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An Enhanced Common Information Sharing Environment for Border Command, Control and Coordination Systems

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D.2.1 User Community Initial Report

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Executive Summary

ANDROMEDA User Community addresses the end-users information exchange needs of the operational maritime and land border surveillance. ANDROMEDA User Community focuses to its industrial and academic experts and end-users interactions for utilizing the achievements reached in previous EU funded projects for unlocking the full capabilities of CISE by extending the scope to Land Border Information Exchange. The ANDROMEDA operative domain will through the enhanced CISE Model streamline the integration with current and future operational systems in order to foster faster detection of new elements, better informed decision making and the achievement of a joint understanding of situation across borders.

ANDROMEDA project can be considered as an integral part of the cross-border continuity started with the CoopP project and CISE network. The results laid down in ANDROMEDA deliverables provide improved elements for interoperability and cooperation and allows Member State and EU Agencies to decide how, when and whether additional data sources are of relevance to its operations.

ANDROMEDA project forms a User Community that covers not only project partners, but also additional organizations, both end users and providers of data and services, not directly involved in the project. The community supports and advises project partners with experience and know-how throughout the project duration. A key element driving this community is the collaborative involvement not only of users but also of all stakeholders, bringing together their expertise in Command & Control (C2) systems, Data Fusion technologies and information sharing solutions, during and beyond the lifetime of ANDROMEDA project. The design of ANDROMEDA therefore integrates the user community experience in design and development as well as needs, operational scenarios, existing gaps, acceptability issues and societal impacts. Collective mind of the ANDROMEDA User Community as a networked expertise community improves the establishment and management of relationships such as management of mutual causalities-nexus and impacts. Here, mutual causalities and impacts are addressed to cross-border interaction processes which faces increasing speed of cross-border technological development, needs for mutual and collective trust building, effects of new updates and needs of resilience for "expected and legacy" as well as "unexpected and emergent" local-global requirements, responses and collective interactions and operations. In addition, ANDROMEDA project offers its participants and stakeholders valuable insights into the development of the data fusion capabilities in the maritime and land border domains.

ANDROMEDA project makes a continuum from the CoopP and EUCISE2020 as well as MARISA research-development-innovation activities and previously delivered capabilities by enhancing the CISE data model and by extending its scopes to the land surveillance information exchange. ANDROMEDA project addresses the relevant gaps and requirements providing a secure, effective common situational awareness and information exchange system integrated with CISE environment. According to the current analysis of past and ongoing initiatives in the sphere of border security operative environments: ANDROMEDA project addresses the development of solutions utilizing the results and co-operation from relevant projects formerly funded by the H2020 and Framework Program 7 (FP7). Moreover, ANDROMEDA consortium proposes an enhanced CISE (e-CISE) Data Model which is an essential driver and enabler of interoperability and operational cooperation. ANDROMEDA project takes place at the time where the benefits of data exchange is in the last-mile research as proofing-off phase, especially on European Commission Policy Level, the definition of the extended CISE data model as well as the EUCISE2020 services and existing CISE and MARISA nodes. Current proof-of-concept and validation processes in the EUCISE2020 exploits adaptor services to integrate legacy systems and nodes as gateways of the CISE network that utilize the CISE Services and Data Models.

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1.   Introduction

This D2.1 User Community Initial Report is incrementally collected in ANDROMEDA (An EnhaNceD Common InfoRmatiOn Sharing EnvironMent for BordEr CommanD, Control and CoordinAtion Systems) project: which has received funding from the European Union's Horizon 2020; related to the funding scheme of Innovation Action; and Grant Agreement which identification number is 833881. Funding reference: H2020-EU.3.7.3 (Strengthen security through border management) and H2020-EU.3.7.8 (Support the Union's external security policies including through conflict prevention and peace-building). Project topic: SU-BES03-2018-2019-2020 (Demonstration of applied solutions to enhance border and external security).

"The ANDROMEDA project aims to unlock the full potential of CISE, by validating in a long period of time CISE-compatible command, control and coordination systems from several Coast and Border Agencies. At the same time it is envisaged to further enhance, validate and demonstrate CISE by extending its scope for land borders and adapting relevant C2 solutions and associated services. This will be accomplished by extending the CISE data model based on the use cases and requirements and adapting state-of-the-art command & control systems for full compliancy with the enhanced model and CISE message exchange patterns.

As stated in the Grant Agreement's Deliverable D2.1 description, the report should include the initial assessment of user community Gap analysis. Gap analysis clearly showed that Land Border authorities are in minority in User Community. Gap analysis also indicated that the enlargement of the User Community should focus on potential Land Border authorities. Gap analysis will be continued in Trials' implementations when they are relevant.

The project architecture will follow a hybrid scheme in order to allow the usage of the End User CISE Nodes or Gateways and at the same time to allow the testing and validation of the extended data model. The project will leverage on the developments, results and experience of the consortium from current and previous research projects (PERSEUS, CloseEye, MARISA, RANGER), from National Procurement projects of CISE Nodes and Adaptors and on the CISE infrastructure of the End Users" (CORDIS[1]: The Community Research and Development Information Service is the European Commission's primary source of results from the projects funded by the EU's framework programmes for research and innovation).

ANDROMEDA operative environment includes border surveillance which is a complex mission related to the length of European borders and the variety of terrain configurations. This domains' complexity arises from the fact that 17 EU countries possess an external land border, including those which border Switzerland, and all countries except the Czech Republic possess an external border of some kind either land or maritime. Border security within the EU remains the responsibility of the independent member states as well as associated Schengen states, though there is an element of coherence of approach imposed as a consequence of multilateral agreements such as the Schengen agreement. The EU region has approximately 8000 km of land border to secure, in terrain varying from the arctic, to the mid-latitudes of southern Europe and North Africa. The maritime border situation varies again, with an extensive maritime border made complex by large numbers of islands, and relatively unconstrained leisure traffic around large portions of the EU. The long length of borders requiring protection, and the inevitably limited resources available demands a risk-based approach to be adopted, with resources concentrated in those areas where the probability of an incursion is highest. Large part of the external borders is Maritime and the Mediterranean being the south gate to enter Europe continuously faces common challenge security challenges and vary types of pressures (ANDROMEDA, 833881, GA, Part B, p. 8-9).

The ANDROMEDA User Community facilitates collective progress for unlocking the full capabilities of the CISE by enhancing the Maritime information sharing environment for land border operations and providing

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[1] https://cordis.europa.eu/about/en

the CISE compliant C2, Data Fusion and Decision Support systems in order to enable the land border specific information sharing. Mutual and collective mind of the ANDROMEDA User Community as a "networked expertise community[2]" addresses to the establishment and management of casual relationships such as management of nexus and mutual impacts. The term "nexus[3]" used here, as mutual causalities and impacts are related to cross-border interaction processes which faces increasing speed of cross-border technological development, needs for mutual and collective trust building, effects of new updates and needs of adaptive-resilient systems-services for "expected and legacy" as well as "unexpected and emergent" local-global requirements, responses and collective interactions and operations.

In ANDROMEDA project, the term "innovation" addresses to the enhanced CISE data model in order to develop 100% CISE compatible Command and Control systems with advanced data fusion and decision support tools, products, processes, knowledge or services by using new or existing scientific or technological knowledge. These provide a degree of novelty either to: the developer, the industrial sector, the nation or the world or to succeed in the operative-tactic domain. Here, the term "innovation" takes place, for the most part, in an end users and stakeholders shared context as the desired result. The focus of research is on investigations for understanding and development of artifacts, innovative capabilities and functionalities, situation understanding, action and decision-making competence. In addition, often, the achieved results of participators innovation-learning transactions are as the stakeholder's own or collective creations as trials, which in turn, may be disseminated to expanded domains or more general to internationally impacting high-value innovations.

ANDROMEDA Task 2.1, User Community Interaction corresponds to the Deliverables 2.1 (initial report) and 2.5 (final report) of ANDROMEDA Work Package 2 (WP2). ANDROMEDA WP2 includes topics of Operational Analysis, User Requirements and Technical Specifications. The specific objectives of WP2 Task 2.1 address to Basic Doctrines of ANDROMEDA User Community described in following Table.

List of Common Principles in ANDROMEDA User Community	
1	The role of ANDROMEDA User Community is focused on the goal of "innovation", delivering the benefits of the Information Sharing Environment through the enhanced CISE models for Land and Maritime Border Surveillance and Monitoring. (GA, Part A p. 15-16).
2	The e-CISE and functionalities of the C2s and the ways that they will implement the CISE service model will first and foremost be driven by this user community. Fostering of pro-active involvement of stakeholders; following a user-centric approach in the design and validation; addressing user needs and relevant requirements; user experience animation; legacy systems connectivity; co-creativity; and collective trust building (GA, Part A p. 15-16).
3	The User Community mechanisms is created to foster interactions, leading to knowledge co-created through social interactions, competence sharing and collective service development. The interactions include the verification and validation during the operational trials (GA, p.15-16).
4	The User Community set-up involves users and partners as well as external end-users invited to join the initiative. Co-creation of relevant requirements of functionalities provided by the Land and Maritime Border Surveillance Systems (GA, p. 15-16).
5	The User Community aims to be as inclusive as possible, building also on the links of individual consortium partners of the ANDROMEDA consortium to past and on-going initiatives in the domain to speed up the process (GA, p. 15-16).

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[2] http://www.helsinki.fi/science/networkedlearning/news/networkedexpertise.html
[3] https://en.wiktionary.org/wiki/nexus

List of Common Principles in ANDROMEDA User Community	
6	Incorporate ethic and legal aspects: an active involvement of the end user partners and associates to identify potential acceptability issues and societal impacts that the proposed solution may entail, and provide useful guidance to the technological partners of the consortium for the implementation of the technologies (GA, p. 15-16).

1.1 Purpose of Document

This D2.1 USER COMMUNITY REPORT is addressed to ANDROMEDA stakeholders and partners for current and further development as well as adoption of authority-based collective activities for achievements of high-value of data fusion services and impacts. The first purpose of D2.1 is that it provides: a continuum of updated documentation of practical data fusion descriptions, terminologies, terminology explanations, practical descriptions, aspects of work packages, approach of decision-making and resilience, key references and remarks that should be used for optimizing the ANDROMEDA implementation towards further adoptions and development projects. The second purpose of document is in: expression of ANDROMEDA User Community and establishment, description of stakeholders visions-anticipations and motivation for authorities over border cooperation, implications for experimentation and rationalization of authorities functions and organizational streamlining, descriptions of interactions and pipelines, investigation of possible expansions of potential data fusion activities in the ANDROMEDA domain, legal and ethical transparency, mutual trust and responsibility, action competence, resilient learning, systemic of causalities and nexus, pre-operational validation and investigation of maritime cyber security aspects, risk settings and assets.

The one additional purpose of this USER COMMUNITY REPORT is in description of paths and outcomes towards availability of future ANDROMEDA services and suites: during ANDROMEDA project, the trials as "data fusion intrinsic" are available only to the ANDROMEDA end-users for the purpose of validating the new tools in the three operational trials. According to the ANDROMEDA Consortium Agreement, the exploitation plan will be agreed among the parties during the project. The toolkit configuration based on the access privileges as access control is one of the capability of the toolkit that will be implemented and validated throughout the project and that will allow to configure the capabilities according to the community profile and needs. For each future User Community of Interest, such as generic, Experts on CISE network and/or other similar EU networks, Data Fusion Expertise and Security-Safety Agencies, different representations of public ANDROMEDA deliverables are available based on access privileges as assigned in the ANDROMEDA Consortium Agreement. In addition, any external end-user who participates in ANDROMEDA User Community can participate to the project trials, demonstrations and workshops as observer providing their evaluation and recommendations for the ANDROMEDA system. It is not foreseen that the external end-users provides assets or legacy systems to be integrated in the ANDROMEDA trials.

1.2 Reference Documents

Reference Documents	
[1]	Grant Agreement No 833881 (ANDROMEDA GA) – Annex 1 Description of the action (DoA). The Grant Agreement is the contract document concluded between the EC, here representing the EU, and the beneficiaries under which the parties receive the rights and obligations, e.g., the right of the Union's financial contribution and the obligation to carry out the research and development work.
[2]	Consortium Agreement (CA) of ANDROMEDA PROJECT. The Consortium Agreement (CA) is the internal agreement signed between the members of the consortium establishing their rights and obligations with respect to the implementation of the activities in compliance with the Grant Agreement.

Reference Documents	
[3]	D.2.1 User Community Initial Report (this document). Deliverable (D.2.1) USER COMMUNITY REPORT is addressed to ANDROMEDA stakeholders and partners for current and further development remarks as well as adaption of authority-based collective activities for achievements of high-value of data fusion services and impacts.
[4]	D2.2 User Requirements & Technical Specifications. The deliverable Describes the requirements and technical specifications. The requirements are combination of results from previous R&D and cooperative projects which have been elaborated and updated by the User Community.
[5]	D.2.5 User Community Report (final version) includes an amendments to the D.2.1 including ANDROMEDA User Community establishment, descriptions of stakeholders visions-anticipations and motivation for authorities over border cooperation, implications for experimentation and rationalization of authorities functions and organizational streamlining, furthered descriptions of interactions and pipelines.

1.3   Definitions and Descriptions

List of Definitions and Descriptions	
ANDROMEDA Toolkit	In order to fostering faster detection of new events, better informed decision making and achievement of a joint understanding of a situation across borders, the ANDROMEDA toolkit it will be able to provide a suite of services to correlate and fuse various heterogeneous and homogeneous data and information from different sources..
Anomalies	Detection of an incident that falls outside the frame of normal operations. Typically detected within own sector work. May require action from other sectors. Services used may include sector- or domain-wide anomaly detection tools, risk analysis and planning tools. Typically, basic and additional information is shared on a regular basis.
Classification	Classification is the process in which the characteristics of an asset is used to associate it to a category, hence, two vessels or vehicles classified in the same way cannot not be easy to differentiated unless they are identified.
CONOPS	A concept of operations is describing the characteristics of a proposed system from the viewpoint of an individual who will use that system. A description of how a set of capabilities may be employed to achieve desired objectives or end state. It is used to communicate the quantitative and qualitative system characteristics to all stakeholders.
Correlation	The process which associates and combines data on a single entity or subject from independent observations, in order to improve the reliability or credibility of the information.
CISE	CISE is the Common Information Sharing Environment originally developed for Maritime Domain. It will integrate existing surveillance systems and networks and give to all the relevant authorities (EU and national authorities responsible for different aspects of surveillance) concerned access to the information they need for their missions. The CISE will make different systems interoperable so that data and other information can be exchanged easily through the use of modern technologies.
CLOSEYE	Collaborative evaluation of border surveillance technologies in maritime environment by pre-operational validation of innovative solutions (FP7project).
Data Fusion	The process of integrating multiple data sources to produce more consistent, accurate, and useful information than that provided by any individual data source. Is analogous to the ongoing cognitive process used by humans to integrate data continually from their senses to make inferences about the external world.
Detection	The process in which the system becomes aware of a real-life object such as a vessel or vehicle, a buoy or a helicopter and creates its virtual counterpart in the Recognized

List of Definitions and Descriptions	
	Maritime or Land border Picture. Detection can be achieved using data coming from one sensor or from several sensors at the same time.
Extra ordinary	When major incidents or accidents occur there is a need to coordinate assets from several sectors and nations. Decision-making across sectors and borders is required. Information sharing outside normal patterns is required. Services should be designed to share information accordingly. Basic and additional information is to be shared as well as restricted as required.
European Interoperability Framework	A commonly agreed approach to the delivery of European public services in an interoperable manner. It defines basic interoperability guidelines in the form of common principles, models and recommendations.
Knowledge: embedded in system	A form of knowledge that is linked whit tools, practices and action environment. End users and operative actors are supported to overcome their decision-making challenges and cognitive processing limitations by facilitating knowledge which is in the system, environment and knowledge of nexus.
Knowledge: distributed	Knowledge that is unique to participator, member, flow of work package or working team and it is not uniform across all consortium members.
Knowledge: instructions & splinters	Instructions addresses to knowledge sharing activities for reduction of the amount of irrelevant cognitive load to a minimum through an increased awareness of individuals and operative factors that influence cognitive processing; an instruction which may advance our capacity to handle complexity in understanding and learning.
Knowledge: shared	Knowledge that is uniform and shared across all participators of a project or an activity related to the share development target. Type of knowledge which is represented in personal way by each member but in very end the type of achieved knowledge is rather kind of uniform when it is shared.
Legacy System	The existing Surveillance systems in the National/Regional Coordination Centres to which ANDROMEDA tools can establish some kind of communications. For example, the term "legacy" is used here in a conversion process, when moving data from the "legacy system" to a new system. However, if the "legacy system" is rebuild or improved, then it is understood as a new system.
Resilience	Addresses (here) to an ability to recover from adverse event. A decision-making ability related to absorption and adaption. Main factors: readiness, clean data, additivity of capabilities, clusters and parallel options, nexus management and adaptive-dynamic capabilities of artifacts. Combines: engineering, infrastructure, organizational, psychological, ethical and socio-ecological impacts in decision-making.
Saturation	Saturation has attained widespread acceptance as a methodological principle in qualitative analysis. It is commonly taken to indicate that, on the basis of the data that have been collected or analysed hitherto, further data collection and analysis are unnecessary.
Situational awareness picture	Sector, domain, regional, national or EU-wide services which are addressed to provide a recognized maritime picture. National or regional maritime situational awareness may be facilitated for maritime domain, cross-domain or cross-border purposes depending on national legislation and agreements. Information exchange and sharing are in line with this principle. The services used provides as much open information as possible, e.g., map services, weather services, tools for visualization, augmentations and compilation which improves quality of information in data fusion.
Surveillance	The set of activities aimed to understand and prevent wherever applicable and manage in a comprehensive way all the events and actions relative to the ANDROMEDA domain which could impact the areas of safety and security, law enforcement, defence, border control, protection of the environment, control, trade and economic interest of the EU.

List of Definitions and Descriptions	
Toolkit	In order to fostering faster detection of new events, better informed decision making and achievement of a joint understanding of a situation across borders, the ANDROMEDA toolkit it will be able to provide as a suite of services to correlate and fuse various heterogeneous and homogeneous data and information from different sources.
Triangulation	The term 'triangulation' refers here to the validation of data through cross-verification from more than two sources. One focus of triangulation in ANDROMEDA would be that decision-maker can be more confident in an analysis for decision-making if different methods (algorithms and inquiries) lead to the same result.

1.4   Structure of Document

The document is structured as follows:

Chapter 1 –   Introduction to the operational environment and a macro level outline of ANDROMEDA User Community. Common principles as the doctrines of ANDROMEDA User Community. Purpose of document. Definitions and descriptions of key terms. List of acronyms and reference documents.

Chapter 2 – Project's cooperation and interactions. Description of ANDROMEDA User Community interests and motivation. Operational drivers and potential of cooperation. Reasoning and rationale of ANDROMEDA. Resonance of related projects and path-dependency of development continuums. Towards the development of the User Community and especially end-user needs based project.

Chapter 3 – Description of methodological approaches as actualized in ANDROMEDA. Replication logic and forms of analysis such as the triangulation fashion. Description of the quality approach and processes of investigating and interpreting quantitative and qualitative data in order to gain a deeper understanding and new knowledge for design-building-testing-validation activities.

Chapter 4 – The User Community discussion document collection in ANDROMEDA addresses to the open category that provides a forum for the communication of well-articulated position statements concerning emerging, paradoxical, or even controversial development and research issues for progress of current ANDROMEDA capability development and further artificial continuums.

Chapter 5 – Summary with the conclusions and final future remarks of the ANDROMEDA User Community with reflections.

1.5   List of Acronyms

List of Acronyms	
AI	Artificial Intelligence
AIS	Automatic Identification System
ASC	Advanced Scientific Computing
BDI	Bulgarian Defence Institute
BMM	BlueMassMed (project)
C2	Command and Control
C3I	Command, Control, Communications and Intelligence
C4I	Command, Control, Communications, Computers and Intelligence
CA	Consortium Agreement
CCTV	Closed Circuit Television

List of Acronyms	
CDBP	Chief Directorate Border Police
CENELEC	European Committee for Electrotechnical Standardization
CINAV	The Portuguese Navy's Research Centre
CIRA	Centro Italiano di Ricerche Aerospaziali
CISE	Common Information Sharing Environment
CLOSEYE	Collaborative evaluation of border surveillance technologies in maritime environment by pre-operational validation of innovative solutions. FP7project.
CMMI	Capability Maturity Model Integration
CO	Centre of Operations
CONOPS	Concept of Operations
CoopP	Cooperation Project Maritime Surveillance Project
COP	Common Operational Picture
CPV	Coastal patrol Vessel
CSP	Climate Simulation and Prediction
CSS	Coastal Surveillance System
DF	Data Fusion
DFE	Data Fusion Engine
DG MARE	Directorate-General for Maritime Affairs and Fisheries
DoA	Description of the Action including Annex 1 of the Grant Agreement
DPD	Data Protection Directive
DSRM	Design Science Research Methodology
DST	Decision Support Tool
E/O	Electro Optical
EAMA	The Executive Agency Maritime Administration
EBCGA	European Border and Coast Guard Agency
EC	European Commission
ECIP	Economic analysis of Climate Impacts and Policy
EDA	European Defence Agency
EEZ	Economic Exclusive Zone
ELSI	Ethical, Legal and Social Issues
EMSA	European Maritime Safety Agency
EMSN	European Maritime Surveillance Network
ENLETS	European Network of Law Enforcement Technology Services
EOS	European Organization for Security
ETSI	European Telecommunications Standards Institute
EUC	European University of Cyprus
EUCISE2020	European test bed for the maritime Common Information Sharing Environment in the 2020 perspective, FP7 project
EUROPOL	European Police Office System
EUROSUR	European Border Surveillance System
FP7	Framework Program 7
FRONTEX	European Agency for the Management of Operational Cooperation at the External Borders of the Member States of the European Union

List of Acronyms	
GDPR	General Data Protection Regulation
GIS	Geographical Information System
HCG	The Hellenic Coast Guard
HMOD	The Hellenic Ministry of Defence
HPL	The Hellenic Police
IA	Impact Assessment
IAFES	Impacts on Agriculture, Forests and Ecosystem Services
IAFES	Impacts on Agriculture, Forests and Ecosystem Services
ICT	Information and Communication Technology
IM	Innovation Manager
INGV	Istituto Nazionale di Geofisica e Vulcanologia
INP	The Israel National Police
INUS	Intelligent UxV Surveillance
IoT	Internet of Things
IPR	Intellectual Property Right
IRL	Integration Readiness Level
IRL	Integration Readiness Level
ISTAR	Intelligence, Surveillance, Target Acquisition and Reconnaissance
IT	Information Technology
ITN	Italian Navy
IUU	Illegal, Unreported and Unregulated
JDL	Joint Directors of Laboratories
JRC	Joint Research Centre
KPI	Key Performance Indicator
LEA	Law Enforcement Agency
LIDAR	Light Detection and Ranging
LRIT	Long Range Identification and Tracking
LSA	Land Situational Awareness
LSP	Local Situational Picture
MARISA	MARItime Surveillance Awareness Project
MCCIS	Maritime Command Control and Information System
MMAIP	The Ministry of Maritime Affairs and Insular Policy
MoD	Ministry of Defence
MoE	Measure of Effectiveness
MoP	Measure of Performance
MOPS	The Ministry of Public Security
MPA	Maritime Patrol Aircraft
MRCC	Maritime Rescue Coordination Centre
MS	Milestone / Member State
MSA	Maritime Situation Awareness
MSD	The Maritime Safety Department of Montenegro
MSW	Maritime Single Window
NAF	NATO Architecture Framework

List of Acronyms	
NATO	North Atlantic Treaty Organization
NCC	National Command Centre
NSP	National Situational Picture
OPA	Ocean Predictions and Applications
OSA	Ocean modelling and Data Assimilation
OSINT	Open-Source Intelligence
PC	Project Coordinator
PERSEUS	Policy-oriented marine environmental research for the Southern European seas (FP7)
PM	Project Manager
PortNet	Port Traffic Declaration Service
POV	Pre-Operational Validation
PSO	Project Security Officer
R&D	Research & Development
R&I	Research & Innovation
RAAS	Risk Assessment and Adaptation Strategies
RCC	Regional Command Centre
RDI	Research, Development and Innovations
REHMI	Regional Models and geo-Hydrological Impacts
RFI	Request for Information
RPAS	Remotely Piloted Aircraft System
RTO	Research and Technology Organisation
SA	Situation Awareness
SafeSeaNet	Vessel traffic monitoring and information system
SAR	Search and Rescue
SAT-AIS	Satellite Automatic Identification System
SATIMAGE	Satellite Image
SEME	Sustainable Earth Modelling and Economics
SMILE	SMart mobILity at the European land borders
SOA	Service Oriented Architecture
SSAS	Ship Security Alert System
STM	Sea Traffic Management
TBD	To Be Decided / To Be Described
TC	Task Croup
TCP	Thematic Community of Practitioners
TM	Technical Manager
TRL	Technology Readiness Level
TTW	Territorial Water
UC	User Community
UCL	User Community Leader
UK	United Kingdom
UNDP	United Nations Development Programme
UoA	Unit of Analysis
VTMIS	Vessel Traffic Management Information System

List of Acronyms	
VTS	Vessel Traffic Service
WP	Work Package

2. ANDROMEDA Authorities Cooperation

ANDROMEDA User Community has been continuously involved in expanded cooperation activities towards a coherent approach to create a basis for clean data based solutions, data refining tools and trust base information sharing with the expanded data fusion functionalities in order to support knowledge transfers from research and development and for collective and operative decision-making on implementation of new confidence-based maritime concepts of operations. This continuum of collective maritime work has led to the development of the partners and end-user needs based ANDROMEDA project, partners and end-user-centred adoption model and improvements of continuum focused methodology for design research in distributed information systems. In ANDROMEDA project, the User Community as a steering forum will first and foremost drive the extension of CISE model to the Land Surveillance Information Exchange.

2.1 Description of User Community

The ANDROMEDA User Community consists of a wide range of leading European organizations such as industrial organisations, research & technology organisations, academies and of course end-users. Nineteen partners representing expertise in the fields of command and control, border surveillance, ICT systems, data fusion, artificial intelligence, GIS systems, electronics, surveillance sensors, industrial integration, design, business and financial models definition signed the consortium agreement. The User community has been open to new external partners through the project duration. The External partners from EU-funded projects related to border surveillance, maritime and land surveillance, security and information & communication technology were invited to support and advise the project with their knowledge and expertise. The User Community is open for new external partners through the project duration. The External partners from EU-funded projects related to border surveillance, maritime and land surveillance, security and information & communication technology are and will be invited to support and advise the project with their knowledge and expertise. The projects in focus are ARCSAR, ARESIBO, CAMELOT, CIVILnEXt, EFFECTOR, EUCISE2020, EWISA, MARISA, MEDEA, OCEAN2020, ROBORDER and TRESSPASS. The user communities and the partners are introduced in this chapter.

2.1.1 EU Bodies and Agencies

The European Union has a wide variety of bodies and agencies. The most important for ANDROMEDA are European Maritime Safety Association (EMSA), Joint Research Centre (JRC) and European Border and Coast Guard Agency (Frontex). EMSA leads CISE transition phase preparing CISE to the operational phase. JRC supports EU projects with scientific and technical expertise. Frontex monitors the situation on the borders and contributes border authorities to share information with Member States. The JRC has replied in the affirmative to participate in the ANDROMEDA project.

Table 1: EU Bodies and Agencies

EU Bodies and Agencies	
	JRC - Joint Research Centre https://ec.europa.eu/info/departments/joint-research-centre_en
The Joint Research Centre (JRC) is the Commission's science and knowledge service. JRC employs scientists to carry out research in order to provide independent scientific advice and support to EU policy. JRC creates, manages and makes sense of knowledge and develop innovative tools and make them available to policy makers. JRC i.e. supports EU industry through scientific research leading to new standards,	

investigates the impact of new digital technologies, manages early warning systems and response mechanisms for natural disasters, health emergencies, humanitarian crises and conflicts and supports EU satellite projects with scientific and technical expertise.

2.1.2 End-User Community

ANDROMEDA End-User community consists of ANDROMEDA consortium partners who are involved in e.g. national security, border surveillance and control, illegal immigration, illegal trafficking, fisheries control. All end users bring their expertise on CISE and other similar information sharing networks, Command & Control systems, Data Fusion (DF) technologies and Situation Awareness (SA) information solutions, during and beyond the project's lifetime.

Table 2: End-User Community

End-Users Community
MMAIP - The Ministry of Maritime Affairs and Insular Policy, GREECE https://www.ynanp.gr/en/
The Ministry of Maritime Affairs and Insular Policy, as a governmental body of the Hellenic Republic, is tasked to apply and enhance the country's general policy on such matters. The Executive Structure of National Strategic Reference Framework of the Ministry of Maritime Affairs and Insular Policy is a specially structured agency, assigned among others with the finding of potential collaborations on research programs for the Ministry, especially Horizon 2020, where it can also participate as a partner. At the same time, under the Ministry's organization chart, among the general secretariats, lies also Hellenic Coast Guard (HCG), the competent authority for the implementation of the law in its area of jurisdiction, which, among others, include: the protection of the life in danger at sea, the general police duties at the sea and at the port facilities, the protection of the marine environment, border surveillance and fishery control.
Key role in project MMAIP will be the coordinator of the project and will be the contact point with the EU. MMAIP will contribute also to: Gap analysis and end user requirements, System Requirements and Functional specifications, Definition and development of use case/ pilot scenarios, Simulations and Training, Pilot Testing and Demonstrations, Validation of use cases, System Evaluation and Assessment and Communication and Dissemination.
ITN - Italian Navy, ITALY http://www.marina.difesa.it/EN/Conosciamoci/Pagine/default.aspx
The Marina Militare Italiana (Italian Navy, ITN) is one of the four services depending from the Italian Defence General Staff / Ministry of Defence, which is called upon to operate with adequate personnel and assets necessary to guarantee the Italian maritime security. In addition to its defence and military duties and tasks, ITN also performs some customary tasks (which are underpinned by national laws and regulations) such as fishing surveillance, the fight against illegal immigration and illegal trafficking, the protection of the environment, which are carried out not only in pursue of national interests but also, due to its pivotal position in the Mediterranean basin, of those of the European Union, surveying its external borders. To perform the assigned tasks, ITN avails itself also of a robust and experienced capability in maritime surveillance and monitoring. This capability is achieved throughout a complex of maritime presence and patrolling activities performed, in the areas of national

End-Users Community

interest, using air and naval assets and also a series of remote sensors including its coastal radar network. At the Command in Chief of the Italian Navy (CINCNAV) is located the ITN Operational Centre, that accommodates the operational staff and enables the acquisition of all collected maritime surveillance-related data acquired by ITN own assets/equipment n sensors and those obtained within alliances and initiatives Italy is member of. All pieces of maritime surveillance-related information, made available by different agencies operating at sea are merged in a single hub.

Key role in project

The Italian Navy participated in the implementation of the project and leads Work Package 2 (Operational Analysis, User Requirements and Technical Specifications). ITN will participate in the ANDROMEDA project trials (in particular the Adriatic-Ionian and also the Iberian) and to the related-validation of value added software based on neural networks.

Assets for ANDROMEDA

Italian CISE node linked to IT NAVY system (SMART). Further assets/data flow TBD.

	MARINHA - Ministério da Defesa Nacional, PORTUGAL https://www.marinha.pt/pt
	CINAV - Centro de Investigação Naval (CINAV), PORTUGAL https://escolanaval.marinha.pt/pt/investigacao

CINAV is the Portuguese Navy's Research Centre. It was created in 2010 to coordinate the various research projects in which the Navy participates, and to support the research conducted by the faculty of the Naval Academy, where CINAV has its offices. It currently has 7 research lines, in the following areas: Signal Processing, Decision Support Systems, Mobile Robotics, Maintenance Engineering and Management, Maritime History, Maritime Strategy, and Naval Health. It has 24 permanent members that hold PhDs (mainly faculty from the Naval Academy), and 142 associate members (mainly naval officers involved in research projects).

Its research projects cover a wide range of areas and go from theoretical research funded by the Portuguese Science Foundation, to more applied research funded by various national and European agencies, to very applied research (demonstration and testing) funded by the Navy itself or by the Portuguese MoD.

Being a Navy Research Centre, CINAV benefits from a very close proximity to the operational experience and expertise of the Navy in all operational fields and, in particular, in the fields of surveillance, security and border integrity.

Key role in project

CINAV's main role is related to maritime surveillance and Sea Lines Of Communications monitoring Territorial Waters, the Economic Exclusive Zone (EEZ) Waters and Sea Lines Of Communication in order to prevent accidents, support seafarers, prevent illegal activities at sea, conduct SAR operations and environmental protection (including fishery control).

PT Navy/CINAV is very interested to identify new smart tools created to support the decision-making process and speed up the data collection in order to give to the operators a better COP. CINAV will participate in several work packages, with various degrees of involvement. In addition, the Portuguese Navy CIS Directorate will have a major involvement in the project being responsible for the link of the

End-Users Community
ANDROMEDA products within the Portuguese Navy Maritime data Network, where all the Maritime surveillance data and maritime information systems services run.

Portugal is also involved in the CISE program and the envisaged compatibility with extended functionalities, provided by ANDROMEDA, will be used in the Portuguese Maritime Operations Centre.

Assets for ANDROMEDA

The main asset that CINAV will provide is the expertise of a vast number of operators and supervisors that, taking into account their experience with the existing legacy system, will allow to test and improve the ANDROEMDA developments and the toolkit to be used, which will run inside the Navy network with a Navy hardware infrastructure, for a better user experience.

Besides, CINAV is able to provide to ANDROMEDA some unmanned vehicles (air, surface, and underwater), Networked Navigation simulator, access to naval assets, access to Maritime Operations Centre and Maritime Rescue Coordination Centre, Infrastructures for meetings, seminars, conferences and Infrastructures for tests and demonstrations at sea.

	INP – Israel National Police, ISRAEL https://www.gov.il/en/Departments/israel_police

The Israel National Police (INP) is under the authority of the Ministry of Public Security (MOPS). The INP is comprised of some 30,000 sworn officers and reinforced by 50,000 volunteers. It is the only Law Enforcement Agency in Israel responsible of policing activities.

The responsibilities of INP cover all aspects of policing from the local through the national levels.

The main areas on which the Israel Police focuses are public security, maintaining Law and Order, fighting crime through Investigating and Intelligence, traffic enforcement and border security.

Key role in project

INP will be involved in collection and analysis of relevant user requirements, contribution to the development process where necessary and perform review of the results where necessary.

Assets for ANDROMEDA

Contributors of knowledge as End-users with comprehensive view of operational requirements along with applicable technological abilities.

Vast experience in conducting Early-stage operational field trials accompanied by thorough Performance analysis in view of realistic scenarios and operational deployment.

	EAMA – Executive Agency Maritime Administration, BULGARIA https://www.marad.bg/en

The Executive Agency Maritime Administration (EAMA) is a legal entity to the Minister of Transport, Information Technology and Communications. The statute of the Agency is regulated in the Merchant Shipping Code. The activities, the structure and the work organization are laid down in the Statutory Regulation, adopted by the Council of Ministers. The Agency's territorial jurisdiction extends to the internal seawaters, the territorial sea, the Bulgarian section of the Danube River and the relevant coastline, the

End-Users Community

territory of the ports except the military ones, the Bulgarian search and rescue sea region and the shipping rivers that flow into the Black Sea.

Key role in project

Among its other activities, Executive Agency "Maritime Administration" is responsible for the coordination and organization of search and rescue activities, emergency response and maritime pollution prevention on national level. Within the ANDROMEDA project, EAMA will contribute to the achievement of full compatibility and integration of the enhanced EUCISE models to the Command, Control and Coordination systems, by providing the civil maritime authority point of view within the areas of its responsibilities.

Assets for ANDROMEDA

EAMA has established EUCISE 2020 Node C and has integrated access to EMSA Portal – CleanSeaNet, SafeSeaNet, LRIT, ImDate; Ship Security Alert System (SSAS); Hydro meteorological data; Vessel Traffic Management Information System data; Search and Rescue assets; Search Planning Software (SAR PC).

	HMOD – Ministry of National Defence, GREECE www.mod.mil.gr

Hellenic Ministry of Defence (HMOD) is a public authority that applies the Government's National Defence Policy. HMOD dispose capabilities and manage resources for the benefit of the society, by implementing interventions focusing on serving every day's and unpredictable matters. In other more pressing issues like crisis management for man-made or physical disasters, humanitarian aid, search and rescue (SAR) missions and environmental research, consistently plays key role. Among others, the most significant contribution is considered the land, air and maritime border surveillance, since Greece is situated in a sensitive area/crossroad. Therefore, HMOD today incarnates a very important social role in everyday life of Greek, EU citizens and other people.

Key role in project

The areas in which HMOD will be involved in the project as participant in work packages and tasks, include the following:
- Gap analysis and end user requirements
- System Requirements and Functional specifications
- Definition and development of use case/ pilot scenarios
- Pilot Testing and Demonstrations
- Validation of use cases, System Evaluation and Assessment

Assets for ANDROMEDA

- EUCISE2020 Gateway Type A

	HPL – Hellenic Police, GREECE http://www.hellenicpolice.gr

End-Users Community

The Hellenic Police is subordinated to the Ministry of Public Order and Citizen Protection. The Hellenic Police assumed its present structure in 1984 when the Gendarmerie (Chorofylaki) and the Urban Police Forces (Astynomia Poleon) were merged (Law 1481/1-10-1984, Government Gazette 152 A). Hellenic Police (Elliniki Astynomia) is a Law Enforcement Agency according to the Law nr. 4249/2014 and its mission is to:

- ensure peace and order as well as citizens` unhindered social development, a mission that includes general policing duties and traffic safety
- prevent and interdict crime as well as to protect the State and the democratic form of government within the framework of constitutional order, a mission that also includes the implementation of public and state security policy
- Prevent illegal border crossing as well as to enforce the legal framework in which immigrants are allowed to live and work in the country.

Hellenic Police is comprised of both central and regional Services. Hellenic Police`s headquarters is the supreme authority over these Services. Its efforts centre on the fulfilment of the Force`s mission, within the framework of the Ministry of Citizen Protection. For this reason, it schedules, directs, oversees and monitors the activities of its Services, and it ensures the necessary conditions for the exercise of its authority.

In its continuous mission to serve and protect citizens, Hellenic Police has responded to our times` demands and challenges by improving training, adopting a modern crime prevention policy, better utilizing science and technology and by exploiting international law enforcement cooperation.

Key role in project

The areas in which HPL will be involved in the project as participant in work packages and tasks, include the following:

- Gap analysis and end user requirements
- System Requirements and Functional specifications
- Definition and development of use case/ pilot scenarios
- Pilot Testing and Demonstrations
- Validation of use cases, System Evaluation and Assessment

	MSD – Maritime Safety Department of Montenegro, MONTENEGRO http://pomorstvo.me/eng

The basic activity of the Maritime Safety Department is to ensure conditions for, and actual performance of, tasks stemming from the international obligations that the State has agreed to by signing conventions, agreements and protocols, related to the safety and security of navigation in the area of responsibility of the Contracting Government. MSD performs i.e. following activities: Border Surveillance, Crisis & Disaster Management, Emergency Management and Safety & SAR Management.

Key role in project

The areas in which MSD will be involved in the project as participant in work packages and tasks, include the following:

- Gap analysis and end user requirements
- System Requirements and Functional specifications

End-Users Community
• Definition and development of use case/ pilot scenarios • Pilot Testing and Demonstrations • Validation of use cases, System Evaluation and Assessment **Assets for ANDROMEDA** According to National plan for SAR at sea, and National Contingency Plan for oil spill prevention at sea, MSD could involve other national institution from Montenegro (Army, Police) and their equipment to participate in SAR action or exercises. MSD infrastructure could be used for the project purposes: VTMIS (Vessel Traffic Management Information System) system, Coastal radio station BARRADIO, MRCC (Maritime Rescue Coordination Centre) and two SAR boats.

2.1.3 Industrial community

The industrial community provides its expertise and knowledge for ANDROMEDA by creating, developing and deploying the ADROMEDA product according the projects and End-User requirements. The Industrial partners are highly experienced in numerous projects with maritime and land surveillance, information exchange, security, defence systems, ICT, data fusion and are leading actors on the markets in Europe. They also own wide experience of aerial surveillance, information sharing, early warning e.g. systems, methods and software.

Table 3: Industrial Community

Industrial Community
GMV - GMV Innovation Solutions, SPAIN https://www.gmv.com/en
GMV is a privately-owned technology business group founded in 1984 and trading on a worldwide scale in the following sectors: Aerospace, Defence and Security, Transport, Telecommunications and IT for public administration and large corporations. In 2019 it chalked up a revenue of more than 240 million Euros and more than 2,100 employees. The company's growth strategy is based on continual innovation; 10% of its turnover is returned back into R&D. GMV has achieved the level 5 of the CMMI (Capability Maturity Model Integration), the world's most prestigious business-process improvement model and holds several international patents. GMV is currently the world's top supplier of ground control systems (GCS) for commercial telecommunications operators; as a firm it boasts Europe's third biggest participation by volume in Galileo; it is the main supplier of C3I command and control systems to the Spanish army and the nation's top supplier of telematic systems for public transport. In the area border Surveillance, GMV is the main contractor for development, evolution and maintenance of the EUROSUR Network. EUROSUR network is operational with more than 20 countries. Border Surveillance is one of the cornerstone activity areas of the company. Exploiting synergies coming from our projects in space and defence, GMV has consolidated its position becoming a refence in this domain. Border and external surveillance technologies constitute an essential part of our R&D strategic mid and long term agenda as we have learned that the key for success is to create and nurture mutually beneficial partnerships with our clients. **Key role in project** GMV'S Technical contributions are focused on Maritime border C2 design Advanced Data Fusion. Regarding Maritime border design, the products provided will be based on the Socrates suite tools that are currently part of the Advanced Services deployed in EUCISE, with the innovative purpose of providing total

Industrial Community
integration with CISE data model, allowing users to consume all the information provided by the CISE network and to provide information to it. Regarding Advanced Data Fusion, the products provided will be based on JDL level 1 components, with the innovative purpose of supporting additional data sources as input to the services and increasing the performance of the services. **Assets for ANDROMEDA** GMV provides for the project the Socrates CO (Center of Operations) which has been developed with the experience gained in development of C4I systems for Spanish MoD, C2 systems for Crisis Management and in particular the development of EUROSUR Pilot Project for FRONTEX. Socrates is especially suited to support the operations of National, Regional and Local Coordination Centres, as it provides all the tools and subsystems for the production and exchange of maritime situational picture in a Unified Graphical Interface. GMV also provides a Data Fusion level 1 component, Socrates DF, with the capability of fusing tracks in the maritime and land domain.

	SATWAYS - Satways Ltd., GREECE http://www.satways.net

The company is dedicated to develop integrated Geospatial command and control solutions for Security and Public Safety applications for police, coast guard, emergency medical service, civil protection and fire & rescue operations, critical public infrastructure protection, transportation security and border monitoring. With core technology built on open standards, Satways offers a range of mission critical enterprise solutions empowering governments and businesses around the world to make better and faster operational decisions. Its product line includes C2 and C3I enterprise software packages namely the Atlantis, AutoTrack, ENGAGE, that respond to different operational requirements of Public Safety Agencies such as Distributed Geospatial Data management, Operational Resources Tracking, Incident Management and dispatch, Physical Security Information Management and Natural &Technological Hazards Crisis Management respectively. The common goal though, is to provide effective decision support, to simplify operations, to provide a Common Operational Picture (COP) and collaboration tools across organizations, to collect and disseminate data in the field and to coordinate response units and system users. **Key role in project** STWS is the Technical Coordinator of ANDROMEDA, responsible for coordinating the implementation of all project- wide technical matters, ensuring technical decisions are in line with ANDROMEDA objectives. STWS is responsible for the definition of the enhanced CISE Model, the adaptation of the ENGAGE C2 and TRITON and the integration of the ANDROMEDA DF, SA and DST services. STWS is also the main responsible to organize the Greece-Bulgaria Land/Maritime Border trial T 6.3. STWS leads the Work Packet 5 and tasks T 3.1 Enhanced CISE (e-CISE) Data Model for Border Monitoring & Control, T 3.4 Maritime Borders C2 Design, T4.1 Development of Land C2 Systems Adaptations, T5.4 Factory Integration and Testing of Trial Configurations and T7.1 Dissemination and Communication. **Assets for ANDROMEDA** STWS provides for the project the ENGAGE Border Monitoring Edition which is C3I system, especially suited to support the operations of National, Regional and Local Coordination Centres, as it provides all the tools and subsystems for the production and exchange of maritime situational picture in a Unified Graphical Interface.

Industrial Community

	EXUS - Exus Ltd., UNITED KINGDOM https://www.exus.co.uk/en

EXUS is an enterprise software company specializing in credit risk management, digital transformation services and innovation management. EXUS designs, creates and markets software solutions and services in several business areas such as finance, e-health, e- learning, and security. The company aims at leveraging its successful track record in view of delivering cutting edge innovation to its customers. Its flagship product 'EXUS Financial Suite' was ranked "Best in Class in the world" from the CEB Tower group in 2016. Both products and bespoke solutions built by EXUS, serve demanding and critical business applications and domains.

Key role in project

EXUS in Andromeda project is going to lead the Situational Awareness System and the data fusion mechanism, Tasks 3.5 and 4.4.

Assets for ANDROMEDA

EXUS has informed to be able to provide wide range of infrastructure for the development, technical testing and integration of the project. EXUS is going also to provide the Data Fusion gateway and Data fusion service (EWE).

	INW – Inovaworks Command & Control, PORTUGAL http://www.inovaworks.com

Inovaworks Command and Control (IW C&C) is a Portuguese software solutions provider specializing in distributed operations management solutions for military and civilian markets – in short, Command and Control software. The company designs, develops and licenses a product suite named GeoC2 that can be used for distributed visualization, analytics, operations management and collaboration in complex multi-party scenarios both for Defence and Security applications. The company provides complete technology-centric and market-centric solutions for operations visualization, sensor integration and fusion, situational awareness, consolidated sense-making, real-time analysis, mission planning, mission execution and monitoring, mission logistics, and deployments dispatch in a modular but well-integrated software solution.

Key role in project

In ANDROMEDA, Inovaworks will be focusing on the technology components of the project (Operational Analysis, User Requirements and Technical Specifications, Overall Design, Architecture & Interoperability Framework, and Interoperable Command & Control Systems Developments) as well as supporting the Portuguese End User (Pilot Demonstrations, Validation & Evaluation). The company will be the leader of Work Package 5, System Integration and Testing and lead the Tasks 3.2 Physical and Logical System Architecture, Task 4.3 Development of enhanced CISE Adaptors, Task 5.3 Definition of System Configurations for Each Trial, Task 6.2 Iberian Maritime Border Trial.
Inovawork's main value add in ANDROMEDA is the expertise in the CISE and C2 matters and integration technologies.

Assets for ANDROMEDA

Inovaworks provides infrastructure and technical equipment for the ANDROMEDA project.

Industrial Community	
	CDN – CODIN SpA, Direzione Ricerca e Sviluppo, ITALY http://www.codin.it

CODIN is a provider of innovative software solutions on the ICT market since 1986. CODIN supports its customers during change and evolution of their information systems and solutions through design, planning and implementation of innovative solutions dedicated to Safety, Security and Process Automation areas. CODIN has developed an integration software platform dedicated to security and safety process management. The platform, ESSG® (Enterprise Security ServiceGrid) is a software framework dedicated to Real Time User and Entity Behaviour Analytics and enables the implementation of integrated security solutions for several domains such as Homeland Security, Cyber Defence, Critical Infrastructure Protection and Territory Protection and Exploitation.

Key role in project

CODIN provides its expertise and the developed computation engines to enhance the capabilities of the Andromeda solution. The computation engine performs ship behaviour modelling, detection, identification and supervision. The engine derives the behaviour from the track position information received from AIS, RADAR, VTS systems etc. In addition CODIN will lead the Task 6.4, Ionian-Adriatic Maritime border.

Assets for ANDROMEDA

CODIN provides to the ANDROMEDA project infrastructure and technical equipment such as Research and Development department in headquarter with 6 people and Taranto branch office for delocalized field trial activities.

	STM – Stemo Ltd, BULGARY https://stemo.bg/en

STEMO LTD is a recognized leader in the field of information and communication technology with offices in all major cities in Bulgaria. STEMO offers a wide portfolio of IT products, solutions and services that help clients to build and increase effectiveness, productivity, security and reliability of the IT infrastructure. Company is direct business partner of leading world manufacturers among which: Hewlett Packard Enterprise Platinum partner, HP Inc. Gold partner and service provider, Cisco gold partner and service provider, SAP gold partner, Microsoft gold partner, NetApp gold partner, VMware enterprise solution provider etc.

Key role in project

As a technology partner STEMO will undertake all activities requiring the knowledge, expertise and resources for development of innovative solutions related to validating operational environment of civilian missions according to specifications set by the practitioners and tailored to effectively meet their needs within civilian missions. STEMOS' information technology experts will support institutions in variety innovation and research activities including validation and demonstration of CISE capabilities, extending its scope for land borders and introduce models for relevant C2 solutions and services.

Assets for ANDROMEDA

STEMO provides a wide range of infrastructure and Technical Equipment

	ENG – Engineering Ingeneria Informatica Spa, ITALY https://www.eng.it/en

Industrial Community
Engineering is the leading Italian software and services group, which has a consolidated presence on all vertical markets and operates through its 4 business units - Public Administration & Healthcare, Telco & Utilities, Industry & Services, Finance - supported by cross business unit centres of competence and by the Research and Innovation Department which, with its 250 resources, has the dual role of promoting research on software at an international level and transferring innovation to the production cycle of the business structures. The Group operates in the outsourcing and cloud computing market via an integrated network of 4 data centres, equipped with infrastructure aligned to the best technological, quality and security standards.   **Key role in project**   Engineering has both a management and technical role into ANDROMEDA. The company will support the project coordination, dissemination and exploitation activities. Under the technical point of view, Engineering will collaborate with the other members of the consortium to form the ANDROMEDA community and build the user requirements specification. ENG will contribute to the overall design, architecture and interoperability framework, particularly giving his own contribution for Situation Awareness and Decision Support Services. The company will also participate to the testing and trial activities for the ADROMEDA system validation. ENG is a Task Leader in T2.4 Operational Scenarios &Trials Definition.   **Assets for ANDROMEDA**   Engineering will not provide any assets to the ANDROMEDA project.

2.1.4 Academic and Research &Technology Community

In the ANDROMEDA project, an investigation of higher education functions and EU research systems addresses the collective contribution of knowledge, competence, capability, operative performance, action proficiency, adaptive capability, ethics and resilience. ANDROMEDA Academic and Research & Technology Community provides its knowledge for above mentioned subjects and consist of four research and technology organisations: LAUREA, ICCS, CMCC and KEMEA.

Table 4: Academic and Research & Technology Organisations (RTO),

Academic & RTO Community	
	ICCS – Institute of Communication and Computer Systems, GREECE https://www.iccs.gr/en
The Institute of Communication and Computer Systems (ICCS) is a non-profit academic research body established in 1989 by the Greek Ministry of Education to carry out research and development activities in the area of telecommunications, systems and techniques, computer systems and their applications in transceivers, radar, electromagnetic sensors, satellite and wireless communications, electromagnetic phenomena modelling, neural networks, systems, software and hardware engineering, telematics and multimedia applications, transport applications, control systems, biomedical engineering and electric power. **Key role in project** ICCS is a Task Leader in T5.1 Test Architecture, ICCS being very active in the broad fields of Emergency Communications, Distributed Architecture for Real-Time Systems and Protocols, Positioning systems, Sensor Networks and Virtual reality all applicable to emergency environments, will mainly undertake research and developments activities associated with the Test Architecture, Sensor and Data Integration Sensor and Data Integration. ICCS is a WP Leader in WP7 Impact Creation, Exploitation and	

Academic & RTO Community

Standardization Activities, Communication Expert incorporating a specialised Communication Office. ICCS is a Task Leader in T7.5 Standardisation, ICCS has large experience and has been very active in standardisation participating in various TCs and working in standardisation of research items it implements.

Assets for ANDROMEDA

Within ICCS, the I-SENSE Research Group is very active in areas with border surveillance technologies, crisis and disaster management communications and platforms, cloud/edge computing, Virtual and Augmented Reality technology and applications, cyber security and privacy by design, embedded systems and sensor networks (remote sensing, ground based and aerial platforms), communication architecture, networking and telecom infrastructures, data analytics and AI, communication middleware/platforms and IoT, Intelligent Transportation Systems and logistics. In ANDROMEDA ICCS will exploit an Intelligent UxV Surveillance (INUS) Platform composed of UAV and ground surveillance assets for object detection and tracking in focused land border surveillance missions.

cmcc	CMCC – Fondazione Centro Euro-Mediterraneo sui Cambiamenti Climatci, ITALY https://www.cmcc.it

The Fondazione Centro Euro-Mediterraneo sui Cambiamenti Climatici (Fondazione CMCC) is a non-profit research institution. CMCC's mission is to investigate and model our climate system and its interactions with society to provide reliable, rigorous, and timely scientific results, which will in turn stimulate sustainable growth, protect the environment, and develop science driven adaptation and mitigation policies in a changing climate.

CMCC collaborates with experienced scientists, economists, and technicians, which work together in order to provide full analyses of climate impacts on various systems such as agriculture, ecosystems, coasts, water resources, health, and economics. CMCC also supports policymakers in setting and assessing costs, mitigation, and adaptation policies.

CMCC benefits from the extensive applied research experience of its members and institutional partners: Istituto Nazionale di Geofisica e Vulcanologia (INGV); Università del Salento; Centro Italiano di Ricerche Aerospaziali (CIRA S.c.p.a.); Università Ca' Foscari Venezia; Università di Sassari; Università della Tuscia; Politecnico di Milano; Resources for the Future; Università di Bologna.

CMCC research activities are distributed among nine research divisions that share different knowledge and skills in the field of climate science: Advanced Scientific Computing (ASC) Division; Climate Simulation and Prediction (CSP) Division; Economic analysis of Climate Impacts and Policy (ECIP) Division; Impacts on Agriculture, Forests and Ecosystem Services (IAFES) Division; Ocean modeling and Data Assimilation (ODA) Division; Ocean Predictions and Applications (OPA) Division; Risk Assessment and Adaptation Strategies (RAAS) Division; Regional Models and geo-Hydrological Impacts (REHMI) Division; Sustainable Earth Modeling and Economics (SEME) Division.

Key role in project

CMCC will lead the activities related to the development and provision of meteo-ocean products in the project. CMCC will integrate new services in the CISE by producing and delivering Decision Support System for Oil Spill, Ship routing and Search and rescue. CMCC will develop relevant adaptor for the integration of the above-mentioned services. CMCC will contribute to the development of the algorithm for the use of meteorological-oceanographic products in the detection of anomalous vessels behaviour also using and adapting the ship routing system

Assets for ANDROMEDA

CMCC is a key expert on innovation, data gathering and management, observation, modelling and forecasting, web and mobile applications, decision support tools in the oceanographic field. CMCC is

Academic & RTO Community

leading the Copernicus Mediterranean Ocean Forecasting Service, and participates to the Black Sea one. CMCC is in charge of the Global Ocean forecasting system and has developed very high-resolution forecasting products for coastal and offshore sites. CMCC is specialized in the provision of ocean products to maritime authorities, shipping, oil and gas production facilities. CMCC has developed oil spill forecasting, ship routing, search and rescue tools and services for supporting maritime safety activities.

	LAUREA – Laurea University of Applied Sciences, FINLAND https://www.laurea.fi/en

Laurea is a distinguished and multi-faculty university educating future professionals for security management, business management, information and communications technology, service innovation and design, and nursing. Laurea operates in the Helsinki metropolitan area in seven regional campuses. Laurea's Research, Development and Innovations (RDI) bring together several aspects – from academic research to practitioners' knowhow, and from tech-savviness to traditional security and safety studies. It offers viable business opportunities, design of new services and enhancement of existing ones, with emphasis on the end-user experience. Laurea RDI activities concentrate on four focus areas, of which the most relevant to this project is Security, Safety and Social Responsibility. This focus area can be described through the human security paradigm which refers to a multidisciplinary approach towards understanding the concept of security, including international relations, strategic and development studies, and human rights. In this context, security is seen as an enabler, outcome, and integral part of other subject fields. Laurea's research activities promote solutions that are, above all, ethically and socially sustainable e.g. respecting fundamental human rights.

Key role in project

Laurea brings contribution and expertise to ANDROMEDA in the areas of Legal Aspect, Policy, Social and Ethical Management (T1.4) and their Context Analysis (T2.3). Laurea can bring high level research expertise on CISE due to its' profound knowledge on the creation of CISE. Laurea is professional in H2020 funded project dissemination and communication activities and strong contribution to ANDROMEDA is delivered. Laurea has strong track record on testing and exercise evaluations and input to these issues is in the core of Laurea's expertise. Laurea is Task Leader for T.1.4, T2.1 and T.2.3 and active contributor to other WPs. For the ANDROMEDA organisation Laurea provides the User Community Leader and the Ethical manager.

Assets for ANDROMEDA

Laurea utilizes its expertise in service science via interaction methods with end-users. Combining user-centric approach with expertise in education, security, sustainable development, system resilience, innovative business models and digitalization, for example defining user requirements, ethical design, sustainable stakeholder engagement and R&I dissemination.

	KEMEA – Kentro Meleton Asfleias, GREECE http://www.kemea.gr/en

The Center for Security Studies (KEMEA) is a think tank on homeland security policies and an established research center since 2005 (L. 3387/2005) within the Hellenic Ministry of Citizen Protection (former Ministry of Public Order and Citizen Protection), aiming to support security policy implementations in Greece, at a strategic level.

Academic & RTO Community
KEMEA is a member of a number of European associations and organizations and it represented the Greek Government as a member of the "European Security Research and Innovation Forum (ESRIF)". Amongst other associations and organizations, KEMEA is a member of the "Public Safety Communication Europe Forum (PSCE)", the "European Association of Research and Technology Organizations" and has established links to the ENLETS community (European Network of Law Enforcement Technology Services). Furthermore, KEMEA is appointed as the Greek "National Contact Point" for the implementation of Directive 2008/114/EC, regarding the protection of European Critical Infrastructures and is member to the Board of Directors of the European Organization for Security (EOS).   More specifically, the activities KEMEA is involved in include: a) research and development in the context of National and European projects in close cooperation with LEAs, working under the auspices of the Ministry of Citizen Protection, b) training of practitioners in new systems and technologies and c) the certification of practitioners in private security professions at the national level.   A main objective of KEMEA is to bring together all national Law Enforcement Agencies (Police, Fire Service, Coast Guard, Civil Protection agency, etc.) and to enable them to collaborate, interconnecting them with corresponding agencies, research institutions and the industry from around Europe. This dedicated approach to exploring synergies, establishing communication links and working together to produce end-user driven research on all fronts of the Security Sector during the last decade, has earned KEMEA its participation in numerous National and EC R&D projects.   **Key role in project**   KEMEA is WP6 Leader for the Pilot Demonstrations, Validation & Evaluation and Task Leader in T1.2 Project Management, Quality Control and Risk Management, T2.2 User Requirements and Technical Specifications, T6.1 Operational Trials Context and T7.3 IPR Review and Patenting Process.   Overall, the areas in which KEMEA is involved in the project include the following: • Project Management   • Gap analysis and end user requirements   • System Requirements and Functional specifications   • Definition and development of use case/ pilot scenarios   • Simulations and Training   • Pilot Testing and Demonstrations   • Validation of use cases, System Evaluation and Assessment   • Legal and Ethical Issues (ELSI)   • Communication, Dissemination and Exploitation   **Assets for ANDROMEDA**   KEMEA defines end-user requirements, transforming the requirements into functional specifications, system requirements and actions, mapping the actions into project's objectives and prepare the appropriate action plans for the pilot tests. KEMEA designs the main use cases and the sub-scenarios for each use case that will take place at each pilot site. Last, KEMEA offers a set of equipment purchased in the context of the project (e.g. Radars, E/O sensors and cameras) for the execution of the trials and the validation of ANDROMEDA technologies with the participating End-Users.

2.1.5 External End-Users Community

ANDROMEDA External End-User community consists of partners who are not members of the consortium. Instead, they have indicated their interests to participate in the project by bringing their expertise in e.g. border

surveillance and border control, national security, illegal immigration, illegal trafficking and fisheries control. External End-users provide, among other things, their expertise and knowledge in situational awareness, surveillance systems and methods to the project. The strategy and method for User Community enlargement with external partners is described in chapter 3.5.

Table 5: External End-Users Community

External End-Users Community

	Bulgarian Navy, BULGARIA https://www.mod.bg/en/ba.html

Navy protects the sovereignty and the territory of the Republic of Bulgaria in her maritime spaces. Organizationally, the Navy consists of Navy Training and Preparation Headquarters; two military naval bases – Varna and Bourgas, and units for combat support and combat provision. Functionally, the Navy is divided into Deployment Forces and Territorial Forces:

- Deployment forces - formations with a high and low degree of readiness, capable of conducting the whole spectrum of NATO missions on the territory of the Alliance or outside it in the sense of Article 5 of the Washington Treaty, or in response to crises of a military or non-military nature. The Deployment Forces of the Navy are fully manned and equipped with the necessary arms and equipment.
- Territorial Forces – formations with a high and low degree of readiness capable of fulfilling operations related to the protection of the territorial integrity (independently and/or in the system of collective security and defence), the maritime sovereignty of the country with integrated systems in NATO's shared system that guarantee contribution to the national security in peacetime and counteraction against potential asymmetric threats.

Key role in project

Bulgarian Navy is able to provide experienced experts concerning Maritime Situational Awareness.

Assets for ANDROMEDA

Bulgarian Navy Command with its expertise.

	BDI - Bulgarian Defence Institute, BULGARIA https://di.mod.bg

The Bulgarian Defence Institute (BDI) "Professor Tsvetan Lazarov" was established by a decree of the Council of Ministers of the Republic of Bulgaria #140 of 04.06.20009 as the main scientific-research, testing-design and expert-technical structure at the Bulgarian Ministry of Defence. The main areas of activates of BDI are:

- Scientific and applied research, development and experimental design activities in the sphere of Armaments, C4I Systems, Military Technologies, Logistics, Equipment and Materials;
- Human Factors in Defence Organisations
- Support to the Analysis of the situation of the Armaments, C4I Systems, and Military Technologies, Logistic Equipment and materials and working out of perspectives of their development;

External End-Users Community

- Support to the Integrated Project Teams through taking part in the preparation, scientific monitoring and complete implementation of the defence programs and projects;
- Recruitment of scientific personnel through education in doctoral programs, their development and creation of scientific-technical for needs of the Defence System
- Support of the activities of the Armaments Council and the Defence Capabilities Council of the Bulgarian MoD
- Cooperation in the sphere of research, development, testing and certification of the defence products in the frameworks of NATO, the European Union, as well as on bilateral basis and in national aspect;
- Working out technical specifications and expertise, programs and methods for testing, as well as standardization and other documents, related with the acquisition of defence products; Preparation and performance of laboratory, functional, acquisition, field and other testing of armaments, C4I systems, Military techniques, Logistics equipment and materials; Treasure, acquisition and development of the departmental standards;
- Certification of Quality Management Systems in accordance with NATO Standards, guaranteeing of the quality and assessment of the compliance during the acquisition of defence products; Ensuring of air safety and flying suitability of the military aerial vehicles, as well as of the aerial vehicles of the Ministry of the Interior;
- Coordination of the national contribution to NATO Science and Technology Organization and the European Defence Agency.

Key role in project
- Define and assess user requirements
- Participation to demonstrations
- Assessment and evaluation of results
- Provide virtual platform for testing and experimentations

Assets for ANDROMEDA

IT infrastructure for tests and experiments

	Bulgarian Border Police, BULGARIA https://www.mvr.bg/en/home

Chief Directorate Border Police (CDBP) is one of the chief directorates within the Ministry of Interior. It is a national specialized structure with protective, preventive and investigative functions. Its main purpose is to perform border control and protection of the state borders of the Republic of Bulgaria.
The total length of Bulgaria's borders is 2 368 km. Out of them, EU external borders are 1 225 km, with 412 km sea border and 813 km land border.
The Bulgarian Border Police is a centralized unit with well-defined organizational structure and three levels of governance:
The first level is the Chief Directorate Border Police HQ, responsible for the overall management and coordination of the Border Police national, regional and local units.
The second level consists of 7 /seven/ Regional Directorates Border Police, each responsible for a specific border (land borders with Serbia, North Macedonia, Greece, Turkey and Romania, the Black Sea border and international airports).

External End-Users Community

The third level includes 37 /thirty-seven/ local Border Police Units with 35 /thirty-five Border Crossing Points (BCPs) and 2 /two/ Border Police Vessels Bases located respectively on the Danube river and at the Black sea (near the city of Burgas).

In line with Schengen best practices, CDBP has set up a specialized Air Surveillance Unit.

The Bulgarian Border Police plays a crucial role in safeguarding EU's external borders. Its efforts are focused on enhancing the effectiveness of border control and prevention of irregular migration, as an indispensable part of the integrated border management.

The human and technical resources dedicated to border control are conditioned by the intensity and profile of travellers' flow, assessment of threats and risk analysis. The Bulgarian Border Police deploys adequate infrastructure, equipment and modern technical devices in its efforts to combat irregular migration, trafficking in human beings and cross-border crime. CDBP personnel participating in/hosting the FRONTEX missions as well.

However CDBP has to remain committed and react in due time if new trends occur or if there is a shifting of the route.

	Montenegro Border Police, MONTENEGRO http://www.mup.gov.me/upravapolicije

National Coordination Center – NCC Podgorica, performs activities of electronic surveillance of state border along whole administrative border of Montenegro, including all border crossings. More specifically, these activities are mostly related to:

- Multisensory surveillance of land and maritime border,
- Sensor detection, identification and classification of safety issues related to suspicious events and objects both on land and maritime borders,
- Deployment of unmanned crafts, radars, thermal and CCTV cameras, SMARTDEC and other mobile sets for situation monitoring and border surveillance purposes,
- Protection of life and property of civilians,
- Detection and prevention of illegal migrations and other types of unlawful border crossing,
- Prevention of all kinds criminal activities in border crossing and transport,
- Reporting on accidental situations related to border safety and data sharing for the purposes of cooperation with EUROSUR, FRONTEX, and other safety and security agencies.
- Detecting and preventing the commission of criminal offenses and misdemeanors and finding, arresting and imprisoning their perpetrators;
- Detecting and preventing illegal immigrations
- Preventing illegal traffic of goods across the state border and all forms of cross-border crime;
- Detecting and preventing criminal offenses, misdemeanors and finding and apprehending their perpetrators on the land, coastal and territorial waters of Montenegro; detecting and preventing the introduction of armed groups and individuals across the state border;
- Gathering and reporting information about situation on boarder, boarder cross and in the depth of the territory;
- Cooperation and exchange of information relevant to combating and preventing all forms of cross-border crime;
- Eliminating and preventing other activities and actions that endanger public security;

External End-Users Community

- Joint work and implementation of activities with other organizational units of the Sector of Boarder Police and the Police Directorate;
- Planning of the use of technical means for the observation, surveillance and control of crossing the state;
- Initiating and participating in the implementation of the planning, and development of the Green and Blue Border Electronic Monitoring System and the Border Crossing;
- Keeping prescribed records and performing other tasks within the scope of work of the Unit;
- Multi-sensory observation of land borders, Border Crossing zones and zone of the waters;
- Classifications of security events and facilities
- Identification of security-interesting events and facilities;
- Issuing the necessary orders;
- Sensor detection of the security events and objects of interest;
- Monitoring, directing and controlling the work of the security authorities in the waters and territory and Boarder Crossing;
- Cooperation and exchange of information with all relevant entities - security system bodies Border Crossing
- Planning and control of the use of observation and technical means for monitoring and controlling the crossing of the state border;
- Monitoring and coordinating the work of Joint Police Cooperation Centers in Trebinje and Plav;
- Monitoring and coordination of the work of Regional Communication Centers - RCC North, RCC Center and RCC South;
- Operational cooperation at national level with EUROSUR and FRONTEX and all NCC centers in EU MS.
- Access to EU classified information;
- Drafting and updating the National Situation Image;
- Receiving reports from RCC North, RCC Center and RCC South;
- Preparation of reports on all incidents in the field of border security and the delivery of the same to EUROSUR system, FRONTEX and other security agencies;
- Coordinating work and providing the necessary support for regional joint actions -JOA;
- Making risk analysis;
- Preparation of analytical reports;
- Proposing the improvement of Operational Procedures and the Border Security System, implementation of all other activities in accordance with EU regulations in the field of EUROSUR, FRONTEX and Schengen Agreement.

Key role in project

Montenegro Border Police can actively participate in workshops, demonstrations and joint trials to exchange experience, and provide, guidelines recommendations, professional expertise for ANDROMEDA system to achieve project goals and other welfare for Security and Safety on Adriatic sea.

Assets for ANDROMEDA

- National Coordination Centre Podgorica;
- Electronic surveillance system;

External End-Users Community
• Patrol watercrafts, and • Training for searching and checking stolen boats (provided by certificated trainers).

	Polish Naval Academy of the Heroes of Westerplatte in Gdynia, POLAND https://www.amw.gdynia.pl/index.php/en

The Polish Naval Academy is a research and development centre for the Polish Navy and other organizations linked to the defence and national security. The research problems are selected so as to shape scientific specialties of the Academy in connection with plans for development of the Polish Navy as well as with the process of technical modernization of ships, weapons systems and equipment.

The Academy has, unique in the country, research and development teams whose area of activity covers mostly the maritime environment. A wide range of scientific investigations causes the results obtained to be of universal character, which leads to implementing them in the maritime economy, the industry and environment protection.

Key role in project

Specialists from the Polish Naval Academy can take part in:
- defining project's user requirements
- project's trials, demonstrations, workshops and providing advices and recommendations
- providing comments on the activities concerning maritime security, education and training programmes
- cooperation with different industrial sectors to discuss relevant challenges proposed to be addressed by the Polish Navy, the Polish Border Guard Maritime Branch and to facilitate potential innovation to strengthen the maritime security
- dissemination the project results

Assets for ANDROMEDA

CAPT (N) Bartlomiej Pqczek, PhD, Associate professor
CDR Wojciech Sokolowski, PhD, Assistant professor
CDR KrzysztofGawrysiak, PhD, Assistant Professor
Jerzy Kosinski, PhD, Associate Professor
Grzegorz Krasnodfbski, PhD, Associate Professor
Jaroslaw Teska, PhD, Associate Professor

	Home Office: Border Force Maritime Command (UKBF), UNITED KINGDOM www.gov.uk/government/organisations/border-force

Border Force was formed on 1 March 2012 as a law enforcement command within the Home Office. Border Force secures the border and promotes national prosperity by facilitating the legitimate movement of individuals and goods, whilst preventing those that would cause harm from entering the UK. This is achieved through the immigration and customs checks carried out by our staff at ports and airports.
Border Force is responsible for:
- checking the immigration status of people arriving in and departing the UK
- searching baggage, vehicles and cargo for illicit goods or illegal immigrants
- patrolling the UK coastline and searching vessels
- gathering intelligence

External End-Users Community

• alerting the police and security services to people of interest

This is some of the most important and challenging work in Government as it both protects and enhances both the UK economy and national security.

Key role in project

Border Force Maritime Command's mission is to enhance UK maritime border security through intelligence-led and proactive maritime operations to deliver the right effect in the right place at the right time to in order to:

• Detect and prevent the smuggling of people and prohibited and restricted goods into the UK;

• Deter those who use commercial and general maritime to pose a threat to the UK;

• Prevent and interdict in criminal activity and preserve and secure evidence to support prosecutions where appropriate;

• Reassure the public and wider maritime community whilst minimising interference into the lawful passage of people and goods within UK TTW's.

ANDROMEDA offers the opportunity to enhance the intelligence which drives our deployments, and we would wish to play an active role in the planning around that.

Assets for ANDROMEDA

Border Force has five cutters (offshore patrol vessels) and six Coastal Patrol Vessels (CPV's). One Border Force Cutter is deployed to the Aegean for humanitarian purposes to assist in the rescue of migrants.
Four cutters and six CPVs operate in UK waters. One or more of these vessels could be used to trail Andromeda technology, dependent upon operational demands.

	The Spanish Navy (Armada Española), SPAIN https://armada.defensa.gob.es

The Spanish Navy (Armada Española) is the maritime branch of the Spanish Armed Forces and one of the oldest active naval forces in the world. The Spanish Navy Headquarters, located in Madrid, comprises a series of departments with the necessary personnel and material to advise the Chief of Naval Staff in the execution of his duties.

The Fleet is the main naval power of the Spanish Navy, the core element of the Naval Force to conduct military operations anywhere as part of the joint action of the Armed Forces and capable of leading multinational operations. The soul of the Fleet is made up by surface combatant ships, submarines, mine countermeasures vessels, aircraft, special naval warfare units, command groups, logistic support and other Marine Corps elements that give the naval force an expeditionary character. To carry out its mission, the Fleet has its own command and control systems as well as centres, departments and support facilities which develop training and assessment tasks, analysis of operations and exercises and generation of tactical doctrine.

The Personnel Admiral is the authority responsible for the management, administration and control of the human resources of the Spanish Navy. Through this structure the Personnel Head Office conducts its activities related to the planning, management, integration of human resources, administration, assistance to personnel, teaching, doctrine, medical support and implementation of social policies.

2.1.6 External Industrial Community

ANDROMEDA External Industrial community consists of industrial organizations who are not members of the consortium, instead they have indicated their interests to participate the project by bringing their expertise in e.g. border surveillance and border control, national security, illegal immigration, illegal trafficking and fisheries control. External Industrial partners provide, knowledge, expertise and best practises in the fields of situational awareness, surveillance systems, methods to the project. At the time of this deliverable publication, Marine Traffic, Székely Family and Company Ltd., and Naval Group have joined to the projects external User Community. The strategy and method for User Community enlargement with external partners is described in chapter 3.5.

Table 6: External Industrial Community

External Industrial Community	
MarineTraffic Global Ship Tracking Intelligence	MarineTraffic Operations S.A, GREECE www.marinetraffic.com
MarineTraffic is the world's leading platform for offering vessel tracking services and actionable maritime intelligence. MarineTraffic.com is an end-to-end service that tracks vessel positions, based mainly on the Automatic Identification System (AIS), and displays them on a map in real-time. The AIS data is collected from MarineTraffic's own receivers' network, comprising of over 2,000 coastal AIS stations around the globe, the world's largest proprietary AIS network. At any given time, MarineTraffic is tracking over 150,000 vessels at real-time with 180,000 vessels reporting daily. With its Big Data infrastructure, MarineTraffic receives hundreds of millions of vessel positions daily and archives billions of records. MT research seeks to define the future of maritime shipping. MarineTraffic engineers are focused on discovering novel and innovative ways of making shipping safer, greener and more efficient through smarter technologies. As a data processing specialist, MT sees Big data as a natural development of its core business. MarineTraffic Research is an example of an industrial research lab where research outcomes affect millions of users in no time. The overarching goal is to build systems and algorithms which can exploit uncertainty and partial truth to achieve robustness and high performance in real world conditions. Research groups are engaged in several diverse projects and their expertise are within the areas of artificial intelligence, distributed and parallel computing, decision support systems, soft computing, evolutionary computing, Human-Computer Interaction and Visualization, data management. With its Big Data infrastructure, MarineTraffic receives hundreds of millions of vessel positions daily and archives billions of records. This data has positioned MT in a competitive position giving it the unique potential to make use of these enormous datasets to innovate and provide new knowledge from combined data sources and patterns in large data volumes.	
	Székely Family and Company Ltd., HUNGARY https://szekely.family
Recognizing the gap between end-users (the market) and research and innovation actions , founded by a family with a vision to provide a safe, secure and sustainable future for our children via responsible	

External Industrial Community

research, innovation and development actions, the Székely Family & Company Ltd. based in Budapest, Hungary supports its partners through joint projects or provides external, complementing services. The core team has sound expertise in the EU Framework Programmes (FP7 and H2020) as well as other research, innovation and development programs in the international (and national) community, such as European Space Agency ' s Business Applications and Space Solutions (technology transfer and business incubation) program or UNDP supporting projects.

The main service is supporting dialogue between end-users , research and industrial partners, thus supporting creation of sound, tangible project result s with real impact. For example, the team has expertise in organizing large-scale (1000 + participants) drills or simulations as well as thorough and realistic tabletops to validate results or solutions. In addition , it possesses strong educational and training skills, ranging from lecturing at higher education to basic training for law enforcement officers, also including high-level capabilities of teaching English for foreign speakers, supporting next generation learning strategies of the youth by AR, VR, gamification and blended learning solutions. The team is experienced in acting as Data Protection Officers or as external data protection experts, this can help overcome difficulties most security research actions certainly meet during the validation.

Key role in project

Székely Family &Company Ltd. will contribute with providing experience in the definition of project's user requirements as well as with providing comments on the definition and implementation of the roadmap for the different demonstrators, facilitating alignment between private and public priorities. Due to its innovation community, it can effectively disseminate project results and related news to global and Hungarian peers.

Assets for ANDROMEDA

- Peer review of ANDROMEDA deliverables upon pre-arranged request.
- Participation on ANDROMEDA external end-user Telcos upon request.
- News published in English and Hungarian over website, Facebook and LinkedIn (see example: https://szekely.farnily/2020/03/12/szekely-family-and-co-joins-h2020-aqua3s-security-advisory-board/)
- Support technology gaps with space technology if needed through its Space Impulse partnership (https://szekely.family/2020/03/23/space-impulse-szekely-family-and-co-partner-to-grow-newspace- industry-platform/)
- Szekely Family & Company Ltd. is a start-up and therefore it was not yet involved in any project as a consortium member. However, the predecessors of the company and the members of the team were involved in the following projects:
  1. H2020 Smart mobility at the European land borders
  2. H2020 Autonomous swarms of heterogeneous robots for border surveillance
  3. H2020 Intelligent Portable Control System
  4. H2020 Smart Resilience for Smart Critical Infrastructure
  5. ESA TTD Satellite information for border security (SUPERB)
  6. ESA TTD Drone Detection and Ranging Technology (DDRT)
  7. ICMPD Eastern Partnership Cooperation in the Fight against Irregular Migration - Supporting the Implementation of the Prague Process Action Plan (Ea -SIPPAP)
  8. DESTRIERO FP7
  9. Implementation of integrated Border Management for Turkey (EU Twinning)

External Industrial Community
10. PCC SEE Project on Joint Investigation Teams (Developing webinars for PCC SEE) JLS/2009/JPEN/OG/0729

	Naval Group, FRANCE www.naval-group.com
Naval Group is an international high-tech company and one of the few global leaders in defence naval systems whose skills cover the whole of the production chain for complex programmes. Naval Group uses its extraordinary know-how and unique industrial resources to meet its customers' requirements. Naval Group offer solutions and products from Offshore Patrol Vessels to first rank Frigates and submarines, and command systems for Combat Fleet and large scale Maritime Surveillance.	

2.1.7   External Academic and Research & Technology Community

ANDROMEDA External Academic and Research & Technology community consists of partners who are not members of the consortium. Instead, they have indicated their interests to participate the project by bringing their expertise in border surveillance and border control, national security, illegal immigration, illegal trafficking and fisheries control. The External Academic and Research & Technology partners provide, among other things, their expertise and knowledge in situational awareness, surveillance systems and methods to the project. The External Academic and Research & Technology partners currently are European University Cyprus / CERIDES; Nord University Business School; Faculty of Maritime Studies in Kotor / University of Montenegro; Faculty of Professional Studies, Aleksandër Moisiu University of Durrës (UAMD); Department of Shipping, Trade and Transport /University of the Aegean, and University of Montenegro / Faculty of Electrical Engineering. The strategy and method for User Community enlargement with external partners is described in chapter 3.5.

Table 7: External Academic and Research & Technology Community

External Academic and Research & Technology Community

	European University Cyprus/CERIDES, CYPRUS https://euc.ac.cy https://cerides.euc.ac.cy
The European University of Cyprus consists of the School of Business Administration, the School of Humanities and Social Sciences, the School of Sciences, the Medical School, and the School of Law with the mission to educate students for successful careers and life achievement, to understand and serve the needs of society, and to create knowledge through research and innovation. EUC is the only university in Cyprus and Greece to be rated by QS TOP UNIVERSITIES (QS Stars), which ranks many of the most prestigious universities in the United States, Canada and Europe. The University has been assessed with the highest distinction of 5-Stars in Teaching, Facilities, Inclusiveness, Social Responsibility and Internationalization. Its 4-Star distinction in the field of Employability is also considered a remarkable success, a result of the close association of its academic programs to the job market. The Centre of Excellence for Risk and Decision Sciences (CERIDES) is the research organisation of EUC. CERIDES provides a holistic offer to the academic and business world and operates under the auspices of	

External Academic and Research & Technology Community

European University Cyprus. It is the first cross-disciplinary, cross-School Center of Excellence of European University Cyprus.

CERIDES focus areas revolve around two basic pillars; risk management and decision science with an application to a number of horizontal areas such as: Security, Safety, Telecommunications, Critical Infrastructure Protection and Industrial Processes.

EXPERTISE: Project Management, Risk Perception, Risk Assessment, Safety, Ethical and Legal Issues in Security, Education and Training in Risk, Sendai Framework, Fires (Wildalnd and Urban), Risks from Climate Change.

Assets for ANDROMEDA

CERIDES has already participated in a large number of EU Funded projects (H2020, MCSA, DG ECHO, FP7, DG HOME, DG JUSTICE) and has amassed significant experience. CERIDES has provided training and consulting for the Government of the Republic of Cyprus, the World Bank and private organizations.

	Nord University Business School, NORWAY https://www.nord.no/en

Nord University, Bodo, Norway provides Internationally-oriented teaching and research with a special focus on developing safe and secure societies and a prosperous community. The Nord University preparedness management laboratory (NORDLAB) is a part of the Nord university Business School. NORDLAB provides an arena for situational awareness and risk assessments, as well as education, research, exercises and tests related to sea, land and air-based emergency response. NORDLAB provides computer-based simulation capacities integrated with crisis management decision-support tools and command and control support systems. In cooperation with world-leading suppliers of emergency preparedness software, modelling and simulation systems as well as decision making support solutions we offer an advanced training and test arena within emergency management for students and professionals.

Key role in project
- Input user perspectives
- Testing systems in simulators
- Research
- Teaching
- Other efforts for dissemination to industry and government

Assets for ANDROMEDA

- Faculty within safety, security and emergency management
- International network towards academic institutions
- Broad cooperation with emergency response agencies, military organizations and government at all levels
- Advanced simulator and test centre within safety, security and emergency response

	University of Montenegro, Faculty of Maritime Studies in Kotor, MONTENEGRO http://www.pfkotor.ucg.ac.me/en

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External Academic and Research & Technology Community

Faculty of Maritime Studies in Kotor is higher education institution being a part of the University of Montenegro. It was established in 1959 as a Maritime College and afterwards, complying with the growing trends of maritime infrastructure of Montenegro, this educational institution, recognized in former Yugoslavia, was turned into Maritime Faculty in 1981.

Today, in accordance with the Bologna declaration, Faculty of Maritime Studies in Kotor provides academic and applied studies lasting from three years (six semesters). Academic studies comprehend Maritime Sciences (Basic; Postgraduate Specialist and Master Studies; PhD studies), and Management in Shipping (Basic; Postgraduate Specialist and Master Studies). Applied Studies consist of Nautical Studies, Marine Engineering and Marine Electrotechnics (third year is a differential year).

Today, Maritime Faculty in Kotor is a modem educational institution for personnel in shipping. Maritime experts are being educated and professionally trained in line with international standards, conventions and regulations. Education of maritime experts is carried out within regular classes and special programmes for professional training and competence. The Institution is equipped with modem equipment for organization of teaching process as well as equipment for practical training. Quality of knowledge and skills of large spectrum of application enable that personnel who gain education at Maritime Faculty in Kotor easily get a job on shipping companies worldwide.

Key role in project

Faculty of Maritime Studies Kotor as an academic, scientific and research institution express great interest to participate actively in the implementation of the ANDROMEDA project. There are numerous areas where the staff members from the Faculty can provide full support, professional expertise and academic opinion regarding to the safety and security domains in maritime industry. Based on the previous participation in several international projects staff from the Faculty of Maritime Studies Kotor will be interested and ready to widen collaboration network, share gained knowledge and skills, disseminate project idea to target groups and stakeholders, support sustainability of the project results and outputs and initiate some new projects based on the results of the ANDROMEDA.

Assets for ANDROMEDA

Faculty of Maritime Studies Kotor have large human and technical resources necessary for the effective implementation of anticipated activities. There are highly qualified experts in different academic and professional fields in maritime sector who are prepared to fully support all the activities of the ANDROMEDA project including organization of workshops, round tables, creation and development of studies, performing research and analysis etc. Technical capacities includes modem maritime simulators (nautical, engine room, DP, offshore, PIESCES II, etc.), laboratories, other sophisticated equipment and fully equipped computer rooms ready to be used in the implementation of the ANDROMEDA project.
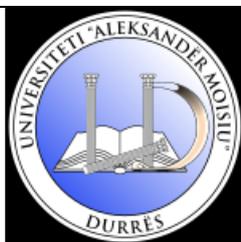
	Aleksandër Moisiu University of Durrës (UAMD), Faculty of Professional Studies, ALBANIA www.uamd.edu.al/index.php/en

Aleksandër Moisiu University of Durrës (Albanian: Universiteti "Aleksandër Moisiu" Durrës; short: UAMD) is the newest public academic institution of the Republic of Albania. The University is located in the ancient city of Durrës and has a branch in Peshkopi. It was inaugurated in 2006 and is using the American system of education, unlike the rest of the public universities in the country. More than 1,300 students started classes as of October 2, 2006. University of Durrës took its name from Austrian actor Aleksandër Moisiu, who was of Albanian descent. The rector is Prof. Dr. Mit'hat Mema. The university

External Academic and Research & Technology Community
offers degree programs in each of its six main divisions: Faculty of Business, Faculty of Applied Integrated Studies, Faculty of Political and Legal Studies, Faculty of Education, Faculty of Professional Studies, Faculty of Information and Technology. The Faculty of Business offers program studies at three levels (bachelor's, master's and doctoral) in various disciplines such as economics, marketing, tourism management, finance and banking. The Faculty of Applied Integrated Studies also offers a focus in economics, but unlike the other divisions, it operates according to the German model of berufsakademie, whereby students work simultaneously in the sectors that correspond with their program studies. The Faculty of Applied Integrated Studies is focused on banking and finance, tourism management, and small to-medium enterprise management.

<table>
<tr><td>UNIVERSITY OF THE
AEGEAN
SCHOOL OF BUSINESS
DEPARTMENT OF SHIPPING, TRADE AND TRANSPORT</td><td>University of the Aegean (Chios), Department of Shipping, Trade and Transport, GREECE
www.stt.aegean.gr</td></tr>
</table>

The Department of Shipping Trade and Transport excels in research and teaching. Our work draws on management, shipping and port economics, transportation science, logistics, finance, computing and innovation studies. We aspire to make an impact on the sustainability and prosperity of maritime transport organizations. Our research is led by people who care authentically about shipping, trade and transport and whose analysis and insight change society.

We constantly work on securing and enhancing centre-stage positioning in key research areas, research that has high impact identified through its use and public recognition, an increase in research income, and increase in the number of our doctoral researchers.

The Department of Shipping Trade and Transport has numerous knowledge and research services to advance the strategies of maritime organizations.

<table>
<tr><td>UCG</td><td>University of Montenegro,   Faculty of Electrical Engineering, MONTENEGRO
https://www.ucg.ac.me/etf</td></tr>
</table>

Faculty of Electrical Engineering, as educational-and-scientific unit, has its mission to educate young and high quality experts in the area of technical sciences (electrical and computer engineering) , capable to contribute to development of the country and region through creative work, in line with European trends, and all these through implementation of modern education techniques and research process. Mission of Faculty of Electrical Engineering is completely in line with the mission of University of Montenegroro.

The Faculty performs educational and scientific research activities:

- educates personnel in disciplines of its competence, with graduate and postgraduate education levels, providing BSc, Spec. Sci and MSc degrees in electrical engineering and computer engineering, and/or PhD degree
- teaches disciplines of its competence in other university units
- organizes and performs scientific research and professional work
- improves scientific thought and pre pare personnel for in dependent scientific work
- develops scientific work as the integral part of its activities and basis for teaching
- through scientific work provides development of science in the area of its competence

Key role in project

External Academic and Research & Technology Community
Faculty of Electrical Engineering is part of the Academic User community, which can provide expertise and advices in different aspects of data collection and data analysis processes.   **Assets for ANDROMEDA**   Being research and educational institutions, Faculty of Electrical Engineering has as its disposal computational and storage equipment, which can be used for analysis of the collected data, then, telecommunication laboratories which can be used for the testing of communication solutions implemented in ANDORMEDA project. Finally, Faculty of Electrical Engineering has expertise in these areas.

2.1.8   External EU funded projects

ANDROMEDA External EU funded projects consist of projects which have collaborated in the context of ANDROMEDA and have contributed in one way or another to ANDROMEDA research. The contribution includes for instance shared user requirements applicable to ANDROMEDA objectives cooperation in different events and sharing their expertise and knowledge in situational awareness, surveillance systems and methods.

Table 8: EU funded projects

EU funded projects	
	D4FLY – Detecting Document Fraud and Identity on the Fly https://d4fly.eu
D4FLY is a research and innovation action funded by the EU Horizon 2020 program "Secure societies – Protecting freedom and security of Europe and its citizens". The project consortium is formed by 19 partners from 11 European countries including universities, SMEs, research institutes and border control authorities. D4FLY focuses on enhancing the quality and efficiency of identity verification at border crossings in all modalities: land, air and sea by providing faster and more secure border control solutions.	
	MARISA - Maritime Integrated Surveillance Awareness https://www.marisaproject.eu
MARISA project aims to provide the security communities operating at sea with a data fusion toolkit, which makes available a suite of methods, techniques and modules to correlate and fuse various heterogeneous and homogeneous data and information from different sources, including Internet and social networks, with the aim to improve information exchange, situational awareness, decision-making and reaction capabilities. The proposed solution will provide mechanisms to get insights from any big data source, perform analysis of a variety of data based on geographical and spatial representation, use techniques to search for typical and new patterns that identify possible connections between events, explore predictive analysis models to represent the effect of relationships of observed object at sea. Enterprise and ad-hoc reporting and services, within the CISE context, will be provided to support users and operational systems in their daily activities, as well as presentation tools for navigating and visualizing results of data fusion processing. The involvement of 5 practitioners as full partners will allow on the one hand to align innovation to user needs, on the other hand to validate the toolkit through a number of trials addressing cross country/cross domain applications.	

EU funded projects

	MEDEA – The Mediterranean & Black Sea Security Practitioners' Network https://www.medea-project.eu

MEDEA is an EU funded Coordination and Support Action project the scope of which is to establish and further develop a regional Network of practitioners and other security related actors in the Mediterranean and the Black Sea region. MEDEA project groups the practitioners into 4 thematic communities (TCPs – Thematic Communities of Practitioners):

- TCP1: Managing of migration flows and asylum seekers
- TCP2: Border management and surveillance
- TCP3: Fight against cross-border crime and terrorism
- TCP4: Manage natural hazards and technological accidents

The aim of MEDEA is to engage a critical mass of security practitioners and actors including first aid responders, border guards, national police, civil protection teams, humanitarian workers, defence entities and other interested stakeholders in efficient cooperation with cross-discipline entities from other countries. The expected result would be the effective response to all security threats common to the Mediterranean and Black Sea region. The requirements from all four communities will be featured as inputs (regional operational needs) in the Mediterranean and Black Sea Security Research and Innovation Agenda (MSRIA).

	RANGER - RAdars for loNG distance maritime surveillancE and SaR opeRations https://ranger-project.eu

RANGER aims at re-enforcing EU by combining innovative Radar technologies with novel technological solutions for early warning, in view of delivering a surveillance platform offering detection, recognition, identification and tracking of suspicious vessels, capabilities exceeding current radar systems. It will be a platform, consisting of 2 radar technologies, a novel Over-The-Horizon Radar combined with a Multiple Input Multiple Output one implemented exploiting the latest photonics advancements, and an Early Warning System exploiting deep and adaptable machine learning schemes able to Automatically detect radar Targets. It safeguards seamless fitting and interoperability with CISE (enhanced maritime surveillance and cross border SaR operations), through the development of a CISE translation Gateway, exporting on-demand CISE services directly to end-users, by strengthening the information exchange between national authorities and the European Agency.

	SMILE - SMart mobILity at the European land borders https://smile-h2020.eu/smile

SMILE Action proposes a novel concept of mobility that addresses the challenges at the European land borders, by designing, implementing, and evaluating in a relevant environment (TRL6) a prototype management architecture for accurate verification, automated control, monitoring and optimization of people flows. It will take advantage of the capabilities of smart mobile devices in border control for secure and reliable authentication and processes their exploitation as a part of a biometric multimodal verification process that augments/complements existing approaches. The idea of SMILE mobility is based on private cloud infrastructure technologies that will communicate with remote handhelds through a secure gateway. The SMILE Action will target the land borders, so the proposed technological and operational framework will be tested through demonstrations at two Border Crossing Points.

EU funded projects

Key role in project

George Stavropoulos is a Research Associate at the Information Technologies Institute of the Centre for Research and Technology Hellas. Within SMILE, his role is the quality assurance manager as well as the day-to-day coordinator, monitoring all project activities.

John Avramidis: He is a Research Assistant the EULAMBIA Advanced Technologies Ltd. He is the "Awareness raising and Exploitation Activities" WP leader and responsible for drawing and managing the execution of the overall communication and dissemination plan of the project and supporting the partners in setting up their individual dissemination plans, in order to raise awareness of the results of SMILE H2020 Action.

Assets for ANDROMEDA

SMILE Action, now at its third year, can contribute based on its experience and lessons learned in various areas such as user requirements, pilots' execution, training activities of end-users, recommendations for legal and ethical challenges stemming from the introduction of new technologies at the land borders, as well as the planning of dissemination and communication activities. Moreover, SMILE can also share its publicly available deliverables which many of them can be a valuable guide for running projects in the security domain.

2.1.9   Potential External End-Users

As a part of User Community Interactions external partners, both users and providers of data and services will be invited to support and advise the project with experience and knowledge they have form previous and ongoing projects or in some other way has been seen as beneficial partner for ANDROMEDA. The process continues throughout the project duration and external partners are able to join the project whenever they want in on the project.

The Letter of support (n=49) was sent to organisations that represent Navies, Coast and Border Guards, Maritime Administrations, Ministries responsible for Maritime Affairs, technology institutes, Universities, EU organisations and EU funded projects. The organizations that accepted the invitation (n = 18) are presented in the sections above (EU MS n=10, non EU MS n=6, EU organisation or EU funded project n=2). Six (6) organisations indicated that they did not intend to participate in the project (EU MS n=4, non EU MS n=2). Totally 25 organisations that were invited to support ANDROMEDA project, have not answered to the Letter of Support. Of the above mentioned invited organizations, 18 belong to EU Member States, five (5) to non-EU countries and two (2) to EU institutions.

2.2   Continuum of Projects

ANDROMEDA focuses to demonstrate the full capabilities of CISE by enhancing the Maritime CISE Model and by extending its scope to the Land Surveillance Sector. To achieve the best results with reasonable efforts it is beneficial to know history and understand the work already done. The continuum of high-value impacts of other projects for ANDROMEDA could be described: "what we can do in our own way is related to where we are and then where we have been". Almost all authorities are participating or has participated EU funded projects related to Land or Maritime surveillance and monitoring. ANDROMEDA consortium brings also experience from European and National Activities related to the Border and external Security and thus it will build on the results of these projects.

The past and current projects have also been used for making the ANDROMEDA User Community completed. New partners to external Organisational, Academic, Industrial and End-User Communities has been invited to

provide their knowledge and expertise in supporting and advising the ANDROMEDA project. The following table provides a more detailed description of past and current projects relevant to ANDROMEDA.

Table 9: Continuum of Projects

Continuum of Projects	
EUROSUR 2007 2013	The European Border Surveillance system is a multipurpose system for cooperation between the EU Member States and Frontex in order to improve situational awareness and increase reaction capability at external borders. The purpose is to prevent cross-border crime and irregular migration and contribute to protecting migrants' lives in all Schengen area countries and Bulgaria, Romania and Croatia. The EUROSUR network is operated by FRONTEX. All Frontex partners has connect their NCC's to EUROSUR information sharing network. For ANDROMEDA Frontex (EUROSUR) could provide real life experience and expertise in border surveillance and incidents in border areas as well as for validation of ANDROMEDA.
SeaBILLA 2010 2014	Sea Border Surveillance Project, which aims to: define the architecture for cost-effective European Sea Border Surveillance systems, integrating space, land, sea and air assets including legacy systems, apply advanced technological solutions to increase performances of surveillance functions and demonstrate significant improvements in detection, tracking, identification and automated behaviour analysis of all vessels. To this end, work included the development of a novel algorithm for change detection and ship detection from space borne sensors, comparison of manned and unmanned aerial means, and assessment of remotely piloted aircraft system performance in selected scenarios. In terms of sensors, activities involved networking between radar and sensors to track small boats close to coastlines and a behaviour analysis algorithm to help relevant stakeholders detect suspicious boats.
BLUEMASSMED 2011 2012	The first European maritime surveillance pilot project launched by DG MARE, whose objective was to foster cooperation in maritime information sharing between 37 State partners from 6 Member States bordering the Mediterranean Sea and Atlantic approaches: operational users, data model, connectivity and capabilities. From the ANDROMEDA point of view, BMM project enhanced the political understanding of cross-border and cross-sectoral information sharing, change the philosophy from "Need to Know" to "Responsibility to Share" principal, enhanced technical readiness for information exchange by developing core and common services for information sharing.
MARSUNO 2011 2012	Maritime Surveillance in the Northern Sea Basins project addressed to support of CISE by identifying practical solutions to overcome legal, technical and administrative hurdles to cross-sectorial and cross-border information sharing between maritime authorities: the data-sharing across borders and across sectors like maritime transport, environmental protection, customs, border guarding, fishery inspection, law enforcement and defence is possible and improves reaction capacity. The project in particular made progress in reviewing the legal situation and made suggestions for a possible governance structure for information sharing in Maritime domain.
PERSEUS 2011 2015	Policy-oriented marine Environmental Research for the Southern European Seas (PERSEUS). Protection of European Borders and Seas through the Intelligent Use of Surveillance: project represented a program and research consortium that furthered large-scale integration, operational validation, demonstration of novel systems, collaboration of European research, a federative frame to joint research and collective steering forum as driver in areas of significant European interest. PERSEUS produced a Policy Brief, which highlights the major scientific findings of the project and sets out evidence-based recommendations for policy and decision makers in the Southern European Seas (SES) based on work carried out in several areas of the Mediterranean

Continuum of Projects	
	and the Black Sea. An atlas of riverine inputs to the Mediterranean was produced during the project.
CoopP 2012 2014	Test project on cooperation in execution of various maritime functionalities at sub-regional or sea-basin level in the field of integrated maritime surveillance: identification of the Common Information Sharing Environment, definition of common data formats, semantics and data model, connection between information sharing and the operational aspect and description of the most important use cases. The CoopP project defined the use cases for CISE, which were used to define the information services, access rights and data model for CISE. The project produced a cost-benefit analysis of the CISE information exchange. The results of the project determined the further development of CISE in several projects e.g. MARISA, EUCISE2020 and now ANDROMEDA.
CLOSEYE 2013 2016	The goal of the CLOSEYE project was validate future solutions by means of the experimentation with innovative proposals in a real operational environment. Aim of the project was to provide an operational and technical framework that increases situational awareness and improves the reaction capability of authorities surveying the external borders of the EU. CLOSEYE paved the way towards the definition of future integrated surveillance solutions.
EUCISE2020 2014 2019	European test bed for the maritime Common Information Sharing Environment in the 2020 perspective. EUCISE2020 is a Security Research project of the European Seventh Framework Program; it aims at achieving the pre-operational Information Sharing between the maritime authorities of the European States. EUCISE2020 data model is based on the CISE data model that was defined in the CoopP project and modified in partnership with Joint Research Centre (JRC).
SUNNY 2014 2017	SUNNY was focused in on UAV platforms collaboration, two-tier intelligent heterogeneous UAV sensor network developments in order to provide both large field and focused surveillance capabilities, remote sensing, situational awareness and data communication capabilities, on-board processing generation, algorithms development to analyse the data collected by the sensors for robust and accurate target identification and event detection.
EWISA 2014 2019	EWISA is a POV on Intelligent Surveillance and Land Border Security that aims to promote further cooperation between public authorities on developing new solutions to improve the quality and efficiency of public services. EWISA will provide an innovative system for warning on possible threats, enhancement of effectiveness and efficiency of all security relevant systems, equipment, tools and processes for the surveillance in the selected areas. EWISA was mainly concentrated on land border surveillance and control and therefore EWISA consortium partners could provide valuable experience for ANDROMEDA.
RANGER 2016 2019	RANGER aims at re-enforcing EU by combining innovative Radar technologies with novel technological solutions for early warning, in view of delivering a surveillance platform offering detection, recognition, identification and tracking of suspicious vessels, capabilities exceeding current radar systems. It will be a platform, consisting of 2 radar technologies, a novel Over-The-Horizon Radar combined with a Multiple Input Multiple Output one implemented exploiting the latest photonics advancements, and an Early Warning System exploiting deep and adaptable machine learning schemes able to Automatically detect radar Targets. RANGER is compatible with CISE providing a scalable set of CISE-ready RANGER services through CISE Gateway to the end-users.
FOLDOUT 2018	FOLDOUT focus is on through foliage detection in the inner and outermost regions of the EU. Foliage penetration is an unsolved important part of border surveillance. By

Continuum of Projects	
2022	solving the problem of unreliable detections in such harsh environments border guards' workloads are reduced, costs are reduced and, last but not least, lives can be saved. Fusing several sensor signals increases the effectiveness of detection. Further, sensors will be influenced (i.e. detection parameters adapted) by events detected by other sensors in the vicinity. By integrating data, such as vehicle traffic, from outside the immediate border area pre-events can be detected and learned. The events will be analysed with machine learning tools to continuously increase the systems detection and tracking capability.
MEDEA 2018 2023	The aim of MEDEA is to engage a critical mass of security practitioners and actors including first aid responders, border guards, national police, civil protection teams, humanitarian workers, defence entities and other interested stakeholders in efficient cooperation with cross-discipline entities from other countries. The expected result would be the effective response to all security threats common to the Mediterranean and Black Sea region. The co-operation between ADROMEDA and MEDEA could be beneficial for both projects. Especially the MEDEA TCP 2 Border management and surveillance community could be seen as end users of ANDROMEDA while reviewing modern surveillance technologies for land and sea borders linked to common information-sharing environment (CISE).
MARISA 2017- 2020	The MARISA project aim was to provide the security communities operating at sea with a data fusion toolkit, which makes available a suite of methods, techniques and modules to correlate and fuse various heterogeneous and homogeneous data and information from different sources, including Internet and social networks, with the aim to improve information exchange, situational awareness, decision-making and reaction capabilities. The proposed solution will provide mechanisms to get insights from any big data source, perform analysis of a variety of data based on geographical and spatial representation, use techniques to search for typical and new patterns that identify possible connections between events, explore predictive analysis models to represent the effect of relationships of observed object at sea.
NEREIDS 2011 2014	NEREIDS was conceived to provide an integrated vision of maritime policy and surveillance so that the different elements of the service become useful to the different domains (immigration, fisheries control...). In this context, the project aimed to enhance automatic and unsupervised ship monitoring capabilities for Maritime Situational Awareness (MSA) and, to support advanced and efficient decision making tools.
ACRITAS 2012 2017	The ACRITAS project aspires to develop an integrated and common border management system, applied to land and sea border control. It will provide rapid deployment to harsh and isolated environments providing multifunctional surveillance capabilities, intelligent data products and innovative services to regional and national authorities. ACRITAS could function as a stand-alone fully functional regional command and control (RCC) centre and/or in cooperation with the National coordination centre (NCC).
ARCSAR 2018 2023	The ARCSAR project will establish international best practice and propose innovation platforms for the professional security and emergency response institutions in the Arctic and the North-Atlantic. The focus is on increased interaction in targeted networks between the professional institutions, academia and the innovators in the preparedness service and equipment industry. The ARCSAR project will monitor research and innovation projects and recommend the uptake and the industrialization of results, express common requirements as regards innovations that could fill in capability and other gaps and improve their performance in the future, and indicate priorities as regards common capabilities, or interfaces among capabilities, requiring more standardization.

Continuum of Projects	
ARESIBO 2019 2022	ARESIBO aims at improving the efficiency of the border surveillance systems by providing the operational teams and the tactical command and control level with an accurate and comprehensive information. The pillars of research in ARESIBO are three-fold: 1. Set-up a complete configuration at tactical and execution level to optimise the collaboration between human and sensors (fixed and mobile), 2. Improve situation awareness by enhancing the understanding of the situation through adapted processing of sensor data, correlation between heterogeneous data and information and creation of knowledge through deep learning techniques and 3. Create a situation awareness capability at C2 level that will combine reports on previous missions, real time situation understanding and threat analysis for future actions. ARESIBO integrates research activities in the domain of 1. surveillance platforms (air, ground, surface, underwater) to optimise the collaborative capabilities of the platforms and their positioning (between themselves and with the teams), 2. Sensor processing to interpret, fuse and correlate all the data to produce information and knowledge and 3. Augmented reality techniques to elaborate and provide to the operators a situation awareness picture which is fit for their missions (minimum information for maximal understanding) both as team level and tactical C2 level.
COMPASS2020 2019 2020	The EU-funded COMPASS2020 project aims to demonstrate that the coordinated use of manned and unmanned technologies and tools, both of aerial and underwater coverage, leads to better achievements regarding the range of operation, the collection of information and the quick reaction to maritime surveillance necessities. The project will offer cost-effective and reliable operational solutions to coast guards and maritime authorities for better situational awareness. The major goal of COMPASS2020 is to demonstrate an operational solution to ensure long range and persistent surveillance, increasing the situational awareness of coast guards and maritime authorities, and, thus, increasing the cost-effectiveness, availability and reliability of the operations.
OCEAN2020	OCEAN2020 (Open Cooperation for European mAritime awareNess), funded by the European Union's Preparatory Action on Defence Research and implemented by the European Defence Agency, represents the ambition and vision of a European maritime initiative, highlighting the strategic approach shared and undertaken by all partners. The project has the main objective to demonstrate enhanced situational awareness in a maritime environment through the integration of legacy and new technologies for unmanned systems, ISTAR payloads and effectors, by pulling together the technical specialists in the maritime domain covering the "observing, orienting, deciding and acting" operational tasks. In particular, the OCEAN2020 Consortium will address the problems of integrating EU systems and individual organisations into a coherent framework.
EL BG SUR	Enhance of the migration flow management at the southeast external border of the EU, through the creation of regional networks, for the exchange of the precise situational picture between Bulgaria and Greece in the context of EUROSUR. Creation of an electronic communication channel between the NCCs of Greece and Bulgaria, for exchanging information, regarding pre-frontier migration cases at the land borders.
SafeShore 2016 2018	The objective of SafeShore is to demonstrate the detection of RPAS, boats and humans on the sea shore beyond capabilities of conventional costal radars. SafeShore will scan the horizon and create above the protected area a virtual dome shield. The SafeShore core solution is based on 3D LIDAR, all-new device that will be developed and integrated with passive acoustic and radio sensors and video analytics to achieve highly accurate detection of mini-RPAS.
Hellenic CISE 2016 2017	The project aims to develop the Hellenic information sharing environment towards an integrated national maritime surveillance environment. To reach its objective, the "Hellenic CISE" seeks to enhance cross-sector and cross border information exchange

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Continuum of Projects	
	capabilities by delivering notably a Situational Picture Manager (SPM) and a Hellenic Coast Guard CISE adaptor.
CY CISE 2017 2018	CY CISE aims to develop the Cypriot information sharing environment towards an integrated national maritime surveillance awareness, complying with the overall European CISE vision. It builds on the knowhow developed within the Hellenic CISE project.
SEAGATE	Initiating the international operational cooperation of all entities in security systems of the Adriatic Sea, with the aim to establish unified control, joint exchange of operational data and information, joint undertaking repressive and preventive measures according to product of joint risk analysis and decisions, in order to effectively fight against all forms of cross border crime, strengthen border security, export controls and non-proliferation efforts and increase the level of security and safety on Adriatic sea.
InBulMarS 2017 2018	Integrated Bulgarian Maritime Surveillance aim to deliver national surveillance system as a set of currently built up Maritime surveillance systems of several national authorities and agencies.
ROBORDER 2017 2021	ROBORDER aims at developing and demonstrating a fully functional autonomous border surveillance system with unmanned mobile robots including aerial, water surface, underwater and ground vehicles which will incorporate multimodal sensors as part of an interoperable network. The projects intention is to implement a heterogeneous robot system and enhance it with detection capabilities for early identification of criminal activities at border and coastal areas along with marine pollution events.
CAMLEOT 2017 2021	CAMELOT proposes to develop and demonstrate different advanced command and control service modules for multiple platform domains, based on a SOA architecture that specifies internal and external interfaces, allowing the development of a modular and scalable command and control station, customisable to the user needs. This architecture can be based on results of previous studies and work or open architectures that may prove more suitable and the interfaces can take advantage of the standardisation work that has been done already.
CREST 2019 2022	CREST aims to equip LEAs with an advanced prediction, prevention, operation, and investigation platform by leveraging the IoT ecosystem, autonomous systems, and targeted technologies and building upon the concept of multidimensional integration and correlation of heterogeneous multimodal data streams (ranging from online content to IoT-enabled sensors) for a) threat detection and assessment, b) dynamic mission planning and adaptive navigation for improved surveillance based on autonomous systems, c) distributed command and control of law enforcement missions, d) sharing of information and exchange of digital evidence based on blockchain, and e) delivery of pertinent information to different stakeholders in an interactive manner tailored to their needs.
VTMIS I 2011 2015	VTMIS (Vessel Traffic Monitoring and Information System) in Montenegro is consisted of procurement and installation of the high performance equipment for maritime surveillance and monitoring of ship traffic, such as: solid state X-band radars, VHF and AIS transceivers, radio-communication devices, VTMIS software, meteo stations, radio-goniometers, etc. VTMIS aims to enhance safety of navigation, as well as environmental protection. VTMIS equipment is installed on several strategic sensor locations and the data transfer is enabled from particular geopositions to MRCC (Maritime Rescue and Coordination Centre) and VTS (Vessel Traffic Service) centre of Montenegro. Data from VTMIS system are shared with European institutions such

Continuum of Projects	
	as EMSA, what enables Montenegro to be a part of European and regional data sharing systems (SafeSeaNet, CleanSeaNet, EU LRIT Data Centre, MARES, THETIS itd.)
VTMIS II 2018 2023	Second phase of VTMIS project is related to continuation of the plans for further development of VTMIS system in Montenegrin sea responsibility area. Aim of second phase is to install additional sensors (CCTV) in new sites (short range radars and AIS) and to achieve compatibility with systems like CISE, STM (Sea Traffic Management), SafeSeaNet, European Maritime Single Window environment and others.

2.3   Operational Drivers

"Operational drivers" refer to the reasons why, from the operational perspective, the User Community should come together and be collective and cooperate both at sea and land surveillance domains. These drivers stem from the ANDROMEDA project objectives as well as from the User Requirements presented in deliverable D2.2 and include: increase of available information sources, cost-effective operations, improved services, and advanced operational effectiveness. A set of Operational drivers in the context of the ANDROMEDA project is described in the following Table.

Table 10: Operational Drivers

Operational Drivers	
1	Access to new information sources, advanced services and improved capabilities, and real time information. Increase the validity and accuracy of available information and the quality of the extracted intelligence. Increase the operational effectiveness.
2	Defining of Maritime CISE Model Enhancements and extending it to support Land Border Operations.
3	Utilise resources towards the same goal, leading to cost efficient usage of existing resources. Achieve cost effective solutions, and reduce operational costs.
4	Provide novel services utilizing advanced algorithms to collect and properly process large amount of heterogeneous dataset for early warning, forensic purposes and illegal act prosecution. Improved data fusion and analytics services capabilities regarding the observation of elements in the environment, the comprehension of the current situation, and projection of future states.
5	Collection and analysis of the available information in time allowing the authorities to react properly to these threats and facilitate decision making.
6	Collection and exchange of maritime and land surveillance information between border and coast guard authorities to handle complex illegal actions taking place between land and sea.
7	The ANDROMEDA e-CISE Data and Service Model will enable the sharing of mission operations to partner organizations.
8	ANDROMEDA shall offer sharing of live selected mission data (general location, description, goals) with partner organizations.
9	ANDROMEDA C2s shall exchange requests of information.
10	The ANDROMEDA C2 will display information received from other ANDROMEDA C2s in a different visual manner for the operator to distinguish local or external created or received information.

Design Drivers refer to basic principles and goals followed in the design of the ANDROMEDA C2 systems. These principles have been specified by the User Community (authorities in charge of land or maritime border surveillance and coast guard functions) through the Questionnaire completion, the in-person discussions, and workshop organization conducted in the context of deliverable D2.2. Some basic Design drivers, derived from the ANDROMEDA objectives, and the User Requirements (mainly the General User Requirements and Operational Needs, and the Non-functional User requirements) presented in D2.2, are listed below.

Table 11: Design Drivers

	Design Drivers
1	The ANDROMEDA System design will incorporate Service Oriented Architecture (SOA) design principles by offering services which are modular and scalable. Design will be based on usability, operability, accessibility, and security principles.
2	ANDROMEDA System shall offer secure communications for data exchange defining the classification level of the information.
3	ANDROMEDA System architecture design shall be based on best practices (e.g. privacy-by-design and security-by-design) and open standards and shall be designed in such a way that its components can be upgraded, replaced, or easily extended with additional services.
4	The ANDROMEDA System design shall be based on the CISE data model classes, entities and attributes. The system architecture will be standardised and follow a modular approach along with a common data model (e-CISE).
5	ANDROMEDA System shall provide secure desktop-based applications enabling users to request and show information managed by the system. ANDROMEDA C2s as part of the ANDROMEDA System are accessible through various means (browsers, desktop apps, mobile terminals).
6	ANDROMEDA System shall provide means for the storage, archiving and backup of data and shall guarantee data integrity of any stored data.
7	ANDROMEDA Data distribution services shall guarantee the security, integrity and availability of exchanged data.
8	ANDROMEDA System shall provide role-based authentication system.
9	ANDROMEDA System shall provide means for protection of personal data (e.g. controlled access to personal data) according to EU GDPR and DPD data protection rules.

2.4   User Community Interactions

ANDROMEDA User Community is described in chapter 2.1 and it covers not only project partners, but also additional organisations, both users and providers of data and services, who has been invited into the project as external partners to support and advise project partners with their experience and expertise.

The user community interaction described in this chapter is divided into two categories, the potentiality of interactions ANDROMEDA could provide and the interaction validated in ANDROMEDA Trials. The main emphasis is on interactions during the Trials. The maritime trial scenarios are based on the use cases defined in CoopP (CoopP project. 2014. Final Report of Work Package 2: Use Cases and Information Services Identification) and EUCISE 2020 projects. The interactions are described in both organisational and system levels with respect to ANDROMEDA new potentiality. The organisational level interactions describe trial's objectives, actions each objective have and the potential authorities involved for each action. The system level describes the systems, services and new utilities that ANDROMEDA brings on the market. This initial deliverable D2.1 provides the foreseen actions and in a final version D2.5 the achieved results will be provided.

Table 12: User Communities and purposes

User Community	Monitoring and supporting purposes
Maritime Safety, Security and prevention of pollution	Vessel traffic management
	Vessel Traffic Safety
	Monitoring of security of ships
	Search and Rescue
	Support of response and enforcement operations (anti-piracy, SAR, salvage)
Fisheries Control	Early warning of illegal fisheries or fish landings

User Community	Monitoring and supporting purposes
	Monitoring of compliance with regulations on fisheries
	Support of response and enforcement operations
Marine pollution preparedness and response	Monitoring of compliance with regulations
	Early warning of environmental accidents and incidents
	Support of pollution response operations
Customs	Monitoring of compliance with customs regulation on import, export and movement of goods
	Support of enforcement operations
Border Control	Monitoring of compliance with regulations on immigration and border control crossings
	Support of enforcement operations
General Law Enforcement	Monitoring of compliance with applicable legislation in sea areas where police competence is required
	Support to enforcement and response operations
Defence	Monitoring in support of defence tasks such as national sovereignty at sea
	Combatting terrorism and other hostile activities outside the EU
	Other Common Security and Defence Policy (CSDP) tasks as defined in Articles 42 and 43 TEU

2.4.1   Interactions in Trial 1

The main objective of this trial is to improve the situational awareness of the Maritime Operational Centres allowing the exchange of information between them through the ANDROMEDA tools. The end users involved in this trial are Italian Navy and Portuguese Navy. The trials structure, preliminary activities and general geographical location are presented in Figure 1.
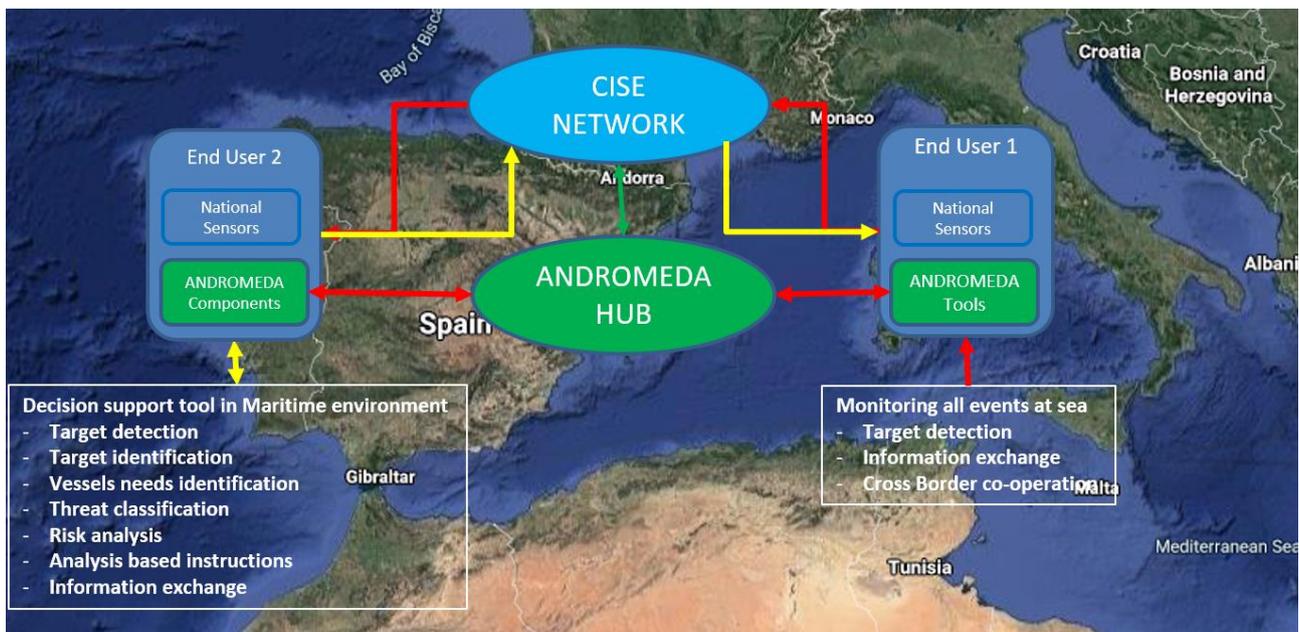

Figure 1:The Iberian Maritime Border Trial

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Data from legacy systems is incorporated into ANDROMEDA according to existing protocols (Radar, AIS, AVL etc.). Other sources, such as satellite images, can be incorporated through specific infrastructures.

The data fusion services allow this information to be processed by the merger data services which will be used by the Operations Centres to improve the Situational Awareness including the exchange of information between the Operational Centres. The Table 13 describes the authorities who could potentially be involved in these trial cases and to whom the ANDROMEDA components could provide new benefits and assist them in their daily routines.

Table 13: Potential Authorities interactions in Trial 1

Objective	Action	Potential Authority	Instrument
Monitoring all events at sea	Target detection	Defence, Fisheries control, Border Guard	Radars, AIS, SAT-AIS, ANDROMEDA: SMART, GEOC2, TRITON, SOCRATES DF
	Target identification	Defence, Border Guard	AIS, SAT-AIS, Visual, Cameras, Radio
	Illegal activities	Border Guard, Defence Fisheries control	Radars, AIS, Cameras, Visual, ANDROMEDA: TRITON, ESSG, DFE
	Suspicious Cargo	Border Guard, Customs, Defence	AIS, MSW, PortNet, VTMIS, ANDROMEDA: GEOC2
	Suspicious Routing	Border Guard, Defence Fisheries control	Radars, AIS, SAT-AIS, ANDROMEDA: SMART, GEOC2
	Dangerous areas	Border Guard, Defence	SMART
	Characterization of vessel needs	Border Guard, Harbour authorities	VTMIS, MSW
	Information exchange	Italian Navy, Portuguese Navy	ANDROMEDA: e-Cise Adaptor ANDROMEDA Hub CISE network other collaborative tools

The Iberian trial (Trial1) is focused on maritime domain and the Table 14 includes the information of ANDROMEDA systems interactions and new validated utility during the trial.

Table 14: System level interaction in Trial 1

System/Component	Service	Data	Interaction channel	New utility provided by ANDROMEDA
SMART	Vessel Management – Anomalies management	Vessels, Maritime Anomalies	web	Send and receive alarms to an external system, i.e. ANDROMEDA Hub
TRITON	Identify and analyse motion patterns of vessels and land objects	Vessels, vehicles and persons	Data Fusion Gateway	Form information that requires attention by using data, rules and information from several different sources.
SOCRATES DF	Track Fusion	Vessels, vehicles and persons	Data Fusion Gateway	Fuse the tracks from different sources and sensors in order to provide one unique visual track to the operator
GEOC2	Monitor vessel position: - Sensor adaptors and Sensing module (receiving data from Shipfinder); - Fusion and perception; - Entity catalog; - Incident management; Share vessel; Create, update, read, send and receive intelligence reports; Receive and read report; Receive and read request for information.	Vessel; Intelligence reports (IR); Report; Request for Information (RFI);	e-CISE Network Adapter; ANDREOMEDA Hub; e-CISE Shipfinder Converter.	Standardized data model; Transparent sharing vessel information with other C2s; Transparent exchange of messages and documents with other C2s (e.g. IRs, reports, RFIs).
Data Fusion Engine		LandAnomaly, MaritimeAnomaly,	Data Fusion Gateway	By combining real-time and historical data DFE produce meaningful warnings and recommendations from lower level information fusion services.

| System/Component	Service	Data	Interaction channel	New utility provided by ANDROMEDA
		Vessel, Land Vehicle, Mission		
ESSG	Rule based alerts	AIS, METEOC	Data Fusion Gateway	Form behaviour analysis from AIS and METEOC data

In this trial the interactions are mainly concentrated between Portuguese and Italian navies which is logical according the area of the trial, scenario, and the maritime CISE domain partners involved the trial. However, as the Table 12 shows, ANDROMEDA systems provide the platform for several authorities' cooperation and connection to CISE network expand the theoretical possibilities substantially.

2.4.2   Interaction in Trial 2

The main objective of these scenarios is to demonstrate to the end users interoperability through advanced CISE with the improvement of situational awareness using the ANDROMEDA services and providing the improved operational framework (COP) in parallel with the legacy automated surveillance system controlled by the local C2. On its own way the trial is unique and demonstrate in proper way one of the main interest of the ANDROMEDA by testing the enhanced CISE capabilities for Land Border activities. The trials structure, preliminary activities and general geographical location are presented in Figure 2.

Figure 2: The Greece-Bulgarian Land Border – Maritime Trial
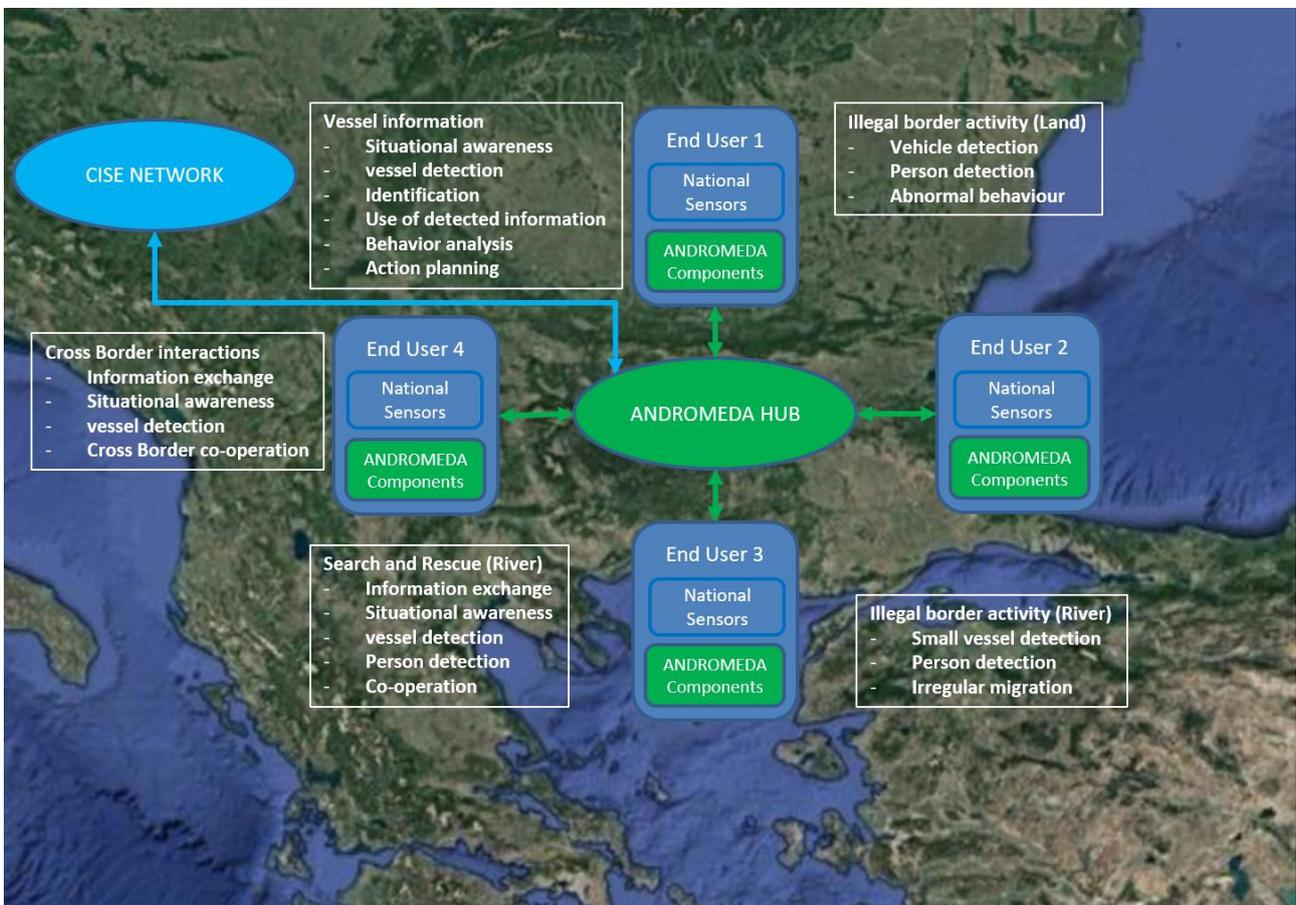
The context of this trial is illegal immigration from Turkey to Europe. Immigrants gather in the main Turkish cities (e.g. Istanbul and Edirne) and cross irregularly from Turkey to Europe, trying to avoid physical or other obstacles (e.g. fences). In many cases, the route of choice is one crossing the Evros river on the border between Greece and Turkey while the route is shorter but also often a treacherous one[4]. Along land and / or river borders, facilitators take over to illegally transfer them to Greece or Bulgaria or forward them near the border and then show them where and how to continue.

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[4] https://www.infomigrants.net/en/post/11678/migrant-route-from-turkey-more-popular-60-stopped-in-2018

The specific objectives of this trial are:

- the detection of possible patterns of anomalous behaviour of the vessels/vehicles used for trafficking in human beings;
- the anomaly of the movement / detection of objects that identify a group of people moving along the land borderline or objects left on the riverbank;
- best performing tools for timely detection of suspicious vessels/vehicles and identification of threats and support tool for search and rescue decisions:
- demonstration of an improved COP among the main actors in the area.

Detection of suspicious behaviour alarmed by specific ANDROMEDA services will be automatically injected into the ANDROMEDA C2. The respective End User will manage this information for task services such as mission preparation, tasking and automatic asset control, mission data management followed by a reporting cycle with local C2s. The purpose is to support common border control operations as well as land-based and maritime surveillance. The Table 15 describes the authorities who could potentially be involved in these trial cases and to whom the ANDROMEDA components could provide new benefits and assist them in their daily routines.

Table 15: Potential Authorities interactions in Trial 2.

Objective	Action	Authority	Instrument
Monitoring all events at sea	Target detection	Defence, Fisheries control, Border Guard	Radars, AIS, SAT-AIS, SATIMAGE, CISE network, ANDROMEDA: ENGAGE C2, GEOC2, GEOC2 Predictive Analytic,
	Target identification	Defence, Border Guard	AIS, SAT-AIS, Visual, Cameras, Radio, ANDROMEDA: ENGAGE C2, GEOC2
	Illegal activities	Border Guard, Defence Fisheries control	Radars, AIS, Cameras, Visual, CISE network, ANDROMEDA: GEOC2 Predictive Analytic
	Suspicious Cargo	Border Guard, Customs, Defence	AIS, MSW, PortNet, CISE network, ANDROMEDA network
	Suspicious Routing	Border Guard, Defence Fisheries control	Radars, AIS, SAT-AIS, ANDROMEDA: GEOC2 Predictive Analytic, GEOC2 Real Time Analytic
	Dangerous areas	Border Guard, Defence	ANDROMEDA: ENGAGE C2, GEOC2, GEOC2 Predictive Analytic, GEOC2 Real Time Analytic

Objective	Action	Authority	Instrument
	Characterization of vessel needs	Border Guard, Port authorities	MSW, PortNet
	Information exchange	All	ANDROMEDA: e-CISE Adaptor CISE network other collaborative tools
Monitoring all events at land/river border	Target detection	Defence, Border Guard, Customs	Radars, Cameras, Patrols, ANDROMEDA: ENGAGE C2, GEOC2, INUS,
	Target identification	Defence, Border Guard, Border Police	Patrols, Cameras, reports, CISE network, ANDROMEDA: INUS, SOCRATES DF
	Suspicious activities	Defence, Border Guard, Customs, Border Police, Law enforcement	Data monitoring, analysis of data algorithms, ANDROMEDA: GEOC2 Real Time Analytic
	Illegal Activities	Law enforcement, Border Guard, Customs	ANDROMEDA: GEOC2 Real Time Analytic
	Anomaly Detection	Defence, Border Guard, Customs, Border Police, Law enforcement	Data monitoring, analysis of data algorithms

The Greece - Bulgarian trial (Trial2) is focused on both Land and Maritime border security and the Table 16 includes the information of ANDROMEDA systems interactions and new validated utility during the trial.

Table 16: System level interactions in Trial 2

System	Service	Data	Interaction channel	New utility provided by ANDROMEDA
ENGAGE C2 (L&M)	Obtain and display: raw vessels, raw vehicles, raw persons, fused vehicles, aircraft (UAV), tracked persons, tracked vehicles, fused vehicles, fused persons, Pull request from other C2, Push, Publish and Subscribe information to and from another C2, Publish information to another C2,	All kind of C2 data	Data fusion Gateway, e-CISE adaptor, ANDROMEDA HUB	Use of the standardized e-CISE Data Model to exchange information among different C2s.
GEOC2 (L&M)	Monitor vessel position: - Sensor adaptors and Sensing module (receiving data from Shipfinder); - Fusion and perception; - Entity catalog; - Incident management; Share vessel; Create, update, read, send and receive intelligence reports;	Vessel; Intelligence reports (IR); Report; Request for Information (RFI);	e-CISE Network Adapter; ANDREOMEDA Hub; e-CISE Shipfinder Converter.	Standardized data model; Transparent sharing vessel information with other C2s; Transparent exchange of messages and documents with other C2s (e.g. IRs, reports, RFIs).

	Receive and read report; Receive and read request for information.			
GEOC2 Predictive Analytic	Route/Track Prediction	Vessels	Data Fusion Gateway	Correlate and forecast geospatial events and their recurrence, generating predictions for occurrence and location of events of interest
GEOC2 Real Time Analytic	Detection of abnormal vessel behaviour	Vessels	Data Fusion Gateway	Unsupervised predictions on potential abnormality of a given vessel track, based on past location history, kinetic performance and pre-trained heuristic detections
SOCRATES DF	Track Fusion	Vessels	Data Fusion Gateway	Fusion of received tracks used to analyse maritime traffic and taking decisions based on this analysis
TRITON	Identify and analyse motion patterns of vessels and land objects	Vessels, vehicles and persons	Data Fusion Gateway	Form information that requires attention by using data, rules and information from several different sources.
INUS Platform	Aerial and terrestrial Object detection/tracking & video streaming	Vehicles and persons	Data Fusion Gateway & C2	e-CISE data model, integration with land border command and control systems
OCEAN SAR	Drifting simulation request, simulation response	Trajectory of person, trajectory of objects	e-CISE Adaptor	e-CISE adaptor functionalities for trajectory information sharing

This trial indicates the ANDROMEDA value of user community interactions for cross border, cross sectorial Maritime & Land border control operations as well as land and maritime surveillance including the information sharing between partners. The planned scenario provides a fruitful platform for authorities interaction and the system level interaction highlight the CISE enhancement on Land Border operation which was one of the ANDROMEDA goals.

2.4.3   Interactions in Trial 3

The objectives of this trial are to demonstrate the advanced C2 system interoperability through the enhanced CISE and Situational Awareness through the advanced DF, Analytics and Decision Support Services.

The area of interest in this trial is the Ionian-Adriatic Sea, where human trafficking represents the second step irregular migration way to ship migrants from Turkey to EU by using many different kinds of vessels. The trials structure, preliminary activities and general geographical location are presented in Figure 3: The Ionian-

Adriatic Trial .

Figure 3: The Ionian-Adriatic Trial

The trials specific objectives are:

- the detection of possible abnormal behaviour patterns of vessels used for human trafficking, a common intervention in case of maritime accidents;
- a better performing tool for earlier detection of suspicious vessels and identification of threats even in high (summer) traffic density;
- the demonstration of an improved common situational picture between main actors in the area;
- a short reporting cycle between the C2 that detect the suspicious vessel and other C2s for continuously tracking the suspicious vessel and usage of Decision support tools such as oil spill, ship routing and search and rescue.

The trial will involve Civil and Military practitioners from different countries, thus resulting in a full cross border application. The Table 17 describes the authorities who could potentially be involved in these trial cases and to whom the ANDROMEDA components could provide new benefits and assist them in their daily routines.

Table 17: Potential Authorities interactions in Trial 3.

Objective	Action	Authority	Instrument
Monitoring all events at sea	Target detection	Defence, Fisheries control, Border Guard	Radars, AIS, SAT-AIS, ANDROMEDA: SMART, ENGAGE C2, SOCRATES C2
	Target identification	Defence, Border Guard	AIS, SAT-AIS, Visual, Cameras, Radio, MPA ANDROMEDA: ENGAGE C2, GEOC2
	Illegal activities	Border Guard, Defence, Fisheries control	Radars, AIS, Cameras, Visual, ANDROMEDA: GEOC2 Predictive Analytic
	Suspicious Cargo	Border Guard, Customs, Defence	AIS, MSW, PortNet, CISE network, ANDROMEDA network
	Suspicious Routing	Border Guard, Defence, Fisheries control	Radars, AIS, SAT-AIS, ANDROMEDA: GEOC2 Predictive Analytic, GEOC2 Real Time Analytic
	Abnormal behaviour	Border Guard, Defence	Radars, Satellites, AIS, ANDROMEDA: TRITON
	Dangerous areas	Border Guard, Defence	Radars, Satellites, AIS, ANDROMEDA: OCEAN SAR
	Characterization of vessel needs	Border Guard, Harbour authorities	MSW, PortNet, NCAGS means
	Information exchange		ANDROMEDA: e-CISE Adaptor, network CISE network other collaborative tools
	Detection and monitoring IUU listed vessels	Border Guard, Fisheries Control	AIS, Radars, Cameras, MPA, Naval Patrols

The Ionian - Adriatic trial (Trial 3) is focused on maritime domain and the Table 18 includes the information of ANDROMEDA systems interactions and new validated utility during the trial.

Table 18: System level interactions in Trial 3

System	Service	Data	Interaction channel	New utility provided by ANDROMEDA
SMART	Vessel Management – Anomalies management	Vessels, Maritime Anomalies	web	Send and receive alarms to an external system, i.e. ANDROMEDA Hub
ENGAGE	Obtain and display: raw vessels, raw vehicles, raw persons, fused vehicles, aircraft (UAV), tracked persons, tracked vehicles, fused vehicles, fused persons, Pull request from other C2, Push, Publish and Subscribe information to and from another C2, Publish information to another C2,	All kind of C2 data	Data fusion Gateway, e-CISE adaptor, ANDROMEDA HUB	Use of the standardized e-CISE Data Model to exchange information among different C2s.
SOCRATES C2	Surveillance, mission planning, tasking, reporting	Vessel data, vehicle data, person data, anomaly data	ANDROMEDA HUB, SOCRATES	The connection with Data Fusion Engine as well as to video camera component improves the situational awareness and decision making. The connection to ANDORMEDA Hub provides the interoperability through network with other C2's.
VTMIS	Vessel Traffic Management Information System in Montenegro	Vessel data	ANDROMEDA HUB	Integration of VTMIS in Montenegro with SOCRATES C2.
WITOIL	Oil spill request, Oil spill response	Oil spill simulation	e-CISE adaptor	e-CISE adaptor functionalities for oil spill information sharing.
VISIR	Ship Navigation request, Ship Navigation Response	Ship Navigation simulation	e-CISE adaptor	e-CISE adaptor functionalities for Ship Navigation information sharing.

2.5 Implications

The implications of ANDROMEDA User Communities interactions are specified from three perspectives; Command and Control, Economical and Co-operation perspective. In this deliverable D2.1 the main influence areas for each subject and the key words of indication to the dedicated influence subject are presented. The tables will be finalized in deliverable D2.5 after the ANDROMEDA Product has been finalised, tested according the trial scenarios, validated and the validation results are in our use. The Tables 19 – 21 present overall subjects regarding each area.

Table 19: Implications regarding the Command and Control

Influence	Indication
Situational awareness	Sensor fusion, threat calculation, information sharing, surveillance coverage, additional surveillance systems/components (e.g. INUS, VISIR, WITOIL)
Decision making	Situational awareness, decision supporting elements and components effect
Authorities cooperation	SAR operations, environmental disasters or threat
Interoperable C2 systems	Automatic information sharing, multiple sensors connectivity, areal coverage, information flow
Centralized network	Single ANDROMEDA Hub
Decentralized network	Information exchange between Hubs and through CISE network
Environmental disaster	Increased information of suspicious vessels , early warning, improved tasking to units, analysing components, data fusion
Search and Rescue	Improved C2 to C2 information exchange, mission planning, tasking, reporting
Crime prevent efficiency	Early warning of illegal refugees/ or immigration, mitigation of smuggling,

The development and use of joint systems between collaborating member states forms a cost effective operational environment compared to isolated development and point to point integration. For joint Border Control operations ANDROMEDA has the potential to increase the operational efficiency and reduce operational costs in cross border cross sector operations. The Table 20 describes ANDROMEDA User Community's influence to Economy.

Table 20: The implications regarding the Economy

Influence	Indication
Authorities cooperation	ANDROMEDA Hub, quickness,
Interoperable C2 systems	commercial procurement, savings in surveillance systems, SAR
Operators work payload	Automation, information sharing, data fusion
Joint procurement	Procurement costs,
Search and Rescue operation	Cost-effective use of resources, mitigation of casualties, environmental savings
Life cycle costs	Life cycle costs, maintenance costs, training, systems upgrade

The success in processes, interests and actions related to border surveillance are mainly based in cross border cross sector authorities cooperation. The enhancement of CISE to Land borders more over facilitate and increase the importance of User Community's cooperation in European level Border and Coast Guards. The Table 21 describes the ANDROMEDA components and systems influence to cooperation.

Table 21: Implications regarding the Co-Operation

Influence	Indication
Situational awareness	e-CISE data model, integration with land border command and control systems, GEOC2 Predictive and Real time Analytic functionalities, increased intelligence information
Search and Rescue operation	Improved C2 to C2 information exchange, mission planning, tasking, reporting, e-CISE adaptor functionalities for trajectory information sharing
Crime prevent efficiency	Early warning of illegal refugees/ or immigration, mitigation of smuggling, e-CISE data model, integration with land border command and control systems
Enhancement to Land border surveillance and security	e-CISE data model, integration with land border command and control systems, increased intelligence information
Environmental disasters prevention	e-CISE adaptor functionalities for oil spill information sharing (WITOIL)
Safety at Sea	e-CISE adaptor functionalities for Ship Navigation information sharing (VISIR), TRITON functionalities, increased intelligence information

3. Methodology

In this part of the deliverables (D.2.1 and D.2.5) report, the central methodological issues of ANDROMEDA research, development and innovation action activities are described: (1) introduction of the quality approach; (2) animated operation and quality assurance processes as data collection practices; (3) continuum of the research, development and innovation methods used; (4) triangulation as a basis for analysis in development; (5) research and development attributes; and (6) the setting of readiness level measures. In this report, the term 'research and development method' refers to procedures for collecting and analysing data, and the term 'analysis' addresses the processes of investigating and interpreting quantitative and qualitative data in order to gain a deeper understanding of and new knowledge for designs and realization of ANDROMEDA Project trials.

3.1 Approach to Quality

In ANDROMEDA, the approach to quality is addressed to the six aspects in terms of quality: (1) internal validity; (2) construct validity; (3) authenticity and transparency; (4) reliability, dependability and auditability; (5) a real sense of objectivity; and (6) the utilization of the trials and concepts. The description of the quality terms are comprised to the followed table.

Table 22: The Description of Quality Aspects in ANDROMEDA

Description of Quality Aspects in ANDROMEDA	
Internal validity	The term "internal validity" refers to newly created three trials, both parallel and alongside the analyses and methods, models and new processes; the objective is to ensure that the new concepts and models are logical, authentic and internally valid from the perspective of realization of information systems, security and service, as well as that trials are suitable to the operative domain and dissemination.
Construct validity	The term "construct validity" refers to the correct operational measures for the theme being developed; then, the view of construct validity is addressed to the extent that "what was to be measured was actually measured" or "it measured what you think it measures".
Authenticity	The terms "authenticity and transparency" refers to participators' thinking and new ideas which emerge, new models, new services and new information systems; in this, the realization process is seen as a continuum of proactive-strategy-process-result-impacts and its feedback, such as: development by success; learning by failure; and incremental development by feedback.
Reliability	The terms "reliability, dependability and auditability" refers to demonstrating that the operations of a trial, such as the data collection procedures and development interventions, can be repeated with the same results.
Objectivity	There is a real sense of "objectivity" when the quality-system-based data that are gained directly from the practice are not tainted or manipulated by the perspectives, biases, defences or experience of participators or other facilitators; therefore, the samples of evidence are gathered from concrete evidence and partially from the reality that came from the participators' anticipation-experimentation, which bring forth their experience based assumptions, views, thinking, beliefs, trust and spirit along with the collective reflection of the data.
Utilization	The terms "utilization of the trials and concepts", is the use of guidance models and an action logic of quality with implementation of operational development and globalization to everyday learning, development, and research activities in the domain,

Description of Quality Aspects in ANDROMEDA
which refers to the utility of new artifacts (trials and services), possible further adapted services and methodologies.

3.2   Operative Process and Data Collection

In ANDROMEDA, the discussion of a common operation process (data collection from operations) has been diverse and relatively challenging theme; however, the observe, orient, decide and act (OODA) loop has been commonly considered to be one of the most expressive operation process models in the ANDROMEDA context. The process cycle includes the (1) observe, (2) orient, (3) decide and (4) act phases. The OODA loop was developed by military strategist and United States Air Force Colonel John Boyd. Boyd applied the concept to the combat operations process, often at the operational level during military campaigns; regardless of its military origin, it is currently also applied to understand commercial operations and learning processes (cf. resilient learning theme in the discussion part). The approach examines how agility and resilience can overcome the raw power in dealing with human opponents as element comprised to followed table.

Table 23: The Description of OODA Process

Continuous OODA Process (cumulative data collection) in ANDROMEDA		
Observe	Unfolding circumstances.	Outside information to orient.
Orient	Cultural traditions; previous experience; new information; genetic heritage.	Analyses, synthesis and implicit guidance and control to action.
Decide	Discussions.	Forward to action.
Action	Produce feedback.	Unfolding interaction with environment.
Feedback for OODA		

The OODA loop has become an important concept in litigation, business, law enforcement and military strategy. According to Boyd, decision-making occurs in a recurring cycle of observe-orient-decide-act. An entity, whether an individual or an organization, that can process this cycle quickly, observing and reacting to unfolding events more rapidly than an opponent, can thereby 'get inside' the opponent's decision cycle and gain the advantage. Boyd developed the concept to explain how to direct one's energies to defeat an adversary and survive. Boyd emphasized that 'the loop' is actually a set of interacting loops that are to be kept in continuous operation during combat. He also indicated that the phase of the battle has an important bearing on the ideal allocation of one's energies. The O-O-D-A loop, which is described in the previous table, focuses on strategic military requirements; however, it has a strong resonance for the business and public sectors' operational continuity planning, and it can be compared with the plan-do-check-act (PDCA) cycle or the Shewhart cycle.

Boyd's OODA Loop diagram, as a proposal for a process model, focuses on decisions that are based on observations of the evolving situation and are tempered with implicit filtering of the problem being addressed. According to Boyd, the observations are the raw information on which decisions and actions are based. Here, the first O represents observed information that can be processed to orient towards decision-making, as Boyd described in 'Organic Design for Command and Control'. The second O is orientation, as the repository of our genetic heritage, cultural tradition and previous experiences can be seen as the most important part of the O-O-D-A loop since it shapes the way we observe, the way we decide and the way we act.

3.3   Applied Design Science Research Methodology

The DSRM (Design Science Research Methodology[5]) is applied in the ANDROMEDA project and it addresses the incremental alignment of the innovative services to the end-user needs and evaluates the implementations with respect to the needs. A key element driving in the ANDROMEDA User Community is the collaborative involvement not only to end-users but also of all stakeholders, bringing together expertise in data fusion technologies and maritime as well as land surveillance solutions, during and beyond the scope and lifetime of ANDROMEDA. In this case, the word "stakeholders" refers not only to project partners, but also to additional organizations, both end-users and providers of data and services not directly involved in the project that support and advise project partners with their experience and know-how throughout the project's duration. In ANDROMEDA, the DSRM is addressed to provide end-user-centred "co-creative space" for the design, development, improvement, integration, and validation responsibilities and to serve as a structured approach on which the harmonization and standardization proposals stemming from this project can be built. The ANDROMEDA DSRM process model includes interdisciplinary approaches and involves the use of stakeholders' knowledge for product-service design and development. The setting of the ANDROMEDA DSRM process (1-7) model is described in the following Figure 4.
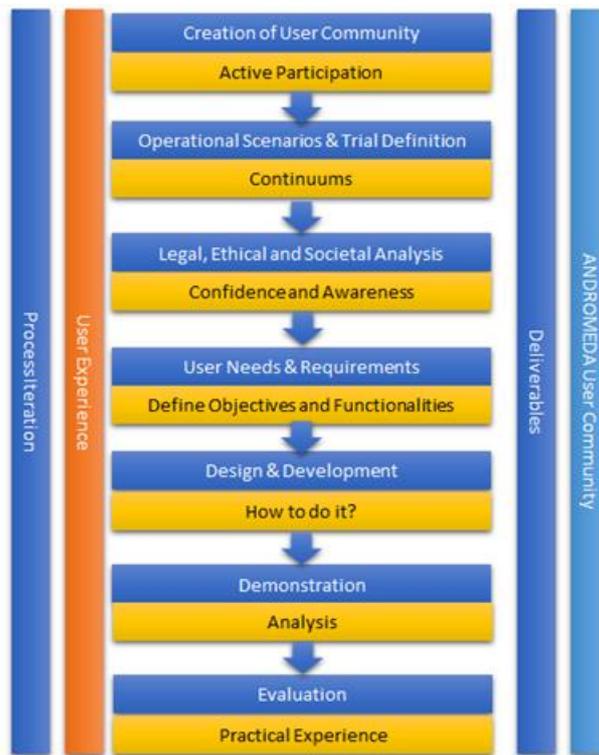

Figure 4: Revised Design Science Research Methodology (DSRM)

In this respect ANDROMEDA adapts a revised version of the improved DSRM, a user-oriented methodology for the design and development of Information Systems. The improved DSRM is adapted to fit ANDROMEDA purposes (see Figure 1) and will provide the means of continuous involvement of the user community driving the user needs and evaluations of implementations incrementally in 3 trials. Finally the user-centred approach will provide a first class opportunity to build the harmonization and standardisation proposals stemming from this project. The research doctrines of DSRM in ANDROMEDA are collected to the followed table.

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[5] https://www.springer.com/gp/book/9781441956521

Table 24: Revised DSRM in ANDROMEDA

Revised DSRM in ANDROMEDA	
Artifacts	The practical means for doing DSRM in ANDROMEDA is in the development of maritime and land surveillance services and products as produce a workable artifacts in the form of a construct, a model, a method, or an instantiation: it can be said that doing research for ANDROMEDA innovations. The expected outcome is that ANDROMEDA tools and services are purposeful.
Problems	The objective of ANDROMEDA DSRM is to develop technology-based solutions as tools in the three trials to important and relevant operational and business problems. ANDROMEDA outcomes are addressed to the specified maritime and land surveillance domain.
Design	Design includes the utility and efficiency of a design artifact which are rigorously demonstrated via verification, evaluation and validation methods. ANDROMEDA tools and services have the high readiness for integration of the artifact within the technical infrastructures of the maritime and land surveillance environments.
Contributions	ANDROMEDA Deliverables offers clear and verifiable contributions in the areas of the design artifact, design foundations and design methodologies. This is addressed to the novelty as solving problems in more effective and efficient manners in ANDROMEDA.
Rigorous	DSRM in ANDROMEDA relies upon the application of rigorous methods in the construction and evaluation-validation of the design artifacts as ANDROMEDA tools and services. This is addressed to adherence to appropriate data collection and analysis techniques such as triangulation.
Searching	The search for an effective artifact involves utilizing available means to reach desired ends while satisfying laws in the problem environment. This is addressed to discovering of an effective solution to problem with an appropriate ethical-legal consideration.
Ethic & Legal	Consolidation of analysis of the ethical-legal frameworks and societal implications; ethical issues in order to guarantee that all ethical and legal issues related to activities have been properly considered; providing guidance on legal, ethical and societal issues of solutions; and reporting of traditional research ethics and implementation of fundamental rights and the data protection aspects.
Communication	ANDROMEDA DSRM is presented effectively to technology-oriented, management-oriented and ethic-oriented audiences. ANDROMEDA project offers technology-oriented, management-oriented and ethical-legal oriented presentations and deliverables for reviews and audiences.

The practical means of DSRM are in doing research for the development of maritime and land surveillance services and viable products as doing research for co-creating of ANDROMEDA innovations. The ANDROMEDA DSRM process model is based on the triangulation of existing research data. It offers a model upon which the DSRM can be built, as well as the evaluation and representation of the results. The ANDROMEDA DSRM process contains seven phases that cover the parts of the system design-development-dissemination process in the ANDROMEDA project. Here, the traditional DSRM process model is improved: it more effectively takes end-users and stakeholders and ethical-legal consideration into account when planning new information systems or when the system is changed, even fundamentally. Additionally, it can include a ready-made system or service (adoption) into the process or the phase for which it is designed. In this setting, the basic thought behind the DSRM process is that, too often, only the designer knows the purpose for which the system is built; the difficulty with that is that the designer alone may know the processes and procedures, thus making the end-users unmotivated and their participation unnecessary.

Usability and confidence are vital parts of any information system; hence, the end-user and the user experience are considered when designing a system or information-intensive service. End-users and stakeholders are

involved throughout the entire design process, making them more committed and giving confidence to the deployment of the artifacts, tools and services. Design theories and DSRM can be used in the engineering, but they also need to offer services and solutions for the actual end-users, actors and authorities that build confidence and promote trust-building-sharing, as well as the supporting co-creativity aspects and consolidation of analysis of the ethical-legal frameworks and societal implications. The contribution of the ANDROMEDA and MARISA (first version) DSRM process model continuum is in line with those in the literature in that many systems and services fail because technical experts do not fully understand the complicated processes and the requirements of the end-users and actors. It was discussed in the ANDROMEDA User Community that even a poorly-designed system can function for a long time if it fulfils end-user and stakeholder needs. However, so far, the ANDROMEDA project remarked for the future that it is still possible to learn to contribute to the information systems and services design process. One difficulty involved with the methods may also be that these methods use only what has been used previously; they confer path-dependency of development and knowledge transfers as more or less a vintage or legacy. The challenges for ANDROMEDA were to create something new (anticipation-experimentation and ethical-legal aspects), to support co-creativity and to make (possibly outdated methods) and literature better for the next service development process.

3.4   Triangulation Fashion and Validation

The principle of data collection is to use several sources of evidence. Triangulation is a powerful technique that facilitates the validation of data by cross-checking from multiple sources. There are four types of triangulation when doing evaluations: data triangulation, investigator triangulation, theory triangulation and methodological triangulation. Data triangulation means collecting information from several sources aiming to confirm the same fact. Triangulation can test the consistency of observations obtained across different assets and increase the ability to manage and assess some threats or multiple causes that affect alerts or outcomes that require additional action. Following table introduces certain types of triangulation.

Table 25: Triangulation types.

Proposal for triangulation types		
1	Operational	Cross-over verification from more than two operations.
2	Organisational	Cross-over verification from more than two organisations.
3	Method	Cross-over verification from more than two methods (algorithms).
4	Service	Cross-over verification from more than two services.
5	Architecture	Cross-over verification from more than two architectures.
6	Data	Cross-over verification from multiple data sources.
7	Information	Towards information fusion.
8	Infrastructure	Critical infrastructure protection.
9	Resilience	Technical resilience: adaptive, dynamic and reconfigurable; functional resilience; resilience engineering (i.e. anticipation-experimentation-simulation).

3.5   User Community forming methodology in ANDROMEDA

The Grand Agreement obligates the project to compose the User Community from the consortium partners and extend the User Community with external partners. The Consortium partners form the body of ANDROEMDA User Community and the nature of the organisations gave a natural and logical formation for User Community roles of Industrial, Academic & RTO and End-User Community.

The External partners are partners who are not part of consortium but are ready to support and advise the project with their knowledge, expertise and experience from other projects. The User Community extension strategy is based on ANDROMEDA Trials objectives and goals. According to Trials objectives and as part of T2.1 work, the potential external partners were investigated from ongoing and recently closed EU funded projects and from other beneficial organisation from the EU countries and outside the EU. The main projects in the focus were ARESIBO, ARCSAR, CAMELOT, EUROSUR, EUCISE 2020, MARISA, MEDEA, ROBORDER, OCEAN2020 and TRESSPASS. By using the OODA method, the potential and beneficial external partners were chosen and invited to ANDROMEDA User Community using the Letter of Support. The process is continuous and new external partners will be searched through the project's duration.

Figure 5: The User Community forming methodology
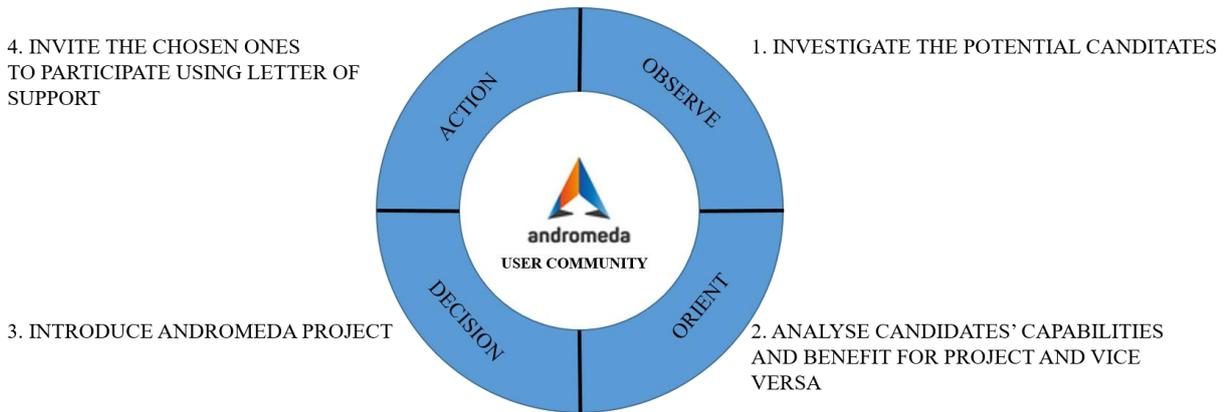
4. User Community Reflections and Recommendations

ANDROMEDA User Community has an open call for issues, opinions and recommendations in the form of the manuscript and publishing themes as part of the ANDROMEDA deliverable (D.2.1 and D.2.5). The User Community discussion document collection in ANDROMEDA addresses in the open category. It provides a forum for the communication of well-articulated position statements concerning emerging, paradoxical, or even controversial development and research issues for progress of current ANDROMEDA capability development and further artificial continuums. The Issues and Opinions submissions channel should open new areas of discourse in ANDROMEDA project, close stale areas, and offer fresh views and recommendations on development-research topics of importance in the project and its continuums. The topic should identify the issues in terms and forms that are "as easy as" possible to understand and provide appropriate conceptual frameworks for the issue to offer opinions and supportive arguments that describe the suggestions of these opinions to the ANDROMEDA capability-service development and research, practice, or teaching to be supported, where appropriate, by empirical evidence. The themes are open and in the end of the document, there are some examples of useful subjects discussed in ANDROMEDA interactions. ANDROMEDA represents an opportunity to set a tool to bring together land and maritime surveillance data, co-existing in a shared context.

4.1 Pattern of Life

The suitability of an effective Situational Awareness (SA) is essentially dependent on two factors:

- technological capability;
- knowledge of the maritime environment.

While the first factor is a function of the development of technological systems in order to meet specific requirements, the knowledge factor is collective to several and mutual aspects related to the (i.e. maritime) environment among which the concept of Patter Of Life (POL) is considered a pillar. POL can be defined as the set of usual or recurrent behaviours that, as such, can be foreseen in consideration of factors of various nature (political, economic, social, technological, environmental, legal, safety, security), influencing behaviours and activities in a given area (not necessarily/not only geographical). In this perspective, an approach to SA restricted to the operations or areas of operation is limiting to the extent that it does not take into account what happens outside of them. Hence the need to improve the knowledge and develop algorithms for the exploitation of a huge variety of sources/flows (real-time, near real-time and available in the "historical" archives/database. For example, those associated elements distinguishing and/or insisting on a single contact of interest and the events that interested him in the past or related to it). In synthesis, it is necessary to develop the POL knowledge that is activities that occur with cyclic repetitiveness and whose knowledge allows to predict, locate, recognize, identify and assess behaviours/anomalies relevant to the building of a reliable Recognized Picture and to the different levels of the decision making process.

The POL concept is applicable to different environments/sectors and therefore in ANDROMEDA to both maritime and land with a shared perspective.

4.2 Towards Resilience

As in ANDROMEDA project, it is almost frequently impossible to clearly define the work objectives and user requirements as "R&D-related learning scopes" in advance; instead, they are specified throughout the cyclic anticipation-experimentation-solution development process (elastic nature and needs of high-maturity skills levels). However, the R&D-related learning process requires critical thought strategies and expert skills to

justify solutions, resilient dimensions and the design of evidence evaluation. Here, R&D work consists of a multidisciplinary setting, a continuous solution-development process that focuses on research, cyclic anticipation-experimentation, artifact development and generating new competencies and action-related capabilities. The outcomes as described in deliverables may include, for example, a creation, an artifact, a new operating method, an improved methodology, a model, an action capability, a service or a product.

In ANDROMEDA project, the used term "resilience[6]" and "resilient learning" refers to the increased rate of interactions in community and external R&D&IA extended pipelines as more resilient-elastic targets for evidence of lessons learnt continuums and catalytic agents in IA processes, which share that knowledge and learning targets can be preserved as a service, methodology, product, activity, capability, demand of change, required adaption, performance, policy, or as educational, innovative or intellectual assets that can be exported for high-value and impact returns. This resonates with the collective utility-related higher education model such as "Humboldtian university model[7]": (1) the school as a centre of inquiry, (2) metaphors of learning, (3) situated learning and (4) interaction between learning and development.

4.3   Learning by Andromeda

The triple-quadruple helix[8] integration of R&D activities in the ANDROMEDA with outcomes such as high-value impacts is a complex and interaction-based process, not only within technology but merged with economic, legislative and social environments, where research, development and innovation action (R&D&IA) is also influenced by government policy and programmes, financial instruments, laws and regulations, and economic boundary conditions. In the ANDROMEDA project, an investigation of higher education functions and EU research systems addresses the collective contribution of: (1) knowledge, (2) competence, (3) capability, (4) operative performance, (5) action proficiency, (6) adaptive capability, (7) ethics and (8) resilience. Learning by Resilience and Development, research activities, and high-value impacts achieved by adaptive capability and resilience have become important not only for demonstration of applied solutions to enhance border and external security but also for regional-national development and security societies, due to the requirement for new competencies and for competent networking experts to meet and adapt to current and future challenges for novel ways of learning.

4.4   Potential of Andromeda

In paragraph 2.4 the interactions during the ANDROMEDA Trials have been described from both End-Users and system level. The interaction and implication are kind of introduction of this section, Potential of ANDROMEDA. In this deliverable 2.1 the approach for the potential of the ANDROMEDA is based on theoretical studies of ANDROMEDA technical and innovative solution. In the course of ANDROMEDA project the studies will be enlarged to the practical studies following the trials, using the trials results and outcome as one line of research. The first results of theoretical studies are presented in Table 26.

Table 26: The Potential of ANDROMEDA

Potential of ANDROMEDA	
CISE Enhancement to land borders	One of most relevant ambition of ANDROMEDA is to unlock the full capabilities of CISE Model by enhancing the Maritime CISE Model and extend it to the Land Border surveillance and information exchange. The enlargement to the land borders surveillance increase the effectiveness of authorities and end users

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[6] https://en.wikipedia.org/wiki/Resilience
[7] https://en.wikipedia.org/wiki/Humboldtian_model_of_higher_education
[8] https://en.wikipedia.org/wiki/Quadruple_and_quintuple_innovation_helix_framework

Potential of ANDROMEDA	
	situational awareness by providing the possibility to interconnect wide range of systems and services according the CISE principles. The ANDROMEDA new services and components increase the situational awareness, enable faster detection of new events, provides more informative decision making and increase the cross-sector cross-border understanding of the situation in border areas.
Improvement of the Safety at Sea	Safety at Sea is mandatory to all Seamen and authorities working in maritime domain. ANDROMEDA provides a wide range of components and solutions for improvement of Safety at Sea. The interoperability and connectivity to existing Legacy and C2 systems increase the situational awareness in Maritime domain. ANDROMEDA components such as TRITON Analytics Engine, GeoC2 Real Time and Predictive Analytics, Mission Planning, Analytics, SOCRATES Data Fusion Services, EXUS early warning engine and CMCC OCEAN-SAR support the operators decision making, ease the mission planning and tasking and helps to find the abnormal behaviour and increased risk for accidents at sea.
ANDROMEDA for EUROSUR	For EUROSUR, ANDROMEDA provides a potential platform for border areas surveillance, security and information sharing. The CISE enhancement to land border by updating the data model with new land border entities enable the system use in FRONTEX scenario. The flexibility for decentralised – centralised system and connectivity to extending legacy systems and different surveillance systems provides new dimension for FRONTEX authorities cooperation. For future understanding of the FRONTEX needs, a close collaboration with FRONTEX is mandatory.
Centralised, decentralised, hybrid operations	Even it is not an objective of ANDROMEDA project the ANDROMEDA solution could be used as centralised or decentralised versions. The centralised version means that areal cross border, cross sector authorities could form the end user community and use ANDROMEDA for their national or international daily routines and information sharing according the their common interests. When the partners has common interests and similar threat scenarios the consensus of access rights and shared information is easier to define. The areas of centralised use could be for example Baltic, Artic, Black Sea, North Sea, the English Channel. The decentralised and hybrid version follows more the CISE principles and could be implemented for example by having one or more connections to CISE network.
ANDROMEDA technical solutions for improvement of situational awareness	Anomaly detection, TRITON, INUS, GEOC2 Predictive and Real time Analytic functionalities, increased intelligence information
e-CISE data model	e-CISE data model, integration with land border command and control systems, increased intelligence information
e-CISE adaptor	e-CISE adaptor functionalities for oil spill information sharing (WITOIL)
	e-CISE adaptor functionalities for Ship Navigation information sharing (VISIR)

4.5   Remarks and Continuums

As the name of this deliverable express, the nature of this Initial report of User community is to give the first and draft description of ANDROMEDA User Community, User Community interactions, methodological issues of ANDROMEDA research, development and innovation action activities and User Community reflections and recommendations. While the Task 2.1 is scheduled to be active until the end of the project, more detailed, research results related information will be provided in the User Community Final Report on month 18. Throughout the project duration User Community activities will be carried out by using ANDROMEDA Forum, Workshops and Trials for supporting the project to achieve its ambition.

The Land Border Authorities are in a minor part of the User Community partners. Therefore the User Community enlargement activities should concentrate on potential and beneficial Land Border authorities who are willing to support the project for achieving its' ambition and utilize the ANDROMEDA results.

5. Conclusions

The ANDROMEDA User Community is formed according the partners' background, Industrial, Academic & RTO, End-User, EU agencies and EU funded project communities. The original Consortium consists of 19 partners from 9 countries and included partners from industrial, academic & RTO and End-User side. As a part of T2.1 work during the project's duration external partners are invited to provide their expertise and knowledge for the project to achieve its' ambition. The external partner community includes the same groups as the consortium. At the time this deliverable is published the User Community consists of 19 consortium partners and 22 external partners. The Land Border Authorities are in minority but as mentioned earlier the work is ongoing.

The ANDROMEDA wide experienced User Community provides an excellent foundation for enhancing the CISE Model to the Land Border information sharing. According the master plan of User Community activities the External partners could provide their input for the project in project's workshops and trials. Unfortunately, it is obvious that the events have to be organized virtually due the Covid 19 pandemic and this might have some effects on the participation and decrease the outcome of the events.

6.   Annex A: Reviews and Quality

The ANDROMEDA Consortium uses the Quality Review Report process for its internal quality assurance for deliverables to assure consistency and high standard for documented project results.

The Quality Review Report is used individually by selected peer reviewers. The allocated time for the review is 7 calendar days. The author of the document has the final responsibility to reply on the comments and suggestions of the peer reviewers and decide what changes are needed to the document and what actions are to be undertaken.

6.1   Reviewers

Project Coordinator	Athena Foka (MMAIP)
Management Support Team Member	Alkis Astyakopoulos (KEMEA)
Internal Peer Reviewer	Lazaros Karagiannidis (ICCS), Dimitris Katsaros (EXUS)

6.2   Overall Peer Review Result

The Deliverable is:

☐ Fully accepted

☒ Accepted with minor corrections, as suggested by the reviewers

☐ Rejected unless major corrections are applied, as suggested by the reviewers

6.3   Consolidated Comments of Quality Reviewers

General Comments	
Deliverable contents thoroughness	Reviewers comment: The deliverable is well described and provides a comprehensive analysis of the user community activities. Author's reply:
Innovation level	Reviewers comment: Not applicable Author's reply:
Correspondence to project and programme objectives	Reviewers comment: The deliverable address the main project and tasks objective. Author's reply:
Specific Comments	
Relevance with the objectives of the deliverable	☒ Yes ☐ No ☐ Partially ☐ Not applicable Reviewers comment: Author's reply:
Completeness of the document according to the its objectives	☒ Yes ☐ No ☐ Partially

	☐ Not applicable
	Reviewers comment:
	Author's reply:
Methodological framework soundness	☒ Yes
	☐ No
	☐ Partially
	☐ Not applicable
	Reviewers comment:
	Author's reply:
Quality of the results achieved	☒ Yes
	☐ No
	☐ Partially
	☐ Not applicable
	Reviewers comment:
	Author's reply:
Structure of the deliverable with clear objectives, methodology, implementation, results and conclusions	☒ Yes
	☐ No
	☐ Partially
	☐ Not applicable
	Reviewers comment:
	Author's reply:
Clarity and quality of presentation, language and format	☒ Yes
	☐ No
	☐ Partially
	☐ Not applicable
	Reviewers comment:
	Author's reply:
Detailed Comments (please add rows as appropriate)	
No.	**Reference**	**Remark**
1		
2		
3		
4		
5		

6.4   Letters of Support

ANDROMEDA project has sent 49 Letter of Support (LoS) and so far 18 organisations have accepted the invitation:

- Polish Naval Academy
- Marine Traffic
- European University Cyprus – CERIDES
- Nord University

- Székely Family & Company Ltd
- Home Office: Border Force Maritime Command (UKBF)
- University of Montenegro, Faculty of Maritime Studies in Kotor
- Montenegro Border Police
- "Aleksandër Moisiu" University of Durrës (UAMD), Albania
- University of the Aegean (Chios), Department of Shipping, Trade and Transport
- Joint Research Centre
- Bulgarian Defence Institute
- Bulgarian Border Police
- Bulgarian Navy
- Naval Group
- University of Montenegro Faculty of Electrical Engineering
- SMILE H2020 project
- Spanish Navy

ANDROMEDA's User Community - Letter of Support

ANNEX A

Letter of Support of Polish Naval Academy in Gdynia to H2020 ANDROMEDA
project (Grant Agreement number: 833881)

POLISH NAVAL ACADEMY
of the Heroes of Westerplatte

Dear Mrs. Athena Foka, Project Coordinator of ANDROMEDA,

I, Tomasz Szubrycht as Rector-Commandant of Polish Naval Academy, have been informed of the objectives of the H2020 ANDROMEDA project "An EnhaNceD Common InfoRmatiOn Sharing EnvironMent for BordEr CommanD, Control and CoordinAtion Systems", coordinated by the Hellenic Ministry of Maritime Affairs and Insular Policy (MMAIP), under the H2020 Call for proposals of Secure Societies, Topic SU-BES03-2018-2019-2020 - Demonstration of applied solutions to enhance border and external security.

The vision and the mission of the ANDROMEDA project is both timely and fundamental, being consistent with the agenda supported by Polish Naval Academy.

I hereby confirm that Polish Naval Academy is interested to participate in the ANDROMEDA's User Community and support the project towards the implementation of its activities.

Specifically, Polish Naval Academy will support ANDROMEDA by offering the following services based on Polish Naval Academy overall strategy:

☒ Provide experience in the definition of project's user requirements.

☒ Participate upon availability to project's trials, demonstrations, workshops and provide advices, recommendations.

☐ Leverage upon the knowledge and built-in skills to provide comments to the definition and implementation of possible governances (for the project) to allow efficient cooperation among all stakeholders.

☐ Provide comments on the definition and implementation of the roadmap for the different value chains / demonstrators, facilitating alignment between private and public priorities.

☒ Provide comments on the activities concerning maritime security, as well as education and training programmes aligned with national activities.

☒ Facilitate the dialogue with the different industrial sectors to discuss relevant challenges proposed to be addressed by the Polish Navy, the Polish Border Guard Maritime Branch and to facilitate potential innovation to strengthen the maritime security.

☒ Disseminate the project results and communicate the organisation of concertation meetings or events organised by the project.

☐ Other services

I wish you the best success with your project.
On behalf of the Polish Naval Academy
Sincerely,

REKTOR - KOMENDANT
AKADEMII MARYNARKI WOJENNEJ

kontradm. prof. dr hab. Tomasz SZUBRYCHT

Rear-Admiral Professor Tomasz Szubrycht, PhD, DSc
Rector-Commandant of the Polish Naval Academy in Gdynia

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MarineTraffic
Global Ship Tracking Intelligence

Letter of Support of MarineTraffic Operations S.A. to H2020 ANDROMEDA project
(Grant Agreement number: 833881)

Dear Mrs. Athena Foka, Project Coordinator of ANDROMEDA,

I, Dimitris Zissis as Head of Research at MarineTraffic Operations S.A., have been informed of the objectives of the H2020 ANDROMEDA project "An EnhaNceD Common InfoRmatiOn Sharing EnvironMent for BordEr CommanD, Control and CoordinAtion Systems", coordinated by the Hellenic Ministry of Maritime Affairs and Insular Policy (MMAIP), under the H2020 Call for proposals of Secure Societies, Topic SU-BES03-2018-2019-2020 - Demonstration of applied solutions to enhance border and external security.

The vision and the mission of the ANDROMEDA project is both timely and fundamental, being consistent with the agenda supported by MarineTraffic Operations S.A..

I hereby confirm that MarineTraffic Operations S.A. is interested to participate in the ANDROMEDA's User Community and support the project towards the implementation of its activities.

Specifically, MarineTraffic Operations S.A. will support ANDROMEDA by offering the following services based on MarineTraffic's overall strategy:

☐ Provide experience in the definition of project's user requirements

☐ Participate upon availability to project's trials, demonstrations, workshops and provide advices, recommendations.

☐ Leverage upon the knowledge and built-in skills to provide comments to the definition and implementation of possible governances (for the project) to allow efficient cooperation among all stakeholders.

☐ Provide comments on the definition and implementation of the roadmap for the different value chains / demonstrators, facilitating alignment between private and public priorities.

☐ Provide comments on the activities concerning the project, as well as education and training programmes aligned with national activities.

☐ Facilitate the dialogue with the different industrial sectors to discuss relevant challenges proposed to be addressed by the project.

Katechaki 75, Athens, Greece
T +30 210 3007571
F +30 210 3007574

www.marinetraffic.com

☐ Disseminate the project results and communicate the organisation of concertation meetings or events organised by the project.

☐ Other services, please name

I wish you the best success with your project.

On behalf of the MarineTraffic Operations S.A.

Sincerely,

Dimitris Zissis

ANNEX A

Letter of Support of European University Cyprus/Center Centre of Excellence for Risk and Decision Sciences (CERIDES)to H2020 ANDROMEDA project (Grant Agreement number: 833881)

Dear Mrs. Athena Foka, Project Coordinator of ANDROMEDA,

I, Georgios Kioumourtzis as Project Manager of EUC/CERIDES, have been informed of the objectives of the H2020 ANDROMEDA project "An EnhaNceD Common InfoRmatiOn Sharing EnvironMent for BordEr CommanD, Control and CoordinAtion Systems", coordinated by the Hellenic Ministry of Maritime Affairs and Insular Policy (MMAIP), under the H2020 Call for proposals of Secure Societies, Topic SU-BES03-2018-2019-2020 - Demonstration of applied solutions to enhance border and external security.

The vision and the mission of the ANDROMEDA project is both timely and fundamental, being consistent with the agenda supported by EUC/CERIDES.

I hereby confirm that EUC/CERIDES is interested to participate in the ANDROMEDA's User Community and support the project towards the implementation of its activities.

Specifically, EUC/CERIDES will support ANDROMEDA by offering the following services based on EUC/CERIDES overall strategy:

☒ Provide experience in the definition of project's user requirements

☒ Participate upon availability to project's trials, demonstrations, workshops and provide advices, recommendations.

☒ Leverage upon the knowledge and built-in skills to provide comments to the definition and implementation of possible governances (for the project) to allow efficient cooperation among all stakeholders.

☒ Provide comments on the definition and implementation of the roadmap for the different value chains / demonstrators, facilitating alignment between private and public priorities.

☒ Provide comments on the activities concerning Decision support systems, as well as education and training programmes aligned with national activities.

☐ Facilitate the dialogue with the different industrial sectors to discuss relevant challenges proposed to be addressed by the ……….. and to facilitate potential innovation to strengthen the ………..

☒ Disseminate the project results and communicate the organisation of concertation meetings or events organised by the project.

☐ Other services, please name

I wish you the best success with your project.

On behalf of the EUC/CERIDES

Sincerely,

Dr. Georgios Kioumourtzis, EUC/CERIDES

ANNEX A

Letter of Support of [NORD UNIVERSITY BUSINESS SCHOOL] to H2020 ANDROMEDA project (Grant Agreement number: 833881)

Dear Mrs. Athena Foka, Project Coordinator of ANDROMEDA,

I, Erlend Bullvaag as Dean of The Nord university business school has been informed of the objectives of the H2020 ANDROMEDA project "An EnhaNceD Common InfoRmatiOn Sharing EnvironMent for BordEr CommanD, Control and CoordinAtion Systems", coordinated by the Hellenic Ministry of Maritime Affairs and Insular Policy (MMAIP), under the H2020 Call for proposals of Secure Societies, Topic SU-BES03-2018-2019-2020 - Demonstration of applied solutions to enhance border and external security.

The vision and the mission of the ANDROMEDA project is both timely and fundamental, being consistent with the agenda supported by Nord university.

I hereby confirm that Nord University Business School is interested to participate in the ANDROMEDA's User Community and support the project towards the implementation of its activities.

Specifically, Nord university will support ANDROMEDA by offering the following services based on Nord university overall strategy:

☒ Provide experience in the definition of project's user requirements

☒ Participate upon availability to project's trials, demonstrations, workshops and provide advices, recommendations.

☒ Leverage upon the knowledge and built-in skills to provide comments to the definition and implementation of possible governances (for the project) to allow efficient cooperation among all stakeholders.

☒ Provide comments on the definition and implementation of the roadmap for the different value chains / demonstrators, facilitating alignment between private and public priorities.

☒ Provide comments on the activities concerning operation, as well as education and training programmes aligned with national activities.

☐ Facilitate the dialogue with the different industrial sectors to discuss relevant challenges proposed to be addressed by the ……….. and to facilitate potential innovation to strengthen the ………..

☒ Disseminate the project results and communicate the organisation of concertation meetings or events organised by the project.

☐ Other services, please name

I wish you the best success with your project.

On behalf of the Nord university

Sincerely,

Erlend Bullvåg, Dean – Nord University Business School

ANDROMEDA's User Community - Letter of Support

ANNEX A

Letter of Support of **Székely Family & Company Ltd.** to H2020 ANDROMEDA project (Grant Agreement number: 833881)

Dear Mrs. Athena Foka, Project Coordinator of ANDROMEDA,

I, Orsolya Székely-Keresztesi as co-founder and CEO of Székely Family & Company Ltd., have been informed of the objectives of the H2020 ANDROMEDA project "An EnhaNceD Common InfoRmatiOn Sharing EnvironMent for BordEr CommanD, Control and CoordinAtion Systems", coordinated by the Hellenic Ministry of Maritime Affairs and Insular Policy (MMAIP), under the H2020 Call for proposals of Secure Societies, Topic SU-BES03-2018-2019-2020 - Demonstration of applied solutions to enhance border and external security.

The vision and the mission of the ANDROMEDA project is both timely and fundamental, being consistent with the agenda supported by Székely Family & Company Ltd.

I hereby confirm that Székely Family & Company Ltd. is interested to participate in the ANDROMEDA's User Community and support the project towards the implementation of its activities.

Specifically, Székely Family & Company Ltd. will support ANDROMEDA by offering the following services based on Székely Family & Company Ltd. overall strategy (see: https://szekely.family):

☒ **Provide experience in the definition of project's user requirements**

☐ Participate upon availability to project's trials, demonstrations, workshops and provide advices, recommendations.

☐ Leverage upon the knowledge and built-in skills to provide comments to the definition and implementation of possible governances (for the project) to allow efficient cooperation among all stakeholders.

☒ **Provide comments on the definition and implementation of the roadmap for the different value chains / demonstrators, facilitating alignment between private and public priorities.**

☒ **Provide comments on the activities concerning land border surveillance as well as education and training programmes aligned with national activities.**

☐ Facilitate the dialogue with the different industrial sectors to discuss relevant challenges proposed to be addressed by the ……….. and to facilitate potential innovation to strengthen the ………..

☒ **Disseminate the project results and communicate the organisation of concertation meetings or events organised by the project.**

☐ Other services, please name

I wish you the best success with your project.

On behalf of the Székely Family & Company Ltd.

Sincerely,

…………………………………….

Székely Family& Co. Kft.
1191 Budapest Fő u. 11. 7/20
Adószám: 27089808-2-43
info@szekely.family

Orsolya Székely-Keresztesi, co-founder
Székely Family and Company Kft.

ANNEX A

Letter of Support of Home Office: Border Force Maritime Command (UKBF), to H2020 ANDROMEDA project (Grant Agreement number: 833881)

Home Office:
Border Force Maritime Command (UKBF)

Address: 2 Marsham Street, London, United KIngdom
E-mail: public.enquiries@homeoffice.gov.uk
Tel: 020 7035 4848
Web: www.gov.uk/government/organisations/border-force

Dear Mrs. Athena Foka, Project Coordinator of ANDROMEDA,

I, Mr. Robert Meyer as representative of Home Office: Border Force Maritime Command (UKBF), have been informed of the objectives of the H2020 ANDROMEDA project"An EnhaNceD Common InfoRmatiOn Sharing EnvironMent for BordEr CommanD, Control and CoordinAtion Systems", coordinated by the Hellenic Ministry of Maritime Affairs and Insular Policy (MMAIP), under the H2020 Call for proposals of Secure Societies, Topic SU-BES03-2018-2019-2020 - Demonstration of applied solutions to enhance border and external security.

The vision and the mission of the ANDROMEDA project is both timely and fundamental, being consistent with the agenda supported by Home Office: Border Force Maritime Command (UKBF).

I hereby confirm that Home Office: Border Force Maritime Command (UKBF) is interested to participate in the ANDROMEDA's User Community and support the project towards the implementation of its activities.

Specifically Home Office: Border Force Maritime Command (UKBF) will support ANDROMEDA by offering the following services based on Home Office: Border Force Maritime Command (UKBF) overall strategy:

☐Provide experience in the definition of project's user requirements

☐ Participate upon availability to project's trials, demonstrations, workshops and provide advices, recommendations.

☐ Leverage upon the knowledge and built-in skills to provide comments to the definition and implementation of possible governances (for the project) to allow efficient cooperation among all stakeholders.

☐ Provide comments on the definition and implementation of the roadmap for the different value chains / demonstrators, facilitating alignment between private and public priorities.

☐ Provide comments on the activities concerning …….., as well as education and training programmes aligned with national activities.

☐ Facilitate the dialogue with the different industrial sectors to discuss relevant challenges proposed to be addressed by the ………..and to facilitate potential innovation to strengthen the ………..

ANDROMEDA's User Community - Letter of Support

☐ Disseminate the project results and communicate the organisation of concentration meetings or events organised by the project.

☐ Other services, please name

I wish you the best success with your project.

On behalf of the concertation

Sincerely,

R Meyer (by email)

Mr. Robert Meyer, representative of Home Office: Border Force Maritime Command (UKBF)

ANNEX A

Letter of Support of Faculty of Maritime Studies in Kotor, University of Montenegro to H2020 ANDROMEDA project (Grant Agreement number: 833881)

Faculty of Maritime Studies in Kotor
University of Montenegro
Adress: Dobrota 36, 85330 Kotor
E-mail: pfkotor@ac.me
Web: http://www.pfkotor.ucg.ac.me/en

Dear Mrs. Athena Foka, Project Coordinator of ANDROMEDA,

I, Assoc. prof. Špiro Ivošević as Dean of Faculty of Maritime Studies in Kotor, University of Montenegro, have been informed of the objectives of the H2020 ANDROMEDA project "An EnhaNceD Common InfoRmatiOn Sharing EnvironMent for BordEr CommanD, Control and CoordinAtion Systems", coordinated by the Hellenic Ministry of Maritime Affairs and Insular Policy (MMAIP), under the H2020 Call for proposals of Secure Societies, Topic SU-BES03-2018-2019-2020 - Demonstration of applied solutions to enhance border and external security.

The vision and the mission of the ANDROMEDA project is both timely and fundamental, being consistent with the agenda supported by Faculty of Maritime Studies in Kotor, University of Montenegro.

I hereby confirm that Faculty of Maritime Studies in Kotor, University of Montenegro is interested to participate in the ANDROMEDA's User Community and support the project towards the implementation of its activities.

Specifically, Faculty of Maritime Studies in Kotor, University of Montenegro will support ANDROMEDA by offering the following services based on Faculty of Maritime Studies in Kotor, University of Montenegro overall strategy:

X Provide experience in the definition of project's user requirements

X Participate upon availability to project's trials, demonstrations, workshops and provide advices, recommendations.

X Leverage upon the knowledge and built-in skills to provide comments to the definition and implementation of possible governances (for the project) to allow efficient cooperation among all stakeholders.

X Provide comments on the definition and implementation of the roadmap for the different value chains / demonstrators, facilitating alignment between private and public priorities.

X Provide comments on the activities concerning internationalization, as well as education and training programmes aligned with national activities.

X Facilitate the dialogue with the different industrial sectors to discuss relevant challenges proposed to be addressed by the education and training and to facilitate potential innovation to strengthen the research in maritime sector.

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andromeda   ANDROMEDA's User Community - Letter of Support

x Disseminate the project results and communicate the organisation of concentration meetings or events organised by the project.

☐ Other services, please name

I wish you the best success with your project.

On behalf of the concertation

Sincerely,

[Signature],   [Stamp]

Assoc. Prof. Špiro Ivošević, Dean of Faculty of Maritime Studies in Kotor, University of Montenegro

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ANNEX A

Letter of Support of Montenegro Border Police to H2020 ANDROMEDA project

(Grant Agreement number: 833881)

Montenegro Police Directorate
Border Police Sector
National Coordination Center – NCC Podgorica
Address: Sv. Petra Cetinjskog 22
Tel: 020 262 931
Fax: 020 248 236
Email: ncc.podgorica@up.gov.me
Web:http://www.mup.gov.me/upravapolicije/naslovna/Sektori/Sektor_granicne_policije/

Dear Mrs. Athena Foka, Project Coordinator of ANDROMEDA,

I, Mr. Zoran Lasica, as a Head of National Coordination Center of Montenegro Border Police, have been informed of the objectives of the H2020 ANDROMEDA project "An Enhanced Common Information Sharing Environment for Border Command, Control and Coordination Systems", coordinated by the Hellenic Ministry of Maritime Affairs and Insular Policy (MMAIP), under the H2020 Call for proposals of Secure Societies, Topic SU-BES03-2018-2019-2020 - Demonstration of applied solutions to enhance border and external security.

The vision and the mission of the ANDROMEDA project is both timely and fundamental, being consistent to the Montenegro Border Police as main stakeholder and authorized for Montenegro Border Security System.

I hereby confirm with this letter that Montenegro Border Police is interested to participate in the ANDROMEDA's User Community and support the project towards the implementation of its activities.

In particular, Montenegro Border Police will support ANDROMEDA by offering support and capacity the following services based on Montenegro Border Police overall strategy:

- ✓ Provide experience in the definition of project's user requirements;
- ✓ Participate upon availability to project's trials, demonstrations, workshops, provide advices and recommendations;
- ✓ Strengthening the knowledge and built-in skills to provide comments to the definition and implementation of possible guides from the (for the project) to allow efficient cooperation among all stakeholders;
- ✓ Strengthening the knowledge and skills to comment on the definition and implementation of possible guidelines (regarding the project from the point of view and role of the border police) in order to facilitate effective cooperation of all stakeholders;

✓ Provide comments on the definition and implementation of the roadmap for the different value chains / demonstrators, facilitating alignment between private and public priorities;

✓ Provide comments on the activities concerning border control task and duties, as well as education and training programmes aligned with national activities;

✓ Facilitate the dialogue with the different industrial sectors to discuss relevant challenges proposed in order to improve fight against organized crime on Adriatic Sea, especially on the field of new modus operando;

✓ Disseminate the project results and plan the organisation of the specific meetings or events organised by the project;

✓ Sharing knowledge and operational experience from our successfully finished operational two-phase action "STOLEN BOAT" through which we have found more than 50 stolen vessels and outboard engines.

As you know, unfortunately we did not participate in the project from the beginning and could not plan it through our budget, so we want to mention that we are not able to cover the cost of our participation in your project.

I wish you the best success with your project.

On behalf of the Montenegro Border Police

Sincerely,

Zoran Lasica,
Head of National Coordination Center
Montenegro Border Police

ANNEX A

Letter of Support of Faculty of Professional Studies, "Aleksandër Moisiu" University of Durrës (UAMD), Albania to H2020 ANDROMEDA project (Grant Agreement number: 833881)

R E P U B L i K A E S H Q i P Ë R i S Ë

UNIVERSITETI "ALEKSANDËR MOISIU" DURRËS
FAKULTETI IN STUDIMEVE PROFESIONALE

Adress: L.1, Rruga e Currilave, Durrës, Albania

E-mail: info@uamd.edu.al

Web: www.uamd.edu.al/index.php/en/

Dear Mrs. Athena Foka, Project Coordinator of ANDROMEDA,

I, Prof. As. Dr. Osman Metalla as Dean and lecturer at **Faculty of Professional Studies, Aleksandër Moisiu University of Durrës (UAMD),** have been informed of the objectives of the H2020 ANDROMEDA project" An Enhanced Common Information Sharing Environment for Border Command, Control and Coordination Systems", coordinated by the Hellenic Ministry of Maritime Affairs and Insular Policy (MMAIP), under the H2020 Call for proposals of Secure Societies, Topic SU-BES03-2018-2019-2020 - Demonstration of applied solutions to enhance border and external security.

The vision and the mission of the ANDROMEDA project is both timely and fundamental, being consistent with the agenda supported by **Faculty of Professional Studies, Aleksandër Moisiu University of Durrës (UAMD).**

I hereby confirm that **Faculty of Professional Studies, Aleksandër Moisiu University of Durrës (UAMD)** is interested to participate in the ANDROMEDA's User Community and support the project towards the implementation of its activities.

Specifically, **Faculty of Professional Studies, Aleksandër Moisiu University of Durrës (UAMD)** will support ANDROMEDA by offering the following services based on **Faculty of Professional Studies, Aleksandër Moisiu University of Durrës (UAMD)** overall strategy:

☐Provide experience in the definition of project's user requirements

ANDROMEDA's User Community - Letter of Support

☐ Participate upon availability to project's trials, demonstrations, workshops and provide advices, recommendations.

☐ Leverage upon the knowledge and built-in skills to provide comments to the definition and implementation of possible governances (for the project) to allow efficient cooperation among all stakeholders.

☐ Provide comments on the definition and implementation of the roadmap for the different value chains / demonstrators, facilitating alignment between private and public priorities.

☐ Provide comments on the activities concerning project, as well as education and training programmes aligned with national activities.

☐ Facilitate the dialogue with the different industrial sectors to discuss relevant challenges proposed to be addressed by the project and to facilitate potential innovation to strengthen the capacities.

☐ Disseminate the project results and communicate the organisation of concentration meetings or events organised by the project.

☐ Other services, please name

I wish you the best success with your project.

On behalf of the faculty

Sincerely,

Associated Prof. Dr. Osman Metalla

Dean of the Faculty of Professional Studies

ANNEX A

Letter of Support of Department of Shipping, Trade and Transport, University of the Aegean (Chios) to H2020 ANDROMEDA project (Grant Agreement number: 833881)

University of the Aegean
School of Business
Department of Shipping Trade and Transport

Department of Shipping, Trade and Transport
University of the Aegean
Adress: Korais St. 2A, 82132 Chios, Greece
E-mail: TNEY_Akad_Gram@chios.aegean.gr
Web: www.stt.aegean.gr/

Dear Mrs. Athena Foka, Project Coordinator of ANDROMEDA,

I, Prof. Dr. Nikitas Nikitakos as Professor of Ship Technology at Department of Shipping, Trade and Transport, University of the Aegean (Chios), have been informed of the objectives of the H2020 ANDROMEDA project"An EnhaNceD Common InfoRmatiOn Sharing EnvironMent for BordEr CommanD, Control and CoordinAtion Systems", coordinated by the Hellenic Ministry of Maritime Affairs and Insular Policy (MMAIP), under the H2020 Call for proposals of Secure Societies, Topic SU-BES03-2018-2019-2020 - Demonstration of applied solutions to enhance border and external security.

The vision and the mission of the ANDROMEDA project is both timely and fundamental, being consistent with the agenda supported by Department of Shipping, Trade and Transport, University of the Aegean (Chios).

I hereby confirm that Department of Shipping, Trade and Transport, University of the Aegean (Chios) is interested to participate in the ANDROMEDA's User Community and support the project towards the implementation of its activities.

Specifically, Department of Shipping, Trade and Transport, University of the Aegean (Chios) will support ANDROMEDA by offering the following services based on Department of Shipping, Trade and Transport, University of the Aegean (Chios) overall strategy:

☐Provide experience in the definition of project's user requirements

☐ Participate upon availability to project's trials, demonstrations, workshops and provide advices, recommendations.

☐ Leverage upon the knowledge and built-in skills to provide comments to the definition and implementation of possible governances (for the project) to allow efficient cooperation among all stakeholders.

☐ Provide comments on the definition and implementation of the roadmap for the different value chains / demonstrators, facilitating alignment between private and public priorities.

☐ Provide comments on the activities concerning …….., as well as education and training programmes aligned with national activities.

☐ Facilitate the dialogue with the different industrial sectors to discuss relevant challenges proposed to be addressed by the ………..and to facilitate potential innovation to strengthen the ……….

☐ Disseminate the project results and communicate the organisation of concentration meetings or events organised by the project.

☐ Other services, please name

I wish you the best success with your project.

On behalf of the concertation

Sincerely,

[Signature], [Stamp]

Prof. Dr. Nikitas Nikitakos, Professor of Ship Technology at Department of Shipping, Trade and Transport, University of the Aegean (Chios)

EUROPEAN COMMISSION
JOINT RESEARCH CENTRE
Space, Security and Migration

The Director

Ispra,

Ms. Athena Foka
Head of Service
Special Service of European Union Structural Funds
for the Ministry of Maritime Affairs & Insular Policy
Akti Vasileiadi E1-E2, Piraeus, P.C. 18510
Greece
e-mail: afoka@mou.gr

Subject: Reply to your invitation for joining the ANDROMEDA Advisory Board

Dear Ms. Foka,

With reference to your email from 17 February 2020, I would like to thank you for the invitation for JRC to join the Advisory Board of the ANDROMEDA H2020 project[1] to advice on strategic directions of the project in terms of technical goals and impact, standardisation, ethical and societal issues, etc.

JRC being the European Commission's in-house science and knowledge service has a long-time expertise on the Common Information Sharing Environment (CISE) and we would like to confirm our interest in the work carried out by the ANDROMEDA project, especially the use of the interoperability standards from the Common Information Sharing Environment (CISE) programme to enhance border control systems.

I therefore propose Mr. David Berger, Transport and Border Security Unit (JRC.E.5), to represent the JRC in your Advisory Board. In further discussions, he will act as the JRC-Directorate E contact:

David BERGER
European Commission
Joint Research Centre – Space, Security and Migration
Transport and Border Security – E.05
TP 268
E-mail address: david.berger@ec.europa.eu

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[1] An enhanced Common Information Sharing Environment for Border Command, Control and Coordination Systems", funded by the European Commission under the Grant Agreement No: 833881

This Letter of Support is not legally binding and does not create any financial obligations on the part of the European Commission.

Yours sincerely,

Dan CHIRONDOJAN

c.c.:   Dan   CHIRONDOJAN   (JRC.E),   Bartel   MEERSMAN   (JRC.E.5),   Franco
        OLIVERI (JRC.E.5), David BERGER (JRC.E.5)
Attachment: Signed confirmation form D. Berger

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Subject: Confirmation of interest to participate in the Advisory Board of the ANDROMEDA project

Date: 18/02/2020

To the ANDROMEDA Consortium,

I am happy to accept your invitation to join the ANDROMEDA Advisory Board and be mentioned in the project which is addressing **H2020 SU-BES03-2018 "Demonstration of applied solutions to enhance border and external security"**, Sub-topic: Open, started on 1st of September 2019 with a duration of 18 months.

I got an overview on the ANDROMEDA which aims to unlock the full capabilities of the CISE Model by enhancing the Maritime CISE Model and by extending its scope to the Land Surveillance Information Exchange. The project will address the "fragmentation" and close "gaps" providing a secure, effective common situational awareness and information exchange system integrated with CISE. Furthermore, based on the analysis of past and current initiatives in the sphere of Border Security, the project will aim to develop solutions leveraging on the results extracted from relevant projects formerly funded by the EU. Specifically, ANDROMEDA will introduce applied solutions to enhance border and external security by:

- Defining Maritime CISE Model Enhancements and contributing on the CISE 2020 roadmap in coherence with the European Maritime Security Strategy Action Plan
- Extending the scope of the CISE Model in order to support Land Border Operational Information Exchange
- Adapting State-of-the-art Command, Control and Coordination systems for full compatibility with the enhanced CISE Models
- Demonstrating advanced functions as well as Data Fusion, Analytics, Situational Awareness and Decision Support Services as parts of the C2 systems and the CISE advanced services
- Analyzing the legal, ethical and cultural barriers of CISE
- Validating in an adequate period of time and three trials the CISE Compliant C2s and associated services by several Civil and Military Maritime and Land Border Agencies

The project objectives are very consistent with my vision and agenda on future developments in this sector and I am deeply interested in fostering the Security Research in this era.

ANDROMEDA Partners:

No.	List of Participants	Short Name	Country
1 (Coordinator)	MINISTRY OF MARITIME AFFAIRS AND INSULAR POLICY	MMAIP	Greece
2	GMV AEROSPACE AND DEFENCE SA	GMV	Spain
3	SATWAYS - PROIONTA KAI YPIRESIES TILEMATIKIS DIKTYAKON KAI TILEPIKINONIAKON EFARMOGON ETAIRIA PERIORISMENIS EFTHINIS EPE	SATWAYS	Greece
4	INSTITUTE OF COMMUNICATION AND COMPUTER SYSTEMS	ICCS	Greece

No.	List of Participants	Short Name	Country
5	EXUS SOFTWARE LTD	EXUS	United Kingdom
6	INOVAWORKS II, COMMAND AND CONTROL,SA	INOVAWORKS C&C	Portugal
7	FONDAZIONE CENTRO EUROMEDITERRANEOSUI CAMBIAMENTI	FONDAZIONE CMCC	Italy
8	LAUREA-AMMATTIKORKEAKOULU OY	LAUREA	Finland
9	CODIN - SOCIETA PER AZIONI	CODIN	Italy
10	STEMO OOD	STEMO	Bulgaria
11	KENTRO MELETON ASFALEIAS	KEMEA	Greece
12	ENGINEERING - INGEGNERIA INFORMATICA SPA	ENGINEERING	Italy
13	HELLENIC POLICE	HELLENIC POLICE	Greece
14	MINISTERO DELLA DIFESA	MARINA MILITARE	Italy
15	MINISTERIO DA DEFESA NACIONAL	Defesa	Portugal
16	MINISTRY OF PUBLIC SECURITY	MOPS-INP	Israel
17	EXECUTIVE AGENCY MARITIME ADMINISTRATION	EAMA	Bulgaria
18	MINISTRY OF NATIONAL DEFENCE, GREECE	HMOD	Greece
19	MINISTARSTVO SAOBRACAJA I POMORSTVA	MSD	Montenegro

Your project clearly has the potential to play a vital role in this development and I would like to support it as good as possible.

I agree to my name being mentioned in the ANDROMEDA as regards the participation to the ANDROMEDA Advisory Board and confirm that I am interested in:

- Attending ANDROMEDA Advisory Board meetings that will be held **at six monthly basis** and in which the ANDROMEDA partners will present their R&D plans and achieved results: specifications, studies, technical developments, recommendations, etc.
- Providing my feedback and advice on these presentations and eventually associated accompanying documentations supplied by the consortium.

I understand that my time spent on these activities will not be charged on the project.

As member of the Advisory Board, I am bound not to discuss / disclose any related information about the project (strategic, commercial, technical, financial etc.) that is not rated as public.

Best regards

Name, surname, title

Mr. David BERGER

Signature

МИНИСТЕРСТВО НА ОТБРАНАТА
ИНСТИТУТ ПО ОТБРАНА „ПРОФЕСОР ЦВЕТАН ЛАЗАРОВ"
София 1592, бул. „Професор Цветан Лазаров" № 2, факс 02/92 21808, http://di.mod.bg

Рег. № 3- 940 / 29.04.2020 г.
Екз. единствен

ANNEX A

Letter of Support **of Bulgarian Defence Institute (BDI)** to H2020 ANDROMEDA project (Grant Agreement number: 833881)

Dear Mrs. Athena Foka, Project Coordinator of ANDROMEDA,

I, Col. Dr. Dimitar Kirkov as Director of Bulgarian Defence Institute (BDI), have been informed of the objectives of the H2020 ANDROMEDA project "An EnhaNceD Common InfoRmatiOn Sharing EnvironMent for BordEr CommanD, Control and CoordinAtion Systems", coordinated by the Hellenic Ministry of Maritime Affairs and Insular Policy (MMAIP), under the H2020 Call for proposals of Secure Societies, Topic SU-BES03-2018-2019-2020 - Demonstration of applied solutions to enhance border and external security.

The vision and the mission of the ANDROMEDA project is both timely and fundamental, being consistent with the agenda supported by BDI.

I hereby confirm that BDI is interested to participate in the ANDROMEDA's User Community and support the project towards the implementation of its activities.

Specifically, BDI will support ANDROMEDA by offering the following services based on BDI's overall strategy:

☐ Provide experience in the definition of project's user requirements

☐ Participate upon availability to project's trials, demonstrations, workshops and provide advices, recommendations.

☐ Leverage upon the knowledge and built-in skills to provide comments to the definition and implementation of possible governances (for the project) to allow efficient cooperation among all stakeholders.

☐ Provide comments on the definition and implementation of the roadmap for the different value chains / demonstrators, facilitating alignment between private and public priorities.

☐ Provide comments on the activities concerning requirements, testing, and evaluation as well as education and training programmes aligned with national activities.

☐ Disseminate the project results and communicate the organisation of concertation meetings or events organised by the project.

☐ Other services, please name

I wish you the best success with your project.

On behalf of the Bulgarian Defence Institute

Sincerely,

Col. Dr. Dimitar Kirkov

29 Apr 2020

ANDROMEDA's User Community - Letter of Support

ANNEX A

Letter of Support of Chief Directorate Border Police-MoI, Bulgaria to H2020 ANDROMEDA project (Grant Agreement number: 833881)

(CDBP)

Dear Mrs. Athena Foka, Project Coordinator of ANDROMEDA,

I, Chief Commissioner Svetlan Kichikov as Director of CDBP-MoI, have been informed of the objectives of the H2020 ANDROMEDA project "An EnhaNceD Common InfoRmatiOn Sharing EnvironMent for BordEr CommanD, Control and CoordinAtion Systems", coordinated by the Hellenic Ministry of Maritime Affairs and Insular Policy (MMAIP), under the H2020 Call for proposals of Secure Societies, Topic SU-BES03-2018-2019-2020 - Demonstration of applied solutions to enhance border and external security.

The vision and the mission of the ANDROMEDA project is both timely and fundamental, being consistent with the agenda supported by CDBP.

I hereby confirm that CDBP is interested to participate in the ANDROMEDA's User Community and support the project towards the implementation of its activities.

Specifically, CDBP will support ANDROMEDA by offering the following services based on CDBP's overall strategy:

☒ Provide experience in the definition of project's user requirements

☒ Participate upon availability to project's trials, demonstrations, workshops and provide advices, recommendations.

☐ Leverage upon the knowledge and built-in skills to provide comments to the definition and implementation of possible governances (for the project) to allow efficient cooperation among all stakeholders.

☐ Provide comments on the definition and implementation of the roadmap for the different value chains / demonstrators, facilitating alignment between private and public priorities.

☐ Provide comments on the activities concerning …….., as well as education and training programmes aligned with national activities.

☐ Facilitate the dialogue with the different industrial sectors to discuss relevant challenges proposed to be addressed by the ……….. and to facilitate potential innovation to strengthen the ………..

☐ Disseminate the project results and communicate the organisation of concertation meetings or events organised by the project.

☐ Other services, please name

I wish you the best success with your project.

On behalf of the CDBP-MoI

Sincerely,

……………………………………………

Svetlan Kichikov, Chief Commissioner, CDBP

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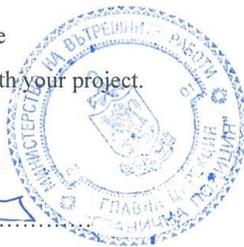
ВОЕННОМОРСКИ СИЛИ
КОМАНДВАНЕ НА ВОЕННОМОРСКИТЕ СИЛИ
Варна 9000, ул. "Преслав" 16, тел: 552-622, 552-635; факс: 603-259

Рег. №_786/_29_._04_.2020 г.
Екз. № ___

ДО ДИРЕКТОРА НА ИЗПЪЛНИТЕЛНА
АГЕНЦИЯ "МОРСКА АДМИНИСТРАЦИЯ"
к.д.п. ЖИВКО ПЕТРОВ

УВАЖАЕМИ ГОСПОДИН ДИРЕКТОР,

Във връзка с Ваше писмо с Изх. № 715/22.04.2020 г. относно „Покана за участие в общността на външните потребители на проект: *ANDROMEDA (An EnhaNceD Common InfoRmatiOn Sharing EnvironMent for BoardEr CommanD Control and CoordinAtion System)*, номер на проекта: 833881, по покана H2020-SU-SEC-2018" приемам предложението за присъединяване на Военноморските сили към Потребителската общност на проекта и заявявам готовност експерти от Военноморските сили да обменят опит и експертиза в областта на морската сигурност.

Приложено Ви изпращам попълнени Анекс А и Анекс В към Писмо за подкрепа (Letter of Support) на проект ANDROMEDA.

ПРИЛОЖЕНИЯ:
1. Приложение 1 – Анекс А от Писмо за подкрепа (Letter of Support) от 1 (един) лист, не съдържащ класифицирана информация, на английски език само за получателя.
2. Приложение 2 - Анекс В от Писмо за подкрепа (Letter of Support) от 1 (един) лист, не съдържащ класифицирана информация, на английски език само за получателя.

КОМАНДИР НА ВОЕННОМОРСКИТЕ СИЛИ

КОНТРААДМИРАЛ _29_._04_.2020 г. **КИРИЛ МИХАЙЛОВ**

ЗК ИА БМС
фл. адм. Георги Пенев
Заповед за заместване
№РД-01-1841 24.04.2020г.
от 27.04.2020 до 25.04.2020г.

1/1

ANNEX A

Letter of Support of Bulgarian Navy to H2020 ANDROMEDA project (Grant Agreement number: 833881)

BULGARIAN NAVY COMMAND

Dear Mrs. Athena Foka, Project Coordinator of ANDROMEDA,

I, REAR ADMIRAL KIRIL MIHAYLOV as COMMANDER of BULGARIAN NAVY, have been informed of the objectives of the H2020 ANDROMEDA project "An EnhaNceD Common InfoRmatiOn Sharing EnvironMent for BordEr CommanD, Control and CoordinAtion Systems", coordinated by the Hellenic Ministry of Maritime Affairs and Insular Policy (MMAIP), under the H2020 Call for proposals of Secure Societies, Topic SU-BES03-2018-2019-2020 - Demonstration of applied solutions to enhance border and external security.

The vision and the mission of the ANDROMEDA project is both timely and fundamental, being consistent with the agenda supported by Bulgarian Navy.

I hereby confirm that Bulgarian Navy is interested to participate in the ANDROMEDA's User Community and support the project towards the implementation of its activities.

Specifically, Bulgarian Navy will support ANDROMEDA by offering the following services based on Bulgarian Navy overall strategy:

☒ **Provide experience in the definition of project's user requirements.**

☒ **Participate upon availability to project's trials, demonstrations, workshops and provide advices, recommendations.**

☒ **Leverage upon the knowledge and built-in skills to provide comments to the definition and implementation of possible governances (for the project) to allow efficient cooperation among all stakeholders.**

☒ **Provide comments on the definition and implementation of the roadmap for the different value chains / demonstrators, facilitating alignment between private and public priorities.**

☒ **Provide comments on the activities concerning Maritime Situational awareness (MSA), as well as education and training programmes aligned with national activities.**

☐ Facilitate the dialogue with the different industrial sectors to discuss relevant challenges proposed to be addressed by the ……….. and to facilitate potential innovation to strengthen the ………..

☐ Disseminate the project results and communicate the organisation of concertation meetings or events organised by the project.

☐ Other services, please name

I wish you the best success with your project.

On behalf of the Bulgarian Navy

Sincerely,

KIRIL MIHAYLOV

REAR ADMIRAL BGN

COMMANDER OF BULGARIAN NAVY

Date 29.04.2020

Patrick MUGNIER
Direction Marketing / Lignes de Produits
Technopôle de la mer
199, Avenue Pierre-Gilles de Gennes
83190 OLLIOULES
France

To Mrs. Athena Foka
Project Coordinator of ANDROMEDA

Date: 12th May 2020

Object: Letter of Support of NAVAL Group to H2020 ANDROMEDA project (Grant Agreement number: 833881)

Dear Mrs. Athena Foka,

I, Patrick MUGNIER as Marketing Director of Product Line Maritime Surveillance Systems of NAVAL Group, have been informed of the objectives of the H2020 ANDROMEDA project "An EnhaNceD Common InfoRmatiOn Sharing EnvironMent for BordEr CommanD, Control and CoordinAtion Systems", coordinated by the Hellenic Ministry of Maritime Affairs and Insular Policy (MMAIP), under the H2020 Call for proposals of Secure Societies, Topic SU-BES03-2018-2019-2020 - Demonstration of applied solutions to enhance border and external security.

The vision and the mission of the ANDROMEDA project are both timely and fundamental, being consistent with the agenda supported by NAVAL Group.

I hereby confirm that NAVAL Group is interested to participate in the ANDROMEDA's User Community and support the project towards the implementation of its activities.

Specifically, NAVAL Group will support ANDROMEDA by offering the following services based on NAVAL Group overall strategy:
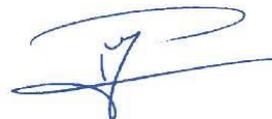
☐ Provide experience in the definition of project's user requirements

☑ Participate upon availability to project's trials, demonstrations, workshops and provide advices, recommendations.

☐ Leverage upon the knowledge and built-in skills to provide comments to the definition and implementation of possible governances (for the project) to allow efficient cooperation among all stakeholders.

☐ Provide comments on the definition and implementation of the roadmap for the different value chains / demonstrators, facilitating alignment between private and public priorities.

☐ Provide comments on the activities concerning ...., as well as education and training programmes aligned with national activities.

☐ Facilitate the dialogue with the different industrial sectors to discuss relevant challenges proposed to be addressed by the .... and to facilitate potential innovation to strengthen the ....

☑ Disseminate the project results and communicate the organisation of concertation meetings or events organised by the project.

☐ Other services, please name

I wish you the best success with your project.

On behalf of NAVAL Group

Sincerely,

Patrick MUGNIER
Marketing Director of Product Line
Maritime Surveillance Systems and Drones

Siège social : 40-42, rue du Docteur Finlay - 75015 Paris - Tél. : +33 (0)1 40 59 50 00 – www.naval-group.com
Naval Group - SA au capital de 563 000 000 euros - RCS Paris 441 133 808 - SIRET 441 133 808 00135 - APE 3011 Z

ANDROMEDA's User Community - Letter of Support

ANNEX A

Letter of Support of Faculty of Electrical Engineering, University of Montenegro to H2020 ANDROMEDA project (Grant Agreement number: 833881)
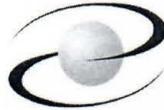
University of Montenegro
Faculty of Electrical Engineering

Adress: Džordža Vašingtona bb, 81000 Podgorica
E-mail: etf@ucg.ac.me
Web: https://www.ucg.ac.me/etf

Dear Mrs. Athena Foka, Project Coordinator of ANDROMEDA,

I, Prof. Saša Mujović, PhD, as a Dean of Faculty of Electrical Engineering, University of Montenegro, have been informed of the objectives of the H2020 ANDROMEDA project "An EnhaNceD Common InfoRmatiOn Sharing EnvironMent for BordEr CommanD, Control and CoordinAtion Systems", coordinated by the Hellenic Ministry of Maritime Affairs and Insular Policy (MMAIP), under the H2020 Call for proposals of Secure Societies, Topic SU-BES03-2018-2019-2020 - Demonstration of applied solutions to enhance border and external security.

The vision and the mission of the ANDROMEDA project is both timely and fundamental, being consistent with the agenda supported by Faculty of Electrical Engineering, University of Montenegro.

I hereby confirm that Faculty of Electrical Engineering, University of Montenegro is interested to participate in the ANDROMEDA's User Community and support the project towards the implementation of its activities.

Specifically, Faculty of Electrical Engineering, University of Montenegro will support ANDROMEDA by offering the following services based on Faculty of Electrical Engineering, University of Montenegro overall strategy:

☐ Provide experience in the definition of project's user requirements

x Participate upon availability to project's trials, demonstrations, workshops and provide advices, recommendations.

☐ Leverage upon the knowledge and built-in skills to provide comments to the definition and implementation of possible governances (for the project) to allow efficient cooperation among all stakeholders.

☐ Provide comments on the definition and implementation of the roadmap for the different value chains / demonstrators, facilitating alignment between private and public priorities.

x Provide comments on the activities concerning technical solutions and communication technologies and protocols used, as well as education and training programmes aligned with national activities.

☐ Facilitate the dialogue with the different industrial sectors to discuss relevant challenges proposed to be addressed by the ………..and to facilitate potential innovation to strengthen the ………..
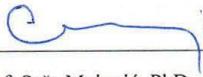
andromeda

ANDROMEDA's User Community - Letter of Support

☐ Disseminate the project results and communicate the organisation of concentration meetings or events organised by the project.

☐ Other services, please name

I wish you the best success with your project.

Sincerely,

Prof. Saša Mujović, PhD

Dean of Faculty of Electrical Engineering, University of Montenegro

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ANNEX A

Letter of Support of [SMILE H2020] to H2020 ANDROMEDA project (Grant Agreement number: 833881)

Dear Mrs. Athena Foka, Project Coordinator of ANDROMEDA,

I, [Georgios Stavropoulos and John Avramidis] as [Quality Assurance Manager and Dissemination and Communication manager respectively] of [SMILE H2020 Action], have been informed of the objectives of the H2020 ANDROMEDA project "An EnhaNceD Common InfoRmatiOn Sharing EnvironMent for BordEr CommanD, Control and CoordinAtion Systems", coordinated by the Hellenic Ministry of Maritime Affairs and Insular Policy (MMAIP), under the H2020 Call for proposals of Secure Societies, Topic SU-BES03-2018-2019-2020 - Demonstration of applied solutions to enhance border and external security.

The vision and the mission of the ANDROMEDA project is both timely and fundamental, being consistent with the agenda supported by [SMILE H2020 Action].

I hereby confirm that [SMILE H2020 Action] is interested to participate in the ANDROMEDA's User Community and support the project towards the implementation of its activities.

Specifically, [SMILE H2020 Action] will support ANDROMEDA by offering the following services based on [SMILE H2020 Action] overall strategy:

☒ Provide experience in the definition of project's user requirements

☒ Participate upon availability to project's trials, demonstrations, workshops and provide advices, recommendations.

☐ Leverage upon the knowledge and built-in skills to provide comments to the definition and implementation of possible governances (for the project) to allow efficient cooperation among all stakeholders.

☐ Provide comments on the definition and implementation of the roadmap for the different value chains / demonstrators, facilitating alignment between private and public priorities.

☐ Provide comments on the activities concerning …….., as well as education and training programmes aligned with national activities.

☐ Facilitate the dialogue with the different industrial sectors to discuss relevant challenges proposed to be addressed by the ……….. and to facilitate potential innovation to strengthen the ……….. .

☒ Disseminate the project results and communicate the organisation of concertation meetings or events organised by the project.

☐ Other services, please name

I wish you the best success with your project.

On behalf of the [SMILE H2020 Action]

Sincerely,

111

ANDROMEDA's User Community - Letter of Support

[Georgios Stavropoulos, Research Associate – Information Technologies Institute

Centre for Research and Technology Hellas]

EULAMBIA
ADVANCED TECHNOLOGIES
ΜΟΝΟΠΡΟΣΩΠΗ ΕΠΕ
ΑΓ. ΙΩΑΝΝΟΥ 24 ΑΓ. ΠΑΡΑΣΚΕΥΗ
ΑΦΜ:800520726–ΔΟΥ:ΧΟΛΑΡΓΟΥ

[John Avramidis, Research Assistant – EULAMBIA Advanced Technologies]

andromeda

ANDROMEDA's User Community - Letter of Support

Letter of Support of the Spanish Navy to H2020 ANDROMEDA project (Grant Agreement number: 833881)

SPANISH NAVY STAFF – PLANS DIVISION

Dear Mrs. Athena Foka, Project Coordinator of ANDROMEDA,

I, Viceadmiral Gonzalo Sanz as Head of the Plans Division of the Spanish Navy Staff, have been informed of the objectives of the H2020 ANDROMEDA project "An EnhaNceD Common InfoRmatiOn Sharing EnvironMent for BordEr CommanD, Control and CoordinAtion Systems", coordinated by the Hellenic Ministry of Maritime Affairs and Insular Policy (MMAIP), under the H2020 Call for proposals of Secure Societies, Topic SU-BES03-2018-2019-2020 - Demonstration of applied solutions to enhance border and external security.

The vision and the mission of the ANDROMEDA project is both timely and fundamental, being consistent with the agenda supported by the Spanish Navy.

I hereby confirm that the Spanish Navy is interested to participate in the ANDROMEDA's User Community and support the project towards the implementation of its activities.

Specifically, the Spanish Navy will support ANDROMEDA by offering the following services based on [the Spanish Navy´s overall strategy:

☒ Provide experience in the definition of project's user requirements

☒ Participate upon availability to project's trials, demonstrations, workshops and provide advices, recommendations.

☐ Leverage upon the knowledge and built-in skills to provide comments to the definition and implementation of possible governances (for the project) to allow efficient cooperation among all stakeholders.

☐ Provide comments on the definition and implementation of the roadmap for the different value chains / demonstrators, facilitating alignment between private and public priorities.

☐ Provide comments on the activities concerning …….., as well as education and training programmes aligned with national activities.

☐ Facilitate the dialogue with the different industrial sectors to discuss relevant challenges proposed to be addressed by the ……….. and to facilitate potential innovation to strengthen the ……….

☒ Disseminate the project results and communicate the organisation of concertation meetings or events organised by the project.

☐ Other services, please name

I wish you the best success with your project.

On behalf of the Spanish Navy

Sincerely,

SANZ ALISEDO GONZALO | 05383700K

Gonzalo Sanz, Viceadmiral, Spanish Navy