

# Description of procurement

SENTIPLA – a sensor integration platform

## Abbreviations and Acronyms

**Table 1: List of used abbreviations**

Acronym	Description
AVA	Added value assessment
CAL	Calibration
MtM	Machine to machine
PA	Partnership
PoC	Point of contact
POLSA	Polish Space Agency
PT3	
POP	Pre-operational
SENTIPLA	Sensor integration platform
SME	Static model evaluation
SST	Space surveillance and tracking
UI	User interface

## 1 Background

The subject of the procurement is a service to create a database system dedicated to a group of devices – sensors and an accompanying group of scripts. The objective of the resulting system includes collecting, sharing, maintaining and augmenting of information and data concerning the devices. In addition, the system will be intended to retrieve, store and share the status of the execution of individual activities. The developed solution will be equipped with mechanisms and interfaces for convenient supervision of its operation. The software that is the subject of the inquiry will be a component of the SST system belonging to POLSA, the current composition of which includes such technological solutions as containerization (Docker) with status monitoring (health check), relational database (DB) with time series support (PostgreSQL with timescale addition), queuing system for event-based communication support (RabbitMQ), application monitoring system (Prometheus), automatic installation and scaling mechanisms (Ansible, Kubernetes). The preferred language for script implantation is Python. It is advisable that the contractor, maintain consistency with the technologies used.

The Ordering Party may increase the size of the support service by another 288 working hours (right of option) during the period indicated in paragraph 2. Implementation of the right of option does not extend the period of technical support. The Ordering Party reserves that the part of the contract specified as "right of option" is an entitlement and not an obligation of the Ordering Party.

## 2 Scope of the document

The scope of this document covers the requirements for delivering the SENTIPLA procurement contract. The purpose of the contract is being defined in Section 3. Section 4 identifies the primary user groups of the system. Section 5, in turn, outlines the requirements of these users with respect to the service and process provided by the system, as well as the non-functional and functional requirements directly concerned with the system and those which are required to integrate the platform with an existing environment. Section 6 summarizes the document with concluding remarks.

## 3 Purpose

The business requirements describing main objectives of the SENTIPLA contract have been summarized in Table 2.

**Table 2: Business requirements**

Id	Requirement
R-01	The system shall automate the operational process of sensor integration into the EU network of SST sensors in accordance with accepted guidelines for conducting the process while maintaining the flexibility to modify the elements of the process.
R-02	The system shall provide the means and tools to allow users to declare and manage assets submitted for integration and integrated into the system in a flexible manner, including modification and updating of their technical and formal and informal description.
R-03	The system shall provide the means and tools to enable internal users of the system to manage resources submitted for integration to carry out the activities related to the sensor evaluation process in accordance with the established procedures and rules
R-04	The system shall provide means and tools to enable internal users of the system to manage resources integrated into the system, including modification, and updating of their technical and formal and informal description.
R-05	The system shall provide the means and tools for the system administrator to manage users, resources, and access level.

## 4 User groups

Examining the illustration shown in Figure 1, it can be observed that users are divided into two generic groups with respect to their interaction with the system. The first group consists of users external to the system. This is the group of stakeholders – End-users. The subject of interest for this user group is the declaration of a resource – a sensor for integration into the EUSST network and the management of its already operational elements held in their ownership. It is therefore an interaction of a business nature. The second group consists of Support users. Their task is to provide help in handling and technical assistance to the first group of users. The third group are Analysts, including members of teams dedicated to specific activities performed during the technical evaluation of sensors. The fourth group consists of Decision-makers who approve the stages of the integration process. The fifth group are the Managers of the process who oversee its progress. The sixth group consists of Readers, users who have access to view the process without being able to interact with it. The seventh group is made up of the system's administrators, who influence its behavior and configuration. The final, eighth group is Script users, representing the MtM connections.

**Table 3: User groups**

<b>Id</b>	<b>Name</b>	<b>Description</b>
<b>UG-01</b>	End-users	A group of institutional or commercial users interacting with system to declare or maintain assets by exploiting either UI or MtM interface.
<b>UG-02</b>	Support	A group of users interacting with system to provide end-user support by exploiting either UI or MtM interface.
<b>UG-03</b>	Analyst	An abstract group of users interacting with the system to provide results of assets declared by End-users
<b>UG-03-A</b>	Analyst-SME	A group of analysts involved in the integration process, where the sensor performance is screened using static model parameter evaluation (SME).
<b>UG-03-B</b>	Analyst-AVA	A group of analysts involved in the integration process, where the sensor value added (AVA) is assessed using simulation-based evaluation.
<b>UG-03-C</b>	Analyst-CAL	A group of analysts involved in the integration process, targeting sensor calibration (CAL).
<b>UG-03-D</b>	Analyst-POP	A group of analysts involved in the integration process, where the sensor performance is assessed during pre-operational (POP) campaign.
<b>UG-04</b>	Decision-makers	A group of users interacting with the system authorized to take decisions on sensor integration
<b>UG-05</b>	Managers	A process manager interacting with the system, managing the process, workflow, and communication.
<b>UG-06</b>	Readers	A user group provided with configurable access to read system data.
<b>UG-07</b>	Administrators	A user group with administrative access.
<b>UG-08</b>	Script	configurable access for MtM connections, e.g., EUSST DB reporting platform etc.

## 5 Requirements

This section outlines the requirements placed on the system's operation and realization methods. Section 5.1 outlines the baseline requirements for the principles of cooperation with the Contractor. In turn, Section 5.2 provides legal requirements for the product and its development. General technical requirements are included in Section 5.3. To determine and evaluate the relevance of the requirements of the stakeholders and the solution itself, the value expected by each user group was introduced. For this purpose, the value of requirements for the system was indicated using the MUST, SHOULD, COULD, WON'T (MoSCoW) method. It is assumed that verification shall be carried out by means of testing, design review analysis or inspection approach. Thus, the user requirements are indicated in Section 5.4. Non-functional and functional requirements have been outlined in Section 5.5. Section 5.6 deals with transitional requirements selected for integration of the platform into the existing production environment. Finally, service and maintenance requirements are included in Section 5.7.

### 5.1 Principles of cooperation

The principles of cooperation have been written in the following lines.

1. The Contractor shall develop, in consultation with the Ordering Party, the architecture of the system, considering the means of communication of new or modified elements to guarantee their compatibility with other components currently being used by the Ordering Party. To this end, the parties will hold a series of meetings to determine the technical solutions, degree of advancement

and relevance of individual tasks. Each time the Contractor will delegate at least one person with technical skills to the meeting.

2. Meeting schedule:
  - a. 2 meetings per week during the first 3 weeks of the project,
  - b. 1 meeting per week, during the remaining weeks of the project.

## 5.2 Legal requirements

The legal requirements have been enlisted in the following lines.

1. The Contractor shall provide a guarantee for the quality and correctness of the software code throughout the period of service, all defects related thereof shall be repaired by the supplier at its own expense.
2. The Contractor shall provide the Ordering Party with complete source codes for the works referred to in the contract.
3. The Contractor shall transfer of the full right to use/modify/replicate/share of the products developed.

## 5.3 General requirements

The general requirements apply to all components, in this case commonly understood as containers in operation in the system.

1. The Contractor shall ensure that the following requirements for container (Docker) images are completed, maintained, and updated:
  - a. each container shall have a function that allows you to inspect its performance (health check),
  - b. containers shall provide metrics, approximately 10 per container, that indicate their performance characteristics for the monitoring (Prometheus) server,
  - c. the containers shall minimize the creation of temporary files, especially when sending/receiving files via REST API, and communication with a function that allows to check the state of the container (health check) - technical solution to be agreed with the Ordering Party,
  - d. each container shall monitor whether the services on which it depends are available and, if necessary, suspend its work until they are available.
2. The Contractor shall ensure that tests are completed, maintained and updated to verify the correct operation of scripts that automate the processes of reading, writing and processing data contained in the DB. Coverage Level:
  - a. a minimum of 80% for software components testing,
  - b. 100% for data flow tests.
3. The developed software shall be supported by documentation (including, but not limited to a description and diagram of the information flow at each stage of the system operation, a description of the code with marked places where configuration changes should be made). The components of the system as a whole and the communication between them will be documented. Any changes to the REST API will be documented according to the OpenAPI specification.

Depending on the Ordering Party's decision, the deployment may be carried out on a Kubernetes cluster with a central login point.

## 5.4 User requirements

The user requirements involve the following.

REQ-SU-001	
Type	Functional
Name	Generic users and roles
Description	Shall provide user and role administration
Verification method	Test

REQ-SU-002	
Type	Functional
Name	Generic entity
Description	Shall provide company business level aggregation of users and information & data
Verification method	Test

REQ-SU-003	
Type	Functional
Name	Generic assets
Description	Shall enable creation of new asset definition with predefined and additional parameters
Verification method	Test

REQ-SU-004	
Type	Functional
Name	Generic integration
Description	Shall provide capabilities to manage sensor integration with status indicators and update
Verification method	Test

REQ-SU-005	
Type	Functional
Name	Dedicated views
Description	Shall enable dedicated views for different roles and users
Verification method	Test

REQ-SU-006	
Type	Functional
Name	Dedicated webapps
Description	Shall provide WebApp interface for user interaction
Verification method	Test

REQ-SU-007	
Type	Functional
Name	Dedicated APIs
Description	Shall provide API interfaces for MtM communication

<b>Verification method</b>	Test
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<b>REQ-SU-008</b>	
<b>Type</b>	Functional
<b>Name</b>	Generic extensions
<b>Description</b>	Shall provide capabilities to include extensions with dedicated elements to be added to view layout in future app developments
<b>Verification method</b>	Inspection

<b>REQ-SU-009</b>	
<b>Type</b>	Functional
<b>Name</b>	Generic WebApp layout
<b>Description</b>	Shall provide a grid-based layout with the possibility to adjust the containers to elements in the grid
<b>Verification method</b>	Inspection

<b>REQ-SU-010</b>	
<b>Type</b>	Functional
<b>Name</b>	Generic WebApp color scheme
<b>Description</b>	Shall provide modern GUI with selection of light and dark modes with a dark mode being as default
<b>Verification method</b>	Inspection

<b>REQ-SU-010</b>	
<b>Type</b>	Functional
<b>Name</b>	Generic WebApp view
<b>Description</b>	Shall provide minimalistic GUIs with responsive layout able adjust to small screens
<b>Verification method</b>	Inspection

## 5.5 System requirements

This section documents the solution requirements, including the specific descriptions of the capabilities and qualities a solution must have to meet the requirements of users and the business itself. To this goal in Sections 5.5.1 and 5.5.2 non-functional and functional system requirements have been described, respectively.

### 5.5.1 Non-functional

Constraints or standards to provide or define the system's quality characteristics.

<b>REQ-SN-001</b>	
<b>Type</b>	Non-functional
<b>Name</b>	A WebApp interface
<b>Description</b>	Shall provide a WebApp interface enabling multiple users to interact with the system without unnecessary delays
<b>Verification method</b>	Inspection

REQ-SN-002	
Type	Non-functional
Name	A MtM interface
Description	Shall provide MtM interface enabling interactions with the system with role and level off access control
Verification method	Test

REQ-SN-003	
Type	Non-functional
Name	Code repository
Description	Shall use Host Git server and Docker image repository to store the code and app in developer friendly manner
Verification method	Inspection

REQ-SN-004	
Type	Non-functional
Name	Sensor definitions
Description	Sensor definition, status and parameter access and sharing shall be based on user and role mechanism
Verification method	Test

REQ-SN-005	
Type	Non-functional
Name	Integration process metrics
Description	The system shall provide metrics related to integration process workflow (business intelligence)
Verification method	Test

REQ-SN-006	
Type	Non-functional
Name	Notification schemes
Description	The system shall provide information management by including notification schemes targeting users and groups of users whenever process or system status is changed
Verification method	test

REQ-SN-007	
Type	Non-functional
Name	Trusted identity
Description	The system shall provide trusted identity propagation to enable user interaction

<b>Verification method</b>	Inspection
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<b>REQ-SN-008</b>	
<b>Type</b>	Non-functional
<b>Name</b>	Content delivery
<b>Description</b>	The system shall use POLSA server for content delivery
<b>Verification method</b>	Inspection

<b>REQ-SN-009</b>	
<b>Type</b>	Non-functional
<b>Name</b>	Feedback forms
<b>Description</b>	The system shall provide feedback forms for users
<b>Verification method</b>	Inspection

<b>REQ-SN-010</b>	
<b>Type</b>	Non-functional
<b>Name</b>	Error forms
<b>Description</b>	The system shall provide error gathering report or form
<b>Verification method</b>	Inspection



REQ-SN-011	
Type	Non-functional
Name	Integration process workflow
Description	The system shall provide capabilities to adapt internal workflow to reflect sensor integration procedure workflow used in EUSST PA
Verification method	Test

REQ-SN-012	
Type	Non-functional
Name	Generic sensor integration
Description	The system shall deliver resources to facilitate sensor integration process according the EUSST procedures, and its modifications
Verification method	Review of design

REQ-SN-013	
Type	Non-functional
Name	Collaboration during system integration
Description	The system shall facilitate the interaction of sensor owners and operators with EUSST organization and teams involved in sensor integration process.
Verification method	Review of design

REQ-SN-014	
Type	Non-functional
Name	Generic interoperability
Description	The system shall provide APIs to enable interoperability with other software
Verification method	Review of design

REQ-SN-015	
Type	Non-functional
Name	Service uptime
Description	The system shall maintain high service uptime levels $\geq 99.999\%$ on a yearly basis
Verification method	Test

<b>REQ-SN-016</b>	
<b>Type</b>	Non-functional
<b>Name</b>	Network traffic
<b>Description</b>	The system shall reduce the network traffic
<b>Verification method</b>	Review of design

<b>REQ-SN-017</b>	
<b>Type</b>	Non-functional
<b>Name</b>	System error rate
<b>Description</b>	The system will provide solution reducing the error rate below 1% while including, i.e. app returns a 404 page, a 500-server error, a blank screen, or a wrong calculation,
<b>Verification method</b>	Review of design

<b>REQ-SN-018</b>	
<b>Type</b>	Non-functional
<b>Name</b>	Service load time
<b>Description</b>	The system will provide WebApp with load time of no more than 3 s
<b>Verification method</b>	Test

<b>REQ-SN-019</b>	
<b>Type</b>	Non-functional
<b>Name</b>	Response time
<b>Description</b>	The system will provide APIs with response time of less than 500 ms
<b>Verification method</b>	Test

<b>REQ-SN-020</b>	
<b>Type</b>	Non-functional
<b>Name</b>	Storage optimization
<b>Description</b>	The system shall use data base backend to optimize storage usage
<b>Verification method</b>	Review of design

<b>REQ-SN-021</b>	
<b>Type</b>	Non-functional
<b>Name</b>	System capacity
<b>Description</b>	The system shall withstand its nominal operating capacity with the workload reaching hundreds of users – if the recommendation for hardware components is met by system host
<b>Verification method</b>	Test

<b>REQ-SN-022</b>	
<b>Type</b>	Non-functional
<b>Name</b>	Compliance with CCSDS standards
<b>Description</b>	The system shall use CCSDS data standards whenever applicable
<b>Verification method</b>	Test

<b>REQ-SN-023</b>	
<b>Type</b>	Non-functional
<b>Name</b>	HADES compatibility
<b>Description</b>	The system shall provide output interface compatibility with HADES XML format
<b>Verification method</b>	Test

<b>REQ-SN-024</b>	
<b>Type</b>	Non-functional
<b>Name</b>	Data models
<b>Description</b>	The system shall use well documented data models to store and communicated information across system components and with external users
<b>Verification method</b>	Review of design

<b>REQ-SN-025</b>	
<b>Type</b>	Non-functional
<b>Name</b>	Compliance with EUSST DB ICD
<b>Description</b>	The system shall provide compatibility with EUSST DB as documented in ICD
<b>Verification method</b>	Test

<b>REQ-SN-026</b>	
<b>Type</b>	Non-functional
<b>Name</b>	Compliance with EUSST reporting platform
<b>Description</b>	The system shall provide data as requested by EUSST reporting platform
<b>Verification method</b>	Test

<b>REQ-SN-027</b>	
<b>Type</b>	Non-functional
<b>Name</b>	Data integrity
<b>Description</b>	The system shall provide mechanisms preventing losing data integrity through injection of corrupted data
<b>Verification method</b>	Review of design

<b>REQ-SN-028</b>	
<b>Type</b>	Non-functional
<b>Name</b>	User experience
<b>Description</b>	The system shall provide metrics to assess end user experience by execution time and error tracking
<b>Verification method</b>	Test

<b>REQ-SN-029</b>	
<b>Type</b>	Non-functional
<b>Name</b>	Source code
<b>Description</b>	The system source code shall be stored using host git server
<b>Verification method</b>	Inspection

<b>REQ-SN-030</b>	
<b>Type</b>	Non-functional
<b>Name</b>	System deployment
<b>Description</b>	The system shall be deployed from host docker image server
<b>Verification method</b>	Inspection

<b>REQ-SN-031</b>	
<b>Type</b>	Non-functional
<b>Name</b>	System development
<b>Description</b>	The system shall use a three-level architecture with development, staging and production environments
<b>Verification method</b>	Inspection

<b>REQ-SN-032</b>	
<b>Type</b>	Non-functional
<b>Name</b>	Automated installation
<b>Description</b>	The system shall use automated installation mechanisms compatible with already available system components
<b>Verification method</b>	Review of design

<b>REQ-SN-033</b>	
<b>Type</b>	Non-functional
<b>Name</b>	Critical error removal
<b>Description</b>	The contractor shall provide critical error removal within 24 h
<b>Verification method</b>	Inspection

<b>REQ-SN-034</b>	
<b>Type</b>	Non-functional
<b>Name</b>	Non-critical error removal
<b>Description</b>	The contractor shall provide non-critical error removal with 7 d
<b>Verification method</b>	Inspection

<b>REQ-SN-035</b>	
<b>Type</b>	Non-functional
<b>Name</b>	Maintenance services
<b>Description</b>	The contractor shall provide maintenance services to the end of grant (EUSST PA)
<b>Verification method</b>	Inspection

<b>REQ-SN-036</b>	
<b>Type</b>	Non-functional
<b>Name</b>	Data backup
<b>Description</b>	The system shall be capable of maintaining frequent - at least twice per day - backup of the stored data
<b>Verification method</b>	Review of design

<b>REQ-SN-037</b>	
<b>Type</b>	Non-functional
<b>Name</b>	Network resource consumption
<b>Description</b>	The system shall minimize network connection usage to ensure sustainability of the environment.
<b>Verification method</b>	Review of design

<b>REQ-SN-038</b>	
<b>Type</b>	Non-functional
<b>Name</b>	Computational resource consumption
<b>Description</b>	The system shall minimize system computational effort to ensure sustainability of the environment.
<b>Verification method</b>	Review of design

<b>REQ-SN-039</b>	
<b>Type</b>	Non-functional
<b>Name</b>	Modular architecture
<b>Description</b>	The system shall provide modular system architecture based on isolated components enabling deployment on module by module basis.
<b>Classification</b>	Must
<b>Verification method</b>	Review of design

<b>REQ-SN-040</b>	
<b>Type</b>	Non-functional
<b>Name</b>	Dedicated WebApp
<b>Description</b>	The system shall provide separate WebApp for organizational users and process related entities – one for each working team
<b>Verification method</b>	Review of design

<b>REQ-SN-041</b>	
<b>Type</b>	Non-functional

<b>Name</b>	Event based communication
<b>Description</b>	The system shall provide architecture communication based on event system
<b>Verification method</b>	Review of design

<b>REQ-SN-042</b>	
<b>Type</b>	Non-functional
<b>Name</b>	Microservice
<b>Description</b>	The system shall be constructed using microservice based architecture
<b>Verification method</b>	Review of design

<b>REQ-SN-043</b>	
<b>Type</b>	Non-functional
<b>Name</b>	workflows
<b>Description</b>	The system shall process workflows using an event-based pipelines
<b>Verification method</b>	Review of design

<b>REQ-SN-044</b>	
<b>Type</b>	Non-functional
<b>Name</b>	WebApp organization
<b>Description</b>	The system shall be composed of main stack at host site and detached WebApp for organizational users
<b>Verification method</b>	Review of design

<b>REQ-SN-045</b>	
<b>Type</b>	Non-functional
<b>Name</b>	Secure communication
<b>Description</b>	The system shall use secured system connections and protocols
<b>Verification method</b>	Review of design

<b>REQ-SN-046</b>	
<b>Type</b>	Non-functional
<b>Name</b>	Authentication
<b>Description</b>	The system shall provide modern user authentication mechanisms
<b>Verification method</b>	Review of design

<b>REQ-SN-047</b>	
<b>Type</b>	Non-functional
<b>Name</b>	Secure data storage
<b>Description</b>	The system shall use data encryption to store the resources related to user profiles
<b>Verification method</b>	Review of design

<b>REQ-SN-048</b>	
<b>Type</b>	Non-functional
<b>Name</b>	Communication identifiers
<b>Description</b>	The system shall use uuid to communicate between system components and with external users
<b>Verification method</b>	Review of design

<b>REQ-SN-049</b>	
<b>Type</b>	Non-functional
<b>Name</b>	Administrative access
<b>Description</b>	Only system administrator shall have access to all functionalities
<b>Verification method</b>	Inspection

<b>REQ-SN-050</b>	
<b>Type</b>	Non-functional
<b>Name</b>	Creating new users
<b>Description</b>	Only system administrator shall have the capability to create new users
<b>Verification method</b>	Inspection

<b>REQ-SN-051</b>	
<b>Type</b>	Non-functional
<b>Name</b>	Deactivation of users
<b>Description</b>	Only system administrator shall have capability to deactivate users
<b>Verification method</b>	Inspection

<b>REQ-SN-052</b>	
<b>Type</b>	Non-functional
<b>Name</b>	Hardware
<b>Description</b>	The system shall use hardware available at host site
<b>Verification method</b>	Review of design

<b>REQ-SN-053</b>	
<b>Type</b>	Non-functional
<b>Name</b>	Hardware resources
<b>Description</b>	The system shall minimize the hardware resources used to deliver requested functionalities
<b>Verification method</b>	Review of design

<b>REQ-SN-054</b>	
<b>Type</b>	Non-functional
<b>Name</b>	Legal compliance



<b>Description</b>	The system will implement all required by law mechanisms to work in a web environment
<b>Verification method</b>	Inspection

<b>REQ-SN-055</b>	
<b>Type</b>	Non-functional
<b>Name</b>	User tracking
<b>Description</b>	The system will avoid tracking users and their interaction with the system apart of the mechanisms required to ensure proper functioning of the system
<b>Verification method</b>	Review of design

<b>REQ-SN-056</b>	
<b>Type</b>	Non-functional
<b>Name</b>	Interface language
<b>Description</b>	The system will provide clean and user-friendly interface with adequate language
<b>Verification method</b>	Inspection

<b>REQ-SN-057</b>	
<b>Type</b>	Non-functional
<b>Name</b>	System agnosticism
<b>Description</b>	The system will provide multi-browser and multi operating system solution
<b>Verification method</b>	Inspection

<b>REQ-SN-058</b>	
<b>Type</b>	Non-functional
<b>Name</b>	System security
<b>Description</b>	The system shall adhere to all the security requirements applicable in EUSST PA and those imposed by POLSA
<b>Verification method</b>	Review of design

### 5.5.2 Functional

The software functionality that the developers must build into the product to enable users to accomplish their tasks, thereby satisfying the business requirements have been identified in the following lines.

<b>REQ-SF-001</b>	
<b>Type</b>	Functional
<b>Name</b>	Sensor data management
<b>Description</b>	The system shall enable user to management – modify or adjust - sensor entry using WebApp

<b>Verification method</b>	Test
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<b>REQ-SF-002</b>	
<b>Type</b>	Functional
<b>Name</b>	New sensor parameters
<b>Description</b>	The system shall allow user to define a set of individual new parameters for sensor using WebApp
<b>Verification method</b>	Test

<b>REQ-SF-003</b>	
<b>Type</b>	Functional
<b>Name</b>	User limited access
<b>Description</b>	The system shall allow designed user within the organization to view only sensor entries or parameters related to sensors (assets) of the organization
<b>Verification method</b>	Test

<b>REQ-SF-004</b>	
<b>Type</b>	Functional
<b>Name</b>	Sensor integration workflow definition
<b>Description</b>	The system shall implement EUSST sensor integration process logic based on pre-defined and managed workflow
<b>Verification method</b>	Inspection

<b>REQ-SF-005</b>	
<b>Type</b>	Functional
<b>Name</b>	Integration process workflow modification
<b>Description</b>	The system shall allow designed user to create or modify integration process stage results
<b>Verification method</b>	Inspection

<b>REQ-SF-006</b>	
<b>Type</b>	Functional
<b>Name</b>	E-mail notifications
<b>Description</b>	The system shall enable to send a configurable MtM and e-mail notification on sensor status change in integration process for designed entities/users based on process roles
<b>Verification method</b>	Test

<b>REQ-SF-007</b>	
<b>Type</b>	Functional
<b>Name</b>	Sensor network status
<b>Description</b>	The system shall allow to exclude sensor form the network by marking the asset as excluded/inactive without removing the entry from the system

<b>Verification method</b>	Test
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<b>REQ-SF-008</b>	
<b>Type</b>	Functional
<b>Name</b>	Sensor history
<b>Description</b>	The system shall store past sensor definitions
<b>Verification method</b>	Test

<b>REQ-SF-009</b>	
<b>Type</b>	Functional
<b>Name</b>	Sensor ownership transition
<b>Description</b>	The system shall allow to link past definitions to new definitions to track sensor upgrades or changes of ownership
<b>Verification method</b>	Inspection

<b>REQ-SF-010</b>	
<b>Type</b>	Functional
<b>Name</b>	Past sensor parameters
<b>Description</b>	The system shall allow to store the historical values of sensor parameters
<b>Verification method</b>	test

<b>REQ-SF-011</b>	
<b>Type</b>	Functional
<b>Name</b>	Sensor names
<b>Description</b>	The system shall allow to use multiple sensor names
<b>Verification method</b>	Test

<b>REQ-SF-021</b>	
<b>Type</b>	Functional
<b>Name</b>	Integration submission
<b>Description</b>	The system shall allow the designated user to submit sensor for integration
<b>Verification method</b>	Test

<b>REQ-SF-013</b>	
<b>Type</b>	Functional
<b>Name</b>	WebApp communication scheme

<b>Description</b>	The system shall deliver HMI via WebApp and transaction mechanism between the detached WebApp and system DB
<b>Verification method</b>	Review of design

<b>REQ-SF-014</b>	
<b>Type</b>	Functional
<b>Name</b>	Sensor parameter validation
<b>Description</b>	The WebApp shall use the system parameter value constraints to validate parameter values (optional and configurable)
<b>Verification method</b>	Test

<b>REQ-SF-015</b>	
<b>Type</b>	Functional
<b>Name</b>	Interaction timestamp
<b>Description</b>	The system shall track and maintain a timestamp of record creation and modification to allow tracking of changes and interactions
<b>Verification method</b>	Test

<b>REQ-SF-016</b>	
<b>Type</b>	Functional
<b>Name</b>	Changes tracking
<b>Description</b>	The system shall identify each accepted transaction or change with unique identifier enabling to identify the changes made to the system
<b>Verification method</b>	Test

<b>REQ-SF-017</b>	
<b>Type</b>	Functional
<b>Name</b>	System workflow
<b>Description</b>	The system shall adhere to event-based transaction processing
<b>Verification method</b>	Review of design

<b>REQ-SF-018</b>	
<b>Type</b>	Functional
<b>Name</b>	Administrative function access
<b>Description</b>	The system shall allow to create user account using WebApp
<b>Verification method</b>	Inspection

<b>REQ-SF-019</b>	
<b>Type</b>	Functional
<b>Name</b>	Users and groups
<b>Description</b>	The system shall group users to organizations
<b>Verification method</b>	Inspection

<b>REQ-SF-020</b>	
<b>Type</b>	Functional
<b>Name</b>	Authorization and access
<b>Description</b>	The system shall provide role-based authorization within organization and group
<b>Verification method</b>	Inspection

<b>REQ-SF-021</b>	
<b>Type</b>	Functional

<b>Name</b>	Role administration
<b>Description</b>	The system shall allow to manage user accounts in terms of roles using WebApp
<b>Verification method</b>	Inspection

<b>REQ-SF-022</b>	
<b>Type</b>	Functional
<b>Name</b>	User authorization
<b>Description</b>	The system shall allow to manage user account in terms authorization using WebApp
<b>Verification method</b>	Inspection

<b>REQ-SF-023</b>	
<b>Type</b>	Functional
<b>Name</b>	Sensor record creation
<b>Description</b>	The system shall allow designated user within organization to create sensor entry using WebApp
<b>Verification method</b>	Test

<b>REQ-SF-024</b>	
<b>Type</b>	Functional
<b>Name</b>	User administrative roles
<b>Description</b>	The system shall allow to create transcendent users of an administrative group with access authorized based on roles in the integration process
<b>Verification method</b>	Inspection

<b>REQ-SF-025</b>	
<b>Type</b>	Functional
<b>Name</b>	Organization creation
<b>Description</b>	The system shall allow administrator to create organizations
<b>Verification method</b>	Test

<b>REQ-SF-026</b>	
<b>Type</b>	Functional
<b>Name</b>	Organization management
<b>Description</b>	The system shall allow managing organizations
<b>Verification method</b>	Test

<b>REQ-SF-027</b>	
<b>Type</b>	Functional
<b>Name</b>	Assigning user to organization

<b>Description</b>	The system shall allow assigning users to organizations
<b>Verification method</b>	Inspection

<b>REQ-SF-028</b>	
<b>Type</b>	Functional
<b>Name</b>	User organization transfer
<b>Description</b>	The system shall allow to move or copy or give access to users between the organizations
<b>Verification method</b>	Test

<b>REQ-SF-029</b>	
<b>Type</b>	Functional
<b>Name</b>	User deactivation
<b>Description</b>	The system shall allow to deactivate user in organization
<b>Verification method</b>	Inspection

<b>REQ-SF-030</b>	
<b>Type</b>	Functional
<b>Name</b>	User authentication
<b>Description</b>	The system shall provide user password authentication
<b>Verification method</b>	Inspection

<b>REQ-SF-031</b>	
<b>Type</b>	Functional
<b>Name</b>	User 2FA
<b>Description</b>	The system shall provide two factor authentication
<b>Verification method</b>	Inspection

<b>REQ-SF-032</b>	
<b>Type</b>	Functional
<b>Name</b>	Biometric user authentication
<b>Description</b>	The system shall not provide biometric authentication method
<b>Verification method</b>	Review of design

<b>REQ-SF-033</b>	
<b>Type</b>	Functional
<b>Name</b>	Authorization configuration
<b>Description</b>	The system shall provide authorization level control for users and roles
<b>Verification method</b>	Inspection

<b>REQ-SF-034</b>	
<b>Type</b>	Functional
<b>Name</b>	Module authorization

<b>Description</b>	The system shall authorize access to each module – business capability identified – of the system
<b>Verification method</b>	Inspection

<b>REQ-SF-035</b>	
<b>Type</b>	Functional
<b>Name</b>	Organization and role assignment
<b>Description</b>	The authorization to access system shall be configured by system business administrator
<b>Verification method</b>	Inspection

<b>REQ-SF-036</b>	
<b>Type</b>	Functional
<b>Name</b>	Process quality report
<b>Description</b>	The system shall provide quality assurance report to monitor deviation of the integration process from formal objectives
<b>Verification method</b>	Inspection

<b>REQ-SF-037</b>	
<b>Type</b>	Functional
<b>Name</b>	Error logging
<b>Description</b>	The system shall provide error logging for each of its modules
<b>Verification method</b>	Inspection

<b>REQ-SF-038</b>	
<b>Type</b>	Functional
<b>Name</b>	Error log system
<b>Description</b>	The system shall provide log exposure for both file-based logging storage and selected dedicated log database solution identified by system host
<b>Verification method</b>	Inspection

<b>REQ-SF-039</b>	
<b>Type</b>	Functional
<b>Name</b>	User interface
<b>Description</b>	The system external interface shall be delivered via WebApp for human user interaction
<b>Verification method</b>	Review of design

<b>REQ-SF-040</b>	
<b>Type</b>	Functional
<b>Name</b>	MtM interface



<b>Description</b>	The system external interface for MtM access shall be provided by dedicated APIs
<b>Verification method</b>	Review of design

<b>REQ-SF-041</b>	
<b>Type</b>	Functional
<b>Name</b>	Source code access
<b>Description</b>	The contractor shall provide access to source code
<b>Verification method</b>	Inspection

<b>REQ-SF-042</b>	
<b>Type</b>	Functional
<b>Name</b>	Integration process progress report
<b>Description</b>	The system shall provide report generation mechanism to track the stages and overall sensor integration process
<b>Verification method</b>	Inspection

<b>REQ-SF-043</b>	
<b>Type</b>	Functional
<b>Name</b>	Business metrics
<b>Description</b>	The system shall provide periodic report for tracking the process statistics on a business level
<b>Verification method</b>	Inspection

<b>REQ-SF-044</b>	
<b>Type</b>	Functional
<b>Name</b>	Active records
<b>Description</b>	The system shall store historical sensor organization and user data using the active or inactive record system
<b>Verification method</b>	Review of design

<b>REQ-SF-045</b>	
<b>Type</b>	Functional
<b>Name</b>	WebApp design specification
<b>Description</b>	The system shall use WebApp which is in line with EU legislation applied to web services
<b>Verification method</b>	Review of design

## 5.6 Transition requirements

All capabilities and conditions a system must have so that an SENTIPLA can be integrated to the EUSST system at its current state have been summarized in this section.

REQ-ST-001	
<b>Type</b>	Functional
<b>Name</b>	Compliance with EUSST DB ICD
<b>Description</b>	The system shall provide interface to read and write information form and to EUSST DB
<b>Verification method</b>	Test

REQ-ST-002	
<b>Type</b>	Functional
<b>Name</b>	Reporting functionalities
<b>Description</b>	The system shall provide interface to provide MtM interface for sensor integration process statistical information
<b>Verification method</b>	Test

REQ-ST-003	
<b>Type</b>	Functional
<b>Name</b>	HADES compatibility
<b>Description</b>	Shell provide interface to be able to acquire (import export) sensor information in HADES complaint XML file format
<b>Verification method</b>	Test

## 5.7 Service and maintenance requirements

Service and maintenance requirements have been enlisted in the following lines.

1. Technical support shall be provided for the period of two years in the form of a service and maintenance contract involving the development of the application (resulting from technological changes, parameter changes and environmental variables) and the need to adapt it to evolving environment. This includes:
  - a. personnel availability, remote or on-site, necessary to assist in maintaining the proper operation of the system during business hours,
  - b. response timeliness - the service provider shall, within 24 hours of receipt of the request (in writing, by email or by other IT solution), provide proposals for the removal of the defect/fault (including software code),
  - c. upon the approval of the repair proposal by the POLSA employee, the fault shall be repaired within:
    - i. 24 h – for critical errors (system failure),
    - ii. 72 h – for non-critical errors enabling system availability and reachability,
    - iii. 96 h – for errors of developed new functionalities (possible extension of the code delivery deadline after POLSA approval).

Each time, a description of the solution to the problem, along with its code, shall be uploaded to the POLSA repository.
  - d. Solving day-to-day problems in the operation of the system and prepared interfaces.
  - e. Responding to changes and updates in received and transmitted data structures and standards.

- f. Refactoring and integration (with possible preparation of e2e tests) of the code proposed by the Ordering Party.
2. The contractor shall provide service and maintenance of the system on both pre-production and production system instances.
3. The Contractor shall conduct training, in agreed format, on the installation and operation of the developed solution. The scope of the training will cover issues related to the deployment of a copy of the system and its everyday operation with special attention to aspects of high availability and the possibility of extending statistics.
4. The Contractor shall guarantee that all components of the procured system are installed on the machines owned and designated by the Ordering Party.
5. The contractor shall support the operation of the system on both pre-production and production instances.
6. The contractor shall hold a meeting(s) at the end of the support period on the possibility of system upgrades and modifications.

## 6 Concluding remarks

The content of the document indicates business and solution requirements and system constraints that have been foreseen during the preparation of the document. If required adjustments can be made to non-critical system components during architecture design stage of the process if the indicated performance or quality metrics (non-functional requirements) of the system are to be improved. In each case a justification to system architecture change is expected in written and in line to the procurement legal frame.