

## CAHIER DES CLAUSES TECHNIQUES PARTICULIERES (CCTP)



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Maritime Surveillance Network

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## SUIVI DES MODIFICATIONS

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0.2	30.04.2010	Whole document	Integration of TWG contributions
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1.1	14.06.2010	Whole document	Final Draft Version for comments and completion. <ul style="list-style-type: none"> <li>• Standard Project Management requirements included</li> <li>• Standard Quality Management requirements included</li> <li>• Acceptance Requirements included</li> <li>• User Requirements section compiled in conformity with User Operational View Document</li> <li>• Service Requirements section aligned to the Operational Views</li> <li>• Intermediate Architecture requirements updated</li> <li>• Appendices with NAF views updated with latest version.</li> </ul>



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## 0 GENERALITIES

### 0.1 Purpose of the present document

This CCTP reports the specific requirements applicable to the contract “**Study of a future wide European Maritime Surveillance Network**’ of BlueMaSSMed Pilot Project”.

### 0.2 Applicable documents

[A-1]

### 0.3 Reference documents

[R-1] NATO Architecture Framework (NAF) version 3.0

### 0.4 Terminology

Sigle	Signification	Remarque
BMM	Blue MaSS Med	Blue Maritime Surveillance System for the Mediterranean sea. Pilot Project launched by the European Commission (Directorate-General for Maritime Affairs and Fisheries - DG MARE), dedicated to the study of a future European capacity of a permanent surveillance of the Mediterranean maritime area and its Atlantic approaches
CCTP	Cahier des Clauses Techniques Particulières	
DG MARE	Directorate-General for Maritime Affairs and Fisheries	
EC	European Commission	
EU	European Union	

# 1 INTRODUCTION

## 1.1 Context

The sea is a space of liberty and freedom, but also an area where illegal or criminal activities are expanding.

Within each Member State of the Union, a number of governmental agencies, each for its part of responsibility, collect and analyze information. Single-agency, single-state or combined interventions need sharing of information and intelligence between, and not only, the European Member States or their agencies. While exchange mechanisms of sectoral nature or in limited ways already exist, a wide and commonly used mechanism has not yet been established to allow improvements on data exchange quality and efficiency terms.

Such exchanges face to unwillingness from the agencies and different kind of obstacles (technical, legal, administrative).

Blue Maritime Surveillance System for Mediterranean sea (Blue MaSS Med) is an European pilot project, launched by the European Commission (Directorate-General for Maritime Affairs and Fisheries - DG MARE), dedicated to the study of a future European capacity of a permanent surveillance of the Mediterranean maritime area and its Atlantic approaches.

It aims to prove the feasibility of a European capacity of a permanent surveillance of the Mediterranean maritime area and its Atlantic approaches by:

- determining the extent to which the project partners are potentially able to set up an exchange of information mechanism at a cross sectoral and cross border level that is viable and durable in time ;
- identifying the legal, administrative and technical obstacles that may hinder these exchanges ;
- studying the appropriate different kind of solutions (technical solutions ; best practices and/or legal adjustments ; etc) to overcome the obstacles identified ;
- illustrating the relevance of the proposals by realising an experimental exchange system between some of the existing national maritime surveillance systems which is going to be implemented during a demonstration.

## 1.2 Project's organisation

It is managed by six EU Members States (Italy, Spain, Portugal, Greece, Malta, France), led by France. It gathers 37 governmental partners involved in state action at sea.

The project is based on a strong implication of the governmental partners. The work has been divided into four working groups :

Users Working Group (UWG)	<ol style="list-style-type: none"> <li>1. <b>Operational requirement assessment.</b></li> <li>2. <b>Related information identification.</b></li> </ol>
Legal Working Group (LWG)	<ol style="list-style-type: none"> <li>1. <b>Connectivity</b> - Exchange of technology and information supporting trustful connectivity mechanisms; (in liaison with the technical sub group dealing with security of exchanges and services).</li> <li>2. <b>Operational</b> - Implications and constraints on information exchange for operational purposes (what information, who needs it, and for what purpose (why))</li> </ol>
Technical Working Group (TWG)	<ol style="list-style-type: none"> <li>1. <b>Data exchange definition</b> based on users' requirements (including dissemination rules implementation);</li> <li>2. <b>Network architecture</b>, identifying the appropriate technical solutions ;</li> <li>3. <b>Interoperability of systems</b> including space sensors and associated services;</li> <li>4. <b>Integration of sensitive information exchanges and services</b>, addressing in particular issues related to secured and trustful connectivity for sensitive and classified information exchanges (in liaison with users and legal groups).</li> </ol>
Communication Working Group	<ol style="list-style-type: none"> <li>1. <b>Communication strategy;</b></li> </ol>

Group (CWG)	2. <b>Web site</b> realisation and update; 3. <b>Conferences, seminars and publishing</b> organisation.
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Technical coordination and synthesis remain done at the whole technical group level.

Coordination between the technical and users group will be done through dedicated common meetings.

The main output of the Users group is the requirement for exchange of information and associated services.

The main output of the Technical group is the technical requirements for the architecture of the future European Wide Surveillance Maritime Network and the recommendation for a future system on functional and technical terms.

The Steering Group, co-chaired by France and Italy and working on the consensus basis, takes over the responsibility of driving the project, ensuring its achievement. A Lead Partner acts, for administrative purposes, as the single point of contact towards the DG MARE. The Lead Partner is the “Secrétariat Général de la Mer”, a service from the French Prime Minister.

### 1.3 Objectives of the contract

Legal obstacles are being studied by the partners to find solutions to overcome them even by proposing regulations' evolutions.

Concerning technical obstacles explaining former unwillingness, the objective is to define technical solutions able to demonstrate the possibility to control the exchange of information with some selected partners. The key factor is to win the confidence of the partners by proving this technical control.

The contractor has to take into account the major constraint concerning the systems which have to exchange information to each other: they relate to sovereignty consideration. That's why the BMM project expects a network oriented solution and doesn't allow a centralised system solution. So the technical solutions will preferably opt for a distributed architecture, non intrusive for the systems of the partners recognizing that the nature itself of the maritime surveillance is devoted to both civil and military users (dual users).

The contract is divided in four main parts :

- a study's phase, based on requirements' analysis and technical solutions' exploration ;
- a design's phase, based on the best technical solutions among the applicable ones and including the realisation of the experimental system and the definition of the recommendations applicable to a future European Network dedicated to maritime surveillance ;
- a demonstration's phase, during which the contractor helps the contracting authority to run the experimental system implementing operational scenarios;
- a proposal's phase during which the contractor, after the demonstration phase, makes a trade-off of the different alternative solutions and proposes a master plan and a cost analysis taking also into account the institutional and legal governance framework.

## 2 MANAGEMENT REQUIREMENTS

### 2.1 Project management

The Contractor shall be responsible for the overall management of the project subject to the contractual requirements (§3).

**MANAG\_RQ 1** - The Contractor shall build a Working Breakdown Structure (WBS), detailing each industrial task, and keep it up to date all along the project. The updated WBS is provided to the client, in a GANTT diagram format, two weeks before each progress meeting and after each noticeable evolution.

**MANAG\_RQ 2** - A quarterly progress meeting shall be organized by the Contractor. Additional progress meetings shall be planned two weeks before every major delivery. Extraordinary progress meeting shall be organized on request of the contracting authority if necessary.

**MANAG\_RQ 3** - For each progress meeting, the Contractor shall submit an agenda to the contracting authority, two weeks before the meeting. The contracting authority can modify it within one week.

**MANAG\_RQ 4** - The Contractor shall lead the progress meetings and give all the details required by the contracting authority. The Contractor shall submit a progress report to the contracting authority, two working days after the meeting. The contracting authority shall give its comments by e-mail within two weeks after having reached the agreed BMM position. The Contractor shall confirm the reception of such e-mail as early as possible and Contractor provide the final version of the progress report one week later.

**MANAG\_RQ 5** - The Contractor shall propose an Organization Breakdown Structure (OBS), including at least the following roles with respective Curricula Vitae of proposed personnel:

- 1 (one) Project Director;
- 1 (one) Technical Manager;
- 1 (one) Demonstration Manager;
- 1 (one) Quality Assurance Manager.

### 2.2 Quality management

**MANAG\_RQ 6** - A dedicated Quality Program shall be implemented to the equipment, services and activities relevant to BMM Project.

**MANAG\_RQ 7** - International Quality standards shall be adopted (e.g. ISO 9001 or equivalent).

**MANAG\_RQ 8** - The Quality program shall specifically address:

- program management;
- documentation and acceptance procedures;
- technologies and equipments.

### 2.3 Delivery conditions applicable for the documentation

**MANAG\_RQ 9** - All the delivered documentation is written in English and is unclassified.

**MANAG\_RQ 10** - Each document is sent by e-mail to the group leader and co-leader concerned and put in the BMM web-site to allow all the people concerned to have access to the information. A systematic copy of each delivered document is sent by e-mail to the operational manager. The contractor delivers also a physical specimen (on a DVD-ROM for example) to the operational manager.

**MANAG\_RQ 11** - The format of the documents is a Microsoft Office 2003 format; free software formats are not accepted. The files enclosed into e-mails are sent in a compressed format (ZIP).

## 2.4 Documentation's management

The following requirements are applicable for every provided document.

**MANAG\_RQ 12** - The contracting authority gives its comments by e-mail within three weeks after having reached the agreed BMM position. Contractor has to confirm the receipt of this e-mail as early as possible.

**MANAG\_RQ 13** - Contractor takes them into account and provides the correct version of the document within one week. If necessary, the Contractor can ask for a dedicated meeting to explain its position and to confront its ideas to the contracting authority's ones. In this case, the one-week period begins the dedicated-meeting's day.

## 2.5 Acceptance conditions

**MANAG\_RQ 14** - The acceptance criteria applicable to the delivered documents, in their final version, are:

- a. Compliance of the content with the requirements (see appendixes).
- b. Compliance of the content with the still-valid observations on the intermediate reports.
- c. Compliance with the format required.

**MANAG\_RQ 15** - The acceptance criteria applicable to the experimental system are:

- a. Representativeness of its architecture towards the recommendations made by the Contractor for the future European wide Maritime Surveillance Network.
- b. Good working order of the system during the factory acceptance test (FAT).
- c. Thoroughness of the delivered component.
- d. Good working order of the system during a dry run and the demonstration's phase.
- e. Compliance of the experimental system with the functional, interface and architectural requirements during dry-run and demonstration
- f. Good performance of the experimental system under the realistic Scenario conditions proposed by the Contractor and approved by the Contracting Authority.
- g. Compliance with the expected Measures of Success (Measures of Effectiveness and Measures of Performance) for tests and validation planned for the experimental phase. The detailed measures of success and the requested scenario specifications are reported in Appendix 7 (Preliminary System Functionality Description – *SV4 View*)

**MANAG\_RQ 16** - The acceptance of the expected deliverables by the Contracting Authority will be carried out according to the following milestones:

- Verification and acceptance of deliverable documents during the study phase and design phase
- Factory Acceptance Tests (FAT) of the Demonstration System Test-bed, at Contractor premises, aimed at verifying the compliance with architectural and interface requirements
- Site Acceptance Tests (SAT) of the Demonstration System Test-bed, after deployment of the demonstrator at User premises, aimed at verifying the compliance with the functional requirements;
- System Acceptance Tests (SYSAT) of the Demonstration System Test-bed, aimed at verifying the compliance with functional and performance requirements under realistic scenario conditions (dry-run)

**MANAG\_RQ 17 -** The provisional acceptance will be granted to the Contractor after all acceptance tests are successfully passed, and the final demonstration performed with User satisfaction .

**MANAG\_RQ 18 -** The final acceptance will be granted to the Contract after reception and approval of the deliverables of the Proposal Phase as reported in §8.

**MANAG\_RQ 19 -** The detailed FAT, SAT and SYSAT procedures shall be proposed by the Contractor and approved by the Contracting Authority at least 30 days in advance before the acceptance tests readiness is declared after having reached the agreed BMM position.

**MANAG\_RQ 20 -** The Contracting authority will plan date and time of each acceptance test not later than 14 (fourteen) days from the Contractor declaration of the readiness to test condition. The duration of each acceptance test shall not exceed 14 (fourteen) days from the start date of the test. The Contractor shall produce acceptance tests reports to be compiled during the tests and attached to payment requests, according to the provisions of the contract.

**MANAG\_RQ 21 -**

The Contractor shall propose in his master-plan the timing of acceptance tests. The final acceptance shall occur not later than 12 months after the Kick-Off of the Contract.

### 3 STUDY PHASE REQUIREMENTS

The aim of the BLUEMASS-MED (BMM) project is to define the architecture of the future European wide Maritime Surveillance Network that will allow the interoperability among all Maritime Surveillance Systems, existing or future, based on a jointly agreed, standard reference model. In reaching this objective, the BLUEMASS-MED project will directly and immediately contribute to the optimization and the efficiency of the current use of the maritime patrolling and surveillance resources.

BMM proposes a model through which the existing maritime surveillance systems (MSS) of partners and other available commercial products (such as AIS) contribute to build a shared basic common maritime picture (SBCMP) which will enhance regional integration in the Mediterranean region, in compliance with the EU policy for a Common Information Sharing Environment.

During the study phase, the BMM pilot project shall define a full-scale service oriented architecture complying with the baseline architectural framework established by the BMM User Working Group and Technical Working Group during the BMM definition phase. Such framework is composed by the following standard NAF views:

- **User Views**
  - All View AV-2 (Integrated Dictionary)
  - Operational View OV-1 (High Level operational concept description)
  - Operational View OV-2 (Information exchange catalogue)
  - Operational View OV-3 (Information exchange requirement matrix)
- **Technical Views**
  - Service Oriented View SOV-1 (Service Taxonomy)
  - Service Oriented View SOV-2 (Service Interface Definition)
  - Service Oriented View SOV-3 (Services to Capability Mapping)
  - System View SV-1 (System Interface Description)
  - System View SV-4 (System Functionality Description)

The requirements for the implementation of such architectural framework are reported in the next sections.

#### 3.1 BMM User Requirements

BMM proposes a model through which the existing maritime surveillance systems (MSS) of partners and other available commercial products (such as AIS) contribute to build a **shared basic common maritime picture (SBCMP)** which will enhance regional integration. This proposal is a model through which future or already developing MSS (SafeSeaNet/STIRES, CleanSeaNet, EUROSUR, MARSUR, FP7 Demo Project, etc) may participate and benefit from it.

##### **TECHN\_RQ 1 - Integrated dictionary (AV-2)**

The integrated dictionary is divided in the following parts:

- a. Operational Nodes
- b. Information Exchange

##### **TECHN\_RQ 2 - Operational Nodes**

The Operational Nodes in Blue Mass Med are the agencies that are partners, as reported in Appendix 1 (AV-2)

##### **TECHN\_RQ 3 - Information Exchange**



BMM data exchange will be based on data already available at MSS level. The Information exchange is the data to be exchanged among the agencies mentioned previously, as reported in Appendix 2. This information is split in the following groups:

- Positional Data
- Basic Current Voyage Data
- BASIC ID Data
- Historical Data
- Other Data

**TECHN\_RQ 4 - High Level Operational Concept Description (OV-1)**

BMM shall allow partners to share information to collaborate in maritime surveillance tasks by establishing a **Shared Common Basic Maritime Picture (SCBMP)**, through a common interface to collect and distribute data.

The project involves many partners and authorities that will be part of the experimental exchange of information. On the provider side are the authorities that feed or manage the national systems that will be connected to the experimental system and provide automatically information to feed the common SBCMP.

A core model of data shall be defined to be used in the common interface, so that BMM partners could speak a common language to enable seamless interoperability.

All the partners will be recipients of the common **SBCMP** through at least a light client station. The number of recipients is more than 30 and will possibly be augmented through the participation of EU Agencies to the experimental demonstration and its assessment. These recipients will participate in the experiment with real and simulated data on selected scenarios and will measure the potential of the integrated surveillance.

**TECHN\_RQ 5 - Information Exchange Catalogue (OV-2)**

A BMM node is defined as an agency or partner which:

- produces information related to maritime surveillance and is able to make it available to other nodes by publishing it, so that the nodes that are interested in that information can subscribe.
- consumes information related to maritime surveillance published by other nodes.

BMM shall provide a common interface to allow one node to exchange data with other nodes.

The BMM common interface shall not be responsible of visualization. Each node implementing the common interface is responsible of displaying the information collected through BMM and its own information.

BMM shall implement a web application which will allow partners without an integrated common interface to access to BMM basic capabilities, including visualization. BMM nodes with an integrated common interface could optionally provide a web server running the BMM web application to grant access to BMM basic capabilities for other partners.

Three types of nodes are defined:

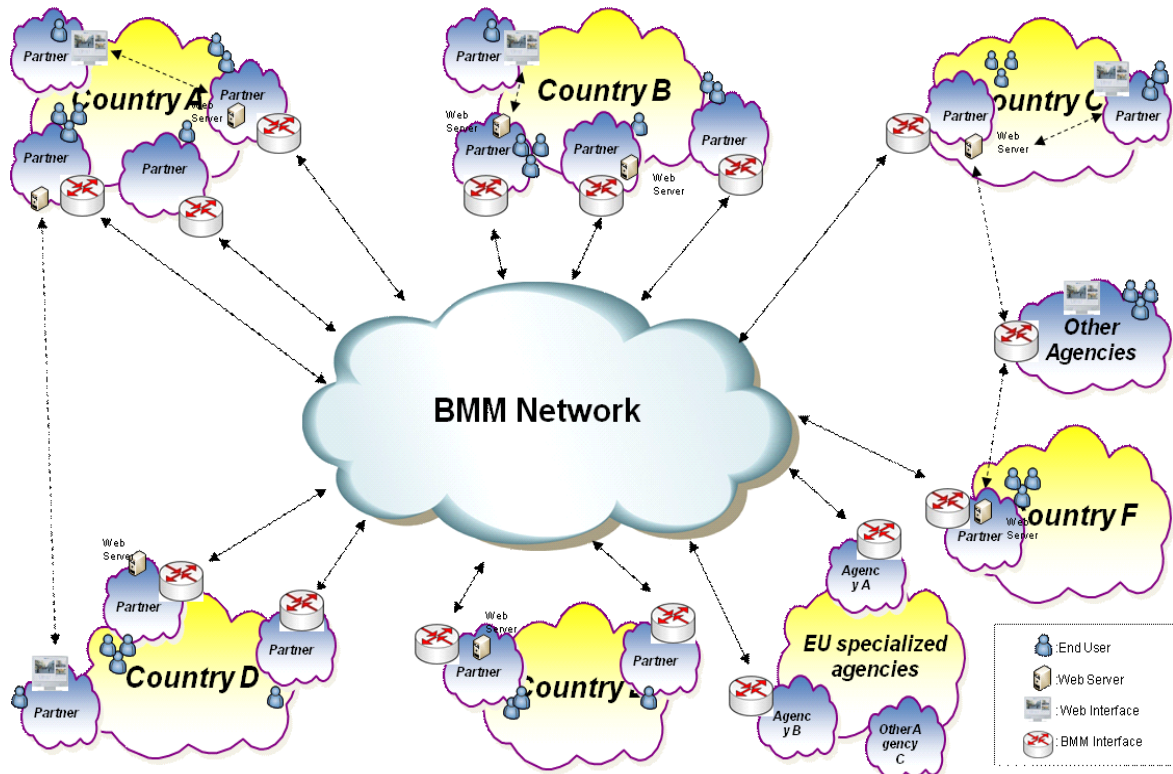
- Nodes with BMM common interface integration.
- Nodes with BMM common interface integration providing a web server.
- Nodes accessing BMM through another node web server.

Each Operational Nodes will be able to provide information of the own systems which compose the operational node.

All agencies participating in the BMM network must be granted the necessary privileges by a responsible authority. While BMM Pilot Project is under development, a group will be designated to manage this authorization and to provide the proper credentials to the agencies. In the future, an organizational mechanism could be created to continue this management. Final user accounts management to access the system will be responsibility of each agency for its members.

The BMM Networking Architecture shall be open, flexible and not centralized. This model provides an abstraction between the networking resource and its underlying technical architecture. It will be built on net-centric architecture. A consumer of information should be provided or be able to get information needed in a timeframe whenever or wherever the consumer may be.

The diagram below shows the flow of information sharing among the partners participating in the BMM Network.



The BMM Network will be designed to support flexible sharing, integration and exploitation of heterogeneous Maritime Surveillance Data by Competent Authorities.

**TECHN\_RQ 6 - Operational Information Requirements (OV-3)**

The purpose of the Operational Information Requirements sub-view is to identify and describe all information exchanges that make all information needles between the operational nodes, as identified in OV-2.

Operational Nodes in BMM will exchange data divided in five groups:

- Positional Data
- Basic Current Voyage Data
- BASIC ID Data
- Historical Data
- Other Data

These data are mainly related to ships but not only, and comprises as well meteorological information, safety data, pollution information, etc.

**TECHN\_RQ 7 - Two packages of information are defined:**

- Basic package
- Classified package

The nodes connected in BMM network should publish all information they have available belonging to the basic package, whereas the information of the classified package will be exchanged according to previous agreements between agencies.

It will not be defined or restricted here which information is exchanged among the operational nodes, as all information could be of interest for every node. This is due to the fact that information exchanges requirements which have been defined as a core information model that makes sense to all nodes. This also means that all nodes could participate in the system with a unique and homogeneous profile, it could depend on the system services list that each node provides to the rest and the services provided by other nodes that the node apply for.

**TECHN\_RQ 8** - The BMM shall allow the information exchanges among the connected nodes, according to the information exchange requirement matrix reported in Appendix 3.

**TECHN\_RQ 9** - The approach to the architecture should be service oriented, and shall take into account the following *service requirements* categorization:

- Basic service requirements,
- Additional service requirements and
- Other service requirements.

### **Basic service requirements**

BMM shall provide connecting partners with a main service consisting in the data exchange protocols and functionalities, needed to implement the SCBMP (near real time, approx 10 min). The SCBMP shall allow access to unclassified, sensitive and classified data according to the architectural requirements specified in §3.3.

#### **TECHN\_RQ 10** - Track Management

Each BMM node shall be able to automatically or manually notify the creation of new tracks, the update of existing tracks, the assignment or modification of a track number, the deletion of an existing track.

#### **TECHN\_RQ 11** - Track Exchange

Each BMM node shall be able to exchange track historic data with other authorised nodes.

#### **TECHN\_RQ 12** - Track Association and Correlation

BMM shall allow nodes to manage track correlation including at least:

- Manual or automatic (geometric) association of known tracks at each node by mapping of relevant track identifiers
- Manual or automatic (geometric/statistical) correlation of partially known track information at each node by creation of correlated tracks and mapping of relevant track identifiers

Every track distributed in the system shall contain an attribute indicating if it is a correlated track.

A BMM node shall be able to automatically correlate tracks under established conditions and rules.

Tracks correlated in a BMM node could be published to other nodes subject to user decision or due to automatic filtering.

BMM shall allow nodes to establish filters in subscriptions, so that only correlated data is sent.

#### **TECHN\_RQ 13** - Latency and Information Updating

BMM shall allow the update of all information held by the partners within **15 minutes**.

The upper limit of the data update frequency must be established in order to ensure the reliability of the data exchanged, and this value should be configurable. If no new data is available, the transmission of the contact information must be based on the last known position of the vessel until a confident prediction can be extrapolated, otherwise no transmission should occur.

The last valid measurement time must be indicated in the transmission of the exchanged data.

A confidence value shall be allocated to the exchanged information:

- 1 = very high confidence, verified data
- 2 = high confidence
- 3 = confident
- 4 = low confidence, unsure source of verification
- 5 = very low confidence, no verification, co-operative target

A quality value shall be allocated to the exchanged information.

BMM data exchange protocol shall include a mechanism for delivering information flagged as important to all partners. It shall be possible to prioritize the flow or nature of information (data, voice, video, etc) according to the services and operative mission. In that sense quality of service policies (QoS) shall be implemented.

**TECHN\_RQ 14 - Security Layers Management**

The BMM system shall support several layers of surveillance data:

- One basic data layer.
- Classified layers, as required by different partners needs.

The BMM shall support multi security layer activity and shall be able of managing sensitive information (legal, commercial, open source intelligence, etc). The restrictions to the data exchange could be operational, political, commercial and legal.

**TECHN\_RQ 15 - Information Filtering**

The BMM nodes shall be able to limit the level of data exchange by filter rules based on security level of the data or any other attribute.

The BMM system must support filtering in disseminating process based on time, geographical area or any other significant known target attribute to be able to utilize lower bandwidth connections and not to exchange unnecessary data.

**TECHN\_RQ 16 - Time stamping and geo-reference**

Exchanged information shall always be in Coordinated Universal Time (UTC) to eliminate possible time zone problems.

All messages sent from one system to another shall be time stamped.

The data exchanged by BMM shall be geographically referenced on global scale.

Geodetic datum used in the interface shall be World Geodetic System 1984 (WGS-84).

**Additional service requirements**

BMM shall provide connecting partners with Communication tools (internet type e-mail, chats, IP phoning...), collaborative planning tool (in the whole or limited communities of interest), services for exchange of imagery products (all available to include, satellite, etc), and mapping (navigational charts) services.

**TECHN\_RQ 17 - E-mail and messaging service**

BMM nodes shall be able to exchange additional free text information via electronic mail (e-mail).

BMM nodes shall be able to exchange singular or multiple track data by using standardized message text formats and additional free text information.

It shall be possible to send email with attachments, including data files.

All email messages shall be labeled at least with:

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- Sender
- Recipients
- Date and time sent
- Priority

**TECHN\_RQ 18 - Additional data sharing**

The BMM shall receive, manage and distribute the following additional data:

- Static Media files (pictures, video clips, satellite information as geo-media files),
- Streaming Media files (Camera feed),
- Telephone calls (IP-phone, hotline)

**TECHN\_RQ 19 -** It shall be possible to publish different types of geometric objects with optional attached meta-data:

- Lines
- Points
- Areas
- Special marks

**TECHN\_RQ 20 -** It shall be possible to collaborate by means of electronic white boarding, telephone and secure telephone communication.

**TECHN\_RQ 21 -** BMM shall be able to work using commercially available communications networks.

**Other (added value) service requirements**

**TECHN\_RQ 22 -** BMM shall provide connecting partners with (added value) services for enhancing partners regional awareness and decision support capabilities, in terms of:

- Sharing, association and correlation of information and intelligence.
- Exploitation of satellite based ship detection and oil spill detection services;
- Capability to generate user oriented services (for a single partner or a limited community), e.g. environmental monitoring and environmental risk detection service (marine pollution, oil spill and waste disposal at sea).

**TECHN\_RQ 23 -** BMM shall provide connecting partners with services for the BMM Network management, according to the SOA reference model.

**TECHN\_RQ 24 -** BMM Partners shall be able to decide when, where and what to share or not to share (time, space, subject, etc.)

**TECHN\_RQ 25 -** BMM network shall be able to leave the door open for future developments in data sharing.

**3.2 BMM Technical Requirements**

A service, within the Service-Oriented view, is understood in compliance with the Reference Model for Service Oriented Architecture proposed by the Contractor and approved by the Contracting Authority.

**TECHN\_RQ 26 -** During the design phase of BMM demonstrator, the Contractor shall submit for approval to the contracting Authority the Reference Model for the Service Oriented Architecture.

Following the NAF methodology, the Technical Working Group has defined the BMM technical requirements by means of three Service Oriented Views (SOV):

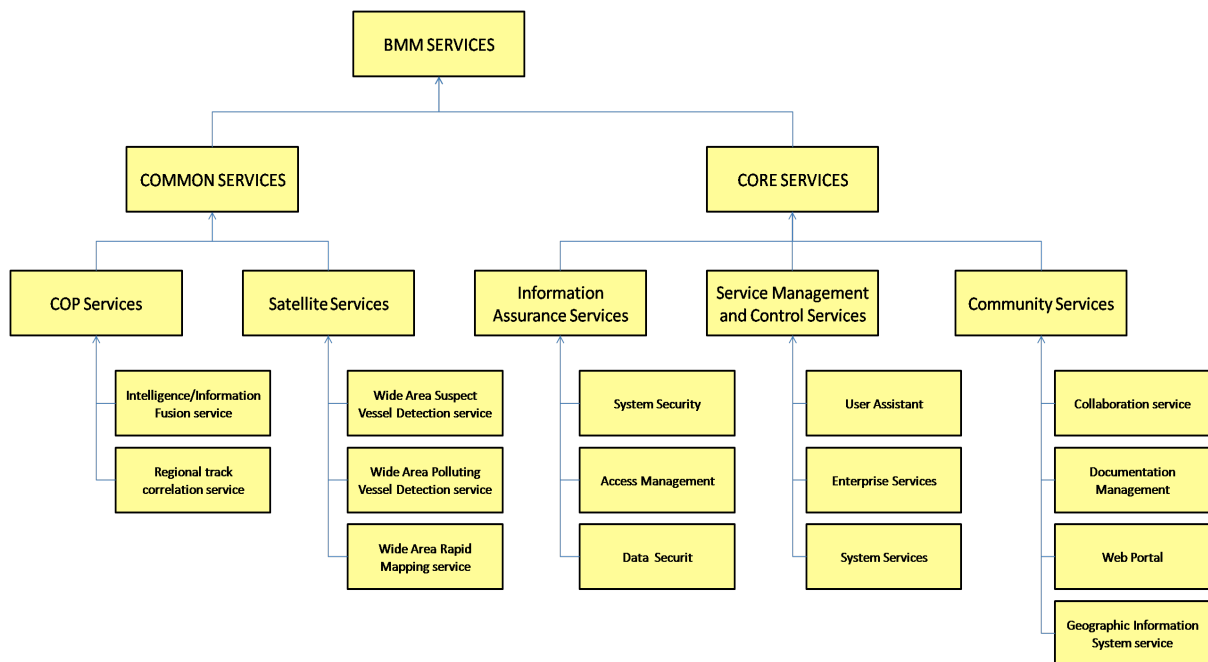
1. SOV-1 Service Taxonomy ;
2. SOV-2 Service Interface Definition ;
3. SOV-3 Services to Capability Mapping (as a traceability matrix between users and technical requirements).

These SOV are respectively exposed in appendix #3, 4 & 5.

**TECHN\_RQ 27** - The proposed Reference Model for the Service Oriented Architecture shall be compliant with the above mentioned Service Oriented Views.

**TECHN\_RQ 28** - BMM Services Taxonomy

The service taxonomy represents the capability to classify services according to some classification criterion. In the BMM context, the criterion is the applicability of a service to the following basic elements: BMM Common Operating Picture, BMM Satellite, BMM User Network, BMM Data Protection. In SOV-1, services are only defined in the abstract, i.e. SOV-1 does not specify how a service is to be implemented. An SOV-1 is structured as a specialization hierarchy of services, with the most general at the root and most specific at the leaves.



The BMM services are categorised in Common Services and Core Services.

Common Services are the Operational Services enhancing the awareness and decision support capability of each connecting node and complying with (i) the basic User requirements to provide a SCBMP and (ii) the other (added value) User requirements to provide added value functions.

Core Services are the System Services providing the core functions for the proper operation of the BMM network as well as the auxiliary functions for the connectivity, management, etc., and complying with (i) the basic User requirements to provide a SCBMP and (ii) the additional User requirements to provide auxiliary connectivity functions.

The following sections specify the technical requirements for the implementation of BMM Common and Core services.

**TECHN\_RQ 29** - Common Services



The purpose of the common services is to provide a SCBMP and added value services for its exploitation, in order to understand the operational domain in terms of services supporting operational activities. The following Common services have been identified:

- ✓ Common Service 1 - Information / Intelligence Fusion services ;
- ✓ Common Service 2 - Regional Track Correlation Services;
- ✓ Common Service 3 - Wide Area Suspect Vessel Detection Services;
- ✓ Common Service 4 - Wide Area Polluting Vessel Detection;
- ✓ Common Service 5 – Wide Area Rapid Mapping Service.

#### **TECHN\_RQ 30 - Core Services**

The purpose of the core services is to provide essential services for assuring the correct operation of the BMM network and good connectivity and flexibility of cooperation among the connected nodes. The following Core Services have been identified:

- ✓ Core Service 1 – Information Assurance Services
- ✓ Core Service 2 – Service Management and Control service
- ✓ Core Service 3 – Community Services

#### **BMM Service Interfaces Definition and Mapping to Operational Capability (SOV-2 / SOV-3)**

The following Common Services shall be defined in accordance with the SOV-2 and SOV-3 reported in Appendixes.

#### **TECHN\_RQ 31 - Common Service 1 - Information / Intelligence services**

**Added Value:** This service aims to augment single Users knowledge of sensitive targets, through access, integration and association of data and information made available by the other authorities connected to the BMM network.

**Typical Use Case:** for a known track (MMSI / IMO Number) pertaining to the Common Operating Picture (COP) of a single Node, the Node broadcasts a service request to the other nodes to provide any information or intelligence linked to that ship during transit in their COP, such as:

- ✓ Abnormal movements, accidents, port operations
- ✓ Results of any inspections and control (during and before transit)
- ✓ Communications from ship (either intentional or captured)
- ✓ Intelligence got from other sources and deemed relevant
- ✓ Statistics concerning the specific ship or ship type

Collected information is then associated and integrated by means of semantics analysis and information fusion engines.

#### **TECHN\_RQ 32 - Common Service 1 - BASIC requirements**

1. The Service Requesting Node shall provide the Service Providing Node with a known track identity (MMSI / IMO Number).
2. The output of the information/intelligence fusion service shall be an enriched BMM track report on the requested track consisting at least of the following attributes:
  - *Basic ID Data*
  - *Current Basic Voyage Data;*

3. The Service Providing Node shall confirm to the Service Requesting Node the possibility to provide the expected service outputs (data, performances, time) on the requested track.
4. The end to end loop from a Service Request to the first transmission of the results has to be less than 10 minutes.
5. Until the Service Request Node will not stop the service request, the Service Providing Node shall update the track report in case of new information available on the requested track.

**TECHN\_RQ 33 - Common Service 1 - OTHER (added value) requirements**

1. The Service Providing Node shall be equipped with a semantic analysis and information fusion module able to collect and associate/integrate information on the requested track, coming from available local COP / databases .
2. The output of the information/intelligence fusion service shall be an enriched BMM track report on the requested track consisting at least of the following attributes:
  - *Archived Basic Voyage Data;*
  - *Historical data (No Basic)*
  - *Other Data (Intelligence, Alerts, etc.)*

**TECHN\_RQ 34 - Common Service 2 - Regional Track Correlation Services**

**Added Value:** The Regional Track Correlation Service allows the enhancement of the tactical picture in a shared monitoring region, when single Users do not possess adequate monitoring means to cover the full area.

**Typical Use Case:** The requesting Node provides an updated and historical description of a track object not adequately tracked but situated in a sea region subject to shared monitoring systems / services.

The Service Providing Node executes a geometric and statistical correlation with available track data in the same region even if at different validity times, determining the confidence index and enriching the “regional” track in case of matching.

Correlated tracks are generally associated to:

- Regional AIS, and LRIT
- SafeSeaNet++ / STIRES data
- National tracks and / or shared intelligence (patrolling, etc.)

**TECHN\_RQ 35 - Common Service 2 - BASIC requirements**

1. The Service Requesting Node shall provide the Service Providing Node with a single track position or the coordinates of the area where the regional track correlation service shall be performed.
2. The Service Providing Node shall be able to provide AIS/VMS/LRIT position reports and radar tracks.
3. The output of the data correlation service shall be a BMM tracks streaming. Each BMM track will consist of the following attributes:
  - Positional Data
  - Identities of Data Sources;
  - Weight of each data sources in a potential (and local) data fusion process.
4. The Service Providing Node shall confirm to the Service Requesting Node the possibility to provide the expected service outputs (data, performances, time) on the requested track or area.



5. The BMM track streaming shall include a maximum of XX BMM tracks.
6. The end to end loop from a Service Request to to the first transmission of the results has to be less than 10 minutes.
7. Until the Service Request Node will not stop the service request, the Service Providing Node shall update the track streaming each 12 minutes.

**TECHN\_RQ 36 - *Common Service 2 – OTHER (added value) requirements***

1. The Service Providing Node shall be equipped with a data correlation module able to process AIS/VMS/LRIT position reports and radar tracks.
2. The data correlation module shall perform the time and space synchronization and correlation of data flows received from different regional/national systems.
3. The output of the data correlation service shall be a BMM tracks streaming. Each BMM track will consist of the following attributes:
  - Positional Data;
  - Identities of Data Sources;
  - Weight of each data sources in a potential (and local) data fusion process;
4. The data correlation module shall control the integrity of received data flows in terms of:
  - Anomalous or corrupted data ;
  - False tracks;
  - Non coherent data;
  - Multiple tracks referred to the same sea surface object.

**TECHN\_RQ 37 - *Common Service 3 - Wide Area Suspect Vessel Detection Services***  
*(Innovative Services made possible by the exploitation of SAR Satellites systems)*

**Added Value:** This service aims to provide support to the detection of suspect vessels in high seas through the association and correlation of Ship Detection Reports obtained by Satellite equipped with Synthetic Aperture Radar sensors.

**Typical Use Case:** the requesting Node:

- has lost a ship because it went outside the coverage of coastal identification systems
- has no tracking but intelligence that a ship is in his area of competence
- has an indication of security risk in his competent area and not adequate monitoring in that area

The service provides NRT (Near Real Time) Ship Detection of all Cooperating and Non Cooperating ships in the desired area by exploiting the most recent wide swath Satellite SAR images acquired regularly on predefined areas<sup>1</sup>.

Starting from Satellite Ship Detection, all detected ships are either co-registered or back-traced to known tracks from identification systems such as AIS, Sat-AIS, LRIT, SafeSeaNet/STIRES and other tracks made available by the competent authority. Non correlating plots are correlated with identification data collected in the observed area within an interval of up to 3 hours around the satellite image acquisition time, with tracks from the COP of concerned Nodes, and those remaining

<sup>1</sup> In order to perform a maritime systematic surveillance it is necessary to predefine some wide areas to be monitored. In this case it is possible to avoid the time of satellite tasking and reduce the system response time.

uncorrelated are considered as new tracks and reported to the concerned nodes. If no identification system data is associated to the ship, and no intelligence information declares the ship as friend, then the ship is considered a “suspect ship”.

**TECHN\_RQ 38 - Common Service 3 – BASIC Requirements**

1. The Service Requesting Node shall provide the Service Providing Node with a single track position or the localization of an area where the wide area suspect vessel detection service shall be performed.
2. The Service Providing Node shall be equipped with an interface module able to receive data (ship detection reports and satellite imagery) from an EO Service Provider or a direct gateway to an existing Ship Detection Report service (eg ASI, MARISS, etc).
3. The output of the BASIC Suspect Vessel Detection Services shall be a ship detection report providing position and kinematic data of the suspect vessels.
4. The Service Providing Node shall confirm to the Service Requesting Node the possibility to provide the expected service outputs (data, performances, time) on the requested track/area.
5. The correlation module shall control the integrity of received data flows in terms of:
  - Anomalous or corrupted data;
  - False tracks;
  - Non coherent data;
  - Multiple tracks referred to the same sea surface object.
6. The Service shall provide the following Satellite Service classes:
  - Level 1: service provided by processing of data of a space based sensor (AIS, radar , VMS, navigation, ...)
  - Level 2: service given by a global processing of a sensor during time and geographical reference (AIS on a zone, multi look radar, optical mosaic,...)
  - Level 3: service given by a processing based on “Fusion of data” of different sensors (optic and radar fusion, space AIS and ground AIS merging,...)
  - Level 4: service given by a processing based on “Fusion of data” of different sensors and “intelligence” (radar – AIS- VMS + Intelligence) necessary to qualify a situation as “abnormal

The satellite services shall provide the following observation capabilities:

- **Detection:** All the optic and radar systems can provide a detection service when sea level is  $\leq 5$  and boat size  $> 10$  m.
- **Classification:** A classification service can give the type of the vessels (cargo vessel, fishing ship, passenger vessel,...)
- **Recognition:** A recognition service can detect that two vessels are sister ships
- **Identification:** The current dual use space services cannot provide alone the identification of a ship. This is the reason why space services cannot be used alone to plan the interventions but they can allow to better target the interventions and the deployment of naval and aerial means.

All levels of services for “ space dual use”:

- have an integrity mode
- need a protection for the transmission of data

Due to the worldwide capacity, a “data policy” is associated to space services to regulate the civil and commercial use of data

7. The BMM track streaming shall include up to XX BMM tracks.
8. The end to end loop from a Service Request to the first transmission of the results has to be less than 10 minutes.
9. Until the Service Request Node will not stop the service request, the Service Providing Node shall update the track streaming each 12 minutes.

**TECHN\_RQ 39 - Common Service 3 - OTHER (added value) Requirements**

1. The Service Providing Node shall correlate Ship Detection Reports (EO plots) from EO satellite with the COP at the moment of reception of a Ship Detection Report.
2. The Service Providing Node shall be able to correlate EO plots, detected in areas inside or outside the terrestrial identification systems coverage, with BMM tracks, which transited out of or inside the BMM covered area in the time period of at least 6 hours before the EO data acquisition time.
3. The output of the correlation service shall be a BMM tracks streaming. Each BMM track will consist of the following attributes:
  - Positional Data
  - Satellite Imagery
  - Alert information for Satellite detected tracks not correlated to the COP in the correlation window of +/- 3 hours.

**TECHN\_RQ 40 - Common Service 4 - Wide Area Polluting Vessel Detection**  
*(Innovative Services made possible by the exploitation of Satellites SAR systems)*

**Added Value:** This service aims to provide support to the detection and, where applicable the identification of polluting vessels through the association and correlation of Ship Detection Reports and NRT (Near Real Time) Oil Spill Detection Reports obtained by Satellite equipped with Synthetic Aperture Radar sensors.

**Typical Use Case:** the requesting Node:

- has detected or reported an oil spill
- has detected or reported an accident

in his competent area but has not adequate monitoring systems.

The service provides NRT Ship Detection and Oil Spill Detection in the desired area by exploiting wide swath SAR images acquired regularly in predefined areas. The service will provide information about oil spill events detected on the images acquired according to a pre-defined procurement plan, but can be also triggered on request where needed in case an event occurs in areas or times not foreseen for monitoring by the satellite procurement plan.

Processing available historical imagery together with the last updates, the detected ships best correlating with the production of the oil spill are identified and either co-registered or back/forward traced to known tracks from AIS, Sat AIS, LRIT, SafeSeaNet/STIRES and other tracks made available by the competent authority.

The tracks of the COP associated to the oil spill (not-correlated, or correlated and so identified) are marked as suspect polluters to be investigated.

**TECHN\_RQ 41 - Common Service 4 - BASIC Service Requirements**

1. The Service Requesting Node shall provide the Service Providing Node with the localization of an area where the wide area polluting vessel and oil spill detection service shall be performed.

2. The Service Providing Node shall be equipped with an interface module able to receive data (ship detection reports, Oil Spill detection reports and satellite imagery) from an EO Service Provider or a direct gateway to an existing Oil Spill Detection service (eg ASI, EMSA, etc).
3. The output of the BASIC Suspect Vessel Detection Services shall be an Oil Spill Detection Report providing position and kinematic data of the suspected vessels.
4. The Service Providing Node shall confirm to the Service Requesting Node the possibility to provide the expected service outputs (data, performances, time) on the requested area.
5. The end to end loop from a Service Request to the first transmission of the results has to be less than 10 min.
6. The Service shall provide the following Satellite Service classes:
  - Level 1: service provided by processing of data of a space based sensor (AIS, radar , VMS, navigation, ...)
  - Level 2: service given by a global processing of a sensor during time and geographical reference (AIS on a zone, multi look radar, optical mosaic,...)
  - Level 3: service given by a processing based on “Fusion of data” of different sensors (optic and radar fusion, space AIS and ground AIS merging,...)
  - Level 4: service given by a processing based on “Fusion of data” of different sensors and “intelligence” (radar – AIS- VMS + Intelligence) necessary to qualify a situation as “abnormal

**TECHN\_RQ 42 - Common Service 4 – OTHER (added value) Service Requirements**

1. The Service Providing Node shall correlate Ship Detection and Oil Spill Detection Reports with the COP soon after the reception of a EO Reports.
2. The Service Providing Node shall be able to correlate EO plots, detected in areas inside or outside the terrestrial identification systems coverage with BMM tracks, which transited out of or inside the BMM covered area in the time period of at least 6 hours before the EO data acquisition time.
3. The correlation module shall control the integrity of received data flows in terms of:
  - Anomalous or corrupted data;
  - False tracks;
  - Non coherent data;
  - Multiple tracks referred to the same sea surface object.
4. The output of the wide area polluting vessel detection service shall be a report on the requested event consisting at least of the following attributes for each of the suspected vessel:
  - Basic ID Data
  - Current Positional Data;
  - Archived Positional Data showing the transit in the polluted area;
  - Historical data (No Basic)
  - Suspicious confidence parameter.

**TECHN\_RQ 43 - Common Service 5 – Wide Area Rapid Mapping Service (including Ports and Littoral Zones)**

*(Innovative Services made possible by the exploitation of Satellites SAR & Optical systems)*

**Added Value:** This service will support Ship classification, Search & Rescue and police operations planning and execution by Competent Authorities, through the fast scheduling and acquisition of Satellite Imagery related to the Area of Interest. The service will support also rapid mapping of strategic and sensitive areas like Ports and Littoral Zones.

**Typical Use Case:** the requesting Node sends on the BMM Network a Service Request indicating the Area of Interest or a Track of Interest, the type of requested Imaging (Optical/SAR, High Resolution/Low Resolution) and the maximum allowed age of the requested imagery. The Service Providing Nodes will check the availability of archive imagery with a compatible age, and where not available, will schedule acquisition of satellite images at the closest opportunity with available satellites (wide swath or narrow swath high resolution), and inform the requesting Node accordingly.

When the image will be available, the Service Providing Node will publish it and make it available to the requesting node for further processing (eg profiling, segmentation and classification)

#### **TECHN\_RQ 44 - Common Service 5 - BASIC Requirements**

1. The Service Requesting Node shall provide the Service Providing Node with the track of interest or the localization of an area where the wide area rapid mapping service shall be performed
2. The Service Providing Node shall confirm to the Service Requesting Node the possibility to provide the expected service outputs (data, performances, time) on the requested area.
3. The Service Requesting Node shall provide the Service Providing Node with the type of requested imaging and the maximum allowed age of the requested imagery.
4. In case of not availability, the Service Providing Node shall allow scheduling of a satellite image acquisition on the requested sensitive zone.
5. The Service Providing Node shall inform the Requesting Node on the time necessary to obtain the required satellite images.
6. The Service Requesting Node shall confirm to the Providing Node the willingness to obtain the required satellite images.
7. Once the satellite images are available, the Service Providing Node shall inform the Service Requesting Node. After its acknowledgment, the image transmission shall start.
8. The age of transmitted information has to be less than XX.
9. The Service shall provide the following Satellite Service classes:
  - **Level 1:** service provided by processing of data of a space based sensor (AIS, radar , VMS, navigation, ...)
  - **Level 2:** service given by a global processing of a sensor during time and geographical reference (AIS on a zone, multi look radar, optical mosaic,...)

The following CORE SERVICES shall be defined in accordance with the SOV-2 and SOV-3 reported in Appendixes.

#### **TECHN\_RQ 45 - Core Service 1 – Information Assurance Services**

The information assurance service shall at least consist of the following services:

- a. The System Security, that shall assure the following capabilities:
  - Crypto Key Management
  - Configuration Management
  - Policy Administration

- Policy Enforcement
  - Policy Decision
  - Logging and Auditing
- b. The Access Management, that shall assure the following capabilities:
- Certificate Validation
  - Identity Management
  - Attribute Management
  - Authentication
  - Authorization
  - Policy Management
  - Access Enforcement
- c. The Data Security, that shall assure the following capabilities;
- Availability
  - Confidentiality
  - Non Repudiation
  - Integrity

**TECHN\_RQ 46 - Core Service 2 – Service Management and Control Service**

The Service Management and Control Service shall at least consist of the following services:

- a. The User Assistant, assuring the following capabilities:
- Notification Service;
  - Workspace Manager;
  - Help and Support Service.
- b. The Enterprise Services, assuring the following capabilities:
- Information Management;
  - User Management.
- c. The System Services, assuring the following capabilities:
- System Management;
  - Network Management;
  - Application Management;
  - Data Management;
  - QoS Management;
  - Data Distribution Plan Management;
  - Data Gateway Service.

**TECHN\_RQ 47 - Core Service 3 – Community Service**

The Community Service shall at least consist of the following services:

- a. Collaboration Services;

- b. Documentation Management;
  - c. Web Portal;
  - d. Geographic Information System Services.
- a. The *Collaboration Service* shall support BMM users in sharing knowledge, experience and expertise on Maritime Surveillance providing near real time and multimedia applications for Instant Messaging, Mail, Chat, VoIP, Video and Voice Conferencing, White Board, File Transfer, and Desktop sharing.
  - b. The *Documentation Management* service shall provide functionalities, within a BMM Central Archive and Repository, to support “document search and retrieve”, “workflow”, “acquisition”, and “archive management”.
  - c. The *Web Portal* shall provide BMM users with a secure and user-friendly Web Based front-end application, which enables them to dynamically and interactively access to a wide range information and application services provided within BMM Network.
  - d. The *Geographic Information System Service* shall provide support for accessing and exploiting digital geographic information, within BMM Network, in terms of GIS Application (including the use of web technologies), geo-database, and geo-catalogue.



#### 4 DESIGN PHASE

Applicable technical solutions have to keep non intrusive for the systems of the partners. Partners have to control the exchanges they decide to implement with enough confidence. So a centralised system is unacceptable; network oriented architecture has to be prioritized. Information's traceability and forwarding control are among the technical objectives of the project.

**TECHN\_RQ 48** - The BMM Network will be an open, flexible network based on a net-centric and non centralized approach: no central controlling entity, but a distributed virtual BMM centre over each node. Each Node will host a Common BMM Application Layer implementing BMM services available for other BMM nodes having the necessary privileges.

**TECHN\_RQ 49** - BMM will be Service Oriented, meaning that no pure data access, or data repository is foreseen in the network; the BMM Network will have a Service Oriented Application Layer, implementing at each Node a set/subset of Common Services, a Network Management and a Data Distribution Control Service, Information Assurance Services (System Security, Access Management and Data Security), Services Management and Control Services (User Assistance, Enterprise Services and System Services).

**TECHN\_RQ 50** - The BMM Network, designed to support flexible sharing, integration and exploitation of heterogeneous Maritime Surveillance Data by Competent Authorities, will treat unclassified data, and will be ready for handling classified information, assuring the implementation and control of a defined data distribution policy.

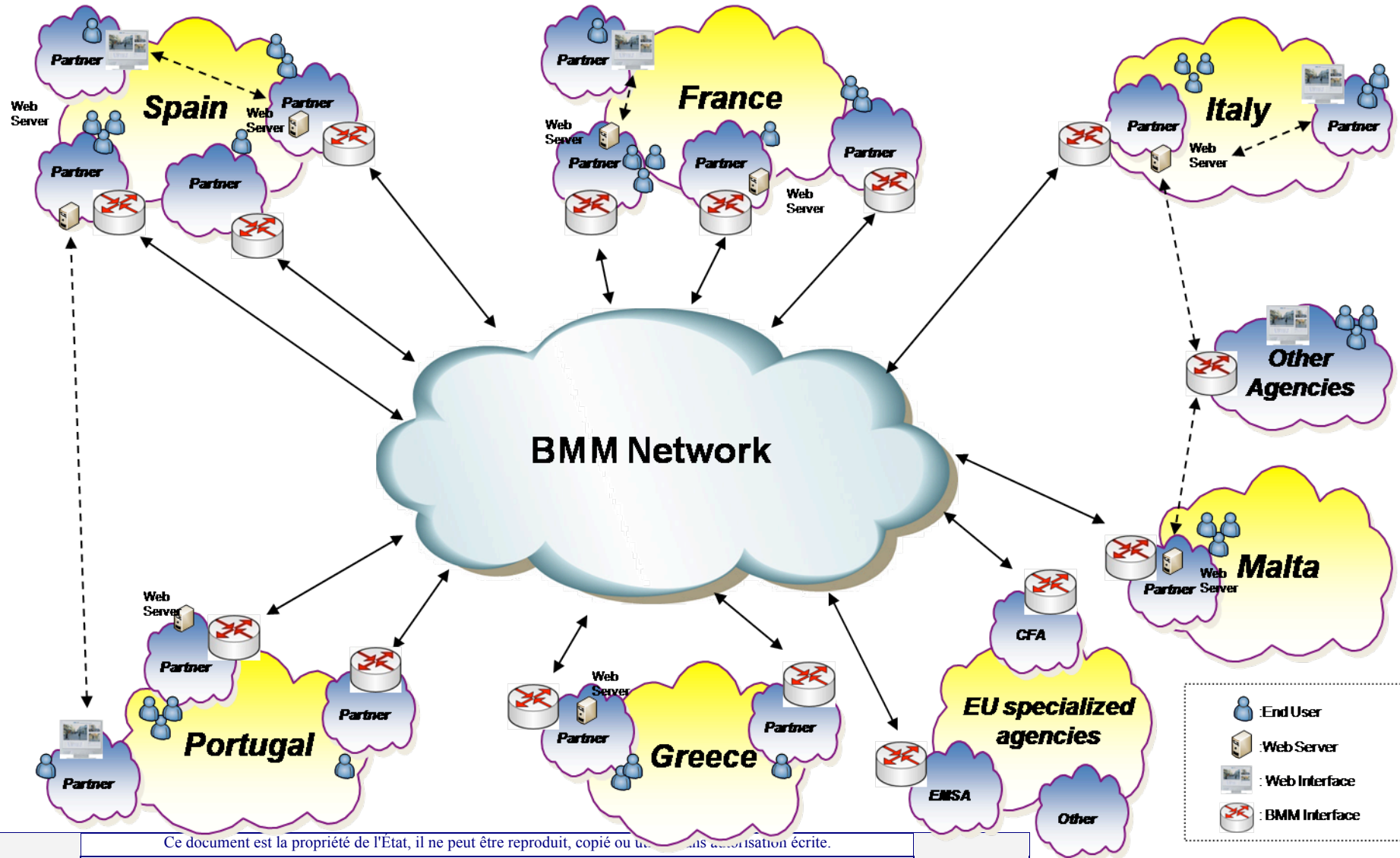
**TECHN\_RQ 51** - A flexible Data Distribution Plan shall be implemented, allowing multi-level tracing of information exchanges and management of data access privileges.

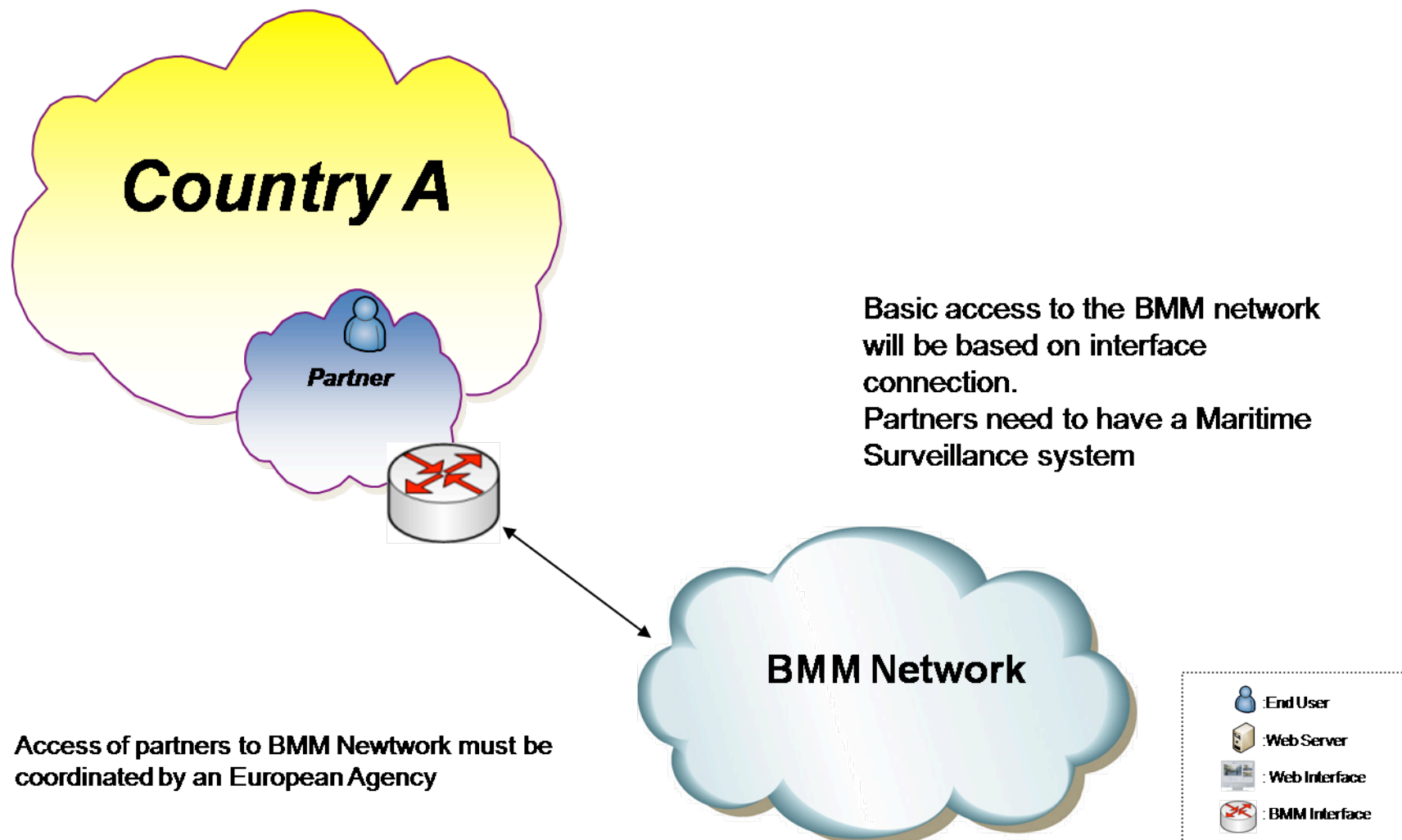
**TECHN\_RQ 52** - Each Node will be left the maximum freedom to implement and grant added value services to the BMM community.

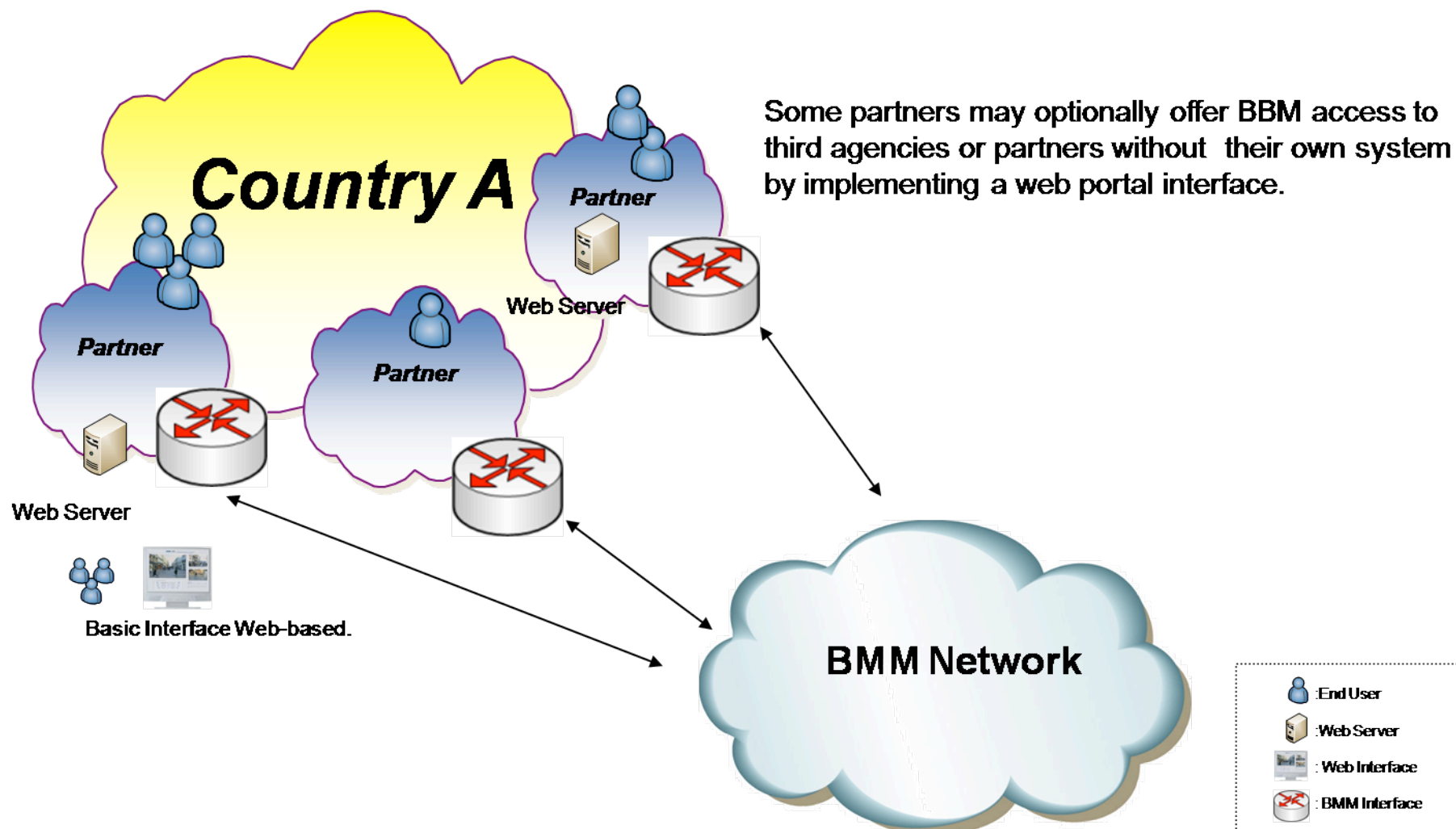
**TECHN\_RQ 53** - At national level, the BMM node will be interfaced through a dedicated peer-to-peer connection, to National systems in order to receive local data and to provide BMM information, which are outputs of BMM common services, in respect to privileges specified in the BMM data distribution plan.

The following pictures provide illustrative reference architecture solutions that the Contractor could implement for the BMM network at regional and national level.

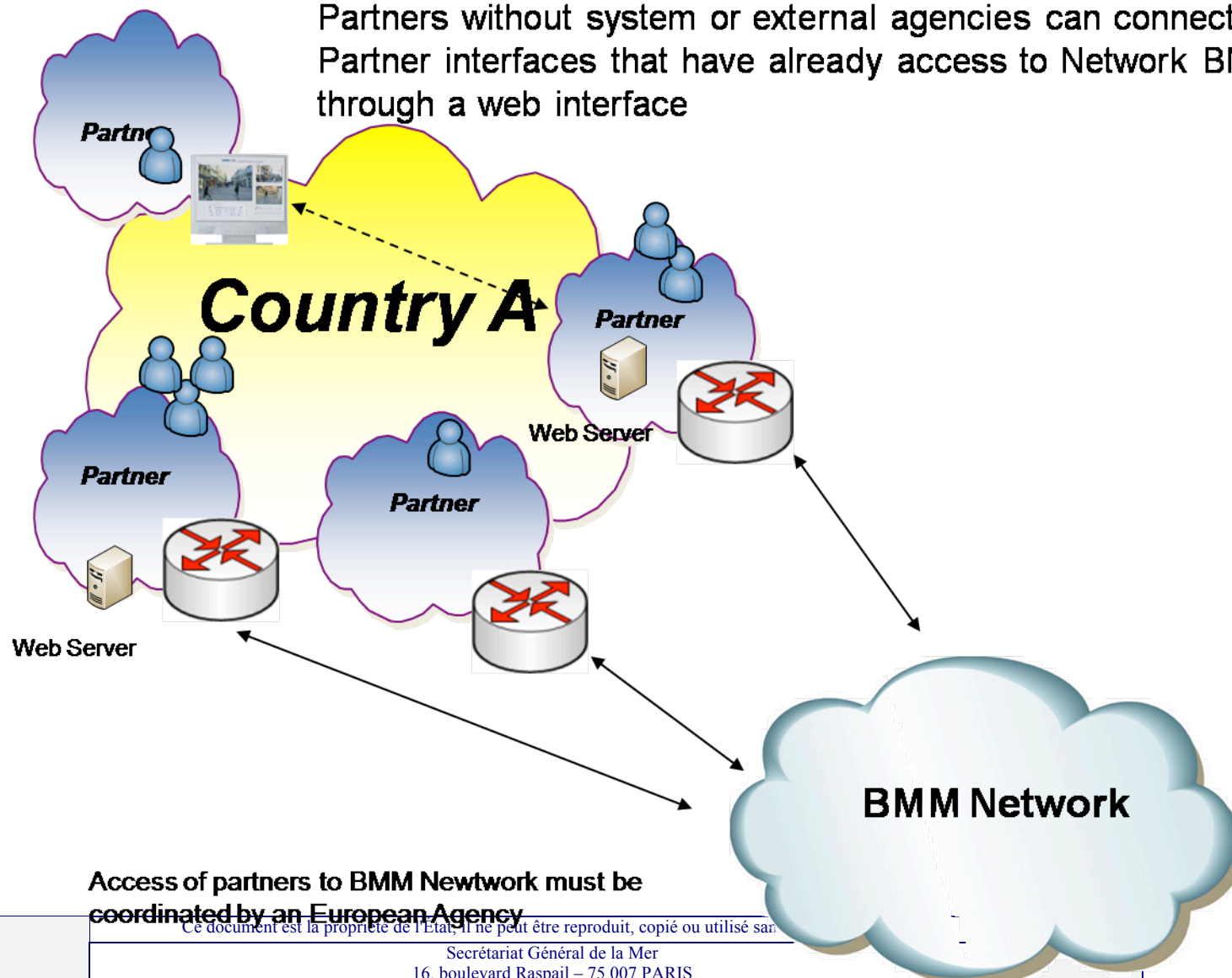












Partners without system or external agencies can connect to Partner interfaces that have already access to Network BMM through a web interface

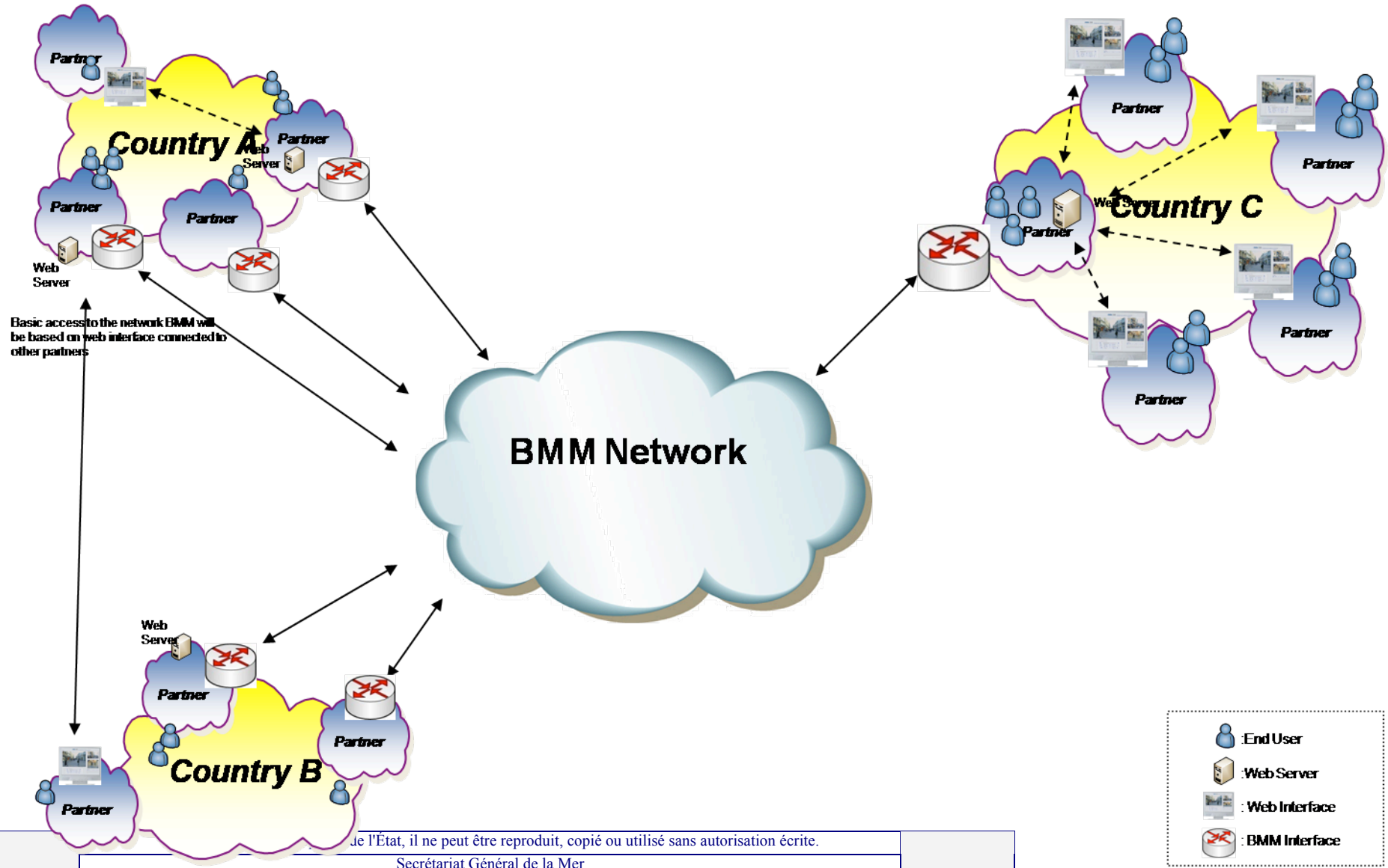


Access of partners to BMM Network must be coordinated by an European Agency

	: End User
	: Web Server
	: Web Interface
	: BMM Interface

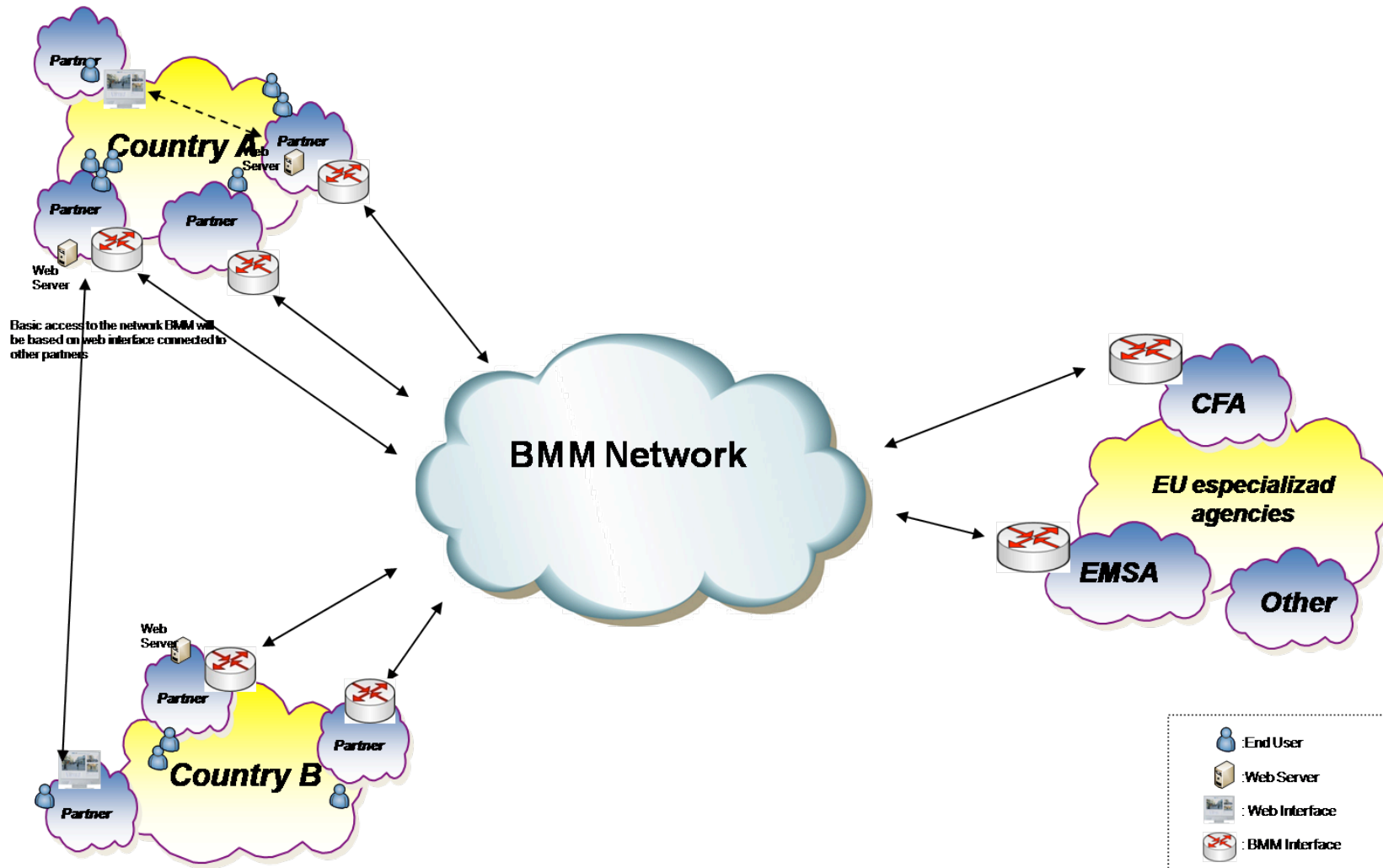
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**TECHN\_RQ 54** - The Contractor shall specify in the *System Functionality Description View (SV-4)* the physical nodes (one or more new BMM nodes, one or more existing national legacy systems or both of them) where the BMM Common Services will be implemented.

**TECHN\_RQ 55** - The Contractor shall specify in *System Functionality Description View (SV-4)* the physical nodes (one or more new BMM nodes, one or more existing national legacy systems or both of them) where the BMM Core services will be implemented.

**TECHN\_RQ 56** - To reduce impacts on interfacing BMM network nodes with the existing national systems, the BMM-to-National\_System interface protocol will be the native interface protocol of each National System. Therefore, if BMM will have to send a BMM track to National System #1, the BMM track message will be in accordance to National System #1 system track message. Vice versa, if National System #1 will have to send to BMM a system track, it will be transferred as a National System #1 system track message.

**TECHN\_RQ 57** - In addition, BMM National Users will access BMM added value services via web browser in a Client-Server architecture. A BMM user will only have to log-in into the BMM web portal to access “its” BMM services according to its privileges.

#### 4.1 Orientations for a future exchange capability in maritime surveillance

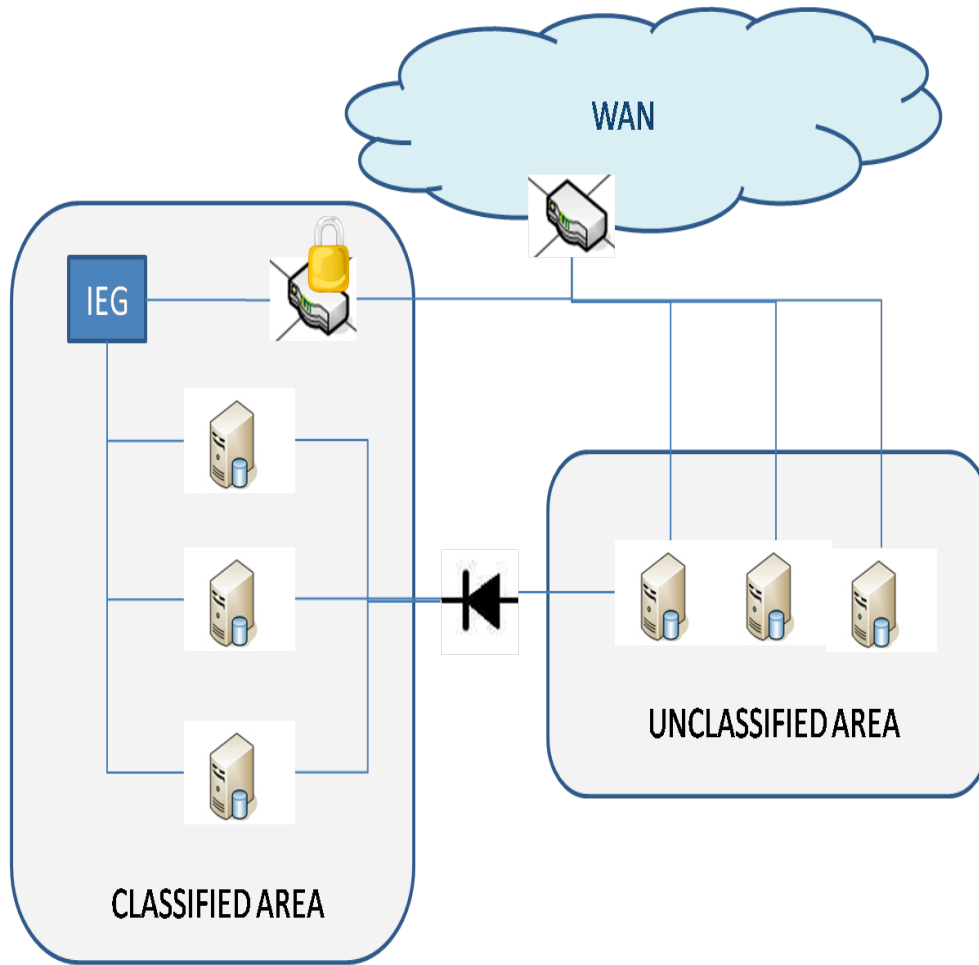
**TECHN\_RQ 58** - The Contractor shall be responsible of studying relevant protocols to allow exchanges between the connected systems.

**TECHN\_RQ 59** - The Contractor has to demonstrate the versatility of the proposed architecture to further integrate other additional services.

**TECHN\_RQ 60** - The Contractor has to implement security mechanism to assure the handling of sensitive information.

**TECHN\_RQ 61** - The following dual-use architecture shall be adopted to provide handling and sharing of classified data, and shall be validated during the demonstration phase (see the figure below):

- ✓ The BMM Network will handle both classified and unclassified data
- ✓ The BMM Node will consist of independent and separate areas
- ✓ The BMM Services input data will be both classified and unclassified data
- ✓ The BMM Services data outputs will be both classified and unclassified data
- ✓ BMM security policy will follow EU Common Information Sharing Environment (CISE) roadmap





## 5 EXPERIMENTAL SYSTEM'S REALISATION

With the contribution of all the partners, the Technical Working Group has defined the technical requirements applicable to the experimental system. Two documents, as system views (SV-1 and SV-4) following NAF methodology, describe the requirements dedicated to system interface description and system functionality description. They are respectively exposed in appendix #6 & 7.

**TECHN\_RQ 62** - The Contracting Authority shall inform the Contractor about the real surveillance systems that will be involved in the demonstration.

**TECHN\_RQ 63** - The Contractor is responsible of the software design and the system's integration. The Contractor shall build the system and the interfaces with the real or simulated surveillance systems involved in the demonstration.

**TECHN\_RQ 64** - The Contractor shall provide a system specification document dedicated to its functionalities, compliant with the System Views SV-1 and SV-4.

**TECHN\_RQ 65** - The Contractor shall provide a system design definition document dedicated to its technical architecture, compliant with the System Views SV-1 and SV-4.

**TECHN\_RQ 66** - The Contractor shall provide a system functionalities description view (SV-4) describing the allocation of designed functionalities and architecture to the BMM services oriented views and operational views.

**TECHN\_RQ 67** - Acceptance of these documents by the Contracting Authority is a prerequisite for the startup of the experimental system implementation phase.

### 5.1 Intermediate Architecture Requirements for Experimental Systems

#### **TECHN\_RQ 68 - Basic Requirements**

- a. The BMM Network shall provide the capabilities to develop a Common Maritime Picture.
- b. The architecture of the BMM Network shall be scalable. REQ. 5. Each Operational Nodes will be able to provide information of the own systems which compose that operational node.
- c. The different interfaces of the SV-1 represent an information exchange need to fulfil the operational missions as defined in the Information Exchange Catalogue (OV-2).
- d. The Maritime Surveillance National Systems used as information resources by the BMM network architecture are specified in the Information Exchange Catalogue (OV-2).
- e. Each Node will host a common BMM application layer implementing BMM services available for others BMM nodes which have the necessary access privileges and implement the common layer. Proprietary application layers can be used at national level if desired, but have to be adapted to the common BMM layer.
- f. The architecture network shall be adaptable in order to support easy implementation of changes and additions in information exchange and network processes.
- g. The architecture shall provide an efficient way of searching information.
- h. The architecture shall use open standards as far as possible
- i. The network shall provide mechanisms for handling classified information.
- j. The network shall provide mechanism to manage sensitive and classified data (the level of classification needs to be defined)
- k. The architecture shall support the application of security policies.

- l. The architecture should use as far as possible the available resources of the participant Agencies in an efficient way.
- m. The architecture shall provide a mechanism for assigning a object ID to each target (ship, person).
- n. Information shall be distributed at a rate that will be directly related to the mission operations.
- o. Central network repositories shall not be used for storing information. A non centralized approach shall be adopted.
- p. The architecture should provide redundancy mechanisms in order to provide an acceptable availability rate.
- q. The life cycle cost, including implementation, should be minimized.
- r. The startup threshold (effort of getting the experimental network up) should be as low as possible.

**TECHN\_RQ 69 - Interoperability**

- a. The architecture shall provide mechanisms for effective sharing of information.
- b. The architecture shall support the interoperability of a wide variety of geographically distributed, non standard, heterogeneous systems.
- c. The architecture shall meet Network Enabled Capabilities requirements (NNEC) to insure interoperability at organizational and process level.
- d. The architecture shall demonstrate technological solutions allowing the exchange of information between BMM military and civilian users.
- e. The architecture shall demonstrate interoperability with Dual Use Space Systems.
- f. The communication and transmission data protocol will be based on Internet Protocol (IP).

**TECHN\_RQ 70 - Information Exchange**

- a. The architecture shall provide mechanisms for maritime surveillance information exchange between National Agencies participating in the BMM Network.
- b. The architecture shall facilitate the retrieval of information from sources hosted on different types of platforms and produced by heterogeneous applications.
- c. Information along the network shall be separated in different data sets with regards to legal, security and mission aspects.
- d. It is proposed the use of XML messaging as far as possible for the Data Exchange Format in the Demonstrator architecture. Anyway it will be possible using Standards, in particular AIS Format for the universal Automatic Identification System and NMEA for VTMS (Vessel Traffic Management) systems.
- e. The Data Exchange System shall take into account the list of data and the interchange rules defined in Information Exchange Requirements Matrix (OV-3).

**TECHN\_RQ 71 - Service- Oriented Architecture**

- a. The architecture will be Service-Oriented. The architecture will support the implementation of the minimum set of services defined in SOV-1 and SOV-2 views.
- b. Each node shall consist of producers of services and information and consumers of such services and information.
- c. Services shall be independent of any platform or operating system.

- d. To ensure interoperability on the network, services shall be implemented according to established standards and protocols.
- e. A service shall support multiple users simultaneously.
- f. Access to services and information can be restricted through the application of data and network security policies.
- g. Each node will implement a set of services depending on the compromised information exchange.
- h. A network node that provides data shall control which data sets are available for each node that requests data.
- i. Access privileges to network services will be implemented at application layer.

## 6 DEMONSTRATION'S PHASE

The demonstration pursues two main aims: illustrate the technical recommendations and prove their validity.

**TECHN\_RQ 72** - The contracting authority informs the Contractor of the number and the identity of the partners involved in the demonstration's phase. It is specified if they are involved as a “player” (owning a real or simulated surveillance system running an interface with the experimental system) or as an observer.

**TECHN\_RQ 73** - The contracting authority has defined the specifications of the scenarios to run, and the relevant measures of effectiveness and performance (see System Functionality Description SV-4 preliminary). The Contractor shall propose the full-scale scenario in compliance with such specifications, for approval of the Contracting Authority

**TECHN\_RQ 74** - The Contractor shall deliver the experimental system in the premises of every partners involved in the demonstration's phase.

**TECHN\_RQ 75** - The Contractor shall implement the data needed by the scenarios (configuration data, permanent data, and fake data) and ensure the connexion with the real or simulated surveillance systems involved in the demonstration.

**TECHN\_RQ 76** - In order to make sure that the network, the interfaces with real or simulated surveillance system and the experimental system are all ready to work, a dry run is driven by the Contractor at least one month before the demonstration. The partners involved as players participate to this dry run.

**TECHN\_RQ 77** - The Contractor shall provide direct assistance to the players and hot line assistance to the observer during the whole demonstration's phase.

**TECHN\_RQ 78** - The Contractor shall provide a demonstration conclusion report two weeks after the demonstration.

## **7 LIABILITIES AND OTHER OPERATIONAL CONSTRAINTS ARISING FROM THE LEGAL FRAMEWORK**

*To be completed by Legal Working Group*

## 8 LIST OF DELIVERABLES

T0: day of the contract's placement

### 8.1 Study's phase

Number	Description of the deliverable	For	Deadline
1.1	Maritime information data Model	Acceptance	
1.2	Catalogue of web-services	Attribution	
1.3			

### 8.2 Design phase

Number	Description of the deliverable	For	Deadline
2.1	Exchanging protocol	Attribution	
2.2	Network oriented technical architecture applicable to a future maritime information exchange system	Acceptance	
2.3	Report explaining : <ol style="list-style-type: none"> <li>1. the compliance with other European initiatives and with the Common Information Sharing Environment (CISE) ;</li> <li>2. the versatility of the proposed architecture to further integrate other additional services.</li> </ol>	Attribution	
2.4	Network oriented technical architecture of the experimental system	Acceptance	
2.5	Experimental system specification document	Acceptance	
2.6	Experimental system design definition document	Acceptance	
2.7	System Functionality Description (SV-4) document	Acceptance	

### 8.3 Demonstration's phase

Number	Description of the deliverable	For	Deadline
3.1	Experimental system, including xx light clients	Attribution	
3.2	Experimental system installation in the premises of the partners involved in the demonstration's phase	Attribution	
3.3	Implementation of the chosen scenarios and assistance to the participants during the demonstration	Attribution	
3.4	Analysis report of the demonstration and conclusion	Acceptance	

## 8.4 Proposal's phase

Number	Description of the deliverable	For	Deadline
4.1	Feasible scenarios for the future European Integrated Surveillance Network in the Mediterranean basin	Acceptance	
4.2	Cost Analysis and Master Plan for the implementation of the most feasible scenarios	Acceptance	
4.3	Institutional and legal governance framework for the implementation of the most feasible scenarios	Acceptance	

## 8.5 Intellectual Property Rights

All the deliverables shall become the property of the Contracting Authority at the end of the project, with the exception of the Deliverable 3.1 (Experimental System), for which specific conditions shall be agreed by the Contractor and the Contracting Authority, taking into account the CCAP and the actual exploitation of Industrial assets in the demonstrator.

## 9 APPENDIX 1 – AV-2 (INTEGRATED DICTIONARY)

This document has been established by the BMM Users Working Group and approved by the BMM Steering Group.

### OPERATIONAL NODES

Country	Agency
France	Secretariat General for the Seas (SGMer) Ministry of Defence-Marine National Ministry of Defence-Direction Generale de l'Armement Ministry of Budget- Customs Ministry of Sustainable Developments- Maritime affairs Ministry of Immigration Ministry of Interior Centre National d'Études Spatiales (CNES)
Greece	Ministry of Mercantile Marine, the Aegean and Islands policy Ministry of foreign affairs
Italy	Italian Space Agency Ministry of Defence-Statto Maggiore della Difesa Ministry of Defence-Statto Maggiore della Marina Ministry of Home Affairs - Immigration Ministry of Home Affairs – Anti-drugs Ministry of Infrastructures and Transports- Direzione Generale del trasporto marittimo e per vie d'acqua interne Ministry of Infrastructures and Transports-Capitaneria di Porto Guardia Costiera



	Ministry of Economy-Comando Generale della Guardia di Finanza
	Ministry of Economy-Customs Agency
	Ministry of Foreign Affairs
Malta	The Office of the Prime Minister
Portugal	Ministry of Defence-Task Group for Maritime Affairs
	Ministry of Defence-Navy
	Ministry of Defence-Air Force
	Ministry of Home Affairs-National Republican Guard
	Ministry of Home Affairs-Aliens and Border Service
	Ministry of Public Works, Transports and Communications-Port and maritime Transportation Institute
	Ministry of Agriculture, Rural Development and Fisheries-General Directorate of Fisheries and Aquiculture
	Ministry of Economy and Innovation-Authority for Food and Economical Safety
	Ministry of Finance and Public Administration-Customs
Spain	Ministry of Foreign Affairs
	Ministry of Defence-Navy
	Ministry of Home Affairs-Guardia Civil
	Ministry of Environment-Fisheries
	Ministry of Economy-Customs
	Ministry of Transports and Infrastructures

**INFORMATION EXCHANGE**

Group	No	Information	Description
Positional Data			
	1	Track number or label	
	2	Position latitude and longitude	
	3	Time Greenwich Mean Time (GMT)	
	4	Course	
	5	Speed	

6 Navigational status

---

7 Type of sensor

---

8 Data provider

---

Basic Current  
Voyage Data

9 Events related with last port

---

10 Port of origin

---

11 Last port of Call

---

12 Estimated Time of Departure  
And  
Actual Time of Departure (ETD  
+ ATD)

---

13 Activity

---

14 Port of destination

---

15 Estimated Time of Arrival and  
Actual Time of Arrival (ETA  
+ATA)

---

16 Route Plan

---

17 Cargo (IMO class + quantity)

---

18 Draught

---

19 Master/Captain details

---

20 Crew list

---

21 List of persons o/b

---

22 Total number of persons onboard

---

23 Elements of suspicion of the persons on board

---

24 Latest report

---

25 International Ship and Port  
Facilities Security Code (ISPS)  
level

---

26 Platform limitations

---

BASIC ID  
Data

27 Name

---

28 Year of construction

---

29 Type

30 Hull main color

---

31 Number of masts

---

32 Propulsion type

---

33 Ship maximum speed

---

34 Length

---

35 Beam

---

36 Max draught

---

37 Gross tonnage

---

38 Dead weight

---

39 Port of registry

---

40 Flag

---

41 Ship owner

---



42 Ship company

---

43 International Maritime Organization (IMO) number

---

44 Maritime Mobile Service Identity (MMSI) number

---

45 International Radio Call Sign

---

46 Classification society

---

47 Ship photograph

---

Historical Data  
( No basic)

48 Global Maritime Distress and Safety System (GMDSS) class

---

49 Ship name history

---

50 Ship ports history

---

51 Ship flag history

---

52 Ship ownership history

---

53 Ship routes history

---

54 Ship MMSI history

---

55 Port State control history

---

56 Elements of suspicion of the vessel

---

Other Data

57 Satellite Imagery

---

58 Environmental information (detail what info) (SERV)

---

59 Meteorological and Oceanographic (METOC) data (SERV)

---

60 Intelligence

---

61 Alerts

---

62 Infrastructure

---

63 Insurance coy

---

64 Ship agent

---

65 Environmental Incident  
(BASIC DATA)

---

66 Safety Incident Report  
(UNCLAS)(BASIC DATA)

---

67 Elaborated Sectorial  
Information

---

**10 APPENDIX 2 - OV-2 (INFORMATION EXCHANGE CATALOGUE)**

This document has been established by the BMM Users Working Group and approved by the BMM Steering Group.

Group	No	Information	Package
Positional data	1	Track number or label	basic
	2	Position latitude and longitude	basic
	3	Time GMT	basic
	4	Course	basic
	5	Speed	basic
	6	Navigational status	basic
	7	Type of sensor	basic
	8	Data provider	basic
Basic Current voyage data	9	Events related with last port	classified
	10	Port of origin	basic
	11	Last port of Call	basic
	12	Time of Departure (ETD + ATD)	basic
	13	Activity	classified
	14	Port of destination	basic
	15	Time of Arrival (ETA +ATA)	basic
	16	Route Plan	basic
	17	Cargo( IMO class+ quantity)	basic
	18	Draught	basic
	19	Master/Captain details	classified
	20	Crew list	classified

	21	List of persons o/b	classified
	22	Total number of persons onboard	basic
	23	Elements of suspicion of the persons on board	classified
	24	Latest report	classified
	25	ISPS level	basic
	26	Platform limitations	basic
BASIC ID Data	27	Name	basic
	28	Year of construction	basic
	29	Type	basic
	30	Hull main color	basic
	31	Number of masts	basic
	32	Propulsion type	basic
	33	Ship maximum speed	basic
	34	Length	basic
	35	Beam	basic
	36	Max draught	basic
	37	Gross tonnage	basic
	38	Dead weight	basic
	39	Port of registry	basic
	40	Flag	basic
	41	Ship owner	basic
	42	Ship company	basic
	43	IMO number	basic
	44	MMSI number	basic
	45	International Radio Call Sign	basic
	46	Classification society	basic

	47	Ship photograph	basic
Historical data ( No basic)	48	GMDSS class	basic
	49	Ship name history	classified
	50	Ship ports history	classified
	51	Ship flag history	classified
	52	Ship ownership history	classified
	53	Ship routes history	classified
	54	Ship MMSI history	classified
	55	Port State control history	classified
	56	Elements of suspicion of the vessel	classified
Other data	57	Satellite Imagery	basic
	58	Environmental information (detail what info) (SERV)	basic
	59	METOC data (SERV)	basic
	60	Intelligence	classified
	61	Alerts	classified
	62	Infrastructure	classified
	63	Insurance coy	basic
	64	Ship agent	basic
	65	Environmental Incident (BASIC DATA)	basic
	66	Safety Incident Report (UNCLAS)(BASIC DATA)	basic
	67	Elaborated Sector Information	classified

See the integrated dictionary (AV-2) for the definition of each of the information items.



### 11 APPENDIX 3 – OV-3 INFORMATION EXCHANGE REQUIREMENT MATRIX

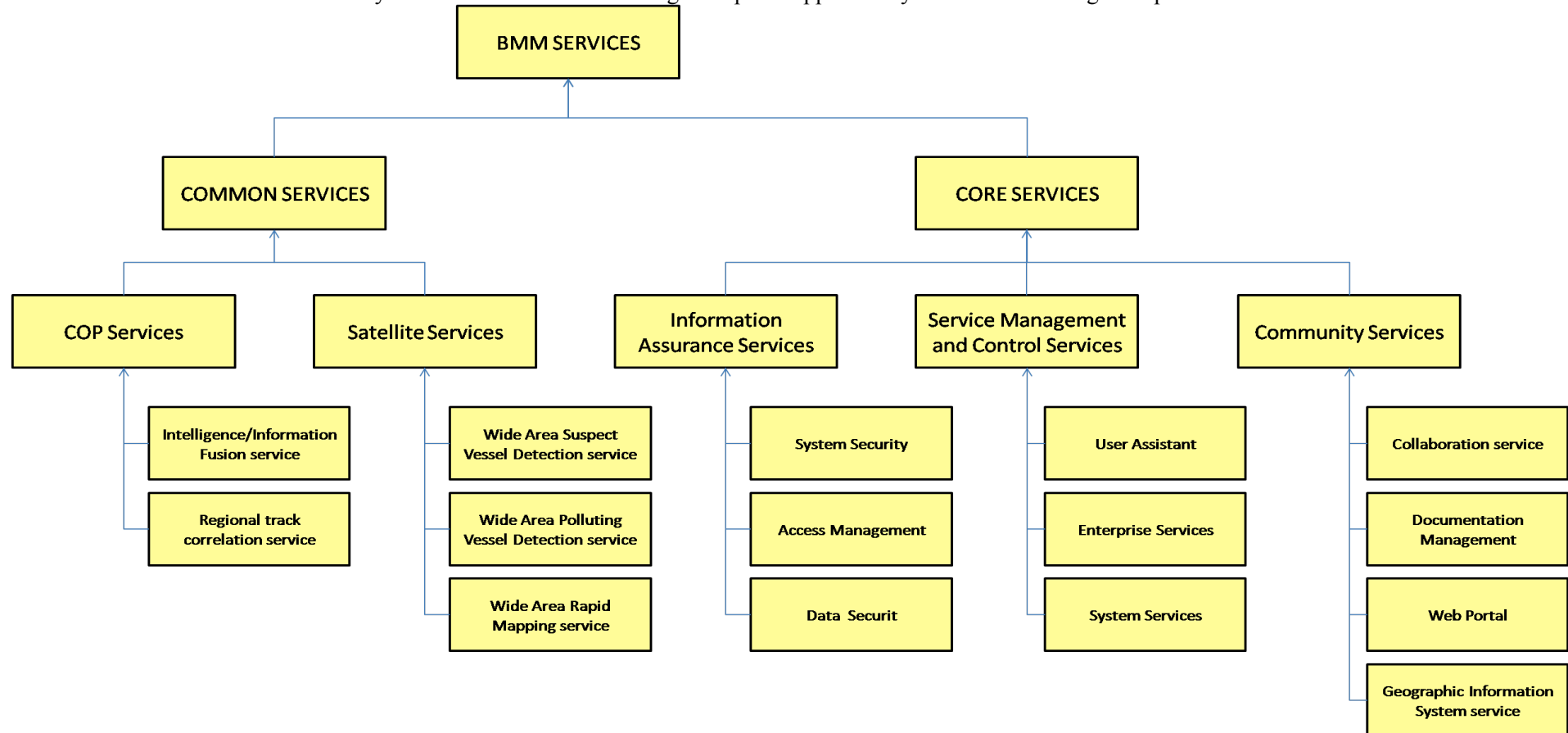
This document has been established by the BMM Users Working Group and approved by the BMM Steering Group.

		Maritime data obtained by the Agency-Availability to share with others										Maritime data needed										
		France	Germany	Italy	Spain	United Kingdom	Netherlands	Belgium	Portugal	Greece	Cyprus	France	Germany	Italy	Spain	United Kingdom	Netherlands	Belgium	Portugal	Greece	Cyprus	
Maritime data	<b>Positional data</b>																					
	Track number/label																					
	Position latitude and longitude																					
	Time-Chart																					
	Course																					
	Speed																					
	Navigation status																					
	Type of sensor																					
	Data provider																					
	<b>Basic Current voyage data</b>																					
	Events related with last port																					
	Port of origin																					
	Last port of Call																					
	Time of Departure (ETA + ATD)																					
	Activity																					
	Port of destination																					
	Estimated time of arrival (ETA +ATA)																					
	Route Plan																					
	Cargo (IMO class+ quantity)																					
	Draught																					
Master/Captain details																						
Crew list																						
List of persons on/b																						
Total number of persons onboard																						
Elements of suspicion of the persons on board																						
Latest report																						
ISPS level																						
Platform limitations																						
<b>BASIC ID Data</b>																						
Name																						
Year of construction																						
Type																						
Hull main color																						
Number of masts																						
propulsion type																						
Ship maximum speed																						
Length																						
Beam																						
Max draught																						
Gross tonnage																						
Dead weight																						
Port of registry																						
Flag																						
Ship owner																						
Ship company																						
IMO number																						
MMSI number																						
International Radio Call Sign																						
Classification society																						
Ship photograph																						
IMO/ISPS class																						
<b>Historical data (No basic)</b>																						
Ship name history																						
Ship ports history																						
Ship flag history																						
Ship ownership history																						
Ship routes history																						
Ship MMSI history																						
Port State control history																						
Elements of suspicion of the vessel																						
<b>Other data</b>																						
Satellite imagery																						
Environmental information (detail what info) (SERV)																						
METCC data (SERV)																						
Intelligence																						
Alerts																						
Infrastructure																						
Insurance coy																						
Ship agent																						
Environmental INCIDENT (BASIC DATA)																						
Safety INCIDENT REPORT (UNCLAS)(BASIC DATA)																						
Elaborated Sectorial Information																						

■ Data not available by this partner  
■ Data available for sharing in the whole BMM community  
■ Data available for sharing in limited sectorial communities  
■ Data available for sharing with respect to legal restrictions  
■ Data the partner does not want to share

## 12 APPENDIX 4 – SOV-1 SERVICE TAXONOMY

This document has been established by the BMM Technical Working Group and approved by the BMM Steering Group.



### 13 APPENDIX 5 – SOV-2 SERVICE INTERFACE DEFINITION

This document has been established by the BMM Technical Working Group and approved by the BMM Steering Group. The following synoptic table summarize the Service Operational Views for the defined Services:

- 1) **Service outcome:** defining the intended real world effects or information provided by the service;

Service	Information provided
Intelligence/Information Fusion service	<p>Information on known ship: accidents, port operations, intentional communication with ship, statistics concerning the specific ship or ship type.</p> <p>Intelligence on known ship: abnormal movements, captured communication from ship, intelligence got from other sources and deemed relevant.</p> <p>Semantic Analysis and Information Fusion: intelligence/information overall report on known ship.</p>
Regional track correlation service	<p>Geometrical and Statistical Correlation: enrichment of local recognized maritime picture with “BMM” tracks and confidence indexes.</p>
Wide Area Suspect Vessel Detection Services	<p>Ship Detection Reports: position reports of ship detected from satellite image processing.</p> <p>Geometrical and Statistical Correlation: co-registration/back-tracing/forward-tracing of ships detected from satellite image processing with national RMP tracks.</p> <p>Suspect Ship Classification: if none RMP tracks and no intelligence information is associated to a “satellite” ship, a new track is generated and it is considered “suspect ship”.</p>
Wide Area Polluting Vessel Detection service	<p>Oil Spill Detection Reports: slick location, position and extent, time of observation.</p> <p>Oil Spilled Source Reports: vessel/oil rigs/wreck/pipeline identification, confidence assignment (High, Low).</p>
Wide Area Rapid Mapping service	<p>Time of Availability: the time when up-to-date imagery of the Area of Interest or of the Track of Interest will be available on the BMM Network</p> <p>Satellite Images: SAR or Optical Imagery of an Area of Interest, made available on the BMM network</p>

Service	Information provided
Information Assurance Service	<p>BMM data distribution plan: defines rules and access rights (i.e. which users can receive what info).</p> <p>User Account management: add/delete users, set users privileges, maintain BMM users log.</p> <p>Data Access management: protect and maintain access to BMM critical data.</p> <p>Data management: backup and recovery policy for BMM critical data.</p> <p>BMM network interface: data exchange between BMM national nodes.</p> <p>BMM to National System interface: data exchange between BMM national node and BMM users national systems.</p>
Service Management and Control Services	<p>Service management: assessing Quality of BMM Services (performance, availability, reliability, maintainability, latency, confidentiality integrity).</p> <p>BMM network clock: usage of Global Navigation Satellite Systems.</p>
Community Services	<p>Chat, Mail, VoIP services: BMM online environment to share knowledge, experience and expertise on Maritime Surveillance between BMM users.</p> <p>Flow and document management: track and store BMM electronic documents.</p> <p>BMM portal management: maintain the BMM web portal.</p> <p>Common GIS layers for BMM Nodes</p>

- **Service identification:** identify and uniquely naming a service; describing the set of functionality offered; describing responsibilities; identifying the service's consumers;

Service	Offered Functionality	Responsibilities	Service Consumers
Intelligence/Information Fusion service	Tracks Streaming Data Fusion Semantic Analysis	TBD by UWG	TBD by UWG
Regional track correlation service	Tracks Streaming Geometrical Correlation Statistical Correlation	TBD by UWG	TBD by UWG
Wide Area Suspect Vessel Detection Services	Satellite Ship Detection Geometrical Correlation Statistical Correlation Ship Classification	TBD by UWG	TBD by UWG
Wide Area Polluting Vessel Detection service	Satellite Oil Spill Detection Oil Spill Source Identification	TBD by UWG	TBD by UWG
Wide Area Rapid Mapping service	Sat. Acquisition Scheduling Sat. Images distribution	TBD by UWG	TBD by UWG
Information Assurance Service	Data Exchange regulation User Account Management Data Access Management Data Management	ALL	ALL
Service Management and Control Services	GPS clock distribution Service Management BMM network interface BMM to National System Interface	ALL	ALL
Community Services	Chat Mail VoIP communications Flow and Documentation Management Web Portal Management GIS Layer Management	ALL	ALL

- **Service properties (measure of success parameters):** the following view should identify specific properties of each service that may differ from one instance or implementation of a service to another.

This View shall be prepared by the Contractor and shall report the quality of service experimental system in terms of the:

- performance,
- security,
- availability,
- reliability,
- maintainability,
- latency,
- confidentiality,
- integrity.

The following table reports the minimum set of performance parameters that shall be declared by the Contractor for the Common Services.

Service	Measure of Success
Intelligence/Information Fusion service	Maximum number of tracks  Timing for data availability (time period from the service request to the service provision)  Semantic analysis algorithms  Detection and Classification Capabilities
Regional track correlation service	Maximum number of tracks  Timing for data availability (time period from the service request to the service provision)  Source data type (AIS, LRIT, VMS, etc.)  Track streaming update time  Detection and Classification Capabilities
Wide Area Suspect Vessel Detection Services	Covered Area  Maximum number of tracks  Timing for data availability (time period from the service request to the service provision)  Detection, Classification, Recognition and Identification Capabilities  Type of Satellite Imagery

Service	Measure of Success
Wide Area Polluting Vessel Detection service	<p>Covered Area</p> <p>Maximum number of tracks</p> <p>Timing for data availability (time period from the service request to the service provision)</p> <p>Detection, Classification, Recognition and Identification Capabilities</p> <p>Type of Satellite Imagery</p>
Wide Area Rapid Mapping service	<p>Covered Area</p> <p>Timing for data availability (time period from the service request to the service provision)</p> <p>Satellite Scheduling Capabilities</p> <p>Type of Satellite Imagery</p>

- **Service interfaces:** specifying the interfaces through which the service consumer may exchange information with this service.

Service	Interface	I/O	Operation	Entity (from UWG)	
Intelligence/Information Fusion service	Intelligence/Information Fusion Request	I	setTrackOfInterest	Track Ship Current Voyage Activity Route Crew Passengers Person Historical	
		I	setAreaOfInterest	Port Countries <b>Area</b> Environmental Information Meteorological data	
	Intelligence/Information Fusion Report		O	sendInformation	Track Ship Navigational Status Current Voyage Activity Route Crew Passengers Historical Person Sensors <b>Communications from ship Statistics (for ship and ship type)</b>
			O	sendIntelligence	Activity Crew Passengers Historical Person Event
	Regional track correlation service	Regional Correlation Request	I	setTrackOfInterest	Track Ship Historical



Service	Interface	I/O	Operation	Entity (from UWG)
		I	setAreaOfInterest	Port Countries <b>Area</b>
	Regional Correlation Track	O	sendTrack	Track (including <b>track index</b> and <b>quality</b> ) Ship Navigational Status Current Voyage Activity Route Crew Passengers Historical Person Sensors
Wide Area Suspect Vessel Detection Services	Suspect Vessel Detection Request	I	setTrackOfInterest	Track Ship Historical
		I	setAreaOfInterest	Port Countries <b>Area</b>
		I	setIntelligence	Activity Crew Passengers Historical Person Event Port Country <b>Area</b>

Service	Interface	I/O	Operation	Entity (from UWG)
	Suspect Vessel Detection Report	O	sendTrack	Track (including <b>identity index</b> ) Ship Navigational Status Current Voyage Activity Route Crew Passengers Historical Person Sensors
	Suspect Vessel Detection Report	O	sendImage	Satellite Image
Wide Area Polluting Vessel Detection service	Polluting Vessel Detection Request	I	setTrackOfInterest	Track Ship Historical
		I	setAreaOfInterest	Port Countries <b>Area</b> Environmental Information Meteorological Data
	Polluting Vessel Detection Report	O	sendTrack	Track (including <b>identity index</b> ) Ship Navigational Status Current Voyage Activity Route Crew Passengers Historical Person Sensors
		O	sendImage	Satellite Image
Wide Area Rapid Mapping service	Rapid Mapping Request	I	setTrackOfInterest	Track Ship <b>Image_Type (WS, NS_HR)</b>

Service	Interface	I/O	Operation	Entity (from UWG)
		I	setAreaOfInterest	Port Countries <b>Area</b> <b>Image_Type (WS, NS_HR)</b>
	Rapid Mapping Report	O	ackRapidMapping	Port Countries <b>Area</b> <b>Time</b> of <b>Availability</b> <b>Image_Type</b>
	Rapid Mapping Image	O	sendPictureforArea	<b>Area</b> Satellite Image

## 14 APPENDIX 6 – SOV-3 SERVICES TO CAPABILITY MAPPING

This document has been established by the BMM Technical Working Group and approved by the BMM Steering Group.

The purpose of the Services to Operational Activities Mapping sub view is to provide traceability by illustrating which services support which operational activities. It is worth noting that not every service is utilized in direct support of an operational activity. E.g. an infrastructure service is typically utilized to support the maintenance and operation of one or more functional service, rather than directly supporting operational activities.

	<<Capability>> BASIC SERVICE	<<Capability>> OTHER (ADDED VALUE)
<<Service>> Intelligence/Information Fusion service	Basic ID Data Current Basic Voyage Data	Archived Basic Voyage Data; Historical data (No Basic) Other Data (Intelligence, Alerts, etc.)
<<Service>> Regional track correlation service	Positional Data of not correlated tracks Identities of Data Sources Weight of each data sources in a potential (and local) data fusion process	Positional Data of correlated track; Identities of Data Sources; Weight of each data sources in a potential (and local) data fusion process
<<Service>> Wide Area Suspect Vessel Detection Services	ship detection report	Positional Data of correlated tracks; Satellite Imagery Alert information for Satellite detected tracks not correlated to the COP in the correlation window of +/- 3 hours
<<Service>> Wide Area Polluting Vessel Detection service	Oil Spill Detection Report	Basic ID Data Current Positional Data; Archived Positional Data showing the transit in the polluted area; Historical data (No Basic) Suspicious confidence parameter.
<<Service>> Wide Area Rapid Mapping service	Satellite Imagery	

## 15 APPENDIX 7 – SV-1 SYSTEM INTERFACE DESCRIPTION

This document, dedicated to the experimental system, has been established by the BMM Technical Working Group and approved by the BMM Steering Group.

## 16 APPENDIX 8 – SV-4 SYSTEM FUNCTIONALITY DESCRIPTION - PRELIMINARY

This document, dedicated to the experimental system, has been established by the BMM Technical Working Group and approved by the BMM Steering Group.

This View shall be prepared by the Contractor and shall contain the description of the experimental system functionalities in terms of:

- Allocation of the experimental system functionalities to the Common Services and Core Services defined by the SOV-1, SOV-2 and SOV-3 views
- Definition of the experimental system architecture with respect to the implementation of the Operational View OV-1 and System View SV-1
- Definition of the experimental system SOA framework and data model with respect to the Operational Views OV-2 / OV-3 and SOV-3
- Definition of validation test cases for the defined services and functionalities wrt the defined Service Requirements
- Definition of the detailed scenario for the demonstration of the system response wrt the defined User Operational requirements.