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HELLENIC REPUBLIC
MINISTRY OF MARITIME
AFFAIRS & INSULAR POLICY



An EnhaNceD Common InfoRmatiOn Sharing EnvironMent for BordEr
CommanD, Control & CoordinAtion Systems

Workshop on EU funded border security research project

Project Coordinator:
Special Service of EU Structural Funds
Hellenic Ministry of Maritime Affairs and
Insular Policy
(SSEUSF/MMAIP)

[personal data, Art 4(1)(b) of Regulation (EC) No 1049/2001]

Starting Date: 1st September 2019
Duration: 18 months
EU contribution: € 4,999,462.50

FRONTEX, Poland , 27 June 2019

The Consortium

A selection of 19 partners

Leading European organizations

❑ Large enterprise (3):

GMV, ENGINEERING, STEMIO

❑ SMEs (4):

SATWAYS, EXUS, INOVAWORKS, CODIN

❑ Academia (1):

LAUREA

❑ RTOs (3):

ICCS, CMCC, CSS (KEMEA)

❑ End users (8) from 6 countries:

- ✓ HELLENIC MINISTRY OF MARITIME AFFAIRS & INSULAR POLICY – Coordinator
- ✓ HELLENIC POLICE
- ✓ HELLENIC MINISTRY OF DEFENSE
- ✓ ITALIAN NAVY
- ✓ PORTUGUESE NAVY
- ✓ ISRAEL NATIONAL POLICE
- ✓ BULGARIAN EAMA
- ✓ MARITIME SAFETY DEPARTMENT OF MONTENEGRO

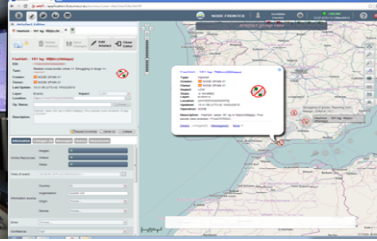


The problem in Border Surveillance

- ❑ The mission of border surveillance is a complex issue given the length of EU borders (maritime and land) and the variety of terrain configuration.
- ❑ In the Mediterranean Sea Basin there are continuous security and safety challenges which require cross-border and multi-discipline collaboration to optimise response actions.
- ❑ Still, there are several threats that prevail in the Maritime and Land borders:

Irregular migration	Piracy	Trafficking of drugs, illicit goods	Arms proliferation	Illegal fishing	Environmental crimes	Maritime accidents/disasters

Border Security Cross Border Cross-sectorial cooperation



☐ Europe needs to

- ✓ enhance cross border and cross-sectorial cooperation to deliver border security
 - ✓ increase the efficiency of surveillance activities via the collection and exchange of land and maritime surveillance information between control authorities even across national borders
 - ✓ share surveillance data among user communities, since data dissemination at present is poor, leading to situations of communities lacking access to existing data, or even duplication of data archives
- ☐ The systems meeting these needs at the moment seem to be EUROSUR and CISE
- ☐ However, the aim must be the development of solutions leveraging on the results extracted from projects funded by the EU, such as PERSEUS, SUNNY, BLUEMASSMED, CLOSEYE, EUCISE2020, EWISA, MEDEA, FOLDOUT, MARISA

The ANDROMEDA's Ambition

Provide a **Common Information Service Environment for Land and Maritime Border Security** that will allow faster detection of new events, better informed decision making, achievement of a joint understanding and undertaking of a situation across borders, allowing seamless cooperation between operating authorities and on-site intervention forces.

ANDROMEDA follows the current EU policy and deployment approach of the CISE system and contributes to the CISE 2020 roadmap by:

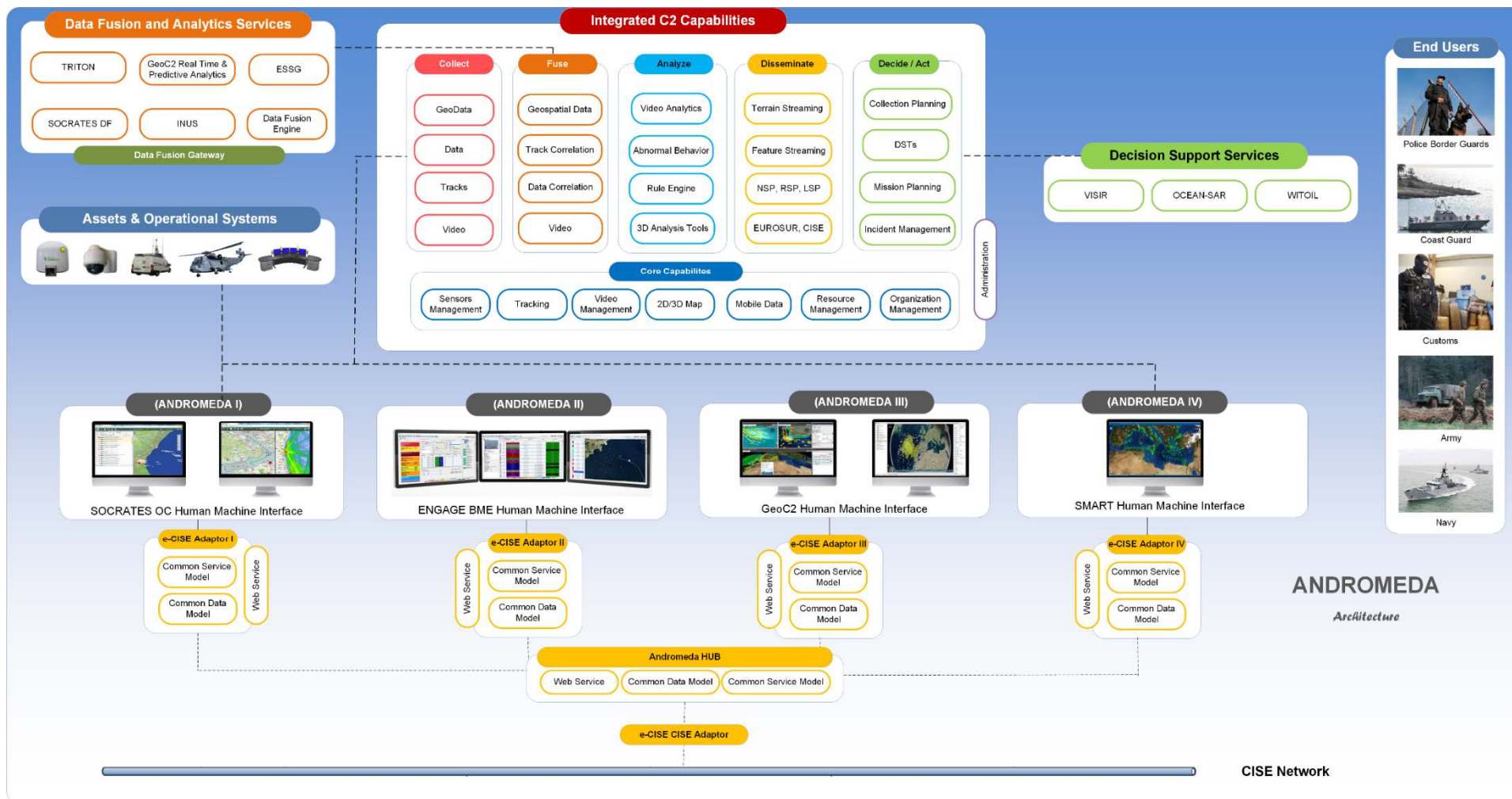


- Aligning the CISE approach to land border information sharing environment to have same information exchange system among maritime and land security authorities
- Adapting innovative C2 systems for total compatibility/ compliance with the enhanced CISE Models (unlocking the full potential of CISE)
- Demonstrating innovative Data Fusion, Analytics, Situational Awareness and Decision Support Services as parts of the C2 systems and the CISE advanced services concept
- Validating in an adequate period of time with three trials the CISE compliant C2s and associated services by several Civil and Military Maritime and Land Border Agencies

Project Objectives

01. Demonstrate innovative solutions validated and qualified in the real, operational environment of civilian missions, defined in detail according to specifications set by the practitioners.
02. Extend the Common Information Sharing Environment (CISE) concept for Land Border Operations.
03. Strengthen the cross sector and cross border collaboration between authorities operating in the Land and Maritime environments (Coast Guards, Police Border Guards, Navies, Customs) in order to utilize resources towards the same goal, leading to cost efficient usage of existing resources.
04. Demonstrate and validate advanced, CISE compliant Command & Control Systems and kick-start the future demand for CISE information services.
05. Support the practitioners along the complete lifecycle of border situations, from the observation of elements in the environment up to detection of anomalies and aids to planning by creating and validating improved Situational Awareness.
06. Complement with actions undertaken in the Preparatory Action on Defence Research under topic PADR-US-01-2017: Technological demonstrator for enhanced situational awareness in a naval environment.
07. Enforce compliance with European societal values, fundamental rights and applicable legislation, including in the area of free movement of persons, privacy and protection of personal data.

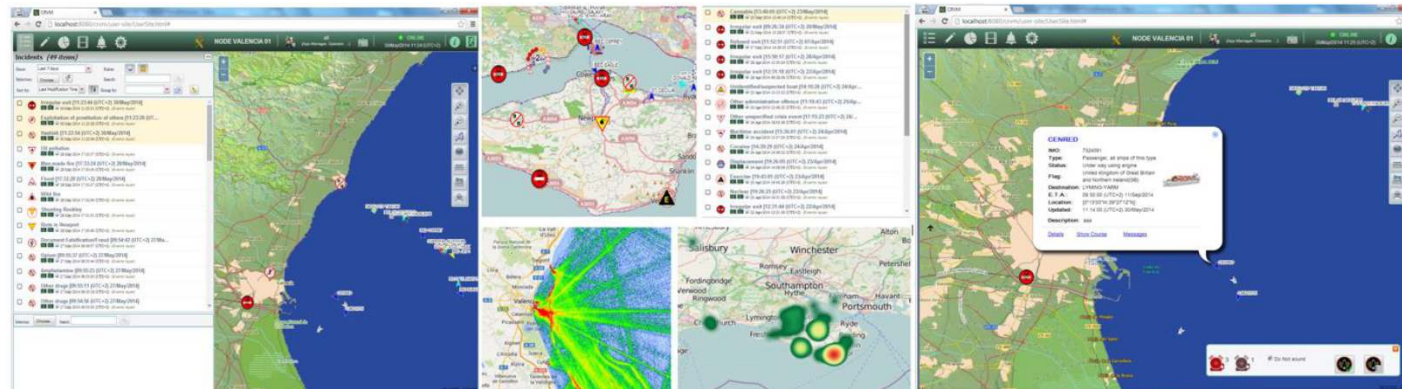
Project Architecture



ANDROMEDA

Command and Control Layer

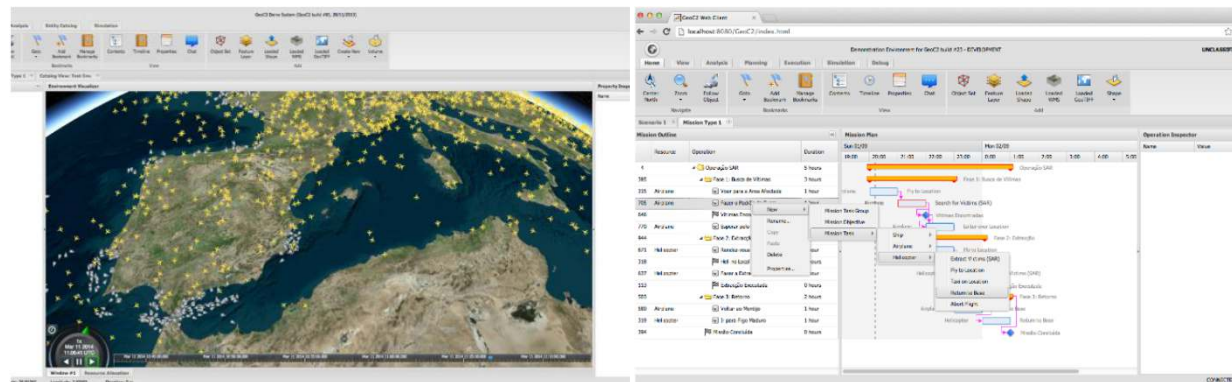
I. Socrates Operational Center (GMV): One of the Socrates suite tools that is currently part of the Advanced Services deployed in EUCISE2020.



II. ENGAGE C3i BME (STWS): One of the C2 Systems demonstrated at the PERSEUS project and the basis of various large scale deployments (Incident Logging System of the International Maritime Surveillance Bureau of MMAIP, National Command System of the Hellenic Fire Brigade etc.)



III. GeoC2 (INW): The basis for a series of national and international large-scale projects in both military and civilian clients (Portuguese Navy, Portuguese Directorate General for Maritime Policy, EMSA)



The ANDROMEDA C2s:

- will be totally integrated in the enhanced and extended CISE network with capability of discovering and consuming all the services, and acting as providers of CISE services.
- will be integrated with the Data Fusion, Analytics and Decision Support services that will enable the realization of the capabilities to Collect, Fuse, Analyse, Disseminate and Decide/Act.

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Data Fusion, Analytics & Situational Awareness Layer

- ❖ **ESSG Real Time Maritime Analytics (CODIN):** Maritime surveillance solution with Real Time User and Entity Behavior Analytics functionalities using Machine Learning and Predictive Algorithms.
- ❖ **TRITON Analytics Engine (STWS):** Vessel Abnormal Behavior Detection Engine that identifies and analyzes motion patterns of vessels from AIS, radar and fused tracks.
- ❖ **Socrates DF Services (GMV):** Converts large amount of received data into useful information and performs a Behavior Analysis.
- ❖ **GeoC2 Real Time Analytics (INW):** A mixed heuristics / statistic analytics engine that continuously monitors a sensor stream, allowing for correlation of events and alert generation.



- ❖ **GeoC2 Predictive Analytics (INW):** Correlate and forecast geospatial events and their recurrence, generating domain neutral predictions for occurrence and location of events of interest.
- ❖ **EXUS Analytics Framework (EXUS):** A data fusion module which takes measurements from different sensors (e.g. data sources, radars, legacy systems, AIS) and fuse them for more accurate results and produce intelligence.
- ❖ **U2AM (ICCS):** Two ICCS UAV systems (one fixed wing and one octocopter) for Land Border Surveillance to identify and track suspicious vehicles/objects, equipped with day/night vision sensors and/or spectral sensors.

The ANDROMEDA DF & SA:

- will leverage the experience of the partners on data fusion and data analytics techniques to support operational and situational awareness of border authorities and disseminate the results and best practices to further enhance awareness between EU countries.
- will advance the current SotA in data fusion focusing on: (a) Hybrid fusion approaches, (b) Probabilistic fusion, (c) Deep Neural Networks.

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Decision Support System

Layer

❖ WITOil - Where Is The Oil (CMCC):

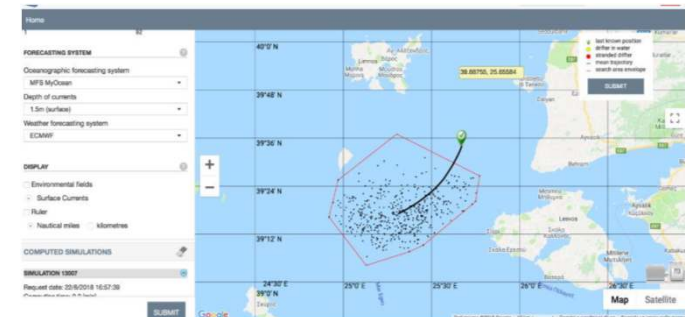
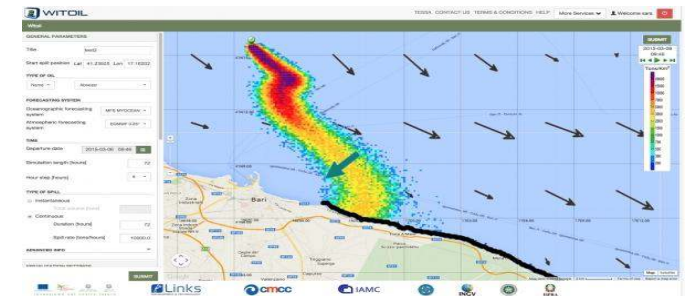
Creates a forecast of oil spill events, evaluate uncertainty of the predictions, and calculates hazards based on historical meteo oceanographic datasets.

❖ VISIR (CMCC):

DSS tool for ship routing. The model employs meteo oceanographic forecast products to optimize nautical routes. The optimization objective is to keep the total sailing time at an absolute minimum while treating safety of navigation as a constraint.

❖ OCEAN SAR (CMCC):

DSS tool for SAR at sea. It simulates drifting objects at sea, using as input ocean currents and wind data.



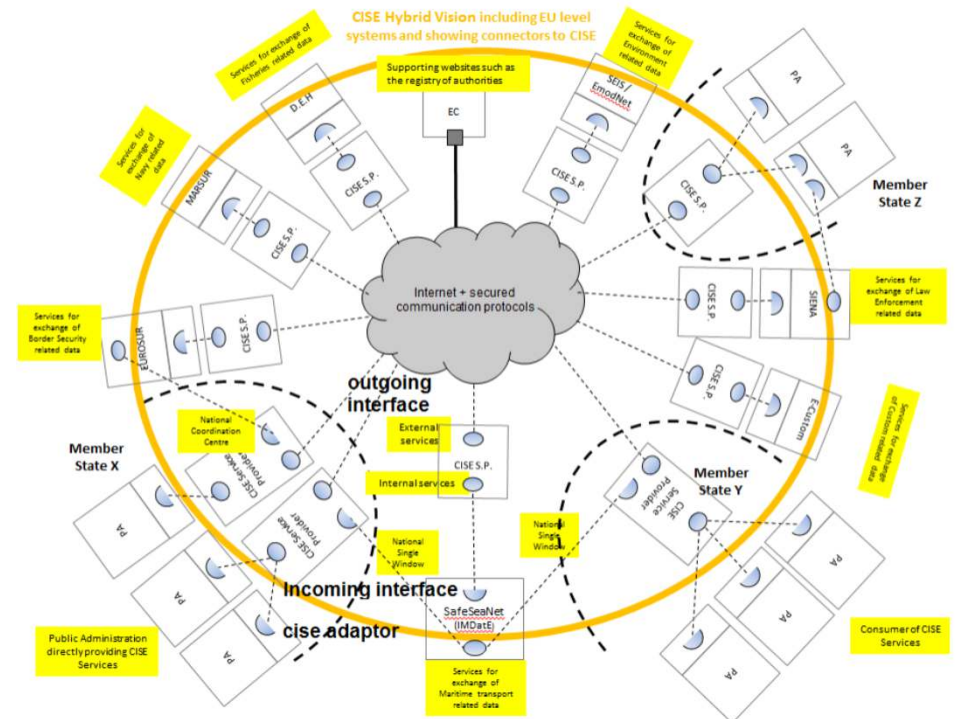
The ANDROMEDA DSS:

- will adapt and integrate existing tools into the CISE framework in order to provide support for operational and situational awareness of border authorities.
- will integrate HR meteorological and oceanographic products and the system will be extended on land environment.

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CISE Level

- ✓ Enrich particular CISE Model Entities and add missing enumerations and fields.
- ✓ Define a Data Model for Land Border Security Operations by combining the knowledge and experience from previous R&D Projects and EUROSUR.
- ✓ Provide an adoption guide for the enhanced CISE Data and Service Model.
- ✓ Define a Hybrid architecture that will allow the testing and validation of the unaltered and the enhanced CISE Services.
- ✓ The CISE Adaptors will comply with the enhanced and extended CISE Data Model



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Validation in Operational Trials

The ANDROMEDA CISE Level:

- will unlock the full capabilities of the CISE Model by enhancing the Maritime CISE Model, extending its scope to the Land Surveillance Information Exchange.
- will support the Service and Data Model into sophisticated Command, Control and Coordination Systems.
- will streamline the integration with current and future operational systems and will perfectly be aligned with the overall European policy facilitating the interagency interoperability and cooperation among Member States.

ANDROMEDA Operational Trials



Trial 1: Iberian Maritime Border Trial

Scenarios:

Maritime Traffic Control and Illegal
Activities Smuggling and Drugs

End Users:

PORTUGUESE NAVY,
ITALIAN NAVY

Trial 2: Greece – Bulgaria Land Border - Maritime

Scenarios:

Illegal Immigration, SAR,
Smuggling

End Users:

HELLENIC COAST
GUARD, HELLENIC
POLICE, HELLENIC
MINISTRY OF DEFENSE,
BULGARIAN MARITIME
ADMINISTRATION



Trial 3: Ionian- Adriatic Trial

Scenarios:

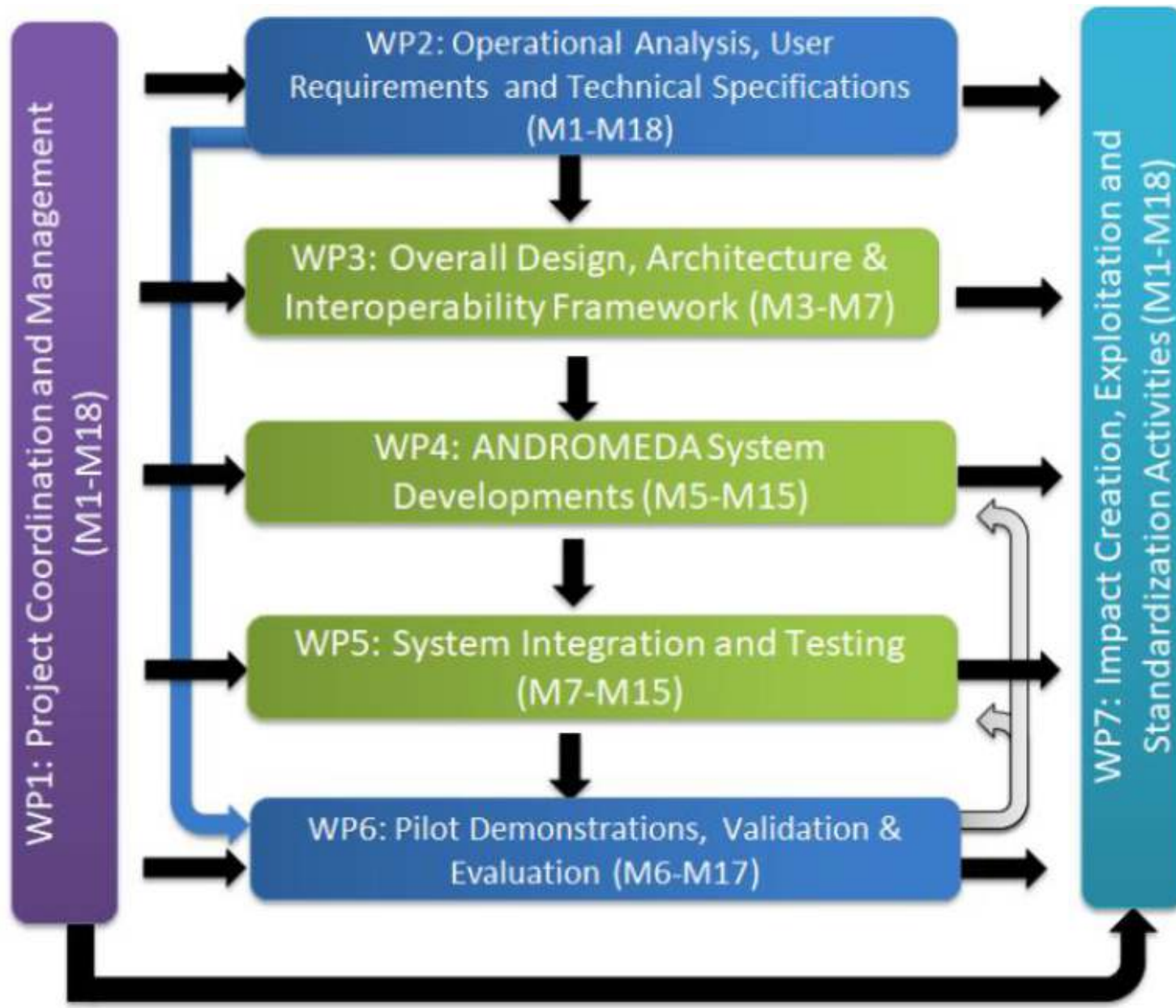
Human Trafficking,
Smuggling and SAR

End Users:

HELLENIC COAST GUARD,
HELLENIC MINISTRY OF
DEFENSE, ITALIAN NAVY,
MARITIME SAFETY
DEPARTMENT OF
MONTENEGRO



ANDROMEDA Implementation Work Plan



Contact Details:

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Thank you for your attention!

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will now provide
answers to all your Qs!