iProcureSecurity PCP

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

Scope Document for the Open Market Consultation

Version 1.0

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Project

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Statement of originality

This document contains original unpublished work except where clearly indicated otherwise. Acknowledgement of previously published material and of the work of others has been made through appropriate citation, quotation, or both.

Disclaimer

The information contained in this document is tentative. Its aim is to consult with the market on the PCP scope prior to its publication in the Call for Tenders. The draft information here contained shall be updated if improvements are deemed necessary, especially after the Open Market Consultation.

1 Introduction

Emergency Medical Services (EMS) in Europe are characterised by a heterogeneous landscape with diverse organisational setups, technology standards, coordination mechanisms and actors. This is the result of different historical and institutional contexts. However, these EMS are united by the common aim of providing timely care to victims of sudden and life-threatening emergencies or disasters in cross-border settings and international humanitarian missions. Fostering the response capacities and increasing the cooperation of the Emergency Medical Services Systems (EMSS) is of decisive importance for strengthening the resilience of European societies.

During the prior iProcureSecurity (CSA) project, a large number of EMS were involved to identify, evaluate and prioritise future challenges and needs. The creation of an interoperable, flexible triage management system supported by modern technologies was among the most requested solutions in the context of security-related scenarios.

This iProcureSecurity PCP action is a result of those intense participatory processes. The action will lead to an innovative triage management system that provides a) quick and accurate overview of victims and their status; b) decision support for better allocation of available resources and quicker support for patients; 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.

Following the EC Guidelines on Pre-Commercial Procurement (PCP), through a competitive series of design, prototype and pilot steps, the iProcureSecurity PCP will contract suppliers to deliver the creation and deployment of the envisaged triage management system.

As part of the Open Market Consultation (OMC), this document describes the scope and initial requirements of the iProcureSecurity PCP project. The OMC represents a specific phase during the overall PCP methodology, aiming to actively approach the market when the identified needs by the procurers must be communicated openly and clearly to all potentially interested bidders. Market players get the unique opportunity to give feedback on the requirements of the foreseen pre-commercial tender.

In this document you will find the following sections:

- **Vision**
- **Requirements**
- **Procurement Process**
- **Call for Tenders**

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 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.

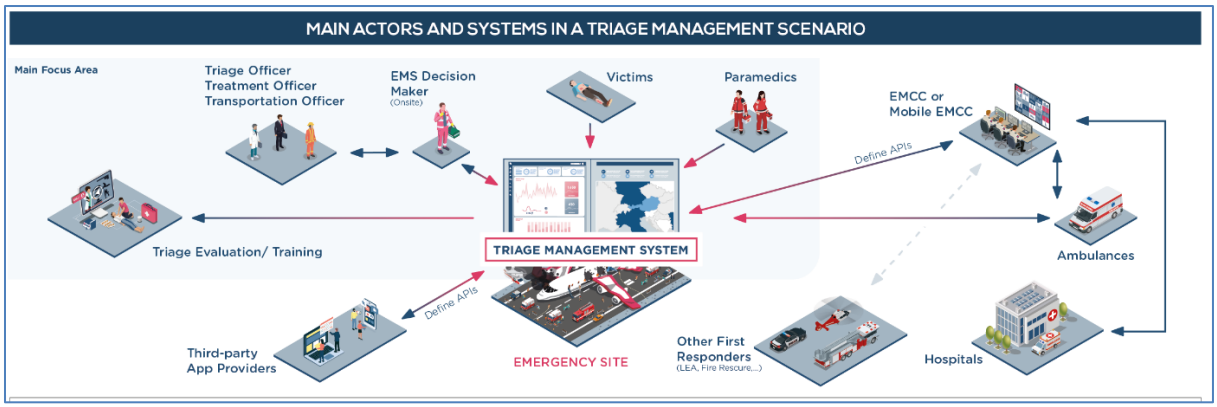

Figure 1: Triage management aspects

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.

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 cross-cutting 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 time between ambulance transport and hospitals, and

e) insights for quality assurance and training measures.

3 Requirements

The following sections present an overview of initial requirements that were identified by the consortium. Each requirement was given a priority between 0 – 10. "0" represents not applicable and "10" represents the highest priority (must have). Essential requirements do not indicate a priority. Tenderers shall aim to address all requirements in the Tender. However, the prioritisation indicates the most important requirements to be addressed. Lower ranked requirements may be addressed in more detail in Phase II and III.

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 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.

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

3.1 Functional Requirements

3.1.1 Quick and accurate overview of casualties and their status

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
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

3.1.2 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

3.1.3 Improved interoperability internally and with other first responders and relevant actors

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

3.1.4 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

3.1.5 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

3.2 Non-Functional Requirements

3.2.1 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 API Legacy Systems	be compatible with existing software in the procurers' organizations.	10.0

3.2.2 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

3.2.3 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

3.2.4 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.

3.2.5 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).

3.2.6 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.
R 2.6.8	Language - Terminology	allow to change terminology easily.

3.3 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	ºC
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)

3.4 Legal and Regulatory Requirements

3.4.1 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).

3.4.2 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.

3.4.3 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)

3.5 Organisational, Staff and Business Requirements

3.5.1 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.

3.5.2 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.

3.5.3 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.

4 Procurement Process

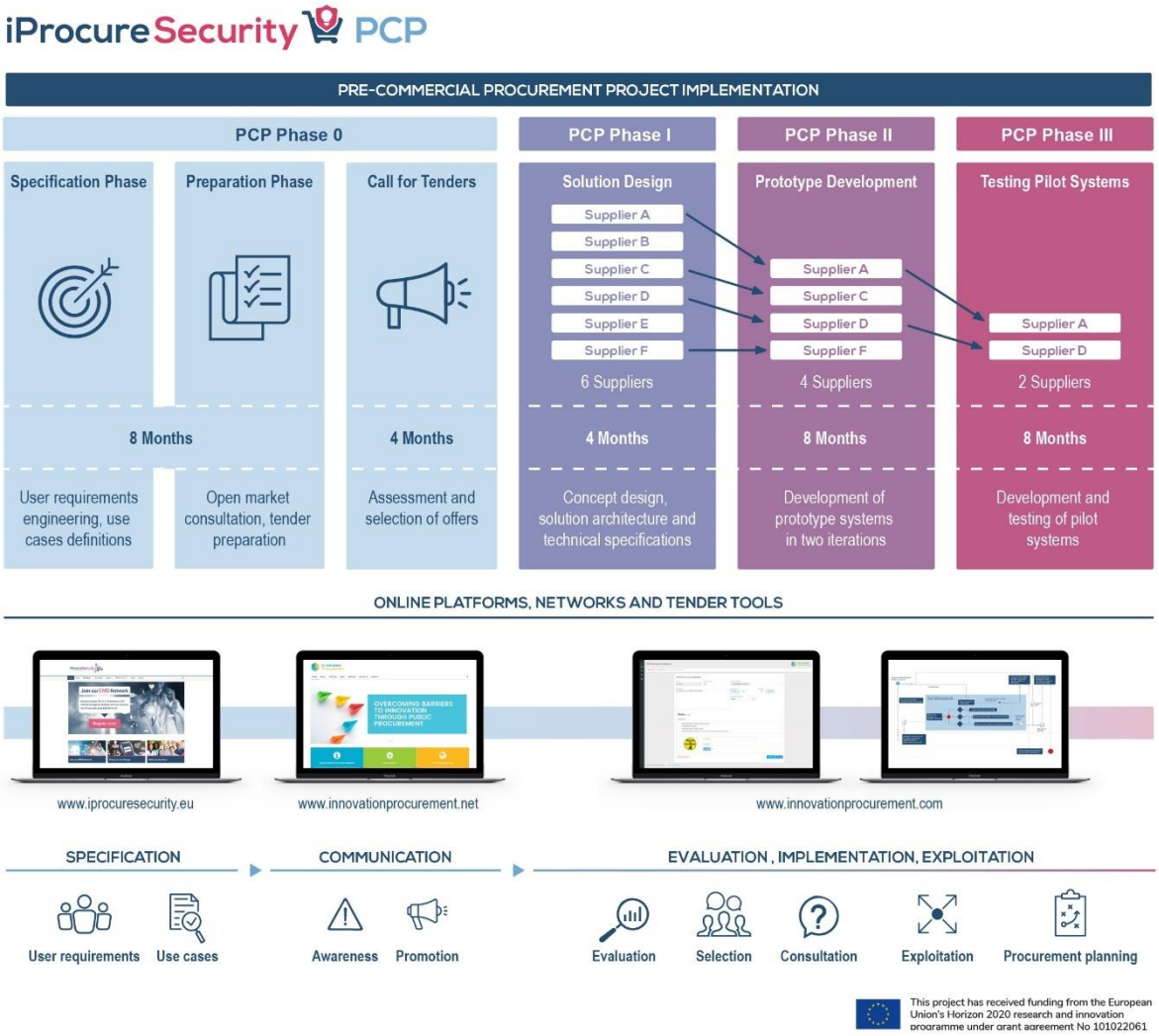

Figure 2: iProcureSecurity PCP Process

The consortium brings together experienced procurers representing local, regional or national EMS providers from five different countries.

Table 1: iProcureSecurity PCP partners

Acronym	Partner	Country
KEMEA	KENTRO MELETON ASFALEIAS (Lead Procurer)	Greece
EPES	EMPRESA PUBLICA DE EMERGENCIAS SANITARIAS	Spain
SERMAS	SERVICIO MADRILENO DE SALUD	Spain
ARC	ÖSTERREICHISCHES ROTES KREUZ	Austria
ASLBN	AZIENDA SANITARIA LOCALE BENEVENTO	Italy
AREU	AGENZIA REGIONALE EMERGENZA URGENZA	Italy
HRC	ELLINIKOS ERYTHROS STAVROS	Greece
EKAB	ETHNIKO KENTRO AMESIS VOITHEIAS	Greece
IBB	IZMIR BUYUKSEHIR BELEDIYESI	Turkey

iProcureSecurity PCP follows the stages of the PCP process as set-out by the European Commission, i.e. work will be divided into four subsequent phases:

- Phase 0: Preparation phase (8 months) and Call for Tenders (4 months)[1]
- Phase I: Concept design, solution architecture and technical specifications (4 months)
- Phase II: Development of prototype systems in two iterations (8 months)
- Phase III: Development and testing of pilot systems (8 months)

In parallel to these phases, separate work strands for co-design, evaluation & impact assessment, dissemination and project management will support the project objectives. For the three phases of the pre-commercial procurement, the table below shows the envisaged distribution of budget, the number of expected suppliers for each of them as well as the planned share of R&D product costs for Phase III (pilots). The final distribution will be agreed also taking into account the feedback received during the OMC.

Table 2: PCP phase overview

	PCP Phase I Solution design	PCP Phase II Prototype development	PCP Phase III Testing pilot systems
% total PCP subcontracting budget	10%	35%	55%
Sum subcontracting budget (excl. VAT)	677 419	2 370 967	3 725 806
Minimum No. of suppliers	6	4	2
Maximum Budget per supplier (excl. VAT)	112 903	592 742	1 862 903

4.1 PCP-phase 0 – Open Market Consultations

An OMC aims to:

- **inform** potential suppliers (industry) about the iProcureSecurity PCP opportunities.
- **explain** in detail the pre-commercial procurement process
- open a dialogue with market stakeholders about the scope of procurement envisaged in the **project**, including technical specifications
- **facilitate** matchmaking among potential suppliers in need of support in the building of consortia capable of addressing the needs of the iProcureSecurity PCP procurers in full.

The Open Market Consultation is organised in the form of different activities that are available in the iProcureSecurity PCP website: https://pcp.iprocuresecurity.eu/open-market-consultations/

- Local events. Each procurer will hold an OMC event in their local language to engage with country **stakeholders**.
- **International** webinar. In addition, an international OMC webinar will be organised in English to welcome participants from any location. Besides, an added value of the international webinar will be a pitching session for market players interested in finding partners for a joint tender. In a parallel session, external procurers are invited to provide feedback on the requirements and use cases, in a way that the procured solution represents the interests of a larger number of demand-side organisations.

[1] The duration of the call is dependent on timely conclusion of the preparation phase and official clearance from the EC to launch the procurement. Depending on these factors, the overall duration of the call may be shorter, but not shorter than 60 days.

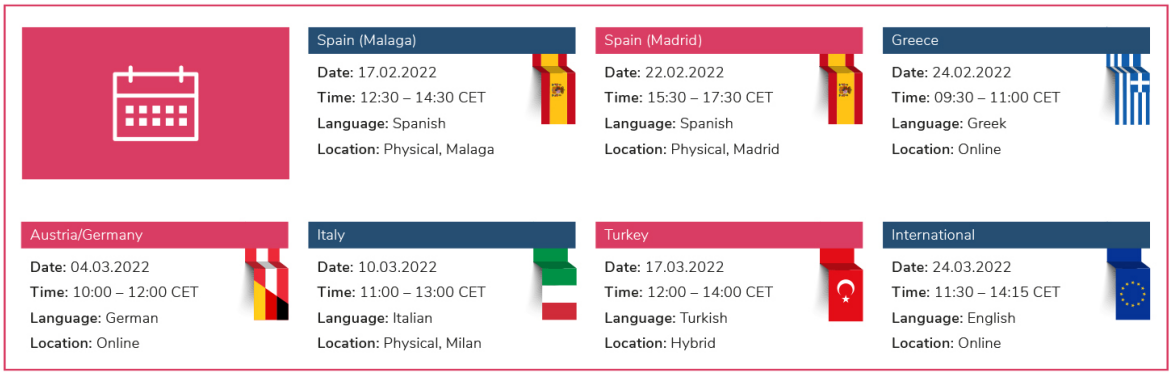

Figure 3: List of OMCs

- **OMC** online questionnaire. Organisations related to iProcureSecurity PCP are invited to fill in an online questionnaire to let us know about their experience, existing solutions and further feedback on the PCP scope. The questionnaire will be open until the 30th of April.
- **Matchmaking** platform. Many PCP tenderers choose to apply together with international partners in a joint tender (consortium) to be able to fulfil all the requirements. The matchmaking will be facilitated by the Innovation Procurement Platform. Find more information here: https://pcp.iprocuresecurity.eu/procurementplatform/.
- Management of FAQs. The questions that might rise during the OMC will be published **anonymously** in the iProcureSecurity PCP website with clear answers for any interested party.

4.2 PCP-phase 1 – Solution Design

To develop an overall conceptual architecture and technical specifications for each of the system components and their interfaces based on the requirements, use cases and service process models.

- **Expected output**: detailed report describing the solution and a detailed plan for the prototyping and testing activities in Phases II & III.
- **Duration**: 4 months
- **Maximum** phase total budget: 677,419 (max. €112,903 per contractor)
- **The offers** are ranked according to quality – price ratio
- **For** phase 1, 6 contracts are expected to be awarded. Contracts are awarded until the remaining budget for that phase is insufficient to fund the next best tender.

4.3 PCP-phase 2 – Prototype development

To develop and test prototypes in two iterations. Iteration 1aims at developing non- or partly functional prototypes of key systems components. Test outcomes will be collected and analysed for design, to serve as input for the suppliers' development of the second iteration. These are now envisaged to be functional prototypes, demonstrating component behaviour and system-wide interaction.

- **Expected** output:
  - Prototype specification
  - Prototype demonstration
  - Plan for development of a limited volume of solutions for field-testing
  - Updated cost/benefits forecast including a preliminary business plan

- **Duration**: 8 months
- **Maximum** phase total budget: €2,370,967 (max. €592,742 per contractor)
    - The offers are ranked according to quality – price ratio
    - Contracts are awarded until the remaining budget for that phase is insufficient to contract the next best tender
- **For** phase 2, 4 contracts are expected to be awarded. Contracts are awarded until the remaining budget for that phase is insufficient to fund the next best tender.

4.4 PCP-phase 3 – Testing of pilot services

Further development of the selected prototype solutions to a state where they can be piloted under real-life conditions, involving patients, EMTs, and health professionals.

- **Expected** output:
    - Implementation in the 5 testing sites
    - Overall assessment and success verification
    - Updated cost/benefits forecast, including a preliminary business plan
- **Duration**: 8 months
- **Maximum** phase total budget: €3,725,806 (max. €1,862,903 per contractor)
    - The offers are ranked according to quality – price ratio
    - Contracts are awarded until the remaining budget for that phase is insufficient to contract the next best tender
- A minimum of 2 contracts are expected to be awarded.

5 Call for Tenders

- **Tentative launch: May 2022**
- **Submission: Online portal**
- **Proposal sections:**
  - ADMINISTRATIVE
  - TECHNICAL
  - FINANCIAL
- **Official language is ENGLISH**
- **Eligibility criteria**
  - Open to all types of operators (companies or other type of legal entities) regardless of their size or governance structure.
  - Single entity or joint tender offer (consortia)
  - The organisation or consortia of organisations must be able to cover all the requirements unless stated otherwise.
- **Evaluation criteria**
  - Exclusion, Selection, Compliance and Award criteria are yet to be developed.
  - Quality-price ratio will put a focus on quality.
- **Intellectual Property Rights**
  - Suppliers keeps ownership of the IPRs attached to the results generated during the PCP implementation.
  - A financial compensation is calculated in the financial section of the tender, valuing the allocation of ownership of the IPRs by giving an absolute value for the price reduction between the price offered in the tender (actual price) compared to the exclusive development price (market price) to ensure compliance with the EU R&D&I state aid framework. The actual price is the price quoted by the bidder considering that they are retaining the IPR on the outcomes in accordance with the framework agreement to be signed and that they can exploit the developed project knowledge in the market. The market price is the price that the bidder would have quoted if the project IPR on the outcomes were fully retained by the contracting authority and the bidder did not have the possibility of exploiting the intellectual property (knowledge developed within the PCP).