



## TECHNICAL NOTE

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## 1. INTRODUCTION

The present Technical Note is intended to provide information to economic entities interested in participating in the tender called by the European Consortium EUCISE2020 to develop and demonstrate the pre-operational version of the Information Sharing Environment for the maritime surveillance of European seas.

The note contains general information on the key features of the project and a summary of the technical content of the tender.

The extended technical specifications of the tender will be provided to pre-qualified tenderers with the necessary certifications to access documents classified EU Restricted contained in the tender documentation.

However, since the tender specifications are based on the results of previous projects and on the work of DG MARE, DIGIT and JRC in collaboration with the European maritime community, the technical documents resulting from such works are provided as attachments; they define with the necessary precision the basis of the technical work to be carried out. The final paragraph of the present Technical Note contains the list of attachments.

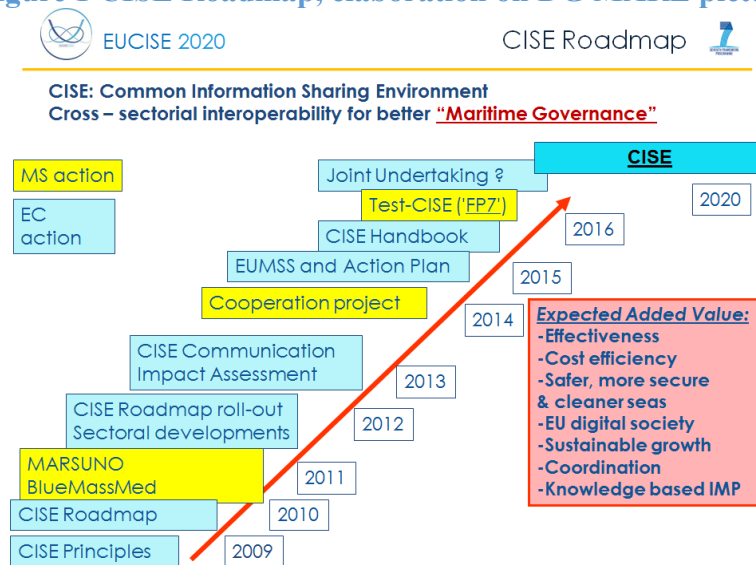
### 1.1. Context

EUCISE2020 aims to be a significant step forward along the accomplishment of the European roadmap for CISE (Common Information Sharing Environment); the project attains the widest possible experimental environment of innovative and collaborative processes between European maritime institutions.

EUCISE2020 takes as reference a broad spectrum of factors in the field of European Integrated Maritime Surveillance, arising from the European legal framework, as well as from studies, pilot and R&D projects accomplished in the last three years.

In particular, the project takes as reference the CISE Roadmap (Figure 1) published in 2010 by DG MARE<sup>1</sup> and constantly updated, whose current design is depicted below, and the needs for

**Figure 1 CISE Roadmap, elaboration on DG MARE picture**



<sup>1</sup> EC, COM(2010) 584 final, on a “Draft Roadmap towards establishing the Common Information Sharing Environment for the surveillance of the EU maritime domain” (<http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52010DC0584&from=en>)



innovation expressed by the maritime stakeholders, arising from their operational experience in managing maritime surveillance processes and systems at European, international and national levels:

EUCISE2020 is based on:

- The definition of User Communities and their functions contained in the CISE Roadmap
- the results of the European pilot projects BluemassMed and MARSUNO,
- the work performed by the seven CISE User Communities represented in TAG-Technical Advisory Group,
- the results of the “Test Project on Cooperation in Execution of Various Maritime Functionalities at Subregional or Sea-basin Level in The Field of Integrated Maritime Surveillance (CoopP)”
- the Marine and Maritime Surveillance services developed in Copernicus,
- the European studies on maritime surveillance promoted by DG MARE,
- the CISE Architecture Vision Document, version 3.0, published by DIGIT/DG MARE and JRC,
- the results of European FP7 Security Research projects -with particular reference to PERSEUS and SEABILLA, and of Copernicus research projects,
- the results of the INCUBATOR project as well as the JRC’s study on Access Rights.

### 1.1. Objectives

The overall objective of EUCISE2020 is to progress towards establishing a forward operating vision of CISE stable and innovative, functionally and geographically large, and shared by different communities of European public and private stakeholders. CISE will support cross-border and cross-sector operational cooperation between public authorities -including EU Agencies- in the execution of the defined maritime functionalities, with a focus on information sharing across sea-basins.

EUCISE2020 will test and validate the CISE concept (surveillance standard), under realistic operational and formal conditions, for the cross-sector and cross-border information exchange at EU/EEA level in a test-bed connecting the systems of the involved maritime authorities.

The POV is in line with the EU Integrated Maritime Policy and the EU Maritime Security Strategy, respecting the Treaty principles and the competition rules. It aims at stimulating national authorities and the industry to converge for the development and test of interoperable information sharing tools, in order to validate solutions for cross-sector and cross-border information exchange

EUCISE2020 aims at achieving the following specific objectives:

- development of an open European test bed for incremental advancement of CISE in the medium-long term,
- elaboration of the action plan for the operational validation of new elements of R&D needed to develop CISE (concepts of architecture, concepts of operation, standards of data and services, new services, new processes, ...),
- independent Verification & Validation of the new elements of R&D,





- evaluation of organizational mechanisms and processes needed to manage in the medium term the R&D results obtained, and to support in the long term the establishment of the appropriate governance structure of the community of maritime administrations participating in CISE, taking into account the need to stimulate public-private cooperation.

In full compliance with the FP7 Cooperation Work Programme, the specific objective of this project is to have a test-bed network of information platforms connecting participating public authorities, developed for cross-sectorial data exchange and tested in particular to assess, in the context of CISE:

- the technical feasibility of option(s) for the Common Information Sharing Environment (CISE) at sea;
- the identification of technological alternatives for the achievement of the set of user defined operational objectives;
- the demonstration that there are existing innovative solutions (services) which provide the required capabilities;
- the feasibility of the integration of the proposed solution, taking into consideration the limitations imposed by the existing surveillance systems;
- the performance under realistic operational and formal conditions of the test bed developed;
- the reusability of solutions as components of an open source platform, made available using open source software licences, as, for example, the EUPL (<https://joinup.ec.europa.eu/software/page/eupl>);
- the demonstration of end-to-end information exchanges, i.e. between existing systems;
- the definition of performance indicators appropriate to assess costs and benefits of the option(s) tested;
- the identification of the maturity level showed by the solution(s) in order to promote short/mid-term utilisation;
- the definition of innovative applications, business models and procurement schemes that can facilitate the migration to these new solutions from the existing tools;
- the evaluation of the experimentation results promoting their widening to future solutions; and the definition of advisable technical management structure for the full life-cycle management of CISE.

As part of the project activities, the industry will be called to provide solutions to test and validate according to the concept developed by the consortium participants, based on CISE definitions and rules provided by the European Commission in due time before testing and validation.

## 1.2. Project partners

The network of European maritime authority partners is the main asset of the project.

The list of project partners is presented in the table below; partners are Maritime Authorities, Oceanographic Institutions in the Copernicus network, and experts on legal issues or maritime surveillance belonging to 15 EU/EEA maritime Countries.

Maritime Authorities belong to 12 EU/EEA Countries and represent directly or indirectly a User Community of more than 60 European maritime Authorities





Partner	website	Partner	website
ASI	<a href="http://www.asi.it">www.asi.it</a>	DMI DK	<a href="http://www.dmi.dk">www.dmi.dk</a>
MMI	<a href="http://www.marina.difesa.it">www.marina.difesa.it</a>	NERSC	<a href="http://www.nersc.no">www.nersc.no</a>
MEF GDF	<a href="http://www.gdf.gov.it">www.gdf.gov.it</a>	AEAT ES	<a href="http://www.agenciatributaria.es">www.agenciatributaria.es</a>
MIT GC	<a href="http://www.guardiacostiera.gov.it">www.guardiacostiera.gov.it</a>	CIT	<a href="http://www.cit.ie">www.cit.ie</a>
MDE ES	<a href="http://www.defensa.gob.es">www.defensa.gob.es</a>	DGPM	<a href="http://www.dgpm.mam.gov.pt">www.dgpm.mam.gov.pt</a>
GUCI	<a href="http://www.guardiacivil.es">www.guardiacivil.es</a>	MARAD	<a href="http://www.marad.bg">www.marad.bg</a>
SASEMAR	<a href="http://www.salvamentomaritimo.es">www.salvamentomaritimo.es</a>	DEMOKRITOS	<a href="http://www.demokritos.gr">www.demokritos.gr</a>
EUSC	<a href="http://www.satcen.europa.eu">www.satcen.europa.eu</a>	RBP	<a href="http://www.politiadefrontiera.ro">www.politiadefrontiera.ro</a>
SWED CG	<a href="http://www.kustbevakningen.se/sv/ta-he-swedish-coast-guard">www.kustbevakningen.se/sv/ta-he-swedish-coast-guard</a>	FINNAVY	<a href="http://www.puolustusvoimat.fi/en/Navy">www.puolustusvoimat.fi/en/Navy</a>
MIN INT FBG	<a href="http://www.raja.fi">www.raja.fi</a>	FGMSSC	<a href="http://www.bmvi.de">www.bmvi.de</a>
FTA	<a href="http://www.liikennevirasto.fi">www.liikennevirasto.fi</a>	HMOD	<a href="http://www.mod.mil.gr">www.mod.mil.gr</a>
TRAFI	<a href="http://www.trafi.fi">www.trafi.fi</a>	HCR	<a href="http://www.hcg.gr">www.hcg.gr</a>
BG PORT	<a href="http://www.mtfc.government.bg">www.mtfc.government.bg</a>	MERCATOR	<a href="http://www.mercator-ocean.fr">www.mercator-ocean.fr</a>
MTC	<a href="http://www.regjeringen.no">www.regjeringen.no</a>	MISE	<a href="http://www.sviluppoeconomico.gov.it">www.sviluppoeconomico.gov.it</a>
LAUREA	<a href="http://www.laurea.fi">www.laurea.fi</a>	GLT	<a href="http://www.studiosato.it">www.studiosato.it</a>
OC UCI	<a href="http://www.ucy.ac.cy">www.ucy.ac.cy</a>	DFT	<a href="http://www.gov.uk/government/organizations/departments-for-transport">www.gov.uk/government/organizations/departments-for-transport</a>
APRE	<a href="http://www.apre.it">www.apre.it</a>	LCU	<a href="http://www.unilink.it">www.unilink.it</a>
INGV	<a href="http://www.ingv.it">www.ingv.it</a>	WPI	<a href="http://www.wisepens.com">www.wisepens.com</a>
CMCC	<a href="http://www.cmcc.it">www.cmcc.it</a>		

### 1.3. Expected Impact

The result of the project will be a validated technical and operational reference framework, used for the pre-operational demonstration of the interoperable solution at a significantly large-scale.

Enhanced maritime awareness will help ensuring more secure, safer and cleaner seas. The commitment of relevant participating public authorities across different sectors and in 12 EU/EEA maritime Countries is an essential requirement to ensure the later take up of the proposed solution at the EU scale.

At the end of the project, the participating authorities and the European Institutions will obtain clear evidence of the cost/effectiveness of the approach. The consolidation of requirements and joint procurement will lead to future reduced procurement and maintenance costs.

Through the execution of the project, participants will verify and optimize their technological choices. Technology providers will increase their understanding of user operational requirements; the adaptation of existing technologies and novel research and development to address the challenges of maritime surveillance will increase their competitiveness. The project has the potential to create important market opportunities worldwide for the European industry and establish a clear leadership in this area.

### 1.4. Project plan

The Project have two components with synergistic effects:

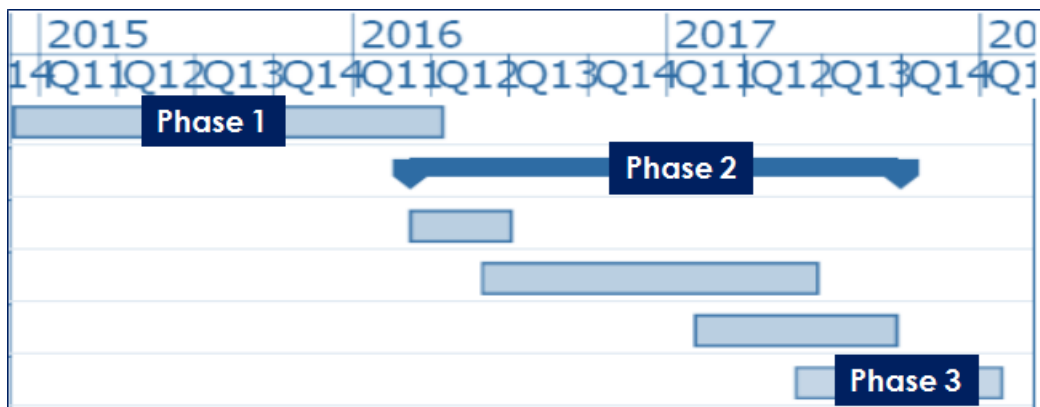
- **Networking and coordination activities (CSA):** for public bodies in Europe to cooperate in the innovation of their public services through a strategy that includes POV.



- **Joint research activities (CP):** related to validating the POV strategy jointly defined by the public bodies participating in the action. This would include the exploration of possible solutions for the targeted developments towards a prototype for CISE, and the testing of the proposed solutions against a set of jointly defined concepts of operations and performance criteria.

The project start date is 1<sup>st</sup> of December 2014.

The implementation plan consists of three consecutive phases devoted to the different types of activities during the overall project duration period of 38 months.



**The definition phase (Phase 1 - Initial Definition Phase (CSA))**, running within the reporting period, is devoted to establish the operational and technical requirements baseline for the R&D procurement and for the validation plan. In this Phase a strategy is put in place for:

- Identification of the needs and the available solutions that could be tested and validated in cooperation.
- Definition of a validation strategy (including a practical exercise plan), setting scenarios and issues for concrete implementation of activities.
- Establishment of good practice procedures and criteria for the evaluation and monitoring (common evaluation criteria and implementation methods) of the developed solution.

During Phase 1, the common European POV Tender is prepared and published; the received offers will be evaluated according to predefined evaluation criteria. The tender will encompass the competitive and open procurement of the R&D solutions for the development and testing of the CISE platform at European level.

The Joint POV R&D contracts will be contracted during 2016 and implemented in 2016-2017.

**The execution phase (Phase 2 - Preparatory and Execution Phase (CP))** includes the contract award to the providers of solutions, selected via the competitive call launched in Phase 1, as well as the implementation of the validation strategy prescribed by the EUCISE2020 Consortium in Phase 1. The selected providers will develop the innovative solutions according to the published Terms of reference, and will execute the testing in real operational scenarios, with their solutions integrated with other existing systems, working under the supervision of the EUCISE2020 Consortium.





During Phase 2, partners participating in the demonstration, will procure nationally the research services needed to develop the national interfaces to the CISE common platform, in time for the planned demonstrations.

EUCISE2020 plans to demonstrate the CISE capabilities both at the different basins level, and a global European scale, through a series of demonstrations planned in the last six months of Phase 2. Operational testing of the developed network environment should last at least 6 months.

In Phase 2, statistical data on the costs and benefits of the developed solution and of the information exchanged will be collected and made available for the subsequent assessment work.

In the **evaluation phase (Phase 3 - Ex-Post Assessment (CSA))**, which will conclude the overall validation, the EUCISE2020 Consortium will conduct a thorough assessment of the solution performances, and of the cost-benefit ratio of the alternative architectures tested in Phase 2, against the set of jointly defined performance criteria. This phase includes a set of recommendations that could be extended to other relevant EU organizations.

The ex-post assessment of the outcomes will be implemented in 2017.

The project website is located at the following address: <http://www.eucise2020.eu/>

## 2. CHALLENGE AND OBJECTIVES

Taking its steps from the lessons learnt from the Pilot Projects, EUCISE2020 is guided by a vision of the CISE which can be described as follows:

*“The CISE shall be an open decentralised hybrid network:*

- *connecting **standardised information platforms** (CISE Cross-Sectorial Nodes) powered by the stakeholders national and European surveillance systems on a proactive and voluntary basis on a “Common Information Services Network”, where interoperability of such platforms is granted through harmonised front-end interfaces*
- *implementing **Infrastructural Core Services** for (i) the enforcement of a multi-level data access and distribution policy, (ii) suitable information protection measures for the exchange of sensitive information under the directives of the respective MS, and (iii) open, selective and tailored web-based access to Sectorial and National Users*
- *delivering **standardized** cross-sector **Information Services** made available by the interested information hubs powered by existing national information infrastructures*
- *allowing information sharing with the existing **sectorial networks** and with the relevant EU Agencies and Stakeholders*
- *enabling military-civilian systems cooperation at Users and Systems level*
- *fostering the adoption of common operational procedures for decision support.”*

Fully applying the principle of abstraction, the CISE network will be independent by the national and European surveillance systems developed for operational purposes; the operational systems, whose security and operational autonomy will be wholly guaranteed, will implement a standardized information exchange layer to enable cross-border and cross-sector interoperability through the CISE network.





From the organizational perspective, in 2013, the CISE Architecture Visions document introduced several architectural models, foreseeing that each Member State will establish a CISE contact point to govern the organization of its services nationwide.

In particular, the CISE Architecture Visions document states that:

*"Interoperability agreements are needed to ensure cross-border and cross-sector interoperability among EU Member States and EU led initiatives.*

*The hybrid vision will require the appointment of 27 CISE Contact Points at Member State level, one per Member State, and 7 CISE Contact Points at EU level, one per User Community.*

*Member States have expressed an interest in having a more holistic and flexible governance model that takes into consideration both the national and the User Community perspectives. The hybrid vision responds to this request by proposing a two-level governance model:*

- **1<sup>st</sup> level:** CISE Contact Points at Member State level to manage the catalogue of CISE services of each Member State. These are the services belonging to, and provided by, the Member States.
- **2<sup>nd</sup> level:** CISE Contact Points at EU level to manage the catalogue of CISE services of each User Community. These are the services belonging to the User Communities and provided by EU led initiatives, usually, under the supervision of EU agencies. The Member States are involved in the governance of these initiatives.

*Member States and User Communities will be able to nominate their CISE Contact Points, in line with EU's subsidiarity principle according to EU legislation if any."*

During Phase 1, EUCISE2020 partners have defined the architecture chosen for the demonstration by each Member State participating in the project; the proposed solution is fully compatible with the European vision of CISE Hybrid Architecture.

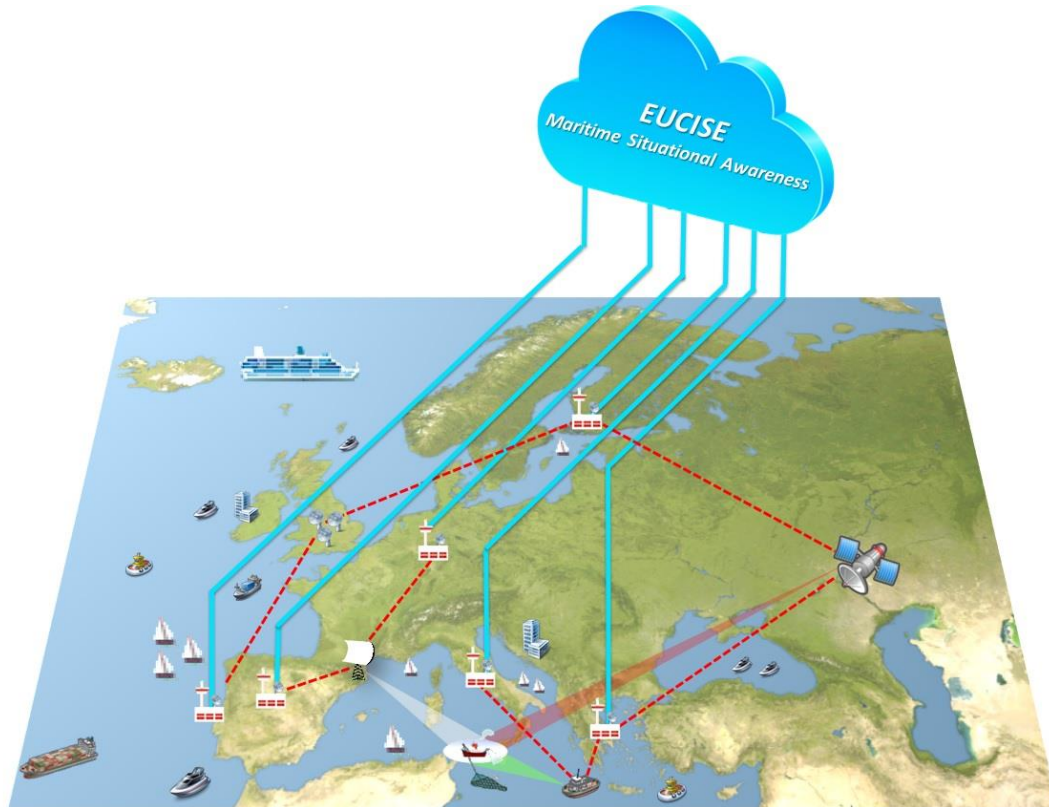
### 3. OPERATIONAL CONCEPT

The primary mission of EUCISE2020 is to support the EU Maritime Situational Awareness capability by means of the definition and the realization of an **Information Sharing Environment**, which is capable to implement adequate security measures and protocols ensuring the confidentiality, integrity and availability of the data required and transmitted in the CISE community.

EUCISE2020 is not considered a new maritime surveillance system, nor is considered a System of Systems, as it does not achieve a capability greater than the sum of the capabilities of the constituent parts; EUCISE2020 is considered a Public Information Sharing Environment as it manage information that can be accessed by a community, but it does not acquire qualitatively new properties as a result of the exchange, and the member systems may not be connected into a whole.

EUCISE2020 will not affect the functionalities of the operational information systems belonging to the participating Public Authorities or of the European existing sectorial information systems.

The following figure represents in a pictorial way the EUCISE2020 operational concept.



The blue lines depict flows of information within the CISE community, while the red dashed lines depict flows of information within the legacy systems belonging to single Public Authorities.

### 3.1. Supported User Functions

In order to model the operational behaviour of EUCISE2020, the Architecture has been designed with reference to the User Communities and their associated functions as defined in the Communication from the European Commission to the Council and the European Parliament on a Draft Roadmap towards establishing the Common Information Sharing Environment for the surveillance of the EU maritime domain, 2010, 584, final.

The user functions have been analysed having in mind 9 different operational scenarios studied in the Cooperation projects and enhanced in the first phase of the project:

- Use Case 13b: Inquiry on a specific suspicious vessel (cargo related).
- Use Case 13c: Inquiry on a specific suspicious vessel (crew and ownership related).
- Use Case 25b: Investigation of antipollution situation (law enforcement).
- Use Case 37: Monitoring of all events at sea in order to create conditions for decision making on interventions.
- Use Case 44: Request for any information confirming the identification, position and activity of a vessel of interest.
- Use Case 57: Knowledge of surveillance capacities of partner authorities in a given sea area to plan basic tactical surveillance (Baseline and Targeted operations).



- Use Case 70: Suspect Fishing vessel/ small boat is cooperating with other type of vessels (m/v, Container vessel etc.).
- Use Case 85: Anti-Piracy Maritime Surveillance and free navigation control: Merchant vessels at sea (outside Territorial waters) sends an alert that it is under Piracy attack.
- Use Case 93: Detection and behaviour monitoring of IUU listed vessels.

For each of the above mentioned scenario a full set of operational views for operational node connectivity and operational activity model are defined.

The detailed analysis of the Use Cases will be part of the technical documentation for tenders delivered to the prequalified tenderers.

Information Exchange in EUCISE2020 employs several ways to enable the exchange of the desired information among participants. All the messaging patterns are asynchronous; the pattern description is the following:

- **Pull:** the consumer knows the exact list of providers and asks for information, which is made available only if and when possible
- **Pull Unknown Recipients:** the consumer does not know the exact list of providers and asks for information from all possible providers. The information is made available only if and when possible. Several responses may occur.
- **Push:** the provider knows the exact list of consumers and sends it to them regardless of their not having previously requested such information.
- **Push Unknown Recipients:** the provider does not know who is willing to consume, and therefore sends the information to the system that is responsible for delivering the information to a list of consumers prepared according to rules regarding community, area of interest, purpose, entity type and subscriptions.
- **Publish:** the provider shares an information delivered as subscription by the system to a list of subscribers.
- **Subscribe:** the consumer can subscribe to a service to automatically receive public information about an entity, area or community.

The following list describes the information exchanges between the operational nodes within a use-case; it includes the most important aspects of selected information exchanges; it does not include all the details contained in every information exchange of every operational node associated with the EUCISE2020 architecture:

- **Actor 1:** Sender Public Authority belonging to a specific Member State and User Community
- **Actor 2:** Receiver Public Authority belonging to a specific Member State and User Community
- **Information Exchange:** Description concerning the exchanged data
- **Performance:** Expected time period to transmit information
- **Security:** Legal restrictions constraining the exchange of the specific information
- **Validity:** Time of validity of the exchanged information



- **Latency:** Minimum time for the transmission of the information
- **Classification/Declassification Restrictions:** Data classification
- **Retention:** time period after which the received data must be removed
- **Frequency:** The rate of occurrence of a specific exchanged information item in a given period of time (a day).

### 3.2. Architecture

The EUCISE2020 environment enables the interoperability of national or European operational legacy systems belonging to Public Authorities of Member States by means of two components: (i) the CISE adaptor that allows a legacy systems to translate data to/from the CISE data model and (ii) the CISE gateway (or a more extensive version called node) that realizes data exchange at cross-sector and/or cross-border level implementing the messaging protocol between CISE gateways.

The CISE components are able to:

- translate the request of information coming from PAs in a common vocabulary;
- ensure the exchange of messages within the EUCISE2020 Community based on a Service Oriented Architecture paradigm;
- manage access rights to information exchange based on a roles/rules based approach;
- handle classified information up to EU restricted level;
- implement a collaborative environment;
- optionally, implement advanced functions to enhance the information available at PAs level.

The network topology of EUCISE2020 is based on the CISE hybrid vision concept. Each Member State and Community can adopt one of the following paradigms:

- **Single-way approach:** All Public Authorities of a Member State are connected to the EUCISE2020 Network through a single access point.
- **Multiple-way approach:** Public Authorities of a Member State are connected to the EUCISE2020 Network through different access points (at least two).



Figure 3 presents the Hybrid Architecture concept in a graphical way.

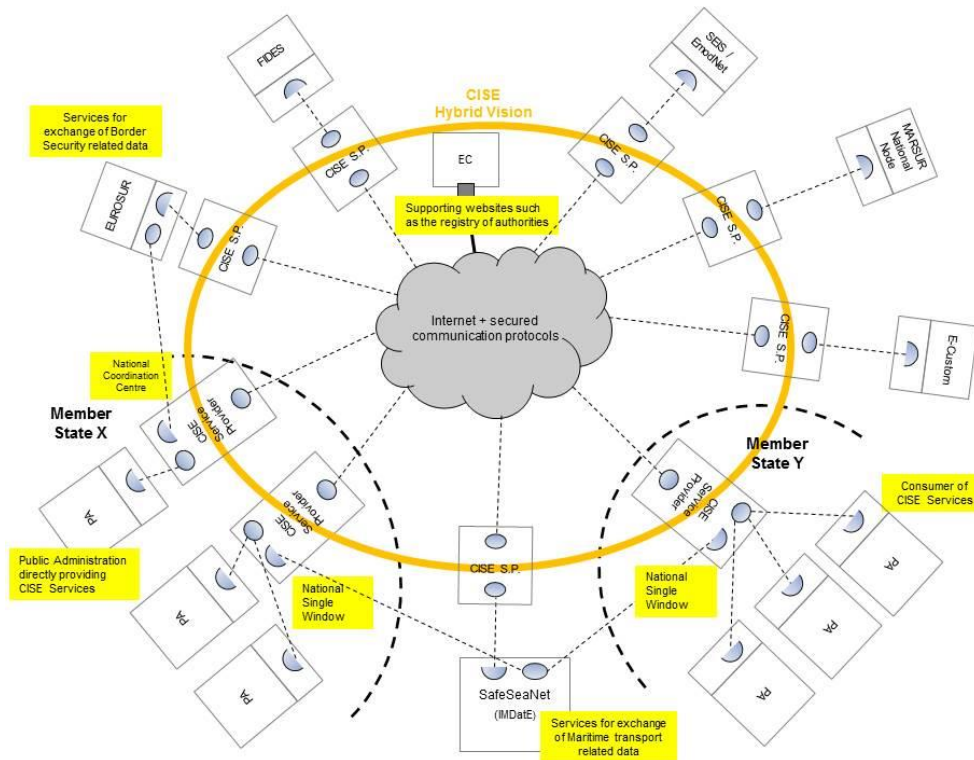


Figure 3 EUCISE2020 OV-1, High-Level Operational Concept: Hybrid Architecture<sup>2</sup>

### 3.3. Information model

In accordance to the Information Exchange requirements defined in the EUCISE2020, the following list defines the information that will be exchanged between EUCISE2020 Operational Nodes:

- **Event:** an occurrence at a certain location at or within a certain time; especially one of some importance (movements, anomalies, incidents and operational actions). An event can involve persons, organizations, objects, can imply risks and may be further defined or explained by documents. Persons and organizations can play specific roles in events.
- **Agent:** an operative entity that plays a role in any Event; owns, handles or operates Objects, such as Cargo or Assets; and creates and exploits Documents.
- **Period:** defines a time interval; can be expressed in several ways.
- **Document:** a digital representation of a paper document. Can be presented as images, pdf files or more structured documents, in a format that can be shared among partners for their automatic interpretation, even if their specific data model is not part of this data model. Documents are used to further describe all aspects of interest to maritime surveillance. As such, many different kinds of documents can be produced by organizations and shared.
- **Location:** the spatial dimension of maritime surveillance, a specified physical location on earth. It can be an address, a point, an area, or a port. Events occur in locations, and

<sup>2</sup> CISE Hybrid Vision V. 3.0





organizations and objects occupy locations that can be further described by documents and can be associated with certain risks.

- **Risk:** the possible negative occurrence associated with its probability. There are several types of risk and severity, as well as different risk levels. Risks can be further described by Documents and can involve events, places, objects, persons and organizations.
- **Object:** holds information about physical entities from the maritime domain, such as vehicles (vessels, aircraft and land vehicles) and cargo packages.
- **IAOFS:** holds information about: Oceanographic fields (i.e. temperature, salinity, currents, sea surface height, wind stress), Sea Ice fields (i.e. sea ice cover, sea ice thickness, sea ice concentration, sea ice drift, snow depth), Wave fields (i.e. significant and maximum wave height, wave direction, wave frequency, wave period), Meteorological fields: (i.e. air temperature at 2m, wind intensity and direction at 10m, visibility, cloud cover, precipitation mean sea level pressure).
- **User metadata:** information concerning user profiles and policies.
- **Service metadata:** a set of metadata defining the service such as version, availability, classification, pattern.
- **Authorities Identity:** information about contact such as name, user community, Member State.
- **Voice:** a voice message exchanged during a collaborative session.
- **Video:** a video stream during a collaborative session.
- **Text:** a generic information exchanged in plain text during a collaborative session.

### 3.4. CISE Data model

Starting from the Information Model and taking as a reference the CISE RoadMap<sup>3</sup>, the CISE Data Model has been enhanced to enable analysis, design and implementation of the data presentation, handling and storage functionality of the EUCISE2020 information sharing infrastructure. The EUCISE2020 Data Model will be included in the Terms of Reference of the tender as an annex of the Technical Specification Document.

### 3.5. Services taxonomy

The purpose of the Service Taxonomy is to organize knowledge according to the service perspective, and to facilitate harmonization of services across multiple domains (or across multiple architectures).

The EUCISE2020 Services are organized in four classes:

- **Core Services:** services devoted to the implementation of CISE gateways that, accordingly to the Hybrid Vision architecture, are the component that will ensure the connection of each partner, or group of them, to the EUCISE2020 network.

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<sup>3</sup> EC, COM(2010) 584 final, on a “Draft Roadmap towards establishing the Common Information Sharing Environment for the surveillance of the EU maritime domain” (<http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52010DC0584&from=en> )



- **Common Services:** devoted to the exploitation of entities within the CISE network following the EUCISE2020 business rules.
- **Advanced Services:** consisting of added value services proposed by each EUCISE2020 community of interest. It is the prerogative of Member States to decide the implementation of advanced services or not.
- **Innovative Services** are optional R&D application services, with TRL (Technology Readiness Level) between 6 and 8 according the HORIZON 2020 scale<sup>4</sup>, and with different IPR; the Innovative Services are expected to compose and orchestrate services in order to deliver new added value in the maritime surveillance business processes.

Core, Common and Advanced Services will be developed, tested, integrated and validated under the contractual framework of LOT1.

Innovative Services will be integrated in the EUCISE2020 platform and validated in the pre-operational environment under the contractual framework of LOT2.

### 3.6. System configurations

A National or European *Legacy System (LS)* represents an existing system owned by a National Public Authority or a European Institution and used by operational users. A LS can hold information that could be shared through CISE; a LS can receive and use information from CISE.

The LSs participate in the exchange of information by providing and receiving data and services; the LSs are the fundamental elements of the CISE environment, but are considered elements external to the EUCISE2020 network.

System configurations include the following components:

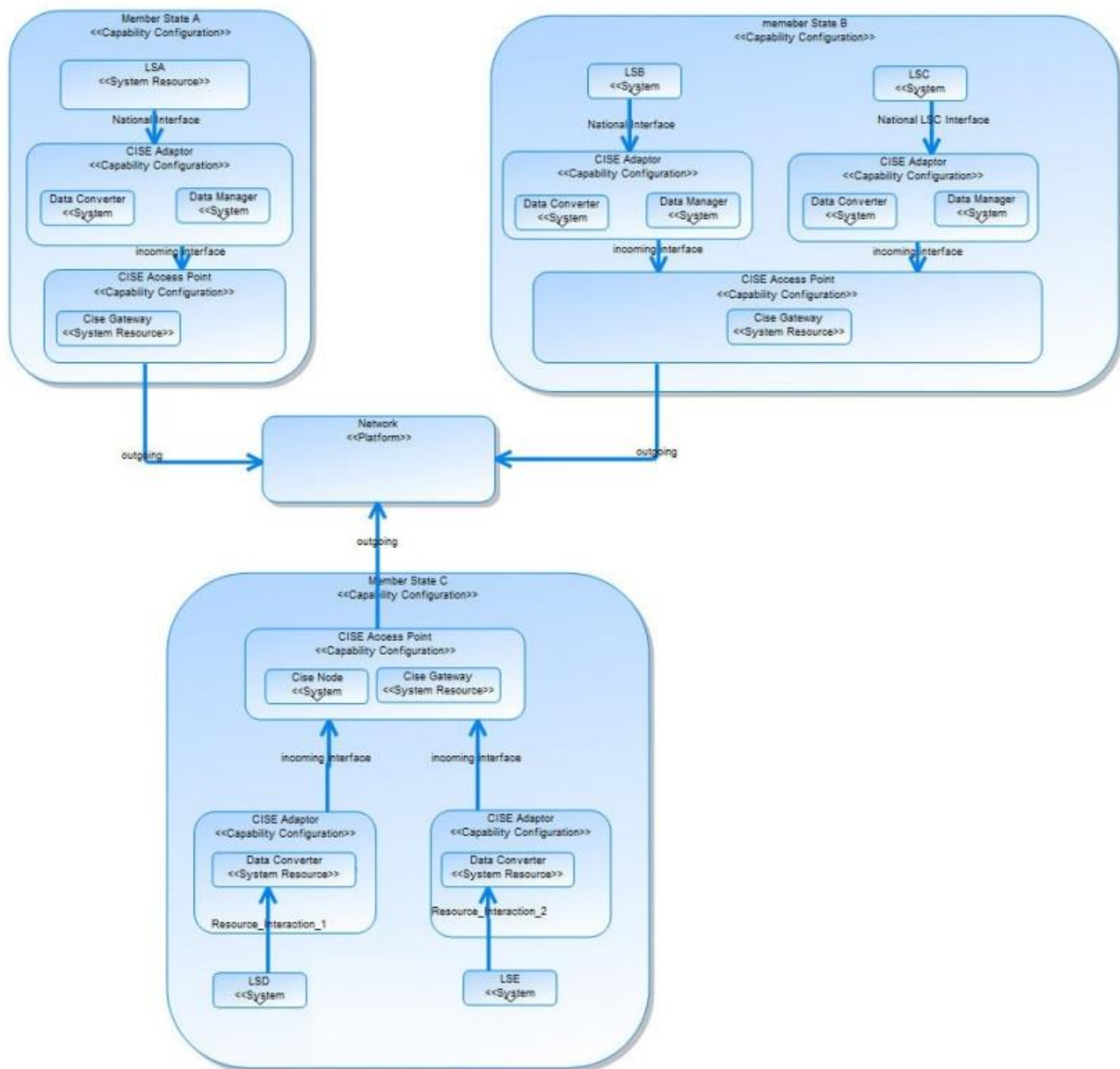
- *CISE adaptor* allows a LS to connect to a CISE Gateway. It translates the LS data into the common CISE Data Model;
- *CISE Gateway (GW)* implements the common CISE specifications and implements the *CISE messaging protocol* to exchange with the CISE adaptor or with the other CISE Gateways.
- *CISE Node (NODE)* is an enhanced gateway, capable of performing advanced business related activities like fusion and storing of information.

Every Member State participating in EUCISE2020 has available three different models (namely A, B and C), presented in Figure 5, to connect to the EUCISE2020 network; each model relates to the way in which the Member State's Public Administrations connect their legacy systems to the network.

The definition of such different configurations is compliant with the CISE Hybrid Vision Architecture and is presented in the following paragraphs.

<sup>4</sup> ([http://ec.europa.eu/research/participants/data/ref/h2020/wp/2014\\_2015/annexes/h2020-wp1415-annex-g-trl\\_en.pdf](http://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/annexes/h2020-wp1415-annex-g-trl_en.pdf))





**Figure 5: EUCISE2020 Configurations A, B and C**

### Configuration A

In this configuration, a single Public Authority belonging to a single Member State will connect to EUCISE2020 contributing with a single Legacy System.

The Legacy System provides and consumes EUCISE2020 services available from other European Public Authorities through only one Adaptor.

The Adaptor connects to a EUCISE2020 Gateway type A to access the EUCISE2020 Network.

The dedicated Adaptor connects the Legacy System into the EUCISE2020 Network ensuring the required data interface between the Legacy System and the EUCISE2020 Gateway:

- carrying out the necessary data conversions so that they become compatible with the EUCISE2020 data model,



- the EUCISE2020 service model.

The data are stored in the Legacy System, whilst the Gateway implements the EUCISE2020 Core services and the Adaptor implements the EUCISE2020 Common Services.

Finally, the Public Authority appoints an administrator to manage the Gateway.

### ***Configuration B***

In configuration B, each Public Authority of the same Member State taking part in the EUCISE2020 information exchange connects its own Legacy System to a dedicated Adaptor; several Adaptors connect to an EUCISE2020 Gateway type B that will access the EUCISE2020 Network.

Configuration B does not exclude the possibility that, in the same Member State, other Public Authority may access the EUCISE2020 network through an EUCISE2020 Gateway type A.

Each Legacy System can provide and/or consume EUCISE2020 services.

Also in configuration B data are stored only in Legacy Systems. Adaptors ensure the required data interface between Legacy Systems and the EUCISE2020 type B Gateway:

- carrying out the necessary data conversions so that data become compatible with the EUCISE2020 data model,
- implementing the EUCISE2020 service model.

In Configuration B, the Public Authorities of the same Member State taking part in the EUCISE2020 information exchange jointly appoint a common administrator in charge of managing the type B Gateway.

### ***Configuration C***

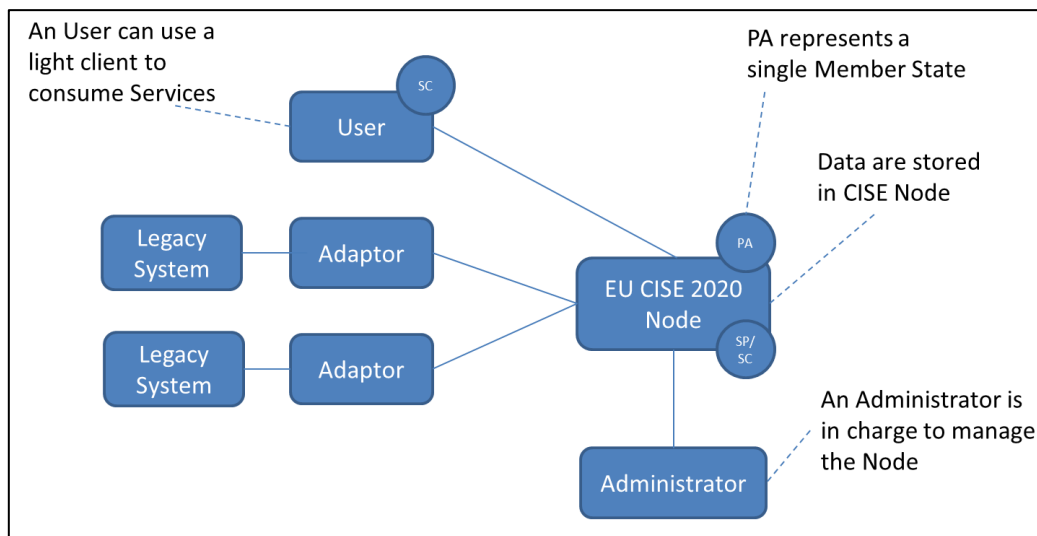
In configuration C (Figure 6), the Public Authorities of the same Member State taking part in the EUCISE2020 information exchange connect to the EUCISE2020 Network through a single EUCISE2020 Node type C.

Each Legacy System of each Public Authority connects to a dedicated Adaptor, and all the national Adaptors connect to the EUCISE2020 Node; also in case C, there is a “1-1” relationship between adaptor and Legacy System, but in configuration C the adaptor does not implement any operational (or business logic) function as in configuration A and B.

In addition, EUCISE2020 Node type C offers the capability to external users that do not have a Legacy System, to access data and EUCISE2020 services by means of a dedicated user graphical interface (namely “EUCISE2020 light client”).

Moreover, in configuration C the EUCISE2020 Node can provide additional Advanced Services to the EUCISE2020 community.

Member State’s Public Authorities taking part in the EUCISE2020 information exchange jointly appoint an Administrator to manage the EUCISE2020 Node.



**Figure 6: EUCISE2020 Configuration C**

Depending on the selected configuration, the EUCISE2020 services will be provided by the EUCISE2020 Node, or by the EUCISE2020 Gateway and the EUCISE2020 Adaptor.

The following Table 1 presents the allocation of EUCISE2020 services for each of the EUCISE2020 configurations.

	Configuration A			Configuration B			Configuration C		
Services	EU CISE NODE	EU CISE GATEWAY	EU CISE ADAPTOR	EU CISE NODE	EU CISE GATEWAY	EU CISE ADAPTOR	EU CISE NODE	EU CISE GATEWAY	EU CISE ADAPTOR
CORE		X			X		X		
COMMON			X			X	X		
ADVANCED							X		
INNOVATIVE							X		

**Table 1: EUCISE2020 Services allocation in configurations A, B and C.**

## 4. EUCISE2020 TENDER

### 4.1. Purpose

The purpose of this tender is to provide R&D services aimed at establishing an interoperable environments for information sharing in the field of Maritime Surveillance among Maritime Public Authorities members of the EUCISE2020 project Consortium, in their role as End Users, according to the principles of European CISE (Common Information Sharing Environment).



Award criteria are based on the principle of the best value for money, that is to say that POV contracts shall be awarded to the tenderers offering the best price-quality ratio; the weight assigned to the Economical Offer is equal to 20%, the weight assigned to the Technical Offer is 80%.

The detailed structure of weighting will be provided to the selected tenderers.

## 4.2. Object

This tender is divided into two lots; tenderers must submit a separate and different proposal for each one of the two lots should they wish to tender for both of them.

Proposals submitted by tenderers shall be compliant with the IPR Strategy defined by the EUCISE2020 Consortium and described in ANNEX 9 - 20151216 EUCISE2020 IPR Strategy FOR PROCUREMENT V2.1.

### LOT 1

LOT1 concerns R&D Services for the Implementation and the pre-operational validation of EUCISE2020 cross-sector and cross-border inter-regional wide network (core, common and advanced services).

The services include the design and development of a Service Oriented Architecture, aimed at sharing maritime information services between EUCISE2020 participants. The information sharing platform shall be able to expose the following services:

- Core Services, i.e. infrastructure services that provide common facilities. These services are devoted to enables the connection of the EUCISE2020 Participants through the EUCISE2020 Network, transferring data among EUCISE2020 participants and allowing the availability of pertinent data to EUCISE2020 services;
- Common Services, i.e. application services that provide the capability to exchange data in the EUCISE2020 Network. Consequently, these services manage EUCISE2020 data model entities;
- Advanced Services, i.e. application services which compose and orchestrate services to implement added value functionalities.

The scope of work shall include:

- Final design of R&D Core, Common and Advanced Services;
- Development of R&D Core, Common and Advanced Services;
- Verification of R&D Core, Common and Advanced Services in test-bed environment;
- Integration and Verification of R&D Core, Common and Advanced Services in the EUCISE2020 participants' environment;
- Pre-operational Validation of R&D Core, Common, Advanced (Lot 1) and Innovative (Lot 2) Services in the real operational environment of the above mentioned EUCISE2020 project's partners.

The Development and the Lab Test works will be executed at winning tenderers' facilities.

The Integration and the Pre-operational Validation of R&D Core, Common, Advanced (Lot 1) and Innovative (Lot 2) Services will be executed in the real operational environment of EUCISE2020 partners of the 12 participating nations (Bulgaria, Germany, Ireland, Greece, Spain, Italy, Norway, Portugal, Romania, Finland, Sweden, UK), according to the model of architecture chosen by each participating nation.



The contract for the R&D services of LOT 1 has an estimated value of 4.200.000 EUR; it lasts 18 months and starts within 3 (three) months after the end of the tender procedure.

## LOT 2

LOT 2 concerns Innovative R&D services for the pre-operational validation of added value services for the maritime surveillance in the EUCISE2020 inter-regional wide network; the services relate to the following domains:

- Big data Analytics
- Entity Fusion
- Plan Mission
- Satellites services for maritime surveillance and communications.

The scope of the contract will be the execution of service trials for the integration and the pre-operational validation of innovative R&D services under the property of the contractor(s) into the EUCISE2020 platform.

The services of LOT2 do not include the development of applications, but only their integration and pre-operational validation in the EUCISE2020 environment. The interested tenderers are required to give evidence of the existence of their innovative service/s in one or more of the application domains listed above; each R&D proposed service shall have a TRL (Technology Readiness Level) between 6 and 8 in the TRL scale of H2020<sup>5</sup>.

LOT 2 contracts can be awarded to several economic operators/consortia or groups depending on the proposed innovative R&D services (from 0 (zero) up to a maximum of 6 (six) different contracts of 12 months of duration). One or more LOT2 contracts could be awarded also to the winning tenderer of LOT 1. The award of the contract for LOT 2 is subject to the award of the contract for LOT 1, i. e. LOT 2 contracts will not be awarded if the LOT 1 contract is not awarded.

The EUCISE2020 Consortium considers that Innovative Services offered in Lot 2 are already available and that, therefore, they do not require tenderers' work of development and test; possible changes and the corresponding tests will be executed at the winning tenderers' facilities.

Each contracted service will be integrated and will undergo pre-operational validation in at least two sites of EUCISE2020 partners interested in experiencing the proposed service, selected from among the 12 participating nations: Bulgaria, Germany, Ireland, Greece, Spain, Italy, Norway, Portugal, Romania, Finland, Sweden, UK.

Each contract for the Innovative Services of LOT 2 has an estimated value of 50.000 EUR; it lasts 12 months and starts within 8 (eight) months after the start of the contract for the R&D services of LOT 1.

<sup>5</sup> HORIZON 2020 TRL (Technology readiness level) scale  
([http://ec.europa.eu/research/participants/data/ref/h2020/wp/2014\\_2015/annexes/h2020-wp1415-annex-g-trl\\_en.pdf](http://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/annexes/h2020-wp1415-annex-g-trl_en.pdf))



### 4.3. Procedure

On the basis for exemption laid down in the EU public procurement Directives (Art. 16 (f) of Directive 2004/18 / EC and Article 13(j) of Directive 2009/81 / EC), the tender falls outside the scope of those European directives. Therefore, the Contracting Authority is free to process the tender through the procedure it finds more appropriate. In this regard, in order to ensure the maximum transparency and competition of tender, the EUCISE2020 Consortium chose to adopt a restricted procedure designed according to the principles of Directive 2004/18 / EC.

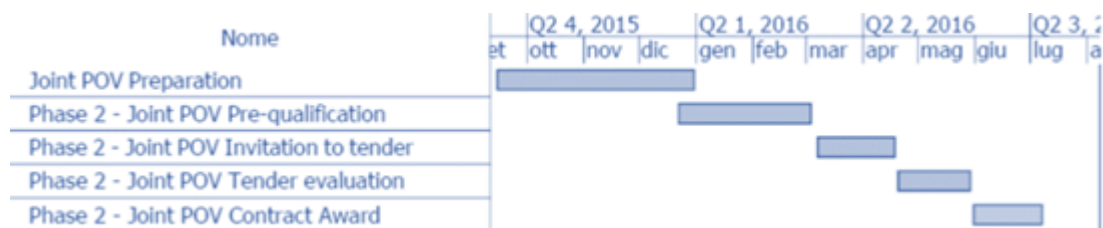
In order to ensure that candidates are aware of the risks and benefits sharing between them and the EUCISE2020 Consortium in such a way that both parties have an incentive to pursue wide commercialization and take up of the new solutions, the Intellectual Property Rights Strategy of EUCISE2020 is included as Annex 9 to the present Technical Note.

The administrative information for the pre-qualification are contained in the published Contract Notice and in its annexes.

The administrative and technical information for the submission of offers will be delivered to the selected tenderers.

The time schedule for the tender procedure is shown in the following chart.

#### Tender procedure timeframe





## 5. DESCRIPTION OF ANNEXES

The documents enclosed concern the main topics reported below relevant for the EUCISE2020 tender.

The content of the documents is not updated with the content of the technical specifications of the EUCISE2020 tender, but delineates precisely the object of the same tender.

The annexes concern:

1. The definition of User Communities and their functions contained in the CISE Roadmap (ANNEX 1 - User Communities and Functions EC COMM 584 CISE ROADMAP); European maritime administrations belonging to the mentioned User Communities are the final users of the Common Information Sharing Environment
2. The work performed by the seven CISE User Communities represented in TAG-Technical Advisory Group to define the required data and the current gap analysis (ANNEX 2 - 20110627 TAG CISE Step2 - Data Dictionary and Gap Analysis) and (ANNEX 3 - 20120208 JRC Gap analysis)
3. The results of the “Test Project on Cooperation in Execution of Various Maritime Functionalities at Subregional or Sea-basin Level in The Field of Integrated Maritime Surveillance (CoopP)” concerning the following topics: Use Cases and Services Definition (ANNEX 4 - 20130805 CoopP WP 2 Final Report Use Cases), Access Rights (ANNEX 5 - CoopP WP 4 Final Report2 Definition of Access Rights) and Data and Service Models (ANNEX 6 - 20140131 COOPP WP5 Final Report Common Data Format and Semantics)
4. The CISE Hybrid Architecture Vision Document developed by DIGIT, DG MARE and JRC (ANNEX 7 - CISE Architecture Visions Document - v3 00)
5. The results of the INCUBATOR project (ANNEX 8 - 20141219\_CISE\_Incubator report v2\_0(2))
6. The IPR Strategy defined by the EUCISE2020 Consortium (ANNEX 9 - 20160210 EUCISE2020\_IPR Strategy FOR PROCUREMENT V2.2)

