Commands	Yes/No
R 3.1.8	Casualty Walking	Yes/No
R 3.1.9	Casualty Consciousness	Yes/No
R 3.1.10	Casualty Blood Oxygen Saturation	SpO2 (SAT02)
R 3.1.11	Casualty Blood Pressure	mm Hg
R 3.1.12	Casualty Body Temperature	٥C
R 3.1.13	Casualty Cardiac Frequency	Beats per minute (bpm)
R 3.1.14	Casualty Pregnancy Status	Yes/No
R 3.1.15	Casualty CBRN Status	Yes/No (chemical, biological, radiological, or nuclear)

## 4.4Legal and Regulatory Requirements

#### 4.4.1 Security

ID	Requirement Name	The iProcureSecurity PCP solution shall
R 4.1.1	Security - Authentication	enable authentication using existing or preferred authentication techniques of the eight procurers.
R 4.1.2	Security - Authorization	be able to ensure only the authorized roles have access to data that is relevant for them.
R 4.1.3	Security - Integrity	ensure highest data security and data integrity.
R 4.1.4	Security - Policy	develop a security policy with respect to the processing of personal data.
R 4.1.5	Security - Impact Assessment	undertake an impact assessment of potential security and privacy risks arising as a result of the use of the solution.
R 4.1.6	Security - Strategy	develop a strategy for the case that, despite the security measures, a breach of security occurs (e.g., this can be theft,

		deliberate attack on the systems, unauthorised use of data by staff members, etc.).
R 4.1.7	Security - Measure Encryption	provide necessary equipment and measures to ensure user and data privacy by encrypting to recent standards all account related information and / or other databases.
R 4.1.8	Security - Measure Firewall	provide necessary equipment and measures to ensure user and data privacy by installing a firewall.
R 4.1.9	Security - Measure HTTPS	provide necessary equipment and measures to ensure user and data privacy by only allowing access to data through a https- encrypted web connection.
R 4.1.10	Security - Measure Intranet	provide necessary equipment and measures to ensure user and data privacy by allowing access to data only within a restricted domain and / or intranet.
R 4.1.11	Security - Measure VPN	provide necessary equipment and measures to ensure user and data privacy by allowing access to data, if applicable inside and / or outside of the restricted domain, via a virtual private network (VPN).
R 4.1.12	Security - Breach Notification	notify the users in case of security breaches by explaining the nature of the breach, contact information about the organisation and how the users can mitigate any possible adverse impact of the breach.
R 4.1.13	Security - Incident	ensure a timely response to incidents reported by the national Computer Emergency Response Team (CERT).
R 4.1.14	Security - Profile	develop a security profile which can be certified according to Common Criteria for Information Technology Security Evaluation (ISO/IEC 15408).

#### 4.4.2 Privacy

ID	Requirement Name	The iProcureSecurity PCP solution shall
R 4.2.1	GDPR Compliance	ensure full compliance with GDPR.
R 4.2.2	Privacy - Policy	develop a privacy policy with respect to the processing of personal data, inc. pseudonymised data.
R 4.2.3	Privacy - Policy Communication	provide the user with complete information on its privacy and security policies during registration and later through navigation in the user interface.
R 4.2.4	Policy - Enforcement	ensure disciplinary measures will be adopted in cases where any breach of the policy occurs
R 4.2.5	Privacy - Access Control	govern access to the solution by username and secure password (in compliance with regional/national/European data protection legislation).
R 4.2.6	Privacy - Access Record	create an audit trail of access, and provide access to such audit trail if requested by the casualty.
R 4.2.7	Privacy - Casualty Access	have the capacity to provide casualties with access to data concerning them or their care in an understandable and shareable format.

R 4.2.8	Privacy - Consent Form	provide a consent form in either written and / or in electronic form.
R 4.2.9	Privacy - Consent Treatment	consent to use of iProcureSecurity PCP tool will be informed, explicit, unambiguous and recorded.
R 4.2.10	Privacy - Consent Research	consent to re-use data for research purposes will be collected separately from consent to use data for care purposes. Data used for research purposes will be anonymised or pseudonymised format if possible.
R 4.2.11	Privacy - Consent Withdrawal	allow for withdrawal of the individual's consent either written and / or in electronic form. A policy in deletion or not if already collected information will be adopted.
R 4.2.12	Privacy - Data Correction	allow for any individual requesting to correct data related to his or her data where an error is found, such correction should be visible.
R 4.2.13	Privacy - Consent Marketing	require specific consent to provide marketing material in any form prior to inclusion in any marketing action.
R 4.2.14	Privacy - Cookies	provide the user (prior to a successful registration) with information about the purpose of storage or access to information gathered by cookies and ask for the user's consent to use such type of devices.
R 4.2.15	Privacy - Disclosure	use disclosure due to its nature of being a project involving different partners and the need of evaluation on an international level.
R 4.2.16	Privacy - Breaches	report any breaches of the data system.

### 4.4.3 Regulations

ID	Requirement Name	The iProcureSecurity PCP solution shall
R 4.3.1	Regulations - Organisation MCI Protocols	comply with the existing protocols and regulations for MCIs in each organization.
R 4.3.2	Regulations - European MDR	use sensors to measure and collect certain parameters. In such cases, the devices offered shall be in line with the European Medical Device Regulation (REGULATION (EU) 2017/745 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL)

## 4.5Organisational, Staff and Business Requirements

### **4.5.1** Installation of Prototypes and Systems

ID	Requirement Name	The iProcureSecurity PCP solution developer will
R 5.1.1	Prototype Installation V1	install the necessary prototype system v1 at the premises of each of the eight procurers. Alternatively, the developer will provide access to a lab environment in order to test the prototype by at least 10 users of each of the procurers.
R 5.1.2	Prototype Installation V2	install the necessary prototype system v2 at the premises of each of the eight procurers. Alternatively, the developer will provide access to a lab environment in order to test the prototype by at least 10 users of each of the eight procurers.

R 5.1.3	Pilot System Introduction	introduce the pilot system at the premises of each of the procurers in close collaboration with procurer representatives. System introduction includes installation of the solution and preparation of user devices for rollout. On-site testing will be done to reveal and resolve any issues that prevent the system from working properly at the premise (e.g., during exercises).
R 5.1.4	Pilot Operation Maintenance	maintain the operation of all systems at each site at full quality. A team will be available to the site management to physically and/or remotely resolve any issues and problems that prevent the system from working as desired.
R 5.1.5	Helpdesk and Maintenance Support	set-up and operate a help service and maintenance response team to address problems faced by end-users. This service will be provided at each of the eight sites.

#### 4.5.2 Procurement Reporting

ID	Requirement Name	The iProcureSecurity PCP solution developer will
R 5.2.1	Procurement Reporting - Phase 1 Status Updates	report on the progress of "Phase 1: iProcureSecurity PCP Service Models & Specifications" in monthly status calls.
R 5.2.2	Procurement Reporting - Phase 2 Status Updates	report on the progress of "Phase 2: iProcureSecurity PCP Prototype Systems" in monthly status calls. This applies to both periods - prototype v1 and v2.
R 5.2.3	Procurement Reporting - Phase 3 Status Updates	report on the progress of "Phase 3: iProcureSecurity PCP Implementation & Operational Testing" in monthly status calls.
R 5.2.4	Procurement Reporting - Helpdesk	report on the progress of the work related to running a helpdesk and a response team to address problems faced by end-users in monthly status calls. This service will be provided at each of the eight sites.
R 5.2.5	Procurement Reporting - Quality Management	provide a quality management and certification strategy which may also allow for certifying the solution as medical device if necessary. Standards such as UNI-EN-ISO 9000, UNI-EN-ISO 13485 may apply.

## 4.5.3 Pilot Feedback

ID	Requirement Name	The iProcureSecurity PCP solution shall
R 5.3.1	Pilot Feedback - Evaluation Section	contain a section which can be easily adapted in order to implement various modes of evaluation and feedback instruments.
R 5.3.2	Pilot Feedback - Evaluation Questionnaires	enable the display and answering of evaluation questionnaires to be filled out by end users.
R 5.3.3	Pilot Feedback - Bug reports	enable a simple, easy to use error/bug reporting and general feedback module that allows end users to almost instantly submit feedback on the solution.
R 5.3.4	Pilot Feedback - FAQ	contain a section with an FAQ.

## **5** Conclusion

The work presented in this deliverable provides an overview on the extensive data collection, screening, analysis and prioritization activities the iProcureSecurity PCP consortium conducted during the first project months. Due to the COVID-19 situation, constantly changing travel restrictions and the fact that the majority of partners in the consortium work in the healthcare sector that plays a crucial role in the fight against the pandemic, the project was not able to hold any physical meetings to discuss key aspects in face-to-face situations. However, this was compensated with many virtual meetings and strong engagement of all partners in the project.

Based on the established initial requirements in the following steps clear use cases and process models will be created as part of Task 2.4. Consequently, also the list of requirements will be further updated and refined. In addition, further relevant inputs are expected to be revealed through the Open Market Consultations (events, survey etc.) and through activities with the Expert and Advisory Board and the Observer Board.

## **ANNEX I: Focus Group Guideline**

# iProcure Security PCP

Pre-Commercial Procurement of Innovative Triage Management Systems Strengthening Resilience and Interoperability of Emergency Medical Services



**Focus Group Guide** 

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## Introduction and purpose of the focus group

The iProcureSecurity PCP project foresees to conduct a series of focus groups during the initial months to collect and structure all relevant information on how currently triage management is handled by the individual procurers (EPES, SERMAS, ARC, ASLBN, AREU, HRC, EKAB, IBB). Furthermore, the process should highlight current capability gaps and innovation needs in the particular organisations. Based on these gaps and needs clear requirements are formulated that will be the basis for the tender documents and which will ensure that suppliers come up with concrete ideas and prototypes that exactly fulfil these mentioned requirements in the later phases of the project.

The purpose of conducting Focus Groups is to ensure that the initial collected information from each procurer is enriched and discussed between main persons/roles involved in typical triage scenarios of the procurer.

Based on discussing specific (real) cases, participants will be able to identify from their experience and different perspectives what are currently the most relevant problems during the process but also identify what works well.

Based on the discussion of the current status of triage management as well as the current problems participants are asked to formulate a Wishlist with their expectations of what a NEW triage management system should be able to do. This information is collected and structured. The outcome of this Focus Group will also show where more insights from individual roles is necessary (e.g., technical interfaces, standards, regulation, processes etc.). These will be discussed in a follow-up meeting/Focus Group.

## General approaches to be followed

Focus groups have to be conducted from each procurer (EPES, SERMAS, ARC, ASLBN, AREU, EKAB, HRC, IBB).

**Ensure the initial screening of the triage management** ("iProcureSecurity PCP Current Status Triage Management.xls") **is completed and all relevant inputs are available in the document.** 

Each focus group should involve around 6 – 10 participants.

The initial focus group should involve a mix of relevant roles that are involved in triage management (e.g. practitioners working in the field during tirage, decision makers at higher levels, administrative staff, technical staff, medical staff, ...). Follow-up focus groups/meetings can then emphasis on particular aspects in detail (where this is necessary).

Please also keep into account following aspects:

#### Preparation

- Decide in which language the focus group will be done (local language or English)
- If translations are needed the iProcureSecurity Glossary might be helpful: <u>https://www.iprocuresecurity.eu/knowledge/glossary</u>
- Ensure the participants understand the background of the Focus Group and why their input is important. E.g.
  - "The provided input will have direct influence on the solutions that will be built"
  - "Having a clear and comprehensive overview of the status quo of triage management will allow the organisation to better adapt to such scenarios on the long run"
- Let participants sign the Informed Consent sheets (can be found in the "Focus Group Package") before the Focus Group starts. Collect the informed consent sheets and keep them on file (no need to forward them to the coordinator).

#### **During the FG**

- Be neutral throughout the discussion.
- Never suggest answers to the respondent or emphasize one response choice over another.
- Do not judge what your respondent says ("Every answer is right"). Show understanding for their difficulties and their point of view.
- Maintain a conversational style and formulate questions to maintain a flow of the conversation. Avoid a succession of nearly closed questions/questions to which only short answers can be provided.
- Trust: Establishing some degree of trust within the Focus Group. Respondents provide information out of their free will and they should understand the principles of anonymity. Always ensure that you are perceived as neutral, not only by showing appropriate conduct during the Focus Group but also in the way the Focus Group is organized and the way in which questions are formulated.

## Agenda / Implementation of the Focus Group

Please follow the agenda (to ensure we conduct the Focus Groups in a similar way at each procurer):

#### 1. Introduction [10min]

- □ Explain briefly what is the iProcureSecurity PCP project about (make use of the *Introduction for Participants.doc* in the Focus Group Package)
- □ Explain scope and goal of the Focus Group (make use of the *Introduction for Participants.doc* in the Focus Group Package)

#### 2. Tour the table [10min]

- □ Short tour the table: Who are the participants and what is their background?
- □ Enter the data directly in the *iProcureSecurity PCP Focus Group Reporting Template.xls*.

#### 3. Presentation Triage Scenario [15min]

- □ Make a brief presentation of a "typical" mass casualty incident where triage was conducted by your organisation (based on the event that you provided in the *"iProcureSecurity PCP Current Status Triage Management.xls"*)
- □ If possible, use some visualisations (e.g. show the steps in the *xls*, or prepare a few ppt slides with the main steps and inputs from the scenario)
- □ This will help the participants to think about their experience in such situations and will facilitate the discussion

#### 4. Discussion on Completeness of Scenario [15min]

- Ask the group if they think the provided description and shown steps show a complete picture or if anything should be added.
- □ Each participant should have the opportunity to add points from their professional role.
- □ If further steps/inputs are mentioned include them in the *"iProcureSecurity PCP Current Status Triage Management.xls"*.

#### 5. Collection of problems / gaps / best practices of current practice [40min]

- □ When the group agrees on that the scenario is well represented the group should collect inputs from each role/area on following aspects:
- During which steps in the scenario improvement is needed, what is not working, where are often main problems coming up?
- o What is working well and probably should not be changed?

## □ The inputs are collected in a structured way for everyone visible (flip chart / virtual whiteboard / reporting template)

- 6. Break [20min]
- 7. Wishlist [50min]

- □ **Based on the collected inputs participants should formulate a Wishlist: "**I want a system that ..." (e.g. shows me how many casualties are at the location)
- □ Each input should be connected with the role (and where possible also with the steps during the event)
- □ The participants should indicate WHAT they expect from the system NOT how the system will do it.
  - Good example: "I want a system that shows me in real time how many casualties are at the scene and which triage status they have."
  - o Bad example: "I want a system that uses artificial intelligence and drones."
- 8. Sorting [15-20min]
  - □ The group will finally go through the wish list and try to sort it/ structure it according basic criteria.
- 9. End of Focus Group

## Reporting

To ensure we can make full use of all outcomes of the focus groups please follow these steps:

- If possible, record the meeting (at least audio recording). This will allow you to double check participant inputs after the end of the Focus Group.
- There is no need to transcribe the recording of the Focus Group.
- Ensure that all main outcomes are entered in the "iProcureSecurity PCP Focus Group Reporting Template.xls".

## **ANNEX II: List of Selected Projects**

ID	Project Acronym	Project Title	Abstract	Funding programme
1	ETIMan	ETIMan: Emergency and Triage Information Manager, disrupting the Emergency Medicine industry	During mass casualties' incidents (MCI), emergency staff, medical teams and operators must make quick decisions depending on the information they have. Triage – a selection of casualties according to the urgency of help – is one of the most difficult complex tasks. The EU-funded ETIMan project will offer a digital mobile tool for MCI emergency staff to make their job easier. Data will be sent rapidly to MCI headquarters and hospitals. It will help to track patients on their way to treatment and reduce administrative work by sending combined data on paper and radio to minimise errors.	SME-1 (H2020)
2	2 DosiKit	DosiKit, a first portable field medical device for fast triage of people after external irradiation	There is currently a lack of irradiation biodosimetry tools that can be used in the event of nuclear accidents where individuals are exposed to potentially dangerous levels of radiation. There are also no devices that can be used by non-specialists in the field to give immediate results in cases of partial-body irradiation (PBI). The EU-funded DosiKit project has developed a device and a fast test that can identify and classify irradiated individuals in the field after nuclear accidents. The project hopes to make the device available in 2022 in Europe after some important regulatory and risk assessment studies.	SME-1 (H2020)
3	B DRIVER+	DRiving InnoVation in crisis management for European Resilience	DRIVER+ starts from the experience that neither successful R&D nor strong end-user demand always lead to innovation in the Crisis Management (CM) domain. This is a problem since as societies become more complex, increasing scope and unpredictability of	<u>CP-IP</u> (FP7)

			potential crises and faster dynamics of major incidents put increasingly stringent demands on CM. European CM capabilities already constitute a mature System of Systems; hence wholesale redesign would often be too costly and might critically destabilise existing CM capabilities. Therefore DRIVER+ focuses on augmenting rather than replacing existing capabilities. DRIVER+ has three main objectives: 1) Develop a pan-European Test-bed for crisis management capability development; 2) Develop a well-balanced comprehensive portfolio of crisis management solutions, and 3) Facilitate a shared understanding of crisis management across Europe.	
4	INGENIOUS	The First Responder (FR) of the Future: a Next Generation Integrated Toolkit (NGIT) for Collaborative Response, increasing protection and augmenting operational capacity	First responders are the first to arrive to an emergency. They include the firefighters, police officers and paramedics who take great risks to save people, property or the environment. Whether it's a small-scale emergency or a devastating disaster, new technologies can give them an edge during a crisis. The EU-funded INGENIOUS project will develop and test a next generation integrated toolkit (NGIT) for collaborative response. This will include tools to keep first responders protected, connected and fully aware of risks and threats during a crisis. This will boost their operational capacities, ensuring rescue operations are carried out safely and efficiently.	H2020- EU.3.7.
5	VALKYRIES	Harmonization and Pre-Standardization of Equipment, Training and Tactical Coordinated procedures for First Aid Vehicles deployment on European multi-victim Disasters	A methodology for tracking and analysing the needs for standardization and certification harmonization thorough the project life cycle will be defined and enforced, which will allow the early identification of issues related to the conceptualization, design, implementation, integration and deployment of tools for support the EU disaster resiliency; which will be facilitated by a complete consultation strategy to the different stakeholders that are expected to act at each capability development `phase, ranging from providers	H2O2O- EU.3.7.

			to end users. On these grounds H2020-VALKYRIES will develop,	
			integrate and demonstrate capabilities for enabling immediate and	
			coordinated emergency response including search and rescue,	
			security and health, in scenarios of natural/provoked catastrophes	
			with multiple victims, with special application in cases in which	
			several regions or countries are affected and hence greater	
			interoperability being required. H2020-VALKYRIES will propose both	
			design and development of a modular, interoperable, scalable and	
			secure platform, which will allow the integration between legacy	
			solutions and new technologies. The platform will be able to deploy	
			services and dynamically adapt its behaviour, as the emergency	
			requires it. A series of use cases and demonstrators will be developed	
			placing an emphasis on cross-frontier and cross-sectorial BLOS	
			(Beyond Line of Sight) scenarios, where the usual communications	
			infrastructure could have been damaged, and emergency response	
			teams are deployed without an accurate view of the operation	
			environment.	
		Circumstan Descurs to restrict Alexandr		112020
E	FIRE-IN	Fire and Rescue Innovation Network	FIRE-IN has been designed to raise the security level of EU citizens by	H2020
			improving the national and European Fire & Rescue (F&R) capability	
			development process. This project aims at increasing the effectively of	
			practitioner's coordinating on operational needs, on available	
			demonstration and training	
			demonstration and training.	
7	SAYSO	Standardisation of situational Awareness	Current Situational Awareness (SA) solutions are not adapted to	
		sYstems to Strengthen Operations in civil	operate in cross-border contexts and present several shortcomings	
		protection	related to interoperability, data management/processing, decision	
			making, standardisation and procurement. This hinders a reliable	
			sharing of SA information. SAYSO will address these shortcomings and	
			nave the way for the development of innovative European cost-	

			effective Multi-Stakeholders SA Systems (MSSAS) which will provide practitioners with user-friendly solutions, providing a clear picture of the situation at hand with relevant advices.	
8	SECONDS	On Time Emergency Response System	Delayed arrivals and long response times represent a critical issue for emergency medical services (EMS). EMS operators must assess emergencies in real-time and decide which vehicle arrangement is better and for which emergency case. The system presents high complexity that is aggravated by traffic, incident severity, multiple and simultaneous incidents, and different types of required ambulances and equipment. The EU-funded SECONDS project proposes an innovative, real-time proactive vehicle management system for EMS operators. The system is based on area incident forecasts and assessments of the response system's preparedness. It increases ambulance effectiveness by 30 %, resulting in shorter response times, faster patient delivery to the hospital and, as a result, lower healthcare costs and increased vehicle availability.	SME-1 (H2020)
9	IN-PREP	An INtegrated next generation PREParedness programme for improving effective inter- organisational response capacity in complex environments of disasters and causes of crises	European countries confront the rising specter of transboundary crises, which cross national borders as well as policy boundaries with speed and ease, threatening the continuing functioning of critical infrastructures and the well-being of many citizens. Transboundary crises pose a specific set of complex challenges for which Europe is – despite recent policy initiatives (e.g. Decision No 1313/2013/EU) – still ill prepared. We recognize three challenges that need urgent attention. First, member states need to develop shared response planning. Second, countries need to share information in real time. This sense-making challenge requires a way to have multiple countries and agencies create a shared picture of an emerging crisis based on multiple sources (different countries, many agencies). Third, countries need to coordinate the use of critical resources to ensure a timely	IA (H2020)

			response and to avoid waste and misspending. These challenges are hard to meet in any type of crisis or disaster, but especially in a transboundary context that lacks a dominant actor. IN-PREP will establish and demonstrate a next generation programme by enabling a reference implementation of coordination operations (Handbook of Transboundary Preparedness and Response Operations that synthesises the lessons learnt, recommendations, check-lists from past incidents) and a training platform (Mixed Reality Preparedness Platform a novel IT-based tool, which holistically integrates Information Systems (IS) and Situational Awareness (SA) modules over a decision support mechanism and the visualisation of assets and personnel) to the entirety of civil protection stakeholders (firefighting units, medical emergency services, police forces, civil protection units, control command centres, assessment experts) to meet these challenges. The proposed framework will not only improve preparedness and planning but can be also applied during joint interventions, thus improving the joint capacity to respond.	
10	RAMSES	Remote access to medical information on smartphones during emergencies and health crises	The RAMSES consortium is working toward commercialising the EmergencyEye, a system designed to allow ambulance dispatchers to have better communication with patients and bystanders in the field. The innovation, which supports emergency dispatchers with speedy geolocation, diagnosis and audio-visual guidance of resuscitation measures, was tested in a pilot in Rhein-Kreis-Neuss, Germany.	EIT
11	Landrettung	Landrettung	As in all European health care systems, German medical practitioners are in short supply, whereas the demand for timely emergency medical care is constantly growing. In rural areas, this has led to critical delays in the provision of emergency medical care. In particular, in cases of cardiac arrest, time is of the essence because,	

			with each passing minute, the chance of survival with good neurological outcome decreases.	
12	SAEPP	Smart Ambulance: European Procurers Platform (SAEPP)	The objective of this project is to create and collate a consensus of agreement from Ambulance Users and Procurers on the core technology-centric features which, if correctly integrated into a suitably re-designed ambulance, would allow them to demonstrate, evaluate and deliver new models of in-community healthcare delivery, with the primary objective of avoiding unnecessary hospital attendances (& thus admissions) and the associated patient distress and hospital costs. Such a consensus would form the basis of a future PCP for the envisaged vehicle, and such a PCP Specification is in fact an output of this proposed work.	CSA (H2020)
13	MOMENTUM	MOMENTUM	The goal of the project is the development of integrated medical technology, which can be used along the process chain to augment clinical and mobile pre-clinical use-cases such as the shock room, operating theatre, intensive care unit, and remote on-scene support in and around the ambulance. Networked medical technology and IT systems are integrated into a communication infrastructure across heterogeneous communication technologies to make their functionalities available via a shared infrastructure. State-of-the-art 5th generation mobile communications (5G) and their further development in public and private networks (in hospitals or on-site) can represent an essential component for continuous networking of medical technology. The digital networking of the mobile point-of-care with medical diagnosis and therapy systems results in a significant improvement in the mobile treatment scenario and is desirable in terms of flexible and personalized treatment optimization. Medical resources, technologies and information from the hospital are accessible at the treatment site and collected patient	BMBF under 16KIS1031

				data can be transmitted to the hospital. This enables a more precise pre-clinical diagnostic assessment of the patient-specific situation and a more precise early initial diagnosis on site. Due to the bilateral availability of clinical information at the scene of the accident, including preclinical data in the emergency room, patient treatment can be improved and made more efficient. In addition, assessments for the further course of treatment can be coordinated before the patient arrives and seamlessly continued in the hospital. The use of new communication technologies integrates the entire emergency care from the point of use to the point of care in the hospital and leads to an increase in mobility in patient treatment with improved resource utilization in combination with lower resource requirements.	
1	.5	RESPONDRONE	NOVEL INTEGRATED SOLUTION OF OPERATING A FLEET OF DRONES WITH MULTIPLE SYNCHRONIZED MISSIONS FOR DISASTER RESPONSES	In case of a disaster, the rapid, effective and efficient response of first responders is crucial for saving lives. Unmanned aircraft systems (UAS) technology can aid emergency management in complementing existing systems used in first response missions. The EU-funded RESPONDRONE project aims at developing a multi-UAS platform for first responders to enhance their situation awareness. The fleet of UAS will provide enhanced capabilities to support assessment missions, search and rescue operations, as well as forest fire fighting by simplifying operations for first responders and thus making first response operations more efficient. The platform will be designed to provide relevant information in real-time to all involved stakeholders using a cloud-based system, supporting on-time decision making and operations management.	RIA (H2020)
1	.6	ASSISTANCE	ADAPTED SITUATION AWARENESS TOOLS AND TAILORED TRAINING SCENARIOS FOR	Crisis management depends on a set of prerequisites such as proactivity, a spirit of cooperation and a dense network of dissemination media. The EU-funded ASSISTANCE project is merging virtual reality, mixed reality and augmented reality, offering advanced	RIA (H2020)

1.000					
			INCREASING CAPABILITIES AND ENHANCING THE PROTECTION OF FIRST RESPONDERS	training to first response organisations aiming at cohesive cooperation and an enhancement of their capabilities. Taking into account the type of crisis that each first response organisation is called to mitigate, the project will offer a set of modules tailored to their real needs based on the type of incident. The proposed solutions will be demonstrated and validated under controlled conditions	
	17	CoP1stRespond	Secured Collaboration Platform for Law Enforcement and First Responders	Security forces – from campus security and guarded communities to emergency responders and the military – face many challenges when dealing with emergency situations. One of these is reliable and secure communication. The EU-funded CoP1stRespond project aims to bring further into the market a solution developed by Globekeeper Tech. It has established a new communication platform that uses standard equipment but harnesses the most advanced encryption and exchange protocols in the industry. Integrating existing hardware like GPS devices and other Bluetooth-enabled hardware, users are able to stream videos and share important files. The technology can also support offline environments. The Europol law enforcement agency has already adopted this new technology.	SME-1 (H2020)
	18	FS-UNIT	FS-UNIT: Light-weight, portable medical Field Suction Unit to disrupt the pre-hospital market	Cardiac arrests can be fatal if not treated immediately. In many cases, airway obstruction could even be the cause of the arrest, requiring a suction device to clear it. Current suction devices are heavy, bulky, time-consuming to use and require extensive cleaning. Therefore, paramedics do not often carry them to a scene, which potentially puts a patient's life at even more risk. The EU-funded FS-UNIT project set out to take EXCITUS AS's FS-UNIT portable suction – a lightweight, easy-to-use, instant functioning unit – to TRL 9 with the aim of launching it into the market by 2022.	SME-1 (H2020)

1	9 ABDRONE4LIFE	An electronic drone pilot and cargo custodian for blood and medical courier services	Up to now, helicopters and vehicles have been widely used to transport vaccines, medications and other emergency medical supplies. The use of drones is starting to take off, to address the limitations of traditional modes of transport. To boost the future use of drones in healthcare, the EU-funded ADRONE4LIFE is developing a smart device to improve safety in drone-based telemedicine systems. The device is flexible, modular and adaptable, guaranteeing and monitoring the condition of the medical drone's cargo, be it blood bags or anti-venom serum. It will also be able to automatically control the drone's flight path to ensure safe and timely arrival to the destination by avoiding harsh weather conditions.	SME-1 (H2020)
2(	D ZENEO	ZENEO® Adrenaline Needle-free adrenaline pre-filled autoinjector rescues you from an anaphylactic shock	Anaphylactic shock is an extreme allergic reaction that needs to be treated immediately with a shot of epinephrine (adrenaline) to reverse the symptoms. Many people at risk of anaphylaxis carry an autoinjector – a combined syringe and concealed needle that injects a single dose of medication. This needle-based drug delivery device may soon be replaced by a needle-free alternative. Crossject's ZENEO device permits needle-free injection of the drug in emergency situations. Under the EU-funded ZENEO project, the company plans to launch ZENEO <sup>®</sup> Adrenaline on the market by the end of 2021. It estimates a turnover of EUR 136 million and a profit of EUR 124 million by the fifth year of commercialisation	SME-1 (H2020)
2:	L EGM	A disruptive life-saving solution for early detection of lung edema in heart failure patients	Heart failure (HF) causes lung fluid congestion and pulmonary oedema due to the reduced cardiac pumping ability. The diagnosis of lung fluid congestion is often inaccurate, and the condition can only be detected at an advanced stage, leading to deterioration and hospitalisation. The EU-funded EGM project will conduct a feasibility study to introduce to the market a non-invasive system that enables the easy and accurate monitoring of lung fluid accumulation. Early	SME-1 (H2020)

			testing indicates that the device - two sets of electrodes embedded inside a wearable vest operating on a specialised software platform - is 98 % accurate and 25-fold more sensitive compared with existing techniques. Moreover, it is cost-effective and has the potential to improve the clinical outcome of HF.	
22	MrDoc	Development and commercialization of a semi-supervised learning AI for robust diagnosis in real world settings.	The potential for artificial intelligence in healthcare is growing. When it comes to making medical diagnoses, computers may be just as successful as human physicians. The EU-funded MrDoc project has developed a semi-supervised learning AI platform that can analyse and interpret medical datasets. It has designed a process that mimics creative human imagination to quickly detect and diagnose some non- communicable diseases such as cardiovascular disease and diabetes, using biometric parameters (blood pressure, heart rate variability, haemoglobin, blood glucose) with a high level of accuracy. The project is preparing for market, to sell and licence its solution to three target groups: patients, developers of software and hardware tools (as well as Apps) and pharmaceutical companies.	SME-1 (H2020)
23	NO FEAR	Network Of practitioners For Emergency medicAl systems and cRitical care	NO-FEAR proposes to bring together a pan-European network of practitioners, decision and policy makers in the medical and security fields. They will collaborate to achieve a common understanding of needs, as well as - in collaboration with academia and industries – increase the EU innovation potential that could better fill the operational gaps and recommend areas for future innovations.	H2020
24	BroadWay	Innovation activity to develop technologies to enable a pan-European interoperable broadband mobile system for PPDR, validated by sustainable testing facilities	the BroadWay project will take the first procurement steps to enable 'interoperable next generation of broadband radio communication systems for public safety and security' to improve Public Safety and Disaster relief organisation's (PPDR's) service to Europe's citizens, and enhance interoperability across borders.	H2020

25	NG112	Next Generation 112	The NG112 architecture enables the modernisation of emergency communications, allowing for far more data collection (text, video, location or additional data), which will result in a more efficient response. NG112 also helps to ensure equivalent access for all citizens, including people with disabilities.	EENA
26	EMYNOS	nExt generation eMergencY commuNicatiOnS	Current emergency systems and 112 services are based on legacy telecommunication technologies, which cannot cope with IP-based services that European citizens use every day. Some of the related limitations are the partial media support (so far, only voice calls and SMS are accepted), the lack of integration of social media, and the use of an analog modem for providing eCall services with limited data amount. As most operators have started migrating towards broadband IP-based infrastructures, current emergency systems need also to be upgraded/adapted in order to fulfill regulatory requirements in terms of Next Generation emergency services. The main objective of EMYNOS project is the design and implementation of a Next Generation platform capable of accommodating rich-media emergency calls that combine voice, text, and video, thus constituting a powerful tool for coordinating communication among citizens, call centers and first responders. Additionally, issues such as call routing/redirection to the closest-available call center, retrieval of the caller location, hoax calls prevention, support for people with disabilities, and integration of social media will be addressed. EMYNOS will enable users to make emergency calls across heterogeneous devices (e.g. PCs, TV sets, mobile, AAC and haptic devices) using various mature technologies, including those making use of the Session Initiation Protocol (SIP), the IP Multimedia Subsystem (IMS), and WebRTC framework. EMYNOS will also demonstrate how the eCall concept can benefit from the IP technologies by allowing audio-video calls towards the emergency calls	RIA (H2020)

			centers and complementing location information, with photos and videos. EMYNOS involves partners with complementary expertise (telecom/satellite operator, VoIP provider, eCall testers, end users), which together form the chain for the provision of emergency services and which will deliver the EMYNOS demonstrator that will be validated in operational environment (TRL 7)	
27	NIGHTINGALE	Connecting Patients and Carers using wearable sensor technology	Safest, reliable, individualised care of patients at-risk of deterioration needs patients themselves to play an active role in their care whenever possible: late detection or escalation of deterioration causes avoidable harms, and deaths. In this project we will challenge industry to develop robust monitoring and communications systems that connect patients, carers and health professionals, provide early warning of acute deterioration in and out of hospital, and learn and adapt to different individuals in different situations. Wearable sensor technology allows dynamic monitoring of vital signs that indicate health status, while bidirectional video communication allows interaction with the patient and in depth assessment. Self-learning adaptive algorithms interfaced with Electronic Medical Records can provide reliable early warning with few false alarms; and data about individual responses to different therapies.We will first target known at-risk patients such as those on general hospital floors after discharge from Intensive Care or following major surgery, and the frail elderly. This will also enable the safe care of many patients at home, e.g. patients seen in the Emergency Room but judged not to need hospital admission, or those with serious chronic conditions. Reliable, robust monitoring and communication systems will improve patient safety in hospital and after discharge, will decrease avoidable harms and deaths, reduce length of stay and readmissions, and help maintain patient's independence; providing reassurance of wellness and early warning of deterioration. Analysis of collected 'big data' will	RIA (H2020)

			increase understanding of treatment of specific patient groups, and provide spinoffs such as eHealth applications for chronic conditions. Once mature and integrated in European health care systems, the procured technology can truly transform healthcare by engaging with and empowering all at-risk patients, and enabling their connection with health professionals	
28	Medical Express	Optimal use of healthcare resources through Al-guided support of healthcare professionals	Delivering services with high quality in the most cost effective and efficient manner in healthcare hinges on patient flow. This refers to the ability to manage patients effectively and with minimal delays. Improving patient flow into, within and out of hospitals is necessary to maximise operational efficiency – a top priority. The EU-funded Medical Express project will develop a modular platform that can integrate easily into existing IT structures and electronic health records. Using artificial intelligence (AI) technology, this B2B solution for healthcare providers facilitates data analysis, reporting and decision-making. Already tested in Sweden's primary care sector, general practitioners reported a 50 % increase in the number of patients per day with this AI-guided solution.	SME-2 (H2020)
29	ARCSAR	Arctic and North Atlantic Security and Emergency Preparedness Network	Mediterranean practitioners' network capacity building for effective response to emerging securitychallenges	H2020
30	InteropEHRate	Interoperable EHRs at user edge	The electronic health record (EHR) collects, systematises and stores patient data in a digital format in order to improve healthcare systems. However, there is a low level of systems interoperability in Europe since data are collected in different silos and managed under converging security and safety conditions. This creates legal hurdles in the availability of data. The EU-funded InteropEHRate project will reverse trends by ensuring that health data are available when and where needed. It will provide patients with full control in usage and	RIA (H2020)

			routes of their medical information through device-to-device and peer-to-peer protocol standards. It will also outline a set of new protocols for secure and cross-border exchange of medical evidence.	
31	eNOTICE	European Network of CBRN Training Center	The overall goal of the eNOTICE project is to establish a European network of CBRN training, testing and demonstration centres aiming at enhancing CBRN training capacity for improved preparedness and incident response through increased collaboration between CBRN training centres and practitioners' needs-driven CBRN innovation and research.	H2020
32	TEEMothyTS Simulator	Commercialization of simulator for interventional echocardiography, specializing in the field of minimally invasive medical therapies	Transoesophageal echocardiography (TEE) is a minimally invasive procedure used to assess the structure and function of the heart. Unlike a standard echocardiogram, the echo transducer is attached to a thin tube that is passed through the mouth into the oesophagus to yield very clear images of the heart. Despite its minimal invasiveness, TEE requires a highly skilled operator with detailed anatomical and clinical knowledge of the heart. Patient discomfort is not uncommon. TEEMothyTS Simulator has developed a cost-effective simulator to enhance training and effective use while minimising patient discomfort. The solution can use CT data from real patients with numerous pathologies for a broad repertoire of realistic medical situations. Its commercialisation should benefit physicians and patients alike	SME-1 (H2020)
33	ROG	Real Organ Generation	The EU-funded ROG project provides support to Italian company MTM S.r.l for the development of a platform that includes an algorithm capturing 2D images and converting them into 3D forms in order to generate realistic organ models. This platform could be used in virtual reality applications and 3D printing, enabling an advanced medical training approach, as well as to simulate real patient	SME-1 (H2020)

			conditions during a pre-operative trial in the healthcare environment. In the future, this platform will help to recognise anomalies, tagging mutations and morphology aberrations, enabling a novel approach to training specialists during critical preparation for surgery. The current stage of the project is dedicated to the development of a detailed business model.	
34	EndoTrainer	EndoTrainer - A revolution in non-invasive	Minimally invasive surgery (MIS), or 'key-hole surgery', has huge benefits for patients and the healthcare system alike. However, its	SME-1 (H2020)
		Surgery training	adoption is not as wide spread as it should be and today's complex	(12020)
			procedures can lead to a set of surgery mistakes generating unforseen	
			patient harm and complicaton. One of the main reasons for the	
			restrain on this full-release of MIS benefit has been due to the	
			traditional, limited practical training. Students are taught the	
			practicalities in real operating theatres with previously qualified	
			surgeons. The environment is very costly and provides limited time	
			fully capable MIS specialist surgeons. At Surgitrainer, we have	
			developed the world's first MIS simulator combining a realistic	
			physical simulation with a virtual one. Trainees can practice at low	
			cost, whilst having their progress precisely monitored and evaluated	
			multiple times prior to their first 'real' procedure. We aim to speed up	
			the generation of qualified MIS surgeons and help to ensure that	
			many more people obtain the vast benefits of these procedures. With	
			our first product entering final accreditation phase, we are applying	
			for phase1 SME Instrument in order to help fund our final trial phase,	
			develop our cloud 'trainee interaction' platform and to fully analyse	
			the feasibility of our business model and route to market. With a	
			general medical shift to simulation tool training and a 2.6 B USD	

				market predicted by 2022, we predict to drive sales of nearly 10.4M Euros by 2022.	
-	35	WISE	Wireless self-powered technology for continuous and accurate smart sensing	Today, tens of billions of computing devices are interconnected via internet exchange data on a global scale. However, most IoT products are battery-powered, resulting in a severe threat to the environment and posing risks in case of sensitive applications. The EU-funded WISE project will bring a solution to this problem by developing and introducing to the market innovative products based on ONiO.zero – ultra low power wireless microcontroller units with sensors developed by Norwegian company ONiO. The technology is based on energy harvesting and uses energy exclusively from its surroundings. By developing turnkey solutions for the market of IoT as well as tailored sensors, this project will enable many smart applications in numerous sectors and for a variety of customers, from wearables and clothing to health and industry	SME-2b (H2020)
-	36	ROVER	RELIABLE TECHNOLOGIES AND MODELS FOR VERIFIED WIRELESS BODY-CENTRIC TRANSMISSION AND LOCALIZATION	Technology plays a vital role in medical healthcare systems. Wearable wireless sensor technology has also entered the medical realm of diagnosis, monitoring and treatment. From measuring body temperature and blood pressure to monitoring vital signs and providing real-time feedback, this technology can improve patient diagnostic procedures. The EU-funded ROVER project is bringing together experts from eight countries to develop novel solutions and procedures, facilitating the commercialisation of non-invasive on-body and in-body wireless technology innovations. It will develop a system architecture that draws on expertise in areas of engineering, physics, medicine, computer science and product development. This new architecture implements non-ionising diagnostics and monitoring	MSCA-RISE (H2020)

			augmented by secure data transfer at all levels with medical involvement.	
37	TOXI-Triage	INTEGRATED AND ADAPTIVE RESPONSES TO TOXIC EMERGENCIES FOR RAPID TRIAGE: ENGINEERING THE ROADMAP FROM CASUALTY TO PATIENT TO SURVIVOR.	The TOXI-triage project addresses the operational; technological; ethical and societal dimensions of CBRN response and recovery, and importantly the economic base from which sustainable CBRN and multiuse systems are derived.	IA (H2020)
39	International Patient Summary	International Patient Summary	The International Patient Summary is a minimal and non-exhaustive set of basic clinical data of a patient, specialty-agnostic, condition- independent, but readily usable by all clinicians for the unscheduled (cross-border) patient care.	Joint Initiative Council Project
40	Magnet4Europe	Magnet4Europe: Improving Mental Health and Wellbeing in the Health Care Workplace	Doctors and nurses are not immune to burnout, which is a combination of exhaustion, cynicism and perceived inefficacy resulting from long-term job stress. In fact, workers in the healthcare sector experience burnout much more frequently than workers in other professions. The EU-funded Magnet4Europe project will develop an evidence-based model for the organisational redesign of clinical work environments in order to enhance workers' wellbeing, retention, productivity and patient outcomes. Specifically, it will use a mixed-method design to determine direct and indirect individual and collective health outcomes and cost effectiveness. The aim is to improve mental health, reduce sickness absence and positively impact productivity and economic results through redesigned clinical work environments that promote mental health	RIA (H2020)
41	HEIMDALL	HEIMDALL - MULTI-HAZARD COOPERATIVE MANAGEMENT TOOL FOR DATA EXCHANGE, RESPONSE PLANNING AND SCENARIO BUILDING	The project aims at improving preparedness of societies to cope with complex crisis situations by means of providing integrated tools to support efficient response planning and the building of realistic multidisciplinary scenarios.	H2020- EU.3.7.

		The project will design and develop a system for improving response planning strategies and scenario building (TRL 7 or 8) and facilitating organizational coordination among many actors, integrating a wide range of support tools to be used operationally by a large variety of stakeholders (firefighting units, medical emergency services, police departments, civil protection units, command and control centres). The devised system shall integrate existing and newly developed tools to enhance the cooperation between autonomous systems (satellite-, sea-, land- and air-based) from different agencies as well as to consolidate the methodology for cross-border scenario-building. The project shall investigate the currently existing tools and methodologies with the involvement of local authorities and end users and provide mechanisms to enhance cooperation among all	
		involved actors.	
43 EU-SENSE	European Sensor System for CBRN Applications	The EU-SENSE project will provide an innovative technical solution to deal with selected shortcomings in CBRNe protection indicated in the ENCIRCLE Catalogue of Technologies. The created system will be a step-forward in chemical detection by developing a novel network of sensors that exploits advanced machine-learning and modelling algorithms for improved performance.	H2020
44 MARISA	Maritime Integrated Surveillance Awareness	The 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-	

45 PULSE	Platform for European Medical Support during major emergencies	In Europe, one of the core emergency response services to deadly threats such as pandemic disease and major terrorism attacks is the European Health Services (EHS). The EHS comprise key stakeholders that include hospitals, community health services, pre-hospital emergency care services, medical suppliers, rescue services, health related voluntary services and others. It is crucial to the EHS that it remains in an excellent state of preparedness supported by first-class planning and decision support tools. Moreover, in the response phase, EHS need consistent, coordinated and standardised advanced support methods and tools providing support in critical tasks like e.g. early threat detection, common operational picture, creation of surge capacity etc. Finally, at a pan European level, EHS also need an interoperable framework with the ability to provide a coordinated European response to any major medical incident.	FP7
46 C2-Sense	Interoperability Profiles for Command/Control Systems and Sensor Systems in Emergency Management	Effective management of emergencies depends on timely information availability, reliability and intelligibility. To achieve this, different Command and Control (C2) Systems and Sensor Systems have to cooperate which would only be possible through interoperability. However, unless standards and well-defined specifications are used, the interoperability of these systems can be very complex. To address this challenge, in C2-SENSE Project, a "Profiling" approach will be used to achieve seamless interoperability by addressing all the layers of the communication stack in the security field. In this respect, C2-SENSE project's main objective is to develop a profile based Emergency Interoperability Framework by the use of existing standards and semantically enriched Web services to expose the functionalities of C2 Systems, Sensor Systems and other emergency/crisis management systems. This will be developed in three steps: (1) first, an Emergency Domain Inventory will be created by surveying existing standards, real life use cases of sensors, devices, C2 systems and emergency	FP7

			management architectures for different scenarios in security field. (2) Based on this inventory, a common Emergency Domain Ontology will be developed to gather all stakeholders' knowledge in a unique and flexible data model. (3) Finally, by using the concepts in this ontology, by also taking into account both functional and operational requirements as well as different countries' cultural, linguistic and legal issues, Emergency Interoperability Profiles that will constitute the framework will be developed. The necessary standardization activities will be initiated to evolve C2-SENSE Emergency Interoperability Framework into a standard specification for interoperability between Sensor Systems and C2 Systems. C2-SENSE will assess its outcomes in a realistic "Flood Scenario in Italy" pilot to ensure that the developed technologies are generic and applicable in a real life setting.	
47	ENCIRCLE	European Cbrn Innovation for the maRket CLuster	To improve its resilience to new CBRN attacks and threats, the EU needs a specialized, efficient and sustainable industry, competitive on a less fragmented EU market and globally. Capitalizing on its experience in the EDEN Demonstration Project, in other CBRN relevant projects, and in the CBRN market and supply chain, the ENCIRCLE consortium proposes an innovative approach to reach this goal in a short to long term perspective so that SMEs and large industries can propose and invest in the best innovations on the market.	H2020
48	SAFECARE	SAFEguard of Critical heAlth infrastructure	The aim of this proposal is to provide solutions that will improve physical and cyber security in a seamless and cost-effective way. It will promote new technologies and novel approaches to enhance threat prevention, threat detection, incident response and mitigation of impacts. The project will also participate in increasing the compliance	H2020- EU.3.7.4

			between security tools and European regulations about ethics and privacy for health services.	
49	LETS-CROWD	Law Enforcement agencies human factor methods and Toolkit for the Security and protection of CROWDs in mass gatherings	LETS–CROWD will overcome challenges preventing the effective implementation of the European Security Model (ESM) with regards to mass gatherings. This will be achieved by providing the following to security policy practitioners and in particular, LEAs:(1) A dynamic risk assessment methodology for the protection of crowds, (2) A policy making toolkit for the long-term and strategic decision making of security policy maker. (3) A set of human centred tools for Law Enforcement Agencies (LEAs).	H2020- EU.3.7.6.
5(	CAMELOT	C2 Advanced Multi-domain Environment and Live Observation Technologies	CAMELOT proposes to develop and demonstrate different advanced command and control service modules for multiple platform domains, based on a SOA architecture that specifies internal and external interfaces, allowing the development of a modular and scalable command and control station, customisable to the user needs.	H2020- EU.3.7.3.
51	TERRIFIC	Tools for early and Effective Reconnaissance in cbRne Incidents providing First responders Faster Information and enabling better management of the Control zone	The TERRIFFIC project will deliver a step change in the effectiveness of first responders during the first hours of a Radiological, Nuclear, explosive (RNe) incident. It will lead to reduced response time, less health and safety risks for the response team, and less human intervention in the operation due to higher number of automated processes and extended mobile detection capabilities. TERRIFFIC will enrich the European response to RNe events by a set of modular technology components in a comprehensive system, incl. new detectors, algorithms, drones, robots, dispersion models, information management software and decision support systems. The project will provide detailed information on the applicability of some developments within a chemical and biological (C/B) context.Dedicated Key Performance Indicators will measure the	RIA (H2020)

			progress towards targeted performance goals, such as significant acceleration of the time to start terrain interventions due more accurate and near-to-real-time estimation of the control and exclusion zones. Advanced mixed reality technology will be leveraged to provide first responders with ad-hoc available and continuously updated information during operations.	
52	2 INACHUS	Technological and Methodological Solutions for Integrated Wide Area Situation Awareness and Survivor Localisation to Support Search and Rescue Teams	Crisis incidents result in difficult working conditions for Urban Search- and-Rescue (USaR) crews. INACHUS aims to achieve a significant time reduction and increase efficiency in USaR operations by providing: 1.Simulation tools for estimating the locations of survival spaces (after a structural collapse) and identify the location of survivors for different construction types and building materials 2.Decision and planning modules for advanced casualty and damage estimation that will be based on input coming from airborne and ground-based laser- scanning and imaging data 3.Integration of i) existing and novel sensors (electromagnetic, vision, chemical) for detecting and high- accurate localisation and ii) mobile phones signals for estimating the number of the trapped humans 4.A snake robot mechanism (integrated with the sensors) to penetrate inside the rubble to locate more accurately trapped victims 5.A robust, resilient and interoperable communication platform to ensure that the sensors data can reach the command center 6.Enhanced data analysis techniques and 3-D visualization tool of the mission place to be operated by the crisis managers and the decision makers. A suitable decision support system will be used for planning & managing complex USaR operations 7.System Integration of all the aforementioned software and hardware subcomponents (INACHUS platform) 8.Contribution to standards: interaction with international organizations and public authorities in the fields of USaR, through an early defined and developed User Group, to ensure strong links with	FP7

			the user communities and standardisation bodies 9.Consideration of societal impacts and legal/ethical issues of the proposed solution at the onset of the project feeding into the technical solutions 10.Numerous field and simulated tests properly designed and executed for presenting the capabilities of the INACHUS integrated platform 11.Appropriate training package and extensive training courses to the First Responders.	
53	IMPRESS	IMproving Preparedness and Response of HEalth Services in major criseS	There exists a huge variety in the occurrence and characteristics of major incidents. Incident management stakeholders and in particular emergency health service providers have to deal with two basic challenges: The disproportion between the needs and the available human/material resources in the response capacity and the inherent time constraints of an emergency. These critical factors play a seminal role in the decision-making process during a crisis event, which affects all levels of command & control (strategic, operational, tactical). The drawback with current health emergency management systems lies with the command & control operations that should coordinate the actions of the separate services and turn them into an effective, multi-faceted crisis response mechanism. IMPRESS will improve the efficiency of decision making in emergency health operations, which will have a direct impact on the quality of services provided to citizens. It will provide a consolidated concept of operations, to effectively manage medical resources, prepare and coordinate response activities, supported by a Decision Support System, using data from multiple heterogeneous sources.	FP7
54	FORTRESS	Foresight Tools for Responding to cascading effects in a crisis	FORTRESS will identify and understand cascading effects by using evidence-based information from a range of previous crisis situations, as well as an in-depth analysis of systems and their mutual interconnectivity and (inter-)dependency. FORTRESS will seek to	FP7

			intervene in current crisis response practices by bridging the gap between the over-reliance on unstructured information collection on one side and a lack of attention to structural, communication and management elements of cross-border and cascading crisis situations on the other. It will use state of the art information collection and modelling tools to assist stakeholders in evaluating what information is significant, relevant and of greater priority so that they can adjust their actions accordingly. It will do so by using evidence-based information from historical crisis case studies (WPs 2 and 3), as well as comprehensive analysis of the different relationships between systems (WP 4), and systems and sensitivity information from current crisis management contexts and practices in four system simulations (WP 5). This will enable FORTRESS to build a collaborative and accesible, modelling platform for cascading and cross-border effects in a range of crisis situations (WP 6). This will feed into the development of the FORTRESS Incident Evolution Tool (FIET) in WP7; a user-friendly tool with cross-border capabilities that can be used in a cascading crisis. FIET can be used as a foresight tool to assist decision- makers in understanding the potential effects of their decisions in training environments. FIET is also a decision support tool that is user- friendly enough to be employed during a crisis to assist real-time decision making. FIET will be subject to rigorous testing in the field to evaluate its effectiveness, and the project will ensure its user- friendliness by undertaking extensive training with decision- makers to optimise the look and feel of the system (WP 8).	
55	5 SECTOR	SECURE EUROPEAN COMMON INFORMATION SPACE FOR THE INTEROPERABILITY OF FIRST RESPONDERS AND POLICE AUTHORITIES	The management of crisis is one of the great challenges of the 21st century. The ever growing human, economic and environmental losses due to natural and man-made disasters evidence the need for a systematic approach to the management of crisis. A multi-disciplinary understanding and disaster risk management is required. In such	FP7

			situations, Collaborative Crisis Management (CCM) is usually coordinated by local authorities or dedicated civil protection organisations, supported by a variety of different national and international crisis management organisations, all acting relatively autonomously. The process is typically coordinated through periodic physical meetings of the involved organisations, in which information is shared about the situation, priorities are set and responsibilities	
			allocated. Follow-up and execution of tasks is managed by each	
			interoperable information management tools, depending on the level	
			of informatisation of the local or national crisis management systems.	
56	PREDICT	PREparing for the Domino effect in Crisis	PREDICT provides a comprehensive solution for dealing with	FP7
		siTuations	cascading effects in multi-sectoral crisis situations covering aspects of	
			critical infrastructures. The PREDICT solution will be composed of the	
			following three pillars: methodologies, models and software tools.	
			Their integrated use will increase the awareness and understanding of	
			cascading effects by crisis response organisations, enhances their	
			preparedness and improves their response capability to respond in	
			case of cascading failures. PREDICT project will start from a deep	
			analysis of recent cases (over 8500 incidents worldwide), which will	
			be accompanied with scenarios of potential crisis. Project partners	
			will set up a generic approach (common framework) to prevent or	
			mitigate cascading effects which will be applied in selected cases	
			agreed with end-users. As modelling each phenomenon separately in	
			a specific environment is not effective, PREDICT project will propose	
			cohesive and comprehensive models of dependencies, cascading	
			effects and common m ode failure which will include causal relations,	
			multi-sectoral infrastructure elements and environment parameters,	
			as well as the human factor aspects. PREDICT will deliver software	
			tools bundled in PREDICT Incident Evolution Tool, which will consist of	
			two core components: a Foresight and Prediction Tool (for simulation of the evolution of cascading effect and impact on multi-sectoral dependencies) and a Decision-Support Tool (for determining the best course of action and to calculate the risk associated with them). The high-quality of the developed solutions will be assured by a consortium consisting of a number of experienced partners joining research, industrial (incl. SME), and end-users approaches. End-users will be deeply involved in PREDICT at three levels: as partners of the consortium (there are three end-users in the consortium), members of the Advisory Board, and representatives from relevant organisations across Europe.	
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57	POP-ALERT	Population Alerting: Linking Emergencies, Resilience and Training	The main objective of POP-ALERT is to prepare societies and populations to cope with crisis and disasters in a rapid, effective and efficient way by blending traditional Crisis Preparedness & First- Reaction strategies with the use of innovative contemporary tools. POP-ALERT proposes to undertake thorough behavioural research and take traditional Crisis Management research a step further by carrying out a series of empirical studies, taking into account new issues related to targeting both local populations and visitors such as expats or tourists (cultural differences, language barriers, etc.), in order to create a framework to facilitate the assessment of the population's capacity to absorb and preparedness to make use of different Crisis Management strategies and technologies developed at the EU level. POP-ALERT will identify specific target success stories within existing and past community preparedness programmes and put together a portfolio of case studies on social networking and community self- reliance initiatives which could potentially be replicated to crisis with a European dimension and to cross-border disasters. The project will seek to study the best ways to blend contemporary tools with the existing practices identified in order to create flexible and easily	FP7

			deployable toolkits for preparing and alarming the European population in case of a crisis. The approach this project proposes for improving the current practices revolves around the use of messaging and cultural sharing technologies to create awareness using technologies and approaches that offer the best form of accessibility and penetration by citizens and authorities. POP-ALERT will propose a pilot project (designing criteria for selection of the area and population to be involved in the pilot, developing scenarios and objectives) in order to test the generic methodologies and to assess their effectiveness in raising an improved level of preparedness of the community.	
58	EMERGE	Emergency Monitoring and Prevention	EMERGE engineers a prototypical solution that treats emergencies with stepwise assistance. First, it provides early proactive assistance to the elderly himself. Next, it integrates friends, family, or caregivers. In case of an emergency that cannot be handled in the first two steps, an integrated emergency medical service (EMS) is called and informed about the case and the personal situation of the affected person. The integrated EMS can resolve the situation through medical care, telemedicine counselling, activation of social services, or sending a rescue team.	FP6
59	<b>Q4HEALTH</b>	Quality of Service and prioritisation for emergency services in the LTE RAN stack	Q4HEALTH project is an innovation action focused on the optimization of real time video for emergency services over LTE. The project is implemented as a set of experiments conducted over the FIRE platforms PerformLTE and OpenAirInterface. The motivation is to study video performance in scenarios with wearable live video for first responders, improving its response on LTE-A with a particular innovation focus on 3GPP release 12. To achieve this goal six different experiments will be performed focused on resolving a set of six challenges identified as well as addressing a range of KPIS Q4HEALTH	IA (H2020)

			faces different challenges, the inability of applications to negotiate a QoS agreement with the network, the delays introduced on live video, the appropriate scheduling algorithms on the access nodes, the service availability on indoor scenarios and the communication between geographically correlated entities. These challenges will be approached from different perspectives, the applications that will be extended to provide information regarding the type of traffic as well as their traffic requirements to the EPC and the scheduler in the RAN; the radio access where different scheduling strategies will be explored for emergency video; and the core network where mechanism to perform QoS reservation, techniques for seamless mobility between heterogeneous access technologies and SDN techniques to improve communication will be studied. Q4HEALTH has defined 20 KPIs and these will be formulated at the start as a baseline and at the end of the project we will measure the KPIs on an integrated optimized experiment in order to validate the project success. Q4HEALTH will participate in the EIT KIC as well as FIRE and 5GPPP events in order to disseminate our results in to the wider innovation ecosystem. All the project results and extensions will be showcased to maximize the exposures to other companies that might also exploit the outcomes of the project.	
60	FASTER	First responder Advanced technologies for Safe and efficienT Emergency Response	During natural catastrophes, technological (man-made) disasters or terrorist attacks, first responders – police, bomb squads, firefighters, anti-terrorism units and emergency medical workers – play a crucial role. Their effectiveness is dependent on a range of factors. The EU- funded FASTER project will examine the impact and the role first responders can have in cases of disasters. It will take into consideration the entire lifecycle of emergency preparedness and response, including the planning, logistical support, maintenance and diagnostics, training and management. The ultimate aim of the	RIA (H2020)

	project is to further the European Union's ability to respond to emergencies.	
61 AEGLE AEGLE (Ancient Greek: Αἴγλη) – An analytics framework for integrated and personalized healthcare services in Europe	The data generated in the health domain is coming from heterogeneous, multi-modal, multi-lingual, dynamic and fast evolving medical technologies. Today we are found in a big health landscape characterized by large volume, versatility and velocity (3Vs) which has led to the evolution of the informatics in the big biodata domain. AEGLE project will build an innovative ICT solution addressing the whole data value chain for health based on: cloud computing enabling dynamic resource allocation, HPC infrastructures for computational acceleration and advanced visualization techniques. AEGLE will: - Realize a multiparametric platform using algorithms for analysing big biodata including features such as volume properties, communication metrics and bottlenecks, estimation of related computational resources needed, handling data versatility and managing velocity - Address the systemic health big bio-data in terms of the 3V multidimensional space, using analytics based on PCA techniques - Demonstrate AEGLE's efficiency through the provision of aggregated services covering the 3V space of big bio-data. Specifically it will be evaluated in: a)big biostreams where the decision speed is critical and needs non-linear and multi-parametric estimators for clinical decision support within limited time, b)big-data from non-malignant diseases where the need for NGS and molecular data analytics requires the combination of cloud located resources, coupled with local demands for data and visualization, and finally c)big-data from chronic diseases including EHRs and medication, with needs for quantified estimates of important clinical parameters, semantics' extraction and regulatory issues for integrated care - Bring together all related stakeholders, leading to integration with existing open databases, increasing the speed of AEGLE adaptation - Build a business ecosystem for the wider	IA (H2020)

			exploitation and targeting on cross-border production of custom multi-lingual solutions based on AEGLE.	
62	DigitalHealthEurope	DigitalHealthEurope: Support to a Digital Health and Care Innovation initiative in the context of Digital Single Market strategy	The EU aims to provide all citizens access to safe and top-quality digital health and care services. In line with the European Commission's Digital Single Market strategy, the top priorities are to ensure secure access to their health data, to personalise medicine through shared European data infrastructure, and to empower citizens with digital tools for person-centred care. The EU-funded DigitalHealthEurope project will provide comprehensive support for the digital transformation of health and care. It supports large-scale deployment of digital solutions for person-centred care, facilitating the replication of impactful best practices through twinning actions. On a policy level, the project will support decision-makers with white papers, guidelines and policy recommendations.	CSA (H2020)
63	IDIH	International Digital Health Collaboration for Preventive, Integrated, Independent and Inclusive Living	Building international cooperation in the field of digital health is necessary to keep up with latest innovations and technological advancements in the field of healthy ageing. The EU-funded IDIH project aims to organise a Digital Health Transformation Forum to serve as a catalyst to encourage close collaboration with experts, agencies and RTI stakeholders from Canada, China, Japan, South Korea and the US with EU. The consortium (involving experts in healthcare and digital health, IT) will formulate priorities and find contributions for works in four groups: preventive care, integrated care, independent and connected living and inclusive living. New collaborations will be established for digital solutions in healthcare, society and the health industry.	CSA (H2020)
64	SOTERIA	Online and Mobile Communications for Emergencies	The SOTERIA Project aims to research and develop recommendations and an associated toolbox that leverage the positive impact of social	FP7

media in emergencies, enabling public safety organisations (PSOs) and citizens using new mobile and online social media technologies to communicate before, during and after an emergency event, and exchange critical information for the PSOs' intervention in emergency, law enforcement and medical assistance situations. Empowered by the new mobile phones with cameras, text messaging and internetbased applications connecting to social media, citizens expect PSOs to use the same technologies. However, this is not the case. SOTERIA innovates the approach to the dynamics between PSOs and citizens in emergencies, allowing (i) the understanding of the impact social media entails in emergency management systems; (ii) the use of all communication channels in emergency situations, including social media, to the benefit of PSOs and citizens, (iii) the exploitation of mobile platforms' ubiquity to locate and effectively communicate with citizens in distress and (iv) the leverage of PSOs' levels of shared awareness and performance, benefiting from citizens' social media information. Joining companies, universities, research laboratories and a wide community of expert end-users across Europe and beyond, the SOTERIA Consortium is one of the Project's strengths, having solid competences and experience developing research and development projects. Its ambitious goal is to create recommendations and a professional SOTERIA emergency response toolbox that, respecting the organisational culture of emergency services and the European Union's legislation and concerns on privacy, and considering the related human and technological dimensions, enables PSOs to understand the benefits of social media in emergencies and to gradually adopt these technologies in their daily activities, assisting in the safeguard of citizens in emergency and crisis situations.

65	REDIRNET	Emergency Responder Data Interoperability	Over the past 5 years the majority of the REDIRNET consortia have	FP7
		Network	participated in Projects SECRICOM and FREESIC; this has involved	
			partners engaging significantly with a wide range of public safety	
			officers across the EU. A benefit of this engagement has been the	
			recognition that in addition to agency interoperability of	
			communications a pressing need exists for agency interoperability of	
			additional IT systems such as databases, sensor systems and cameras.	
			REDIRNET provides a framework for addressing this need with	
			detailed mapping of user preferences and related legal requirements	
			using innovative technologies. The consortium is aware that	
			frequently it is non-technical issues that hinder agency	
			interoperability regardless of the quality of technical solutions.	
			Consequently user engagement across a range of agencies EU-wide	
			will be ongoing throughout the duration of REDIRNET. This will lead to	
			the first of two elements of the REDIRNET framework - a quality	
			repository of user identified interoperability issues and proposals for	
			their resolution The second element of REDIRNET will be technology.	
			REDIRNET will provide a decentralized framework for interoperability	
			for first responders' systems based on a public meta-data gateway	
			controlled by the agencies themselves via a REDIRNET socio-	
			professional web. Agencies will be able link up to partner agencies of	
			their choice and operational need; they will also be able to manage	
			the scope of such interoperability. To help set up these link-up	
			arrangements REDIRNET will be enhanced with semantic web	
			methods in accordance with the vocabulary and processes of the user	
			community. Inter-operating agencies will need only to develop one	
			gateway (to REDIRNET) leading to a cost effective solution; agent	
			technologies will also be developed to facilitate the integration of	
			user systems into REDIRNET.	

66	SUPER	Social sensors for secUrity Assessments and	"Social media (SM) statistics during recent disasters (e.g. the 20	FP7
		Proactive EmeRgencies management	million tweets relating to «Sandy» storm and the sharing of related	
			photos in Instagram at a rate of 10/sec) provide tangible evidence	
			that security forces and civil protection agencies could greatly benefit	
			from the effective blending of SM information into their processes.	
			However, despite the widespread use of SM in various domains (e.g.	
			marketing/branding/finance, there is still no easy, structured and	
			effective way to leverage several SM in security/emergency	
			management applications. SUPER is a joint effort of social media	
			experts (incl. social network providers) and security experts (incl.	
			security and civil protection agencies), towards introducing a holistic,	
			integrated and privacy-friendly approach to the use of social media in	
			emergencies and security incidents. The approach will operate at	
			multiple time-scales (before/during/after events), while serving both	
			strategic and tactical level operations. It will be characterized by: a.	
			Intelligent information gathering from SM based on novel algorithms	
			(sentiment analysis, topic tracking, real-time event detection), b.	
			Quantitative assessment of the credibility of SM information towards	
			alleviating manipulation, c. Integrated search over multiple SM	
			towards deriving non-obvious information, d. Gathering/analysis of	
			the citizens' and the forces' opinions as part of policy modelling	
			processes, e. Use of SM as an effective way for conveying information	
			to stakeholders, f. Modular integration of the above functionalities	
			within existing processes for strategic planning, management of	
			operations, generation of operational picture and management of	
			policies for emergencies, g. Compliance with privacy laws/regulations.	
			SUPER will be validated in two complementary scenarios spanning	
			civil protection activities (earthquakes) and police activities (unrest)."	
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67	7 EMERGENT	Emergency Management in Social Media Generation	EmerGent aims at understanding the positive and the negative impact of social media in emergencies in order to enhance objective and perceived safety and security of citizens before, during and after emergencies. Furthermore, EmerGent aims at strengthening the role of European companies dealing with services and products related to the aimed research and development results. EmerGent will perform studies on the communication behaviour via social media in an emergency situation and its impact on emergency management procedures with citizens and public authorities (emergency management services) involved. The understanding of critical situations, the reactions expressed through social media and the general importance and preferred types of social media will be considered. For this research new methods and tools will be	FP7
			emergency management services, supported by European associations. To handle the vast amount of valuable and distributed data new methods for Information Mining and Information Quality will be developed to classify and rate publicly available and provided data from users. With developed methodologies and software tools for the routing of mined and classified emergency relevant information from social networks, EmerGent will create a comprehensive concept for Novel Emergency Management. All analysis and impact assessment results will lead to the creation of guidelines. Hence stakeholders will be enabled to understand and get the most benefit out of social media and its integration into their processes.	
68	B EPISECC	Establish Pan-European Information Space to Enhance seCurity of Citziens	In a disaster situation three things contribute to a success: having the right resource available in the shortest time, with the highest relevance and at the right location. Access to necessary information,	FP7

			communication with other rescuers and stakeholders as well as the availability of resources are key factors in minimizing damage and loss of life. Large scale disasters and crisis situations increase the requirements on man and material exponentially. Additional challenges, in particular in cross border events, include language barriers, knowhow and organizational barriers and technical barriers (communication and data exchange). To address this challenge it will be necessary to analyse three defining factors: 1. Past responses to critical events and disasters in terms of time and cost 2. The data and data management tool used by crisis managers and first responders 3. The organisational structures of the crisis managers and first responders This analysis will enable the definition of a concept for a common information space. A requirement for a successful pan European information space is the definition of a common taxonomy.	
69	MoSiVersMikro	Modelling and Simulation of supply planning in the health care system by means of micro simulation (de: Modellierung und Simulation der Versorgungsplanung im Gesundheitswesen mithilfe Mikrosimulation)	standardization activity, will widen the EU wide market for organization developing solutions and tools for crisis management. For the two areas supply and needs of medical services simulation modells are developed and linked together. Therefore an imbalance of both can be recognized in time. As the supply planning aims the needs of single persons, microsimulation is chosen as modelling method that enables to constitute and model single person groups and their characteristics in a differantial manner. The aim is to develop and implement an innovative and holistic model for supply	FORPA (Autrian funding programme)
			planning, that allows to simulate various scenarios and present possible changes of the system with the aim to generate a balance of needs and the medical supply.	

7	D SYSTEM	SYnergy of integrated Sensors and Technologies for urban sEcured environMent	The SYSTEM project will design and demonstrate a data fusion system for the continuous monitoring of threats associated to the manufacturing of explosives and to the production and handling of synthetic drugs. Data fused from different mature sensor networks will provide Law Enforcement Agencies with enriched information to assess the potential occurrence of a criminal activity (e.g. to localize the production of improvised explosive devices and/or clandestine synthetic drugs laboratories) in an identified area.	H2020
7	1 CARE-MAN	Healthcare by biosensor measurements and networking	Diagnostics at hospitals is based either on large-scale automated equipment or ELISA techniques based on bioassays which are not suitable for bedside and emergency medicine. Therefore CARE-MAN will provide a validated, intelligent, next-generation diagnostic device and system based on biosensor technology with new, radically enhanced detection capabilities and integrated sample-handling to address the most common diagnostic problems in the EU like cardiovascular disease, coagulation disorders, chronic/acute inflammation, cancer, thyroid disorders	FP6
7	2 CIRDINNOVA	Shifting the limits of resuscitation with "CIRD Controlled Integrated Resuscitation Device"	Sudden cardiac arrest is one of the most frequent causes of death. But only 3% of the patients survive out-of-hospital resuscitation, and only 18% survive in-hospital resuscitation. Today the time-frame for successful resuscitation is only about 3 to 5 minutes after cardiac arrest. Thereafter, with every minute a rapid decline in survival is observed, tending to "zero" beyond ten minutes of CPR. For decades no significant improvement of the clinical outcome and no significant scientific progress in resuscitation could be shown! More than 10 years ago a research group led by the international renowned cardiac surgeon Prof F Beyersdorf at the Freiburg University Hospital started intensive clinical R&D to develop a completely new therapeutic concept for resuscitation The new therapeutic concept enables a	IA (H2020)

			game changing breakthrough in resuscitation therapy. It is patient-	
			individual and introduces for the first time a controlled, automated	
			and personalized medical therapy in emergency medicine. The	
			designation for the therapy is "CARL – Controlled Automated	
			Reperfusion of the whoLe body". To bring this new therapy worldwide	
			into the hospitals and rescue organisations a new start-up company –	
			the ResuSciTec GmbH - has been founded as a Spin-off from the	
			Freiburg University Hospital in 2010. In close collaboration with the	
			Freiburg University Hospital ResuSciTec developed an innovative	
			system of medical devices called "CIRD - Controlled Integrated	
			Resuscitation Device". First very promising results from a clinical study	
			in humans are already available. That means ResuSciTec has reached	
			TRL 7. To reach TRL 9 and to start full international commercialisation	
			and wide market take-up a consortium consisting of ResuSciTec as	
			industrial partner and three university hospital in Freiburg (DE), Linz	
			(AT) and Rotterdam (NL) will execute the proposed innovation action.	
73	I-REACT	Improving Resilience to Emergencies through	Society as a whole is increasingly exposed and vulnerable to natural	IA (H2020)
73	I-REACT	Improving Resilience to Emergencies through Advanced Cyber Technologies	Society as a whole is increasingly exposed and vulnerable to natural disasters because extreme weather events, exacerbated by climate	IA (H2020)
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			effective preparedness thanks to risk assessment and early warnings, and efficiently manage emergency responses by empowering first- responders with up-to-date situational information and by engaging citizens through crowdsourcing approaches and social media analysis. I-REACT will integrate multiple systems and European assets, including the Copernicus Emergency Management Service, the European Flood Awareness System (EFAS), the European Forest Fire Information System (EFFIS), and European Global Navigation Satellite Systems (E-GNSS), e.g. Galileo and EGNOS.I-REACT will be structured as a user-driven project, integrating the requirements from all main stakeholders as well as the guidelines that emerged during European workshops and seminars related to emergency management. I-REACT services will also enable new business development opportunities around natural disasters triggered by extreme weather conditions, which will reduce the number of affected people and loss of life, lowering the environmental and economic costs due to damaged assets within society	
74	NEXES	NEXt generation Emergency Services	The NEXES Research and Innovation Action aims to research, test and validate the promising integration of IP-based communication technologies and interoperability into the next generation emergency services, so that they attain increased effectiveness and performance. Empowered by smartphones with cameras, messaging and internet-based applications connecting to social media, citizens expect emergency services to use the same technologies. However, this is not the case. NEXES innovates the approach to the dynamics between emergency services and citizens, allowing (i) the use of total conversation capabilities in emergencies, including social media, to the benefit of citizens, including those with disability or special needs (ii) the exploitation of improved location information to rapidly and effectively identify and locate the caller and the incident site and (iii)	RIA (H2020)

			the leverage of Internet-enabled connectivity to enhance	
			interoperability and shared awareness among emergency services, to	
			the benefit of a more secure society. The NEXES Consortium gathers	
			world-class European entities, well experienced in the research and	
			development of innovative solutions for communications and	
			emergency products and solutions. The NEXES Team presents	
			extensive background knowledge and in-house solutions to adapt,	
			test and validate in NEXES's open Testing Regime and Validation	
			Framework, ensuring solid results are achieved to produce relevant	
			Recommendations and contributions to Europe's standardisation	
			effort on emergency services. To leverage related dissemination and	
			market exploitation activities, the NEXES System, Apps and its	
			operational benefits are demonstrated in three realistic pilots to end-	
			users and stakeholders. In fact, end-users' involvement, directly	
			ensured by NEXES Partners and indirectly by invited Advisors, is a key	
			contributor to guarantee NEXES's operational validity as a reference	
			implementation system for next generation emergency services.	
75	AI4EMS	Artificial Intelligence for Emergency Medical	Out-of-Hospital Cardiac Arrest (OHCA) is one of the leading causes of	SME-2
		Services: a smart digital assistant for faster	death worldwide. It is a time-critical condition with survival chances	(H2020)
		and more accurate cardiac arrest recognition	decreasing by 10% with every minute of delay from collapse to	
		during emergency calls	defibrillation. Currently, Emergency Medical Services (EMS)	
			dispatchers use guidelines to recognise OHCA during emergency calls	
			prior to activating the emergency response system. EMS are	
			struggling as emergency calls have increased in Europe from 100	
			million calls in 2003 to 320 million in 2016. Thus, assistant decision	
			tools will be necessary to help EMS to faster identify OHCA situations.	
			Our solution, AI4EMS, is the first and only smart digital assistant for	
			EMS dispatchers that supports the triage decision-making by: 1)	
			processing and analysing emergency calls in real-time; 2) recognising	
			OHCA in an evidence-based process from large amounts of historical	

			data (unfeasible to humans); and 3) presenting the most important insights to the EMS dispatcher in a user friendly manner. AI4EMS allows for faster (reducing almost 3 minutes on average) and more accurate (increase from 73.9% human accuracy to 95%) OHCA recognition by leveraging advanced speech analytics and AI. We offer a user-friendly and secure SaaS solution capable of communicating using Natural Language, accessed via a Nvidia TX1-based device. We are directly supporting the eHealth Action Plan 2012-2020 and Digital Single Market (DSM) strategies, by providing a disruptive ICT technology to improve EMS dispatch efficiency and triage accuracy – which will impact the economy and society at large. With the upgrade and commercialisation of AI4EMS we will disrupt the Artificial Intelligence (AI) market for healthcare taking a step further on our goal to become world leaders in EMS artificial intelligence. Forecasted sales will render revenues of €86.7 million in the first five years of commercialization and a total of 127 new jobs will be created by 2024.	
7	6 HELP	Enhanced Communications in Emergencies by Creating and Exploiting Synergies in Composite Radio Systems	Wireless communications technologies play an irreplaceable role in emergency and disaster relief scenarios. Nevertheless, it is generally acknowledged that existing wireless communication networks frequently fall short of meeting users' needs and cannot properly support the management of these critical situations. Project HELP will establish a comprehensive solution framework for supporting public safety communications aspiring to significantly enhance the communication resilience and responsiveness in emergency situations. The envisioned solution framework consists of significantly strengthen the role and commitment of commercial wireless infrastructures in the provision of public safety communications, especially in the case of aftermath crisis scenarios where the exceptional traffic demand can exceed the capacity and coverage	FP7

			provided by any single infrastructure. Only a solution framework targeted to create and exploit synergies of composite radio systems encompassing commercial and PMR networking technologies can address the complex requirements of modern emergency and disaster relief communications. Project HELP will define and establish the foundations for the development of network and spectrum sharing concepts between networks by identifying outstanding technical advances with respect to current state-of-the art. Project HELP will identify the key features and functional building blocks of the operations and management system needed to achieve a synergic and holistic operation of the composite radio systems. Project HELP dissemination plan is strongly committed towards the achievement of a qualified wide awareness and support of relevant end users, European industry and research community. It is expected that the resulting solution framework will firmly constitute a solid basis and establish a clear roadmap to drive future research activities, in particular, throughout the development of a large scale phase II demonstration project.	
77	7 GERYON	Next generation technology independent interoperability of emergency services	"Nowadays there is a growing uncertainty about the near future evolution of classical PMR solutions due to spectrum scarcity, digital dividend issues and economic crisis. GERYON aims at facing this situation by seizing the existing window of opportunity due to the convergence of the IMS as a predominant enabler for future multimedia networks and the imminent deployment of commercial LTE networks,. GERYON proposes an innovative emergency inter- networking system capable of connecting existing first responder communication systems and enabling the integration of next generation mobile networks by defining technology independent standardized interfaces and autonomic configuration and adaptation techniques under the umbrella of IMS. Therefore, GERYON will unify	FP7

				common technical and operational logic of first responder	
				communications networks in a technology independent manner. This	
				unification will offload interconnection gateways from duplicated	
				technology dependent details by providing a neutral interconnection	
				interface. Proposed system will ensure seamless operation regardless	
				the access technology and take advantage of coverage and	
				responsiveness of existing PMRs and broadband data services of 4G	
				networks. GERYON will demonstrate both classical (i.e. PTT, MTP and	
				preemptive calls) and enhanced emergency services (i.e. multimedia	
				streaming and data services) over an across-frontier testbed.	
				Furthermore, its capability for including general purpose IMS	
				terminals and GERYON enhanced ones will allow an easy access to	
				first responder networks to different groups of unprotected users	
				such as elderly people, people with special needs and battered	
				women that will take advantage of enhanced services such as the	
				"Red Button" over general purpose devices."	
7	'8	ATHENA	ATHENA	The ATHENA project brings together major user communities with	FP7
7	8	ATHENA	ATHENA	The ATHENA project brings together major user communities with world leading experts in crisis management and experts and	FP7
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			devices, can be harnessed to provide efficient and effective communication and enhanced situational awareness during a crisis. The ATHENA system is a crisis communication and management system that encourages and enables the public to participate, in an ethical way, in the process of emergency communication to contribute to the security of the citizen in crisis situations and for search and rescue actions. ATHENA makes use of new social media and high tech mobile devices to efficiently and effectively acquire, analyse and disseminate crisis information and intelligence that is appropriate and useful to LEAs/police/first responders and the public.	
79	ADRONE4LIFE	An electronic drone pilot and cargo custodian for blood and medical courier services	Up to now, helicopters and vehicles have been widely used to transport vaccines, medications and other emergency medical supplies. The use of drones is starting to take off, to address the limitations of traditional modes of transport. To boost the future use of drones in healthcare, the EU-funded ADRONE4LIFE is developing a smart device to improve safety in drone-based telemedicine systems. The device is flexible, modular and adaptable, guaranteeing and monitoring the condition of the medical drone's cargo, be it blood bags or anti-venom serum. It will also be able to automatically control the drone's flight path to ensure safe and timely arrival to the destination by avoiding harsh weather conditions	H2020
80	SaFiRe	Sahana First Response	Sahana First Response (SAFIRE) follows principles of an Incident Command System (ICS) to offer any Emergency Operation Center (EOC) for achieving their incident command and control objectives namely saving lives and leaving no one behind. A local or national Ambulance, Police, Fire, Disaster Management Center EOC might utilize SAFIRE for recording field-observations (burglary, accident, disputes, illicit activities, fores fire) and casualty-illness reports (accident, murder). The Police response procedures and resources	Sahana Foundation

			allocated to incidents varies upon each scenario, which can be planned in SAFIRE. The other extreme is managing a crisis such as an earthquake, cyclone, chemical spill, civil unrest, terror attack, and so on, with many casualties, damages, and losses. All these, whether big or small, call for managing information and seeing the common operating picture for multi-agency coordination and, especially, with bring efficiency gains during the golden 72 hours of crises.	
81	S&R	Search and Rescue: Emerging technologies for the Early location of Entrapped victims under Collapsed Structures and Advanced Wearables for risk assessment and First Responders Safety in SAR operations	After an earthquake, an industrial chemical release or a building's collapse, a timely and effective response is crucial and can prevent or significantly reduce the risk of casualties. This is why first responders and rescue teams need to be equipped with cutting edge tools and specialised instruments in order to enhance their capabilities in terms of accuracy, quick localisation, and reduction of false alarms. Through a series of large-scale pilot scenarios, the EU-funded Search and Rescue project will design, implement and test a highly interoperable open architecture platform for first responders, including advanced frontend equipment systems and backend applications, improving the decision-making of first responders and providing a dynamic common operational picture of the crisis.	H2020
82	CURSOR	Coordinated Use of miniaturized Robotic equipment and advanced Sensors for search and rescue OpeRations	After an earthquake, landslide or flood, search and rescue teams scramble to help trapped survivors. Finding victims can be a tough job, even with the use of sniffer dogs, highly sensitive audio listening devices, and thermal imaging cameras. The EU-funded CURSOR project is developing mini robotic equipment and advanced sensors to assist in these operations. Specifically, their system comprises unmanned aerial vehicles (UAVs), 3D modelling, and transportation of disposable miniaturised robots that are equipped with advanced sensors for the detection of volatile chemical signatures emanating from human beings. Information and data collected are transferred in	H2020

			real time to a handheld device operated by first responders at the disaster site.	
83	RESCUER	first RESponder-Centered support toolkit for operating in adverse and infrastrUcture-less EnviRonments	Police officers, firefighters and paramedics are the first to respond to an accident or emergency – from a small-scale crisis to a devastating disaster. They are on the first line of response. Behind this line, there are scientists and engineers designing and testing tools to support these real-life superheroes. In this context, the EU-funded RESCUER project is developing a toolkit offering sense augmentation through enhanced sensorial input, precise and infrastructureless self- positioning, and cognitive support and multi-sense augmented reality interfaces, improving their focus and capability to utilise information and robust ad hoc intra-team communications for both verbal and data exchanges. Lightweight and non-obtrusive devices and sensors are used to boost human sensing and operational capabilities.	H2020
84	TEAMAWARE	Team Awareness Enhanced with Artificial Intelligence and Augmented Reality	First responders are the first to arrive and provide assistance at the scene of an emergency that requires rescue operations and crisis management. However, despite their heroic services, first responders often struggle with inefficient and old technologies. Advanced technology like smart sensor systems, wearables, data processing, data fusion, data analytics, communication infrastructure and AI can dramatically improve performance. The EU-funded TeamAware project will develop an integrated and cost-efficient situational awareness system with heterogeneous and interoperable sensor units. It will include drone-mounted, wearable and external sensor systems, existing first responder services and operational centres. Highly standardised augmented reality and mobile human–machine interfaces will increase the flexibility and reaction ability of first responders.	H2020

85	INTERPID	Intelligent Toolkit for Reconnaissance and assessmEnt in Perilous Incidents	When first responders are called in after a disaster, they need a prompt analysis of the environment in which they are going to be operating as they have to navigate difficult conditions in their effort to rescue victims and neutralise threats. The EU-funded INTREPID project aims to help first responders in this scope, by providing a platform that will improve the 3D exploration and analysis of disaster zones. This platform will be based on intelligence amplification and extended reality concepts, with smart cybernetic assistants as well as innovative deep indoor networking and positioning capabilities. Thanks to this platform, first responders will be able to immediately start operations without having to wait for specialised teams or for the zone to be fully secured.	H2020
86	SIXTHSENSE	Smart integrated extreme environment health monitor with sensory feedback for enhanced situation awareness	Natural disasters occurring in inaccessible rural areas are on the rise, leading to the multiplication of first responders' missions. However, engagement in fighting wildfires or participating in rescue missions includes risks for the well-being of the engaged first responders. Consequently, a system that monitors their actions and provides real- time and actionable information without obstructing their operational capacity is needed. The EU-funded SIXTHSENSE project aims to improve the efficiency and safety of first responders' engagement in difficult environments by optimising on-site team coordination and mission implementation. The project proposes an innovative wearable health monitoring system based on multimodal biosensor data that enables first responders to detect risk factors early on and allows real-time monitoring of all deployed responders.	H2020
87	MED1stMR	Medical First Responder Training using a Mixed Reality Approach featuring haptic feedback for enhanced realism	The role of medical first responders (MFRs) in mass casualty incidents like natural disasters and attacks on public transportation is crucial today. The capabilities of MFRs are essential since they are first on the scene to provide life-saving assistance to victims. But there are critical	H2020

			training gaps that need to be filled. In this context, the EU-funded MED1stMR project will provide a new generation of mixed reality training by adapting haptic feedback and enabling mixed reality to prepare MFRs for disasters. It will provide flexibility for adapting to trainee needs manually or by applying AI-driven smart scenarios.	
88	RESPOND-A	Next-generation equipment tools and mission-critical strategies for First Responders	Climate change and industrial accidents can create challenging environments for first responders when they are called in to deal with an incident or crisis. The EU-funded RESPOND-A project aims to develop technologies based on 5G wireless communications, augmented and virtual reality or autonomous robots to optimise first responders' work. Thanks to RESPOND-A, first responders will have the opportunity to test these technologies and see how efficiently they can be applied within the framework of diverse disaster scenarios. With these technological advances, first responders will be able to better predict and assess the incidents and to safeguard themselves before, during and after disasters	H2020
89	Patho-CERT	Pathogen Contamination Emergency Response Technologies	Pathogens can easily spread via water, leading to serious health complications or even death. Due to the nature of their work, first responders are more likely to become contaminated when they need to operate in areas where water is present. The EU-funded PathoCERT project aims to strengthen the coordination capability of first responders in the event that they have to work in places where the risk of contamination via water is high. Within this scope, the project will produce pathogen contamination emergency response technologies, tools and guidelines to be validated by first responders, helping them to detect pathogens quickly and to better control emergency situations	H2020

## **ANNEX III: List of Selected Solutions**

ID	Name of solution	Short Description	Features	Supplier	Country	Solution URL
1	Inmarsat Safe Triage Pro	Safe Triage Pro is a fully automated triage solution for the emergency services, delivering secure, real-time patient and incident information to receiving hospitals and supporting individual or multiple patients at the scene of an incident	emergency services, delivering secure, real-time patient and incident information to receiving hospitals and supporting individual or multiple patients	Inmarsat	UK	https://www.inm arsat.com/en/sol utions- services/enterpris e.html
2	RescueWave	RescueWave is a completely new system that allows ambulance and search and rescue organisations to take operational command of multiple or mass casualty incidents.	Priority score, status info, location info	VOMATEC Innovation s	German Y	https://rescuewa ve.de/products- and- services/?lang=en
3	Panacea Cloud	communication and coordination tool in disaster situations	Dashboard, Video feeds, IoT integration	University of Missouri- Columbia	US	https://panaceas cloud.wordpress. com/
4	Adashi C&C	management platform designed to help EMS practitioners handle medical emergencies and large-scale disasters	real-time collaboration, tactical planning, resource management, and incident reporting	Adashi Systems	US	https://www.ada shi.com/incident- command- software/
5	Adashi RollCall	Adashi RollCall was designed specifically to help Fire, Police, EMS, and other emergency services organizations create rosters, fill breaches, and assign overtime, while streamlining processes and controlling labor costs.	minimize labor costs, ensure compliance with union rules, save time, and increase efficiency.	Adashi Systems	US	https://www.ada shi.com/rollcall/
6	Adashi FirstResponse MDT	Adashi FirstResponse MDT is a revolutionary emergency response software product. The dynamic interface allows first responders to view and access mission-critical data, including navigation, pre-plans, and custom may layers – when they need it the most	fast, coordinated, and intelligent response	Adashi Systems	US	<u>https://www.ada</u> <u>shi.com/mdt-</u> <u>software/</u>

7	Adashi Alert	The alerting system is designed to give firefighters access to critical data, improve turn out and response times, and create a common operating picture across the whole agency	Real-time alerts, common operating picture, improved response times	Adashi Systems	US	<u>https://www.ada</u> <u>shi.com/alert/</u>
8	Bioharness 3 physiological monitoring	chest belt with gps sensor to track position and vital paramenters	Measurement of heart rate, breathing rate,core bodytemperature, posture, and activity; GPS tracking	Jjstech	US	https://www.jjste ch.com/rae-039- bh01-001.html
9	Hexoskin smart shirt	The Hexoskin ProShirt comes with built-in textile ECG & Respiratory sensors and a precise Activity senso	Vital paramenter tracking	Hexoskin	CA	https://www.hex oskin.com/collect ions/kits/product s/hexoskin- prokit-women
10	Quadiocore heart rate monitor	Smart wearable chest belt	Vital parameter tracking and synchronizing data with doctor automatically	Qardio	US	https://www.qar dio.com/qardioco re-wearable-ecg- ekg-monitor- iphone/
11	Dataminr Pulse	Dataminr Pulse gives you the earliest indications of high- impact events, plus rich visual context and tools to help you collaborate and act faster—so you can better protect your people, your brand and your physical and virtual assets.	real-time event detection	Dataminr	US	https://www.dat aminr.com/pulse
12	Iris Core	IRIS is a software that centralises all data and tools in one single place allowing Incident Commanders to obtain real-time situational awareness and coordinate the teams in a simpler and safer way	real-time event detection	Unblur	Spain	<u>https://www.unb</u> <u>lur.co/iris/</u>
13	CityGIS Navigator	CityGIS Navigator is a control room-driven and POS- specific navigation. It is based on three pillars: POS Map, POS Navigation and POS integration. Through our own cartographic department, we offer a flexible POS-specific	POS Map, POS Navigation and POS integration	CityGIS	Netherl ands	https://www.city gis.nl/en/mobile- en/navigation- nav/

		map. The POS-specific map is updated on a daily basis and can be adjusted at the request of the customer.				
14	Emergency Mobile Location	Emergency Mobile Location, or EML, is a mobile localization methodology which provides an accurate dispatchable location (address) to Emergency Services. Call information provided includes both a room and/or apartment number, as well as floor number.	Emergency location detection	ELi Technology	Canada	https://eli- technology.com/ what-is-eml
15	MDgo	Meet MDgo Tag. The smart sensor designed for driver adoption. No location tracking or behavior monitoring. No app download needed. Drivers just stick the MDgo Tag on their windshield and go. Its internal GPS, SIM card and collision sensors run silently in the background, only transmitting real-time accident data to the MDgo Cloud when a crash occurs	SaaStags, sensors, dashboards		Israel	https://www.md go.io/product
16	LUCAS	The LUCAS device has been shown to improve quality of chest compressions, increase ETCO2 levels as well as being able to sustain life-saving circulation during prolonged resuscitation attempts	Compression, Suction cup, Ventilation	Jolife AB	Sweden	https://www.luca <u>s-</u> cpr.com/product <u>specifications/#</u> <u>overview</u>
17	Solution Ray-X Chest Al.N	A suite of radiological computer-aided traige and notification software indicated for use in analysis, including Pneumothorax and Free Air and Intracranial Hemorrhage	Automatically analyze image, adapt workflow for radiologist	Nanox Al	Israel	https://www.nan ox.vision/ai#AI- solutions
18	ENGAGE IMS/CAD	ENGAGE IMS/CAD suite is an integrated Call-Center solution for public & private safety organizations providing all the tools for call & incident management, computer aided dispatch, operational resource management and disparate crucial information data integration. It allows seamless interconnection of control centers and the field by deploying mobile dispatch	Call Taking Incident Management & Dispatch Operational Resource Management Duty Rostering Resource Tracking	Satways	Greece	https://www.sat ways.net/product s-sw/engage-ims- cad/

		capabilities on smartphones, and tablets allowing field personnel to update event details, access databases, and exchange rich media messages. Based on a highly modular and reconfigurable S/W platform and a reliable, distributed Event Driven architecture, ENGAGE supports comprehensive incident control and dispatching for Public Safety offering an unmatched combination of speed, reliability, and features adaptive to highly complex communication environments.				
19	Smart First Aid	Establish a unified quick-response IoT platform based on 5G technology to empower a 120 emergency treatment system. While improving response efficiency, family monitoring equipment, public emergency treatment equipment and professional equipment on ambulances is connected with IoT technology, to quickly collect the vital sign data of patients, thus realizing intelligent coordination with big data and AI technology, optimizing the dispatching of subsequent emergency treatment resources and guaranteeing timely rescue.	IoT Equipment + Platform	BOE	China	https://www.boe .com/en/Enterpri se/SmartFirstAid
20	fiResponse®	Enterprise incident management, dispatching and resource tracking system available on an integrated desktop, web and mobile platform.	dispatching, resource tracking	Tecnosylva	Spain	https://tecnosylv a.es/en/products
21	DISP	HITEC Luxembourg Dynamic Information Sharing Platform (DISP®) software is an efficient and interactive solution to obtain situational awareness and ensure people and resources safety.	Track and trace different important situational information (GPS devices from numerous manufacturers supported by DISP	HITEC Luxembour g	Luxemb ourg	https://www.hite c.lu/mission- critical/
22	Corpuls.mission	corpuls.mission is not just a telemedicine solution - it is a medical communication platform in which the patient is brought into the main focus. Specific knowledge from selected experts and various disciplines is crucial for adequate patient treatment. With corpuls.mission, we	Telemedicine solution, exchange vital parameters, ECG in real time	Corpuls	German Y	https://corpuls.w orld/produkte/co rpuls.mission/

		draw knowledge together where it is most urgently needed: during a mission. By combining medical data, chat, video and documentation, all relevant information is collected in one place and can be viewed by the rescuers, physicians and specialists involved. Specifically designed for the special requirements of preclinical use, corpuls.mission breaks away from old, linear communication channels. It offers the possibility to view diagnostic ECGs and photos of medication plans or mission sites as well as the live curves and vital parameters* of the corpuls3T and corpuls3. All of this in the usual corpuls quality.				
23	Leitstellensyste m	ServicePlus is the system for Service providers in ambulance transport / rescue services ,Municipal and private control centres ,Integrated and cooperative control centres ,Fire brigade ,Police Security ,companies etc.	Dashboard, Alerting, Management	Leitstellen- Informatio ns-System	German y	https://lis- gmbh.com/leitsys teme/leitstellens ystem
24	ACE	Being in a highly competitive environment, time does really cost money, so having a digital solution that is simple to use, easily adopted, secure and reliable is important for every business. ACE is a cloud based forms system which permits companies to retain the proven benefits of paper while enjoying the full power of digital. This solution offers paper document handling and business process automation. With a digital pen and paper printed with Anoto's pattern, it captures handwritten information as digital data and automate document processing to improve efficiency. It helps to automate any paper-based process where there is clear benefit in having faster access to and visibility of the handwritten data, or where loss or delay of paperwork can cause a negative financial, social or regulatory impact	Automatically capture handwritting in forms	Anoto	Sweden	https://www.ano to.com/

		to business. This proven solution is ideal for any industry where using expensive equipment, like laptops or tablets, may be risky or intimidating. Using pen and paper is very ubiquitous, less intrusive and more user friendly than other mediums. Being able to capture handwriting on standard forms that are automatically transferred and converted into a digital format, offers a secure solution that leverages existing work practices while removing the challenges of user adoption.				
25	PulsePoint	The lifesaving potential of PulsePoint is only available in communities where it has been implemented by the local Fire/EMS agency with the assistance of our professional services team.	solution for emergency response	PulsePoint	US	https://www.puls epoint.org/
26	Code Blue	React to events in an instant with our preconfigured mass notification and emergency management solutions designed to help you clearly communicate with your audience.	incident response	Code Blue Corporatio n	US	https://codeblue. com/products/
27	Prometech triage system	We are able to provide a stand alone or integrated system of tracking patient triage status. Mass casualty incidents are stressful and complicated scenarios that require massive amounts of information to be gathered, interpreted and shared. Having a system to physically track the casualties and input their triage status to the larger incident management system allows command to make informed big picture decisions and field first responders to more efficiently make life saving actions.	Tag & Trace Casualty Tags	Prometech	Netherl ands	https://prometec h.eu/commercial /triage-system/
28	VITAL-First Responder	VerdaSee's solution helps protect and preserve the lives of First Responders and provide critical, real-time information to Incident Commanders. All modules are designed to significantly improve accuracy and accelerate (or fully automate) data capture while maintaining or	incident response	VerdaSee	US	http://verdasee.c om/products/

		reducing the time and effort associated with current practices				
29	Secuware Massive Casualty Response System	Massive Casualty Response System : System that can Sort/Categorize/Transport patients according to severity rating in a mass casualty disaster scene. Real-time data will be used to support emergency responders to increase the survival rate of an individual.	e-Triage	Secuware	Republi c of Korea	http://www.secu ware.co.kr/en/sol utions
30	TOD	5VS is committed to identifying, prioritizing and initiating lifesaving measures on anyone in critically condition within seconds, while providing operational/incident command with the tactical medical picture – at a glance & in real time.	Triage-On-Demand biosensor	Five Vital Signs 5VS		<u>https://fivevitalsi</u> gns.com/
31	Triage-Plus	In Mass Casualty Incidents with multiple patients it is critical to be able to quickly and easily identify how many patients, how sick they are and where and when they will arrive at receiving medical facilities and making this information available to multiple agencies and personnel simultaneously.	e-Triage	Triage-Plus Limited	US	https://triage- plus.com/
32	Call center triage	Receive guidance during all medical calls, ensuring that patient triage results in the best, most informed medical advice possible.	Live recommendations, protocoll, interaction tracking	Corti	Denmar k	https://www.cort i.ai/solutions/call- center-triage
33	5G connected Ambulance	The 5G connected ambulance provides an innovative new way to connect patients, ambulance workers and remote medical experts in real time, thanks to a collaboration between Ericsson, University Hospital Birmingham NHS Foundation Trust (UHB) and King's College London.	connect patients, ambulance workers and remote medical experts in real time	Eriscsson, University Hospital Birmingha m	UK	https://www.eric sson.com/en/cas es/2020/the-5g- connected- ambulance
34	THR880i plus	The THR880i plus has been designed to be used without looking. Its radio side is optimal for critical communications	Talk group selctor, PTT and duty key, GNSS positioning technology	Airbus	France	https://www.sec urelandcommuni cations.com/thr8

						<u>80i-handheld-</u> tetra-radio
35	Vuzix M4000	The Vuzix M4000 is an all-in-one enterprise AR solution that combines a revolutionary mix of optics, processing performance, and lightweight ergonomics.	First enterprise-focused smart glasses using revolutionary Vuzix waveguide See-through heads-up display Crystal clear, professional quality streaming Lightweight, comfortable form factor that you can wear all day Flexible input options with buttons, voice control, and swipe pad	Vuzix	US	https://www.vuzi x.com/products/ m4000-smart- glasses
36	First iZ	As a 911 call is received, information is entered into a computer-aided dispatch (CAD) system. When the GPS coordinates of the incident are calculated, a Genesis- created software module (integrated with our Genesis PULSE® software) determines the location of the nearest FIRST iZ drone, located at a city-or county-owned facility such as a fire station, police substation, or other appropriate site. FIRST iZ software develops and sends a flight plan to the drone. The flight plan component considers air space restrictions, weather, and other potential obstacles, then files the plan with the FAA and other necessary parties.	Foreknowledge, Quick Response, Flight Speed, RT Video	First Iz	US	https://firstiz.co/ our-product/
37	L3Harris Geospatial solutions	Man-made and natural disasters are occurring more frequently and with greater intensity, straining resources and challenging community resilience. To help combat these catastrophes organizations and governmental agencies can use remotely sensed data to plan for and alleviate risks and hazards and manage the response and recovery efforts when an emergency disaster strikes.	Disaster Management Software	L3Harris	US	https://www.l3ha rrisgeospatial.co m/Industry- Solutions/Disaste r-Management

38	Motorola Disaster Preparedness Solutions	Communication and coordination with multiple agencies is vital to weather a natural disasters. Yet, it's oftentimes overlooked in planning. You may find yourself short on back-up radios. Or, you could lack extra chargers. Perhaps software is the issue. Don't let surprise be an element of your disaster response. Check the solutions that we have compiled for you to be ready to face any situations that come your way.	Mission-Critical Comms for disaster preparedness	Motorola	US	https://www.mot orolasolutions.co m/en_us.html
39	VIMED STEMO	Telemedical system for the prehospital diagnosis and therapy of acute stroke patients	Fully equpped vehicle, transfering data and scans to hospital, treatment can be done locally	VIMED	German y	https://www.vim ed.de/de/system e/vimed- stemo.php?lang= en
40	VIMED Teleambulance	An ambulance as rolling, prehospital telemedicine platform with advanced diagnostic possibilities	IT-integrated POC-, laboratory- and diagnostic-systems for an advanced spectrum of acute life-threatening and especially time-sensitive diseases	VIMED	German y	https://www.vim ed.de/de/system e/vimed- teleambulance.p hp?lang=en
41	VIMED Mobil	Portable workstation for telemedicine applications	audio-visual communication in telemedical real-time applications, such as telediagnostic, teletherapy, second opinion or case discussions; Integration with DICOM data	VIMED	German y	https://www.vim ed.de/de/system e/vimed- mobil.php?lang=e <u>n</u>
42	VIMED Car	Telemedicine communication hub for ambulance	LTE/UMTS/WiFi and GPS antennas; LAN, WiFi and Bluetooth interfaces	VIMED	German Y	https://www.vim ed.de/de/system e/vimed- car.php?lang=en
43	VIMED Telemedizinakt e	Coordinated and interdisciplinary communication in the hospital environment	teleportal-server; HL7, information server;	VIMED	German y	https://www.vim ed.de/de/system e/vimed-

						<u>telemedizinakte.p</u> <u>hp?lang=en</u>
44	Asgard	ASGARD is an innovative communication and switching system, which is designed for the operation of safety-critical control centres.	Telephony via ISDN, VoIP, eCall, "All- IP" (TRNotruf 2.0), analogous and digital radio, aviation radio and coastal radio	Frequentis	Austria	https://www.freq uentis.com/en/p ublic-safety
45	999eye	Dispatchers are under time pressure to question 999 callers to ascertain what is wrong, where they are, who they are and who is in danger in order to dispatch the right resources. 999eye live footage offers instant 'on scene eyes' to the dispatchers; providing immediate INSIGHT which helps them to assess the scenario and, with caller's location visible, to better select the appropriate RESPONSE to the incident – either as a 'real- time', immediate response or for a 'slow-time', non- emergency follow up – while at all times considering the SAFETY of responders and the public	"on screen eyes", live location, RT- video	Capita Secure	UK	https://www.capi ta.com/expertise /industry- specific- services/public- safety/contact- command-and- control/emergen cy-live-streaming
46	Gam	Complete solution to manage a company of Patient Transportation. It covers any situation that might arise in this type of business.	GPS, Communication services, Routes, Service Management	OriginalSof t	Spain	http://original- soft.com/en/prod uct.php?item=ga m
47	Criscom Commander	The CrisCom Commander is a browser-based command and control system for the crisis management of authorities and organisations with security tasks and companies with their own emergency response.	Communication module, maps, graphics, visualisations, patient module, operation module	Eurocomm and	German y	https://www.eur ocommand.com/ komplettloesung en/criscom- commander.php
48	Defidrone	The Defidrone Fast Medical Response UAV is a result of a project which aims to create a rapid response network of autonomous VTOL systems. They will allow a quick access to hard-to-reach areas, performing missions in which every second counts. Each drone carries a defibrillator to provide a rapid response in case a person suffers a heart	autopilot, 24h service, quick response	Embention	Spain	https://www.em bention.com/proj ects/defidrone- fast-medical- response/

		attack, in areas where emergency teams are not able to act quickly.				
49	FirstRespnse 911	Incorporating automated call data routing, transaction archiving, receipt acknowledgment, and a suite of powerful reporting tools, FirstResponse911 is used to improve EMS interoperability, accountability, and response times. Using FirstResponse911 to streamline sharing emergency data can save time and save lives.	Selective Call Data Transfer, Continious Incident Updates, Personnel Safety, Reporting	DataTech9 11	US	https://www.dat atech911.com/sol utions/firstrespo nse911/
50	StatusNet 911	StatusNet911 is a cloud-based dashboard connecting hospital, dispatch, and first responders with real-time situational data. It provides hospital resource availability, triage status, and system outages in order to support real-time response to multi/mass-casualty incidents (MCIs) and daily incident traffic. Health systems benefit by receiving Emergency Medical Services (EMS) incident information in real-time to more effectively manage facility resources. StatusNet911 is used daily to handle routine incidents which assures that staff is proficient with the system when disaster strikes.	Ambulance Drop Times, Improved Stroke & STEMI Response, Hospital Information Status	DataTech9 11	US	https://www.dat atech911.com/sol utions/statusnet9 11/
51	RTEAM	RTEAM is a real-time solution that provides a powerful user-managed tool to create alerts and exceptions. Alerts provide real-time notification of issues that need immediate action in the field, in operations, and in dispatch. Exceptions are captured in real time to be reviewed and analyzed. A workflow process provides mechanisms for timely collection of relevant information enhancing the quality and accuracy of the data necessary for root cause analysis.	Manage EMS Operations, Personnel Performance, Improved Patient Care and Outcomes	DataTech9 11	US	https://www.dat atech911.com/sol utions/rteam/
52	DataWatch 911	DataWatch911 is a comprehensive 911 system management solution that provides real-time Emergency Medical System (EMS) analytics, reports and actionable insights into resource performance, incident response	Real-time workload monitoring, Improved stroke & STEMI response, Automatic alerts	DataTech9 11	US	https://www.dat atech911.com/sol utions/datawatch 911/

		and Computer Aided Dispatch (CAD) system performance. Use it to allocate and staff resources more effectively, respond faster to events as they unfold, and increase the overall accountability of your organization. Getting the best of an EMS team requires using resources where and when they are most effective.				
53	Emergency Management Software - The Virtual EOC	Emergency management software should help your teams help those in need, not slow them down with clunky interfaces, or stop them in their tracks with system crashes. Veoci is easy to use, quick to deploy, and always available. Gather every member of your team, no matter where they are, into a virtual EOC where everything is centralized, organized, and instantly archived. Veoci doesn't run your teams through inflexible checklists - it provides a way for them to communicate with each other and the EOC, and it gives you the mapping, alerts, workflows, task management, dashboards, and every other operational tool necessary for running a successful EOC.	Tailored emergency prepardness, Connect and integrating different teams, Tailored recovery plan	Veoci	US	https://veoci.com /solution/emerge ncy-management
54	TriageLogic	With TriageLogic, you receive a fully installed solution, managed 24/7, INSIDE your organization's network. This solution provides all benefits of a fully hosted solution, with increased flexibility to connect to multiple systems, while meeting internal security requirements.	Web-based system, Robust reporting, Decreased training time	TriageLogic	US	https://triagelogi c.com/call- center-software- solution/
55	Adlink Mini-ITX	The ADLINK Mini-ITX embedded systems are small form factor, low-power, and mechanically ruggedized system providing rich I/O that can be used to connect on-board devices, enabling wired and wireless connections, and suitable for the deployment in an ambulance-based telemedicine system. The MIX series features with rich I/O features include a GPS module for providing real-time vehicle location, 3G and Wi-Fi modules to allow for	Wireless communications, GPS, RT vehicle Information	AdLink	Taiwan	https://www.adli nktech.com/en/T elemedicine

		wireless communications, and a mini-PCle expansion slot that can be used to enable video applications				
56	RescueNet	With the push of a button, medics now directly send X Series <sup>®</sup> files from the field to your system at the end of a call and move on with their shift. With RescueNet <sup>®</sup> CaseReview, access to case files is as fast as opening the browser of any web-enabled device. Case files are immediately available moments after their transmission	Fast access to files, Aggregate data, Tracking	Zoll	US	https://www.zoll. com/products/da ta/ems/rescuenet -casereview
57	LifeBot 6	LifeBot <sup>®</sup> 6 is a telemedicine / telehealth system which goes far beyond simple video teleconferencing by also (and in a fully integrated fashion) acquiring and transmitting (in real-time) critical patient vital signs data like multi-lead ECG (including 12-lead), SPO2, non- invasive "and" invasive blood pressure, ETCO2 (with capnogram), dual temp, multiple exam cameras, imbedded ultrasound (just plug in a handheld probe), an onboard server to capture full medical record patient history (ePCR), geographical location, etc. This level of integration eliminates the need for the investment of separate disparate devices and the training / service costs required to operate and maintain them. Ancillary devices (like external portable defibrillators) and patient information generated can be easily linked to and captured (including pre-shock ECG) by the LifeBot <sup>®</sup> via USB or Bluetooth.	On-BOARD Communications, Protection, Serviceability, Extra Modules,	LifeBot	US	https://www.life bothealth.com/pr oducts/lifebot-6/
58	EmergencyEye	Through EmergencyEye, service facilities will improve their performance, as staff will be able to handle their calls faster, more accurately and efficiently, and provide better support and care to those affected. The innovative technology is set up in a few minutes, can be easily integrated into existing IT infrastructures and thus easily complements the already existing armentarium. The very	Chat, Location, Video, Photos, Session report, GEOsms	COREVAS	German y	https://emergenc yeye.de/

		intuitive usability of EmergencyEye, the highest possible cyber security and the protection of personal data lead to a high acceptance among callers and users. In the COMMAND version, we make EmergencyEye available to emergency management, command, crisis and disaster teams, supervisory authorities and decision- makers/leaders in the event of special operations and major emergencies for situation reconnaissance and assessment.				
59	St John First Responder	Pinpointing your exact location can become difficult in an emergency situation. The St John First Responder App sends your GPS coordinates to the operator when you call Triple 000 for an ambulance, speeding up the time it takes to confirm your location and dispatch and ambulance	Automatically sending the gps location	St John Ambulance Austrailia	Australi a	https://stjohnwa. com.au/online- resources/st- john-first- responder-app
60	SMSlivräddare	SMS lifeguards are a system for alerting volunteer lifeguards to a suspected cardiac arrest.	Connecting voluntary lifeguards by SMS	Heartrunne r Sweden AB	Sweden	https://heartrunn er.com/about- the-system/
61	MMX Platform	The MMX <sup>®</sup> platform as a foundation, offers a variety of communication solutions. From a simpler call-center setup, text telephony and videophone apps, to more advanced solutions for critical emergency calls for people with deafness, hearing loss or deaf-blindness. MMX <sup>®</sup> gives a highly flexible platform for being able to provide efficient interpreting and public services in an accessible way. It also provides the tools needed by the person who will be using the services. Apps and softphones are a perfect fit when it comes to providing modern, customized tools to people with different types of functional impairments. The apps and phones have many settings and can easily be adapted to suit your particular needs	cirtical emergency calls for people with deafness, hearing loss	nWise AB	Sweden	https://nwise.se/ en/mmx/
62	Seconds Application	Seconds Application calculates the coverage of a region in real-time and gives advice to maximise the probability that future incidents are reached within the set response time targets. The coverage need for each location in the region is predicted using a combination of demographical population data and historical incident data	Coverage need protection, ambulance coverage, actual, useable advice	Stockhos	Netherl ands	https://www.stok hos.nl/product.ht ml
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63	Incident Managemet Software	Real-time incident management software that enables the coordination of an effective response to any situation. Easily create a common operating picture, communicate objectives, and collaborate on a resolution using forms, tasks, logs, maps, and status boards.	Status Boards, Maps, Control Room, Dashboard	D4H	Ireland	https://d4h.com/ incident- management
64	Adam	ADAM (Apparatus Deployment Analysis Module) is a "What if?" predictive modeling tool that uses historical CAD data, GIS map data and a rigorous projection algorithm to project the impact of deployment changes on response times and availability	Analyzes the effect of deployment changes to determine exactly where to place units and staff, Projects the impact on response performance due to temporary or permanent, Stores GIS layers in geodatabase and shapefile formats, Visualizes deployment plans with color-coded maps, Compares alternate deployment scenarios, and provides the optimal location for a new station	Deccan Internation al	US	https://deccanint I.com/what-we- do/adam/
65	ESF8 Portal Incident Management	The ESF 8 Portal was born after Hurricane Gustav in 2008 out of the frustration of using multiple, independent software tools that covered only partial needs to manage a large scale emergency. We built the ESF 8 Portal based on the first hand experiences of Louisiana's response during Katrina, Rita, Gustav and Issac.	Power Generation + Fuel Status, Operation and Evacuation Status, Facility Compliance, Utility Providers, Track Contracts, Census	ESF8 Portal	US	https://esf8portal .com/incident- management/
66	ICO 911 Dispatch	The most flexible and scalable solution to manage computer assisted dispatch calls within the context of personnel, vehicles and other emergency services.	Phone dispatch, CAD, Geotracking, Message Board, Reports and analytics	ICO	Canada	https://icosolutio ns.com/en/softw

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						are/ico-911- dispatch-cad/
67	ICO Fire RMS	ICO Fire RMS is the most extensive solution for managing every aspect of a fire department. All modules are integrated and provide the ability to perform operation and administrative workflows	Operations, Inventory and equipment, Roster, Prevention, Addresses, Reports and Analytics, Health and safety	ICO	Canada	https://icosolutio ns.com/en/softw are/ico-fire-rms/
68	Emergency Response System	The Emergency Response System (ERS) solution facilitates inter-agency collaboration for dispatchers, first-responders, government and healthcare agencies in order to save more lives with agile and effective emergency response.	Call talking process is automated, dispatchers gain unified interoperability, first responders are empowered in real time	ST Engineerin g	Singapo re	https://www.sten gg.com/emergen cy-response- system
69	Salamander Live	SalamanderLive's web-based solution allows you to manage your resources, both people and equipment, as well as plans and events from anywhere that has internet connectivity.	Access SalamanderLive from anywhere with a web connection, Import / export all resource data including people and equipment with our self-service interface, Create accountability TAGs for all resources including people, equipment, and collections, Capture a vast amount of information within a Profile for every resource entered into SalamanderLive, including but not limited to, Information collected from Salamander's mobile and PC- based solutions syncs to SalamanderLive to create a common operating picture, all in real-time	Salamande r	US	https://www.sala manderlive.com/ solutions/cloud- solutions
70	Fotokite Sigma	The Fotokite Sigma. A Situational Awareness System for First Responders. Focus on your mission. Drastically improve your team's situational awareness. The Fotokite Sigma allows you to gain an impressive, unobstructed overview of any incident in an instant. Live stream and	IP55 Rated, 45m /150 ft Max Height, Advanced Cameras, Robust Wind Performance & Intelligent Redundancy, Lightweight and Built for Reliability	Fotokit	Swiss	https://fotokite.c om/situational- awareness- system/

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		document mission-critical aerial views with total operational freedom.				
71	Ambulance Dispatch System	Our Ambulance Dispatch System provides a cloud-based solution to easily retrieve, record, and monitor data anytime, anywhere	Cloud-based, automation, intelligent support	TrackAsia	Singapo re	https://track- asia.com/ambula nce-dispatch- system.html
72	Logis IDS	Intelligent CAD Solutions for 911 & Public Safety, Mobile Healthcare & Non-Emergent Medical Transport	Predictive AI Deployment, Advanced Emergency Recommendations, Automated Planning	Logis	Denmar k	https://logissoluti ons.net/solutions /logis-ids/
73	Phoenix EMS	Our Phoenix EMS browser-based solution provides you with the most advanced electronic Patient Care Reporting (ePCR) features available on the market today. We have it all with call details, basic patient info, history and assessment to interventions, document and photo attachment, and transport and billing. Using the most up- to-date technology, our ePCR nearly fills itself out, giving the EMS professional a break from the mounds of paperwork previously associated with patient care and transportation. Submission may be manual or configured to run automatically by the system.	NEMSIS V3.4.0 protocol, Autofill data, HIPAA and PHI compliant, Mapping ,	ProPhoenix	US	https://www.pro phoenix.com/sol utions-ems
74	Mark43 CAD	Mark43 CAD is the best-designed, most intuitive public safety dispatch application available. Built to mirror the way a telecommunicator thinks, the platform seamlessly augments any action a user performs to process an event.	Dashboard, geospatial system, high- speed workflows, open API, first responder autonomy	Mark43	US	https://mark43.c om/cad/
75	Core Technology CAD	Core Technology's computer-aided dispatch system (CAD) is a solution that provides agencies with a basic call for service. It is a straight-forward tool that guides users through initiating and recording information that begins with a phone call from a citizen, dispatch or originates from personnel in the field. Our CAD integrates with	Automated recommendation of best-scenario response; Address validation against street layers and address points; Superb administrator configurability; GIS data delivered to dispatchers instantly, including intersections;	Core Technology	US	https://www.cor etechcorp.com/di spatch/

		Talon Incident Management System (TIMS) and supports mobile with Talon MDC.	User-friendly Mapping features with unlimited map layers with deep level address information like floorplan maps and hazard/safety alerts; Integrated NCIC and RMS queries			
76	TAMS	Modernise your ambulance service with TAMS. This innovative technology is a full, end-to-end solution providing ambulance authority stakeholders with the critical information they need when they need it – empowering data-based decisions at every stage.	Interoperability, Data Aggregation & Insights, In-Vehicle and other displays, paramedic communication and management, Proven track record for incident management	Trapeze	Australi a	https://www.trap ezegroup.com.au /solutions/emerg ency-response- system
77	ZOLL <sup>®</sup> Dispatch	When seconds count, it's imperative that EMS call takers and dispatchers have the tools to align response with transport need and the data to optimally position vehicles for swift response. Anticipating where crews will be needed saves time, and more importantly, saves lives. ZOLL® Dispatch is a data-rich call taking and computer- aided dispatch (CAD) solution that enables your team to respond quickly, communicate effectively, and deliver more quality outcomes efficiently. This intelligent solution reduces workload and errors, facilitates two-way communication with medical centers, and offers robust monitoring and QA functionality. The highly visual dashboard allows users to benchmark and measure performance for continuous operational improvements.	dispatching, dispatch software, real- time situational analysis	ZOLL	US	https://www.zoll data.com/ems- software/dispatc h
78	Trakka's TM- 100 Map & Video Management System	Trakka's TM-100 Map & Video Management System brings a total solution to mission management, one which is designed to perfectly complement Trakka's range of sophisticated, advanced camera and searchlight systems.	mission mapping and video management system	TrakkaSyst ems	Australi a	https://www.trak kasystems.com/tr akkamaps/
79	CAREpoint	CAREpoint consolidates EMS communication, including forms data, 12-leads, and calls for more seamless EMS to ED communications. With the latest generation release,	EMS communication, pre-hospital communication	General Devices	US	<u>https://general-</u> <u>devices.com/inno</u>

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		CAREpoint 3 has all the power and functionality of its predecessor the CAREpoint 2.0 Workstation, but with a range of advanced features to enable healthcare teams to save lives and reduce costs with seamless patient care from the field to the hospital. By incorporating the latest architecture, interoperability, and functionality in a Solution as a Service model, CAREpoint 3 makes coordination of care between EMS/fire and hospitals simply seamless.				<u>vations/carepoint</u> 2
80	Tassica MCI Management	TASSICA MCI Management is an application that allows managing in real-time the health care assistance in emergencies with multiple victims by means of using Web Technologies, permitting the Net connection and exchange of information among those involved. Easy computing tool that manages INCIDENT WITH MULTIPLE VICTIMS. An event that, due to the high number of patients and the nature of their injuries, makes the number of resources and health care personnel to be insufficient to pay attention to all the injured people under habitual criteria. Thus, it is necessary to optimize to the best performance of the resources.	MCI management, app, Real-time the health care assistance in emergencies with multiple victims by means of using Web Technologies, permitting the Net connection and exchange of information among those involved	Tassica	Spain	https://www.tass ica.com/index.ph p/mci- management