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## Abbreviations & Definitions

| *Term* | *Definition* |
|---|---|
| ***Aggregation (of information)*** | ***(Definition from the CISE Architecture Vision Document)*** A function where requested information from multiple sources are grouped together to form a single response e.g. a list or a set. |
| ***Agreement*** | ***(Definition from the CISE Architecture Vision Document)*** A contract between one or more authorities acting as information providers and one or more authorities acting as information consumer to define the term and conditions for accessing and providing services. Can be bi-lateral (between 2 authorities) or community agreement (between more than 2 authorities). May include service level specifications in the form of Service Level Agreements (refer to SLAs). |
| ***AIS Regional Server*** | ***(Definition from SSN IFCD)*** A server that a group of MSs agrees to maintain**1** in accordance with the security and reliability requirements of the SSN system and to use to relay AIS data from their national SSN systems to the central SSN system. It may include data collection, storage, backup and re-distribution, as well as monitoring the availability and quality of the data. For these functionalities, and as long as the MSs concerned request to use it as an alternative to the direct connection to the central SSN system, the AIS Regional Server will be considered to be a component of the central SSN system. |
| ***Application*** | ***(Definition from the CISE Architecture Vision Document)*** Software designed to perform specific tasks and that exposes certain functionalities through interfaces. |
| ***Architecture*** | ***(Definition from the CISE Architecture Vision Document)*** The structure of components, their inter-relationships, and the principles and guidelines governing their design and evolution over time. |
| ***Architecture building blocks*** | ***(Definition from the CISE Architecture Vision Document)*** A constituent of the architecture model that describes a single aspect of the overall model. These elements typically describe required capability and shape the specification of Solution Building Blocks. |
| ***Authentication*** | ***(Definition from SSN IFCD)*** The process of determining whether someone or something is who or what it is declared to be. |
| ***Authorisation*** | ***(Definition from SSN IFCD)*** The process of granting access rights to a user. |
| ***Authority (or public authority)*** | ***(Definition from the CISE Architecture Vision Document)*** Any organisation that has an interest in maritime data. An authority can be local, regional, national or European level.<br><br>Throughout this document, the terms authority and public authority are used interchangeably. |
| ***Broadcasting*** | ***(Definition from the CISE Architecture Vision Document)*** A type of message distribution where a message is sent to all members, rather than specific members, of a group such as a department or enterprise. |
| ***Central SafeSeaNet system*** | ***(Definition from SSN IFCD)*** This comprises those SSN components (both technical and procedural) which act as the central/nodal point for the exchange of information between national SSN systems. Such components are the responsibility of the Commission, in close cooperation with the MSs, and are administered by EMSA on their behalf. |
| ***Classified information*** | ***(Definition from SSN IFCD)*** |

| *Term* | *Definition* |
|---|---|
| | Any information and material, an unauthorised disclosure of which could cause varying degrees of prejudice to EU interests, or to one or more of its Member States, whether such information originates within the EU or is received from Member States, third States or international organisations (in accordance with Commission Decision 2001/844/EC amending its internal Rules of Procedure by annexing Commission Provisions on Security). |
| ***Clustered system*** | ***(Definition from the CISE Architecture Vision Document)***<br>An architecture that ties together authority systems with the use of nodes. Clustering provides access to all files from any of the clustered nodes regardless of the physical location of the file. |
| ***Commercial sensitive information*** | ***(Definition from SSN IFCD)***<br>Information that is likely to prejudice the commercial interest of any person (a person may be an individual, a company, the public authority or any other legal entity). |
| ***Commissioning tests*** | ***(Definition from SSN IFCD)***<br>Tests which assess whether national SSN systems support the reliable, timely and accurate exchange of information within the SSN system (as defined in the MS Commissioning Tests Plan). The commissioning process covers all SSN messages transmitted to/from the central SSN system. |
| ***Complexity*** | ***(Definition from the CISE Architecture Vision Document)***<br>The number of relationships between elements.<br><br>Acts as an information sharing barrier in technology architectures. |
| ***Confidentiality*** | ***(Definition from SSN IFCD)***<br>The process that ensures that information is not made available or disclosed to unauthorized entities. |
| ***Coordinator*** | ***(Definition from the CISE Architecture Vision Document)***<br>A type of a node that clusters other nodes. Similarly to nodes, coordinators can have programmed or engineered capability to recognise and process (e.g. aggregate) or forward messages to other nodes or authority systems.<br><br>Implements specifications e.g. commonly agreed information exchange model, transport protocol and service interface. |
| ***Correlation (of information)*** | ***(Definition from the CISE Architecture Vision Document)***<br>A function where requested information from multiple sources are analysed to determine what relationships between the information exist. |
| ***Data*** | ***(Definition from the CISE Architecture Vision Document)***<br>Facts represented in a readable language (such as numbers, characters, images, or other methods of recording) on a durable medium. Data on its own carries no meaning, but when given context, data becomes information. |
| ***Data provider*** | ***(Definition from SSN IFCD)***<br>An authorised SSN user who provides information required by the SSN legal framework to other MSs through the SSN system, and makes it available to end users. |
| ***Data user*** | ***(Definition from SSN IFCD)***<br>An authorised SSN user requesting information required by the SSN legal framework from other MSs through the SSN system. |
| ***Digital Certificate*** | ***(Definition from SSN IFCD)***<br>A digitally signed statement that certifies the binding between the owner's identity information and his/her electronic public key. |
| ***EIS*** | European Index Server (one of the central SSN system applications) |
| ***Encryption*** | ***(Definition from SSN IFCD)***<br>The Cryptographic transformation of data into a form that conceals the data's original meaning to prevent it from being known or used by unauthorized entities. |
| ***Exchange mechanism*** | ***(Definition from SSN IFCD)*** |

| *Term* | *Definition* |
|---|---|
| | Constitutes the entire electronic data interchange system, including the transmission, message flow, document format, and software used to interpret the documents. |
| ***eMS*** | Group of experts from EU Member States dealing with maritime administrative simplification and electronic information services. |
| ***Fusion (of information)*** | ***(Definition from the CISE Architecture Vision Document)***<br>A function where requested information from multiple sources are blended to form a single response.<br><br>Fusion of data fills information gaps and can reduce the uncertainty in information received from various sources. |
| ***Gateway*** | ***(Definition from the CISE Architecture Vision Document)***<br>A connection point in a network. The gateway converts information, data or other communications from one protocol or format to another.<br><br>Implements specifications e.g. commonly agreed information exchange model, transport protocol and service interface. |
| ***High Level Steering Group on SafeSeaNet (HLSG)*** | ***(Definition from SSN IFCD)***<br>The group defined in Annex III of Directive 2002/59/EC (as amended), which comprises MS and Commission representatives, and which has the tasks defined in Commission decision 2009/584/EC of 31 July 2009. The HLSG shall:<br>– make recommendations to improve the effectiveness and security of SafeSeaNet;<br>– provide appropriate guidance for the development of SafeSeaNet;<br>– assist the Commission in reviewing the performance of SafeSeaNet, and;<br>– approve the IFCD document and any amendments thereto. |
| ***Information*** | Contextual meaning associated with, or derived from, data. |
| ***Information consumer*** | ***(Definition from the CISE Architecture Vision Document)***<br>A role assumed by a participant to facilitate interaction and connectivity in the use of services. |
| ***Information exchange model*** | ***(Definition from the CISE Architecture Vision Document)***<br>A logical representation to illustrate the structure, semantics, and relationships of information. |
| ***Information owner*** | ***(Definition from the CISE Architecture Vision Document)***<br>A user who ensures the consistency and validity of information. They define the security needs of the information for which they are responsible.<br><br>Information ownership means identifying which participants have the right to change information, together with their obligation to determine impact and notify all impacted parties. Typically, each authority as the owner of its information may define the rules for access to its information. |
| ***Information provider*** | ***(Definition from the CISE Architecture Vision Document)***<br>A role assumed by a participant to facilitate interaction and connectivity in the exchange of information. |
| ***Information source*** | Authentic provenance of the information. |
| ***Integrity*** | ***(Definition from SSN IFCD)***<br>The process that ensures the accuracy and completeness of information. |
| ***Interoperability*** | ***Definition from the CISE Architecture Vision Document)***<br>Interoperability, within the context of European public service delivery, is the ability of disparate and diverse organisations to interact towards mutually beneficial and agreed common goals, involving the sharing of information and knowledge between the organisations, through the business processes they support, by means of the exchange of data between their respective ICT systems. |
| ***Interoperability*** | ***(Definition from the CISE Architecture Vision Document)*** |

| *Term* | *Definition* |
|---|---|
| ***agreement*** | Means of reaching consensus on a common information sharing interface (also referred to as service interface) through which services can be offered. There are 3 different types of interoperability agreements: semantic, technical and organisational |
| ***Interoperability framework*** | ***(Definition from the CISE Architecture Vision Document)*** An interoperability framework is an agreed approach to interoperability for organisations that wish to work together towards the joint delivery of public services. Within its scope of applicability, it specifies a set of common elements such as vocabulary, concepts, principles, policies, guidelines, recommendations, standards, specifications and practices. |
| ***Intricacy*** | ***(Definition from the CISE Architecture Vision Document)*** The state of containing a large number of parts or details.<br><br>Acts as an information sharing barrier in technology architectures. |
| ***License*** | ***(Definition from the CISE Architecture Vision Document)*** A licence is a document containing provisions allowing or restricting actions and uses normally reserved for the copyright holder. |
| ***Local Competent Authority (LCA)*** | ***(Definition from SSN IFCD)*** These are authorities or organisations designated by MSs to receive and transmit information pursuant to the SSN legal framework (e.g. port authorities, coastal stations, Vessel Traffic Services, shore-based installations responsible for a mandatory ship's routing system or a mandatory ship reporting system approved by the IMO and bodies responsible for coordinating search and rescue operations). |
| ***Maritime Support Services (MSS)*** | ***(Definition from SSN IFCD)*** The 24/7 EMSA service responsible for monitoring the EU maritime transport operational systems (in particular SSN) for the exchange between MSs (and some participating third countries) of information on ships, their voyages, their cargoes and incidents at sea (including accidents and pollution). The MSS is permanently monitoring the data quality in, and the performance and continuity of, the operational systems. It also provides a helpdesk facility to the SSN Community and supports the prompt mobilisation of EMSA's contracted oil pollution response vessels following a MS request. |
| ***MSW*** | Maritime Single Window |
| ***MS*** | Member States |
| ***National Competent Authority (NCA)*** | ***(Definition from SSN IFCD)*** The body which assumes responsibility for a national SSN system and its management on behalf of a MS. It is responsible for the operation, verification and maintenance of the national SSN system, and for ensuring that the standards and procedures comply with the requirements described within the IFCD and with the agreed technical and operational documentation. The NCA responsibilities are defined in Annex |
| ***National SafeSeaNet system (national SSN system)*** | ***(Definition from SSN IFCD)*** This comprises technical and procedural SSN elements which support the provision, retrieval and use of information required to implement the SSN legal framework within an MS. These elements are the responsibility of the relevant MS and can be administered either directly by the NCA, via the establishment of LCAs or by setting up other appropriate arrangements with third parties. |
| ***NCA 24/7*** | ***(Definition from SSN IFCD)*** The contact point at national level used for 24/7 operational contacts between MSs and with the EMSA MSS. |
| ***Node*** | ***(Definition from the CISE Architecture Vision Document)*** A connection point in a network that clusters authority systems or other nodes. In general, a node has programmed or engineered capability to recognise and |

| *Term* | *Definition* |
|---|---|
| | process (e.g. aggregate) or forward messages to other nodes or authority systems.<br><br>Implements specifications e.g. commonly agreed information exchange model, transport protocol and service interface. |
| ***Non-repudiation*** | ***(Definition from SSN IFCD)***<br>The process that ensures that the entities involved in a communication cannot deny having participated (e.g. sending entity cannot deny having sent a message). |
| ***Notification*** | ***(Definition from the CISE Architecture Vision Document)***<br>A service that can be used to inform many authorities at once (e.g. by broadcast). |
| ***Notification*** | ***(Definition from SSN IFCD)***<br>Required information sent by the national SSN systems to the central SSN system to inform the SSN community of an event related to a vessel or an incident at sea. |
| ***NSW*** | National Single Window |
| ***Operational requirements*** | ***(Definition from SSN IFCD)***<br>Requirements which focus on the operational usability of SSN, and which define the information, business rules and responsibilities that should be respected during SSN system operation. Operational requirements derive from the legal framework, as interpreted by decisions taken by the HLSG or SSN groups and recorded in SSN documentation. |
| ***Password*** | ***(Definition from SSN IFCD)***<br>A string of characters used to authenticate the identity of a user. The format of passwords used in SSN is given in the SSN Technical and Operational Documents. |
| ***Payload*** | ***(Definition from the CISE Architecture Vision Document)***<br>The essential bits of data that are being carried within a message "packet". The payload does not include the "overhead" data required to get the packet to its destination. |
| ***PCS*** | Port Community System |
| ***Personal Data*** | ***(Definition from SSN IFCD)***<br>Any information relating to an identified or identifiable natural living person ('data subject'); an identifiable person is one who can be identified, directly or indirectly, in particular by reference to an identification number. |
| ***Principle*** | ***(Definition from the CISE Architecture Vision Document)***<br>They provide for a high level design rationale, which must always be taken into account when creating, changing or removing any CISE-related element. |
| ***Proportionality*** | ***(Definition from the CISE Architecture Vision Document)***<br>Similarly to the principle of subsidiarity, the principle of proportionality regulates the exercise of powers by the European Union. It seeks to set actions taken by the institutions of the Union within specified bounds. Under this rule, the involvement of the institutions must be limited to what is necessary to achieve the objectives of the Treaties. In other words, the content and form of the action must be in keeping with the aim pursued.<br><br>The principle of proportionality is laid down in Article 5 of the Treaty on European Union. The criteria for applying it is set out in the Protocol (No 2) on the application of the principles of subsidiarity and proportionality annexed to the Treaties. |
| ***Protocol (or transport protocol)*** | ***(Definition from the CISE Architecture Vision Document)***<br>A set of procedures in information exchange that the authority systems or nodes use to send messages back and forth. Networks and systems cannot communicate unless they use the same protocol or make use of a gateway. |
| ***PSC*** | Port State Control |
| ***PSC Directive*** | Directive 2009/16/EC on port State control |
| ***PSW*** | Port Single Window |
| ***Request (or information*** | ***(Definition from the CISE Architecture Vision Document)*** |

| *Term* | *Definition* |
|---|---|
| ***request)*** | A message sent from an information consumer to an information provider, asking for information according to a certain criteria with the use of a common information exchange model. |
| ***Request/response mechanism*** | ***(Definition from SSN IFCD)***<br>This describes the activities to be carried out when a MS requests detailed information on a notification via SSN. |
| ***Requirement*** | ***(Definition from the CISE Architecture Vision Document)***<br>Determine the expectations of the stakeholders with regards to information sharing and discovery, information assurance and security, collaboration, organisation, etc. |
| ***RFD*** | **Reporting Formalities Directive**<br>A Directive of the European Commission coming into force on 1/6/2015 dealing with the reporting formalities for ships arriving in and/or departing from ports of the MSs |
| ***Routing*** | ***(Definition from the CISE Architecture Vision Document)***<br>Functionality of forwarding messages without the information consumer and provider having to know each other. Usually present in nodes and coordinators. |
| ***SafeSeaNet authority (SSN authority)*** | ***(Definition from SSN IFCD)***<br>These are authorities defined as NCAs, LCAs and EMSA, on behalf of the European Commission for the central SSN system. This covers both "Competent authorities" and "Port authorities" as defined in Article 3 of 2002/59/EC as amended. |
| ***SafeSeaNet Group (SSN group)*** | ***(Definition from SSN IFCD)***<br>The working group, which comprises representatives from MSs, the Commission and EMSA with responsibility for managing technical and operational issues relating to SSN with tasks as defined in section 1.6. of the IFCD |
| ***SafeSeaNet system (SSN system)*** | ***(Definition from SSN IFCD)***<br>This comprises both the national and central SSN systems. |
| ***SafeSeaNet user (SSN user)*** | ***(Definition from SSN IFCD)***<br>This refers to a person or persons performing the same function and position (e.g. duty officers on shift work within a single MRCC or VTS-centre) (i.e. an SSN Web user using a browser-based web interface at central, national or local level) or a system (at national level the national SSN system, and at local level the LCA systems). |
| ***Sea basin*** | ***(Definition from the CISE Architecture Vision Document)***<br>This refers to the EU sea regions: Baltic Sea, Black Sea, Mediterranean Sea, North Sea, the Atlantic and the Arctic Ocean. |
| ***Service*** | ***(Definition from the CISE Architecture Vision Document)***<br>A unit of functionality that an authority exposes to other participants of CISE. These services are accessible through a service interface. |
| ***Service interface*** | ***(Definition from the CISE Architecture Vision Document)***<br>A point of access where a service is made available to another application. |
| ***Service Level Agreement*** | ***(Definition from the CISE Architecture Vision Document)***<br>A service-level agreement (SLA) is a contract between an information provider and an information consumer that specifies, usually in measurable terms, what services the information provider will furnish. Some metrics that SLAs may specify include:<br><br>What percentage of the time services will be available;<br><br>The number of users that can be; served simultaneously; |

| *Term* | *Definition* |
|---|---|
| | Specific performance benchmarks;<br><br>Help desk response time. |
| ***SOAP*** | Simple Object Access Protocol, is a protocol specification for exchanging structured information in the implementation of web services in computer networks |
| ***Solution Building Block*** | ***(Definition from the CISE Architecture Vision Document)***<br>Represent the actual components that will be used to implement the required capability. |
| ***S-TESTA*** | ***(Definition from SSN IFCD)***<br>A private network that gives public administrations access to modern telecommunications services for daily dealings with other public sector bodies across Europe. Its purpose is to provide European institutions and agencies, as well as administrations in the MSs, with network infrastructure that ensures the easy, reliable exchange of data. |
| ***STIRES*** | SafeSeaNet Information, Relay and Exchange System, a software application of the central SSN system |
| ***Subscription*** | ***(Definition from the CISE Architecture Vision Document)***<br>An agreement between the information provider and the information consumer for providing, receiving or making use of information in a continuing or periodic nature. |
| ***Subsidiarity*** | ***(Definition from the CISE Architecture Vision Document)***<br>The principle of subsidiarity aims at determining the level of intervention that is most relevant in the areas of competences shared between the EU and the Member States. This may concern action at European, national or local levels. In all cases, the EU may only intervene if it is able to act more effectively than Member States. |
| ***System Security information*** | ***(Definition from SSN IFCD)***<br>Information which requires protection as its public or unauthorised disclosure would reveal privileged or confidential information related to persons, systems, operations and/or facilities. |
| ***Traceability*** | ***(Definition from SSN IFCD)***<br>Traceability is the process to verify the history, location, or application of the information by means of documented recorded identification. |
| ***Translator*** | ***(Definition from the CISE Architecture Vision Document)***<br>An application that converts the information of an authority legacy system to the structure of the commonly agreed information exchange model of CISE and vice versa. Without the translator information cannot be exchanged between CISE participants. |
| ***UN/LOCODE*** | ***(Definition from SSN IFCD)***<br>The United Nations Code for Trade and Transport Locations (UN/LOCODE) is an international, geographical coding scheme which has been developed and maintained by the United Nations Economic Commission for Europe (UNECE). |
| ***Unclassified information*** | ***(Definition from SSN IFCD)***<br>Information that can be released to individuals without a clearance except when it is deemed personal or sensitive. |
| ***User community*** | ***(Definition from the CISE Architecture Vision Document)***<br>A user community is composed of a set of public authorities, which are bound together by their function e.g. customs, marine environment, maritime safety and security, defence, fisheries control, border control. |
| ***XML*** | Extensible Markup Language (XML) is a computer language that defines a set of rules for encoding documents in a format that is both human-readable and |

| *Term* | *Definition* |
|---|---|
| | machine-readable |
| ***VAS*** | Value adding Service |
| ***VTMIS Directive*** | Directive 2002/59/EC (as amended by the 2009/17/EC) establishing a Community vessel traffic monitoring and information system and repealing Council Directive 93/75/EEC |

## Executive summary

This report includes (in the chapters 2 to 5) an extensive analysis of the current state of play and forthcomings in the e-Maritime domain. The analysis is made from the perspective of systems operated by Administrations at national or EU level with a special focus on those:

- Interacting with SSN currently;
- Those that shall interact with it or in the near future (NSWs).

We tried, via the analysis of collected information, to identify how the work in eMAR project can contribute in practical terms in the development of ***an integrated information management system*** in Europe based on existing systems such as **SSN**. It is identified that the greater challenges, that eMAR work should focus, relates with:

1. The implementation of reporting gateways and Maritime Single Windows for port clearance, border controls on persons and maritime declaration of health.
2. The collection and distribution of cargo information in the form of a harmonized eManifest.
3. The interoperability framework between Maritime Authorities, Custom Authorities and Industry.

In all these three areas eMAR may contribute by:

a. Proposing a reference specification for the data exchange mechanism utilized for maritime and customs formalities. This would be based on a modification of the CRS initially developed in the eFreight project taking into account recent developments, especially the work carried out by eMS Group and AnNA project on business rules and data mapping. The conceptual model is presented in the Appendix D.
b. Proposing a conceptual approach on the content of the eManifest based on a principle of full re-usability of previously reported data (refer to 5.2.3)
c. Devising and proposing reference specifications for a number of “interoperable” applications, which could be utilized in a multi-node environment for the collection and distribution of information related to port and cargo clearance (refer to the the Appendix D “Guide for the implementation of SSN/ NSW – related e-Maritime services and interoperability of these services with National) and EU systems”)

Chapter 6 provides the conclusions of the report including a proposal for NSW/ SSN compliant application on which eMAR develops reference specifications as well as a summary of Policy, Standardisation recommendations and recommendations for further research work

# 1 Rationale for this report

**Editor note**
The quotation below (providing the rationale for this report) is extracted from the COM(2009) 8 final *"Strategic goals and recommendations for the EU's maritime transport policy until 2018"*

*"Looking ahead to 2018, the capacities of the EU's maritime transport system should be strengthened by putting in place* ***an integrated information management system*** *to enable the* ***identification, monitoring, tracking and reporting*** *of all vessels* ***at sea*** *and* ***on inland waterways to and from European ports and in transit through or in close proximity to EU waters****.*

*Such a system would be part of the e-Maritime Initiative and* ***develop into an integrated EU system providing e-services*** *at the different levels of the transport chain. In that regard, the system should be able to interface with the e-Freight, e-Customs and Intelligent Transport Systems*[1]*, allowing the users to track and trace the cargo not only during the waterborne part of the journey, but across all transport modes in a true spirit of co-modality.*

*In a broader context, building on the resources currently available, such as AIS, LRIT,* ***SafeSeaNet*** *or CleanSeaNet, or those that are being developed, such as Galileo and GMES, and taking into account the need to fully develop EUROSUR*[2]*, the EU should promote the creation of a platform to ensure the* ***convergence*** *of sea-, land- and space-based technologies, the* ***integrity*** *of applications and appropriate* ***management and control of information*** *on a "****need-to-know****" basis. Civil-military cooperation should be promoted in order to avoid duplication.*

*The Commission is also working towards the creation of an integrated cross-border and cross-sectoral EU surveillance system*[3]*.* ***One of its key objectives is to set up an exchange of information networks amongst national authorities, with a view to increasing interoperability of surveillance activities, improving the effectiveness of the operations at sea and facilitating the implementation of the relevant Community legislation and policies***[4]*.*

[1] COM(2007) 607, 18.10.2007.
[2] Cf. Council Conclusions on 5.6.2008 with regard to the future development of Frontex, the Eurosur and the future challenges of EU external border management.
[3] SEC(2008) 2737, 3.11.2008.
[4] An overview of the actions undertaken in 2008 is available in SEC (2008) 3727 of 13.10.2008 and a Communication from the Commission to the Council and the European Parliament on maritime surveillance is foreseen for 2009.

# 2 SSN today

**Editor's note**
The information in this chapter is based on the SafeSeaNet Interface and Functionalities Control Document (SSN IFCD) and the SSN XML reference guide v.07. The complete text of these documents is available at http://www.emsa.europa.eu/documents/technical-documentation.html.
References to EU initiatives linked to SSN are sourced from a variety of sources, the main been the EMSA and European Commission sites.

SafeSeaNet (SSN) is a European network encompassing all the EU Member States as well as Iceland and Norway acting as the European Platform for Maritime Data Exchange between maritime Administrations. Its role is to ensure the implementation of Community legislation. It is composed of a network of national SafeSeaNet systems in Member States and a SafeSeaNet central system acting as a nodal point.

## 2.1 SSN legal basis

Following the accident of the ERIKA off the French coast in 1999, the European Union adopted several legal instruments for improving the prevention of accidents at sea and combating marine pollution. Directive 2002/59/EC of the European Parliament and Council of 27 June 2002 as amended establishing a Community vessel traffic monitoring and information system and repealing Council Directive 93/75/EEC, aims at establishing in the Community, a vessel traffic monitoring and information system *"with a view to enhancing the safety and efficiency of maritime traffic, improving the response of authorities to incidents, accidents or potentially dangerous situations at sea, including search and rescue operations and contributing to a better prevention and detection of pollution by ships"*. To achieve this goal, in 2001 the European Commission launched development of a European network - the so-called SafeSeaNet. SafeSeaNet is currently operated in accordance with European Parliament and Council Directive 2002/59/EC of 27 June 2002 as amended by the Directive 2009/17/EC, establishing a Community vessel traffic monitoring and information system.

The legal requirements which relate to SSN, are defined by the following legal documents:

1. Directive 2002/59/EC as amended (establishing a Community vessel traffic monitoring and information system);
2. Directive 2000/59/EC (on port reception facilities for ship-generated waste and cargo residues);
3. Directive 2009/16/EC (on port State control);
4. Directive 2010/65/EU (entering into implementation in June 2015) (on reporting formalities for ships arriving in and/or departing from ports of the MSs)] and;
5. Regulation (EC) No 725/2004 (on enhancing ship and port facility security)

## 2.2 SSN system – Functionalities currently supported (as of September 2014)

The aforementioned legal Acts of the Union requires the collection and distribution of various kinds of data. These concern vessel traffic monitoring, dangerous cargo details, incidents and accidents reports, information related to ships' waste and security. SafeSeaNet improves the exchange through better standardization and efficient implementation of EU maritime safety legislation.

By enabling the exchange of vessel and voyage related information, the SSN system supports users at EU and MS level in:

- The efficient and timely response to incidents or pollution at sea in progress including search and rescue operations;
- The monitoring of ships that pose a potential risk to the safety of shipping and the environment, including those involved in incidents, thus allowing for earlier precautionary actions and risk mitigation at sea by coastal states;
- The effective collection of information in support of the PSC inspection regime;
- The effective collection of the required security information prior to ship's entry into a port of a Member State and facilitate the sharing of vessel position information for other security purposes;
- The management of flag State responsibilities, including the follow up of ships involved in incidents/accidents;
- The efficiency of port logistics;
- The gathering and comparison of objective and reliable information on maritime safety and on pollution by ships, thus enabling users to take the necessary steps to improve maritime safety and the prevention of ship-generated pollution, and to evaluate the effectiveness of existing measures.

SSN is a functionality-rich system. The functionalities introduced to the system are agreed by the SSN group following decisions of the SSN HLSG (refer to definitions). Additional functionality may be incorporated in the SSN system, subject to approval by these two Groups.

In the present release of the IFCD, the functionalities are split into two distinct sections:

- Mandatory system functionalities.
- Additional system functionalities.

The mandatory SSN system functionalities are the sending, receipt, storage, retrieval and exchange of information by electronic means required by the SSN legal framework. SSN currently supports the exchange of the following information:

1. **Port call information:** Pre-arrival information sent to ports 24 hours in advance and information on ship arrivals and departures (as per Article 4 of Directive 2002/59/EC as amended and Articles 9 and 24 of Directive 2009/16/EC). In addition, 72 hours pre-arrival information if no other national arrangement is in place.

2. **Hazmat information:** Information on the carriage of dangerous and marine polluting goods (as per Articles 4, 13 and 14 of Directive 2002/59/EC as amended).
3. **Incident information:** Information on accidents and incidents which have occurred at sea (as per Articles 16, 17 and 25 of Directive 2002/59/EC as amended) and information on ships, which have not delivered their ship-generated waste and cargo residues (as per Articles 11.2.d and 12.3 of Directive 2000/59/EC).
4. **Position information:** AIS, MRS and LRIT[5] information (as per Articles 5, 6.b, 9 and 23 of Directive 2002/59/EC as amended).

The additional system functionalities are related but not limited to:

1. Statistics;
2. Email warnings for giving an indication that there is Incident Report information available in SSN;
3. Background information display (e.g. nautical charts);
4. System monitoring tools, and;
5. Secondary or reference data sources (e.g. SSN users contact details, ship particulars, special lists of ships).

## 2.3 SSN system - Short term evolution (2014/ 15) based on the new XML Reference guide v3.01 and the Reporting Formalities Directive

In 2012 the SSN group decided to improve the current data exchange framework of incident reports exchange by including a new data exchange mechanism enabling the "pushing" of incident information provided to central SSN system to MS. The new mechanism is documented in the XML Reference guide v2.07 and could be implemented by MS on voluntary basis from the last quarter of 2013 onwards.

Furthermore, considering the legal requirements in the RFD, it is anticipated that the following functionalities shall be exchanged via the SSN in the near future (in compliance with the XML Reference guide v3.01[6]):

1. **Security information:** Prior to ship's entry into a port of a Member State, security information should be sent in accordance with Article 6 of Regulation (EC) 725/2004 taking into account the provisions on exemptions according to Article 7 and the Annex to Directive 2010/65/EC.
2. **Waste and cargo residues information:** Prior to ship's entry into a port of a Member State, ship-generated waste and cargo residues information should be sent in accordance with Article 6 of Directive 2000/59/EC taking into account the provisions on exemptions according to Article 9.

[5] The currently available version of the SSN enables "flag" state users to visualize in the system's graphical user interface the, so-called, "mandatory" LRIT reports that are provided by ships four times per day every 6 hours. The full distribution of LRIT data to MSs through SSN is under development and shall be implemented in future releases of the system.

[6] The current version of the XML Reference Guide v.3.01 could be downloaded from EMSA's side (http://emsa.europa.eu/ssn-main/documents/technical-documentation/224-ssn-documentation/1979-ssn-xml-messaging-reference-guide-v3-01.html).

3. **Exemption Information: F**ollowing the implementation of the RFD, the information already recorded in the SSN central system on pre-arrival information and HAZMAT exemptions will be exchanged, on request, via XML messages. Currently such information is exchanged via the SSN web interface only. In should be also anticipated that security exemptions will be exchanged via XML (on request) while it is unclear whether waste exemptions will be exchanged too.

## 2.4 Overview of the SSN architecture

As mentioned above, the SSN system architecture comprises two main layers:

- National SSN systems.

- The central SSN system.

At central SSN level the system interacts with several EU systems. The following illustration (extracted from the SSN XML Reference Guide v3.01) outlines the SafeSeaNet system global architecture.

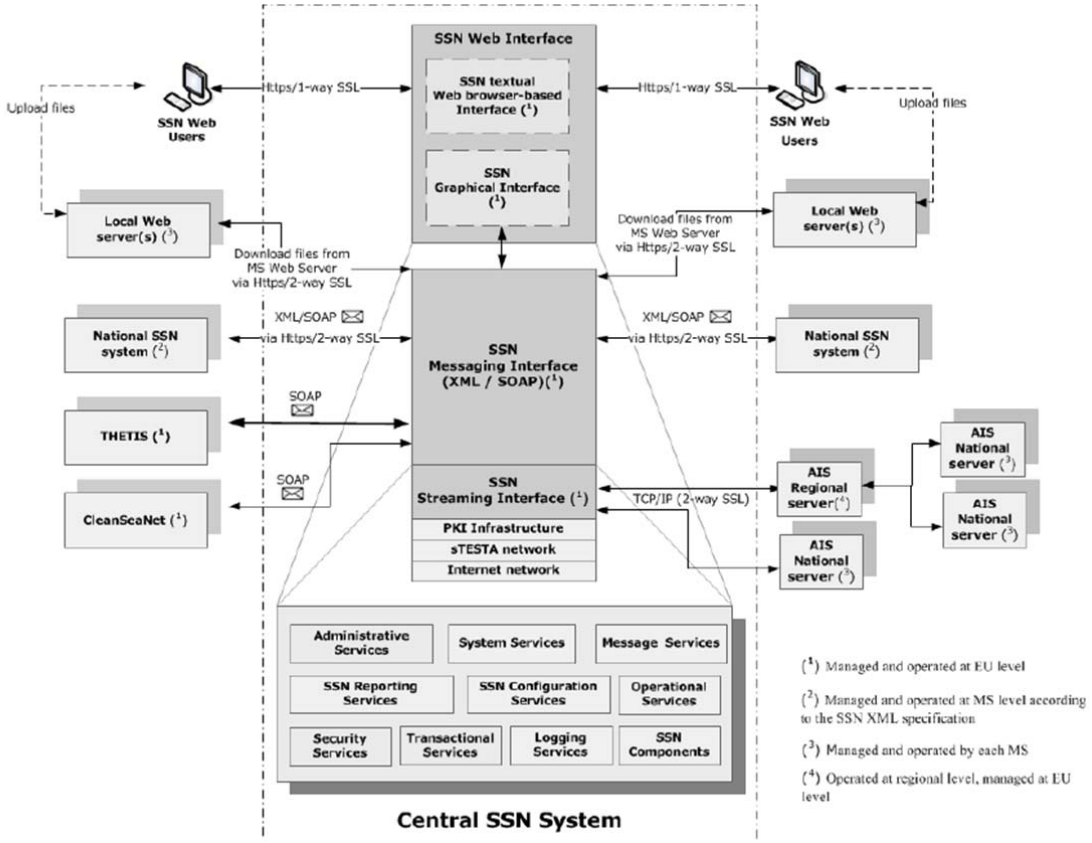


**Figure 1 Central SSN System and its interfaces to national and other EU systems** (source : SSN XML Reference Guide v3.01)

The SSN central system is built following a service oriented architecture approach. The components depicted in the diagram above are implemented within two major applications:

a. The European Index Server (EIS)

   Hosting the SSN textual interface the SSN messaging interface (XML/ SOAP) and the administration and configuration services of the whole SSN central system

b. The SafeSeaNet Information, Relay and Exchange System (STIRES)

   Hosting the SSN graphical Interface (GIS-based) and the SSN streaming interface

An overview of the architecture of the SSN system is provided below within this deliverable. Where appropriate are highlighted the functionalities of the central SSN system implemented by EIS or STIRES applications of SSN.

### 2.4.1 SSN Network organization

Figure 2 describes the principles of the SSN system, according to the architecture description within the IFCD.

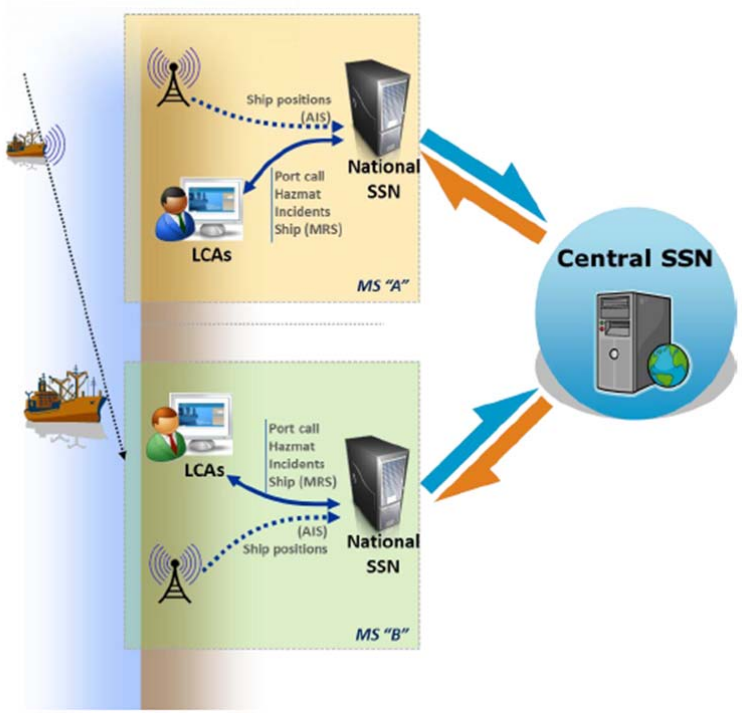


**Figure 2 SSN architecture (source: SSN IFCD)**

- The National SSN systems provide information to the central SSN system in the form of notifications. Authorized users within the SSN Community can retrieve information related to these notifications. The central SSN system locates and retrieves this information and provides it to the data user. The NCA may at national level establish a centralized system where all relevant information is registered,

stored and exchanged. Alternatively, the details relating to notifications may be stored in the servers of the LCAs.

- While the central SSN system stores information enabling a rapid and effective response to users' requests, detailed information may be stored at national level. When the data provider changes the notifiable information, a notification is provided to the central SSN system, and information is updated accordingly.
- LCAs may be data providers as well as data users at local level. LCAs, depending on national architecture choices, may interact with the NCA centralized system (in case such a system is established), via the NCA's system web interface and/ or via a system interface.

The central SSN system provides different alternative mechanisms to the national SSN systems in order to enable the mandatory exchange of information. These are:

1. Message-based mechanism (EIS): A mechanism which allows individual messages to be exchanged between the national and central SSN applications. The messages (in XML format) fulfil the needs of both data users and data providers (e.g. proprietary protocol, web-services, etc.). This mechanism supports the notification, request and response functions for all types of SSN information
2. Streaming mechanism (STIRES): A mechanism enabling the constant flow of AIS data (based on predefined criteria) from the national systems to the central SSN system (either directly or via an AIS regional server)[7]. This mechanism is currently only available for the provision of AIS information and is an alternative to the message-based mechanism.
3. Central SSN Web browser-based mechanism: This mechanism is available for requesting information and providing Incident Reports, and may be used to provide other information as a back-up solution in the case of failure of the national or local SSN systems. It is also available for system administration.

The central SSN Web browser-based mechanism offers two interfaces:

- A "textual" interface (EIS): This provides direct access to the central SSN system using a textual layout;
- A chart-based Graphical interface (STIRES): This uses geographical information system technology to provide access to ship positions enriched with the data in the central SSN system (information on pre-arrival, arrival, Hazmat cargo, incidents, etc.), thus creating a vessel traffic image showing movements in near-real time.

Member States can select the mechanism that fits best their national organization and technical framework, in order to effectively participate in the SSN Community.

The table here-after clarifies the functionality offered by each one of the currently applicable mechanisms for data exchange (according to the XML RG v.3.01).

[7] For notification purposes, the message-based mechanism and the streaming mechanism are alternative ways of providing Ship AIS positions.

**Table 1 SSN mechanisms for information exchange (last quarter of 2013)**

| SSN mechanisms for information exchange | | Message-based (EIS) | Streaming (STIRES) | Web-browser- based | |
|---|---|---|---|---|---|
| | | | | Textual Interface (EIS) | Graphical Interface (STIRES) |
| Available for: | Data providing | All information | Ship AIS positions | Incident Information (back-up mechanism for all information) | N/A |
| | Data request/ response | All information | N/A | All information | All information |
| | Data "push" | Incident report only | N/A[8] | N/A | N/A |

In relation to the mechanisms mentioned in the table the following principles apply:

#### 2.4.1.1 Message- based exchange (EIS):

**Message based notification**

The description refers to the process diagram in Figure 3 below extracted from XML guide v.07:

- The data provider gathers the necessary information to be reported. This information is sent to the national SSN system.
- The national SSN system compiles the message in the SSN compliant format and forwards it to the central SSN.
- Upon receipt the central SSN determines whether the notification is well formed.
- If it is well formed, the notification is indexed in the server.
- If it is not well formed, the notification is rejected by the central SSN system and the national SSN system should resend the corrected message.

[8] This might change in the near future following relevant decisions of MS.

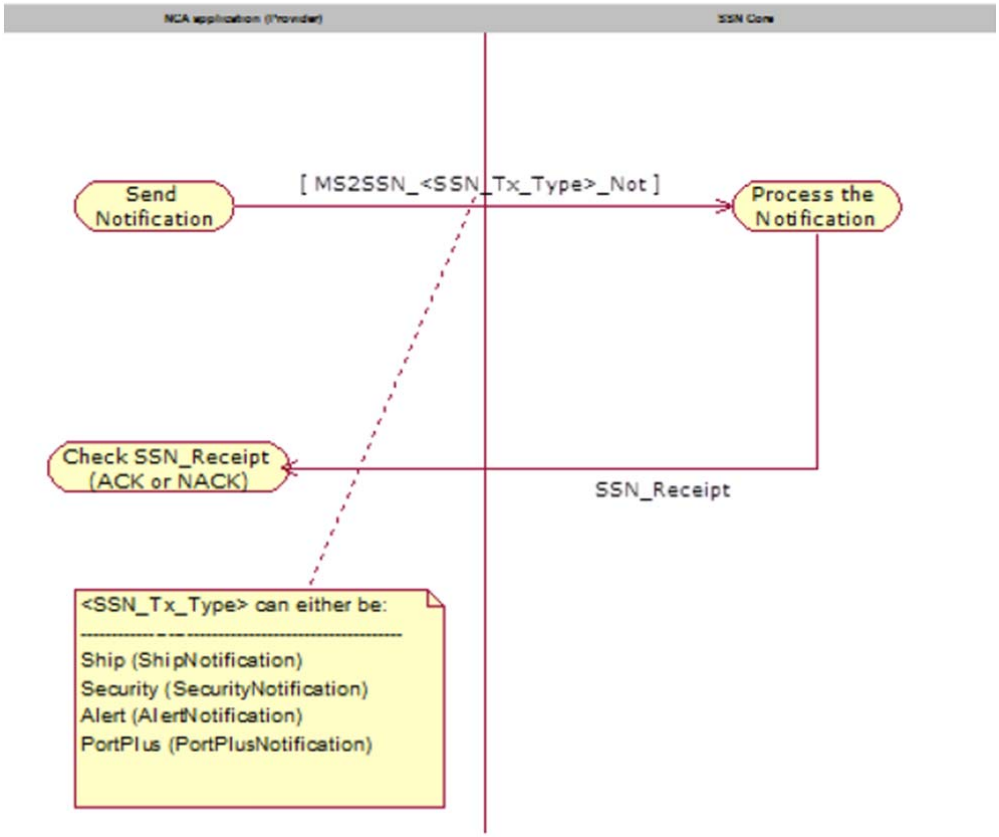


**Figure 3 SSN – Data notification process**

The following messages are currently implemented and used in the data notification process:

| Message type | Description |
|---|---|
| **Ship notification** | Used to notify SafeSeaNet about a ship's position, identity, voyage and cargo information. A ship notification is essentially based on either an MRS or AIS message. |
| **Alert notification** (based on the message definition of previous SSNv1/ the message is still used in SSNv2)<br><br>**Incident notification** (based on the new definition incorporated in SSNv2 | Used to notify SafeSeaNet that the sender holds some information about specific incidents like SITREP, POLREP, Waste, lost/found containers. An alert can be linked or not to a particular vessel. |

| Message type | Description |
|---|---|
| compliant with the XML RGv2.07) | |
| **Portplus** | Used to notify SafeSeaNet in cases of:<br>1. Pre-arrival notification of information at least 72 hours before the ship's arrival in a EU port whenever the ship is eligible for an expanded PSC inspection;<br>2. Pre-arrival notification of information at least 24 hours before the ship's arrival in a EU port;<br>3. Arrival notification, upon actual ship's arrival;<br>4. Departure notification, upon actual ship's departure;<br>5. Notification of dangerous and polluting goods carried on-board a ship bound for an EU port, either when coming from a non-EU or an EU port (HAZMAT)<br><br>Note :<br>The XML reference guide v3.01 includes s the specification of the Portplus data elements, which shall be used to report the security and waste notifications in accordance with the RFD. |

**Request and response**

The description refers to the process diagram in Figure 4 below extracted from XML guide v.3.01:

1) The data user requests information from the national SSN system.
2) When the information cannot be provided nationally, the national SSN system forwards the request to the central SSN system.
3) The central SSN system verifies the access rights of the user, and subject to acceptance, proceeds as follows:
   - In the case of information stored at central SSN level, the information is sent back to the requester (via national SSN system).
   - In the case of information is available in MS national servers through document download, the central SSN system retrieves directly the document and forwards it to the requester (via the national SSN system).
   - In the case of information is available upon request only, the central SSN system forwards the request to the national SSN system where the information is located, which, may, in turn, forward it to the data provider that owns the information. The data provider that owns the information then responds with detailed information which is transmitted (via the national SSN system) back to the central SSN system for forwarding to the data user.

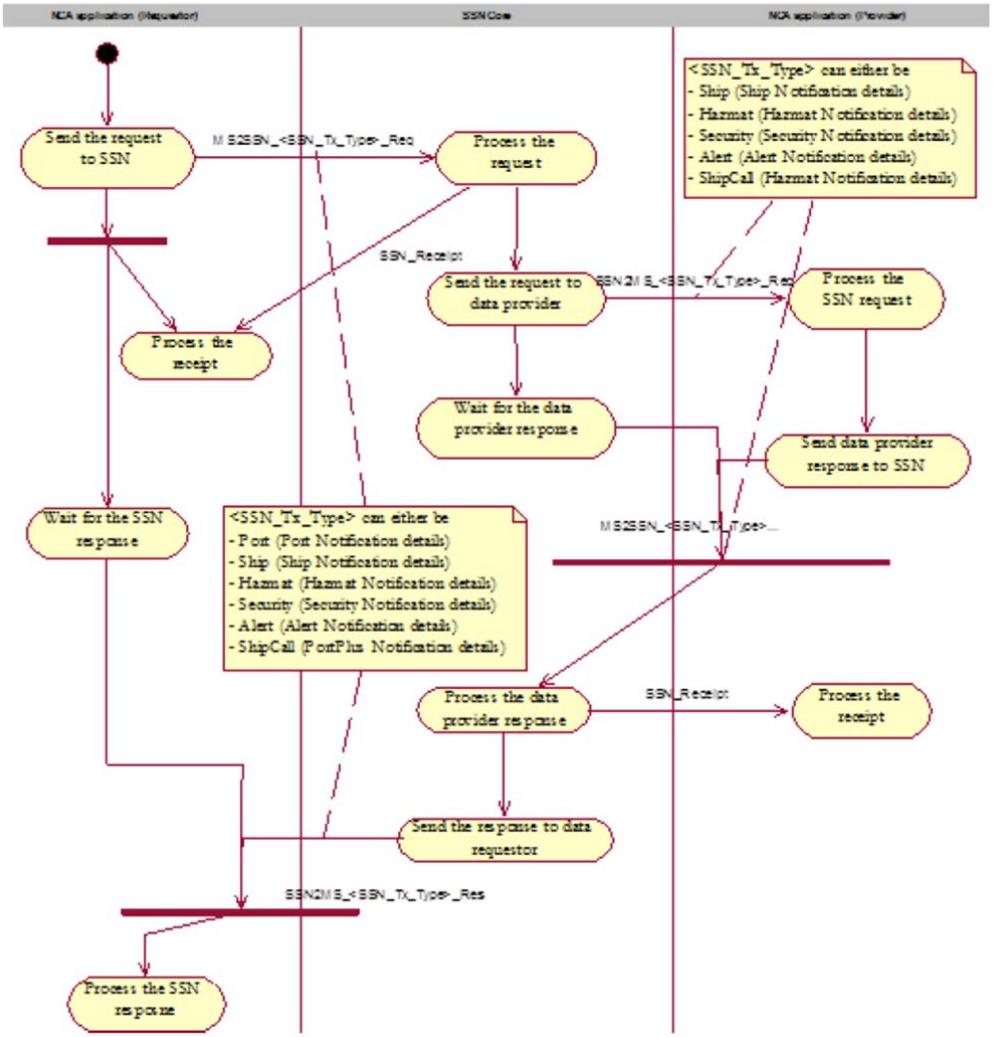


**Figure 4 SSN request/ response process**

### Data push (currently applicable only for incident reporting[9])

The description refers to the process diagram in Figure 5 below extracted from XML guide v.07:

1) The data provider gathers the necessary information to be reported. In the message is included a “distribution list” specifying the MS that should be proactively warned about the message. This information is sent to the national SSN system.

[9] It appears that in the future, subject to results of the Central Ship database pilot project, SSN will also `push` to Member States the changes in the ship particulars store in SSN`s Central Ship Database (refer to http://emsa.europa.eu/2014-07-02-10-35-18/central-ship-database.html)

2) The national SSN system compiles the message in the SSN compliant format and forwards it to the central SSN.
3) Upon receipt, the central SSN determines whether the notification is well formed. If it is well formed, the notification is indexed in the server. If it is not well formed, the notification is rejected by the central SSN system and the national SSN system should resend the corrected message.
4) Then, subject to the configuration of incident report reception by the MS10: i) if the recipient MS has implemented the XML distribution mechanism, SafeSeaNet "pushes" the incident report to the recipient MS and ii) if the recipient MS has not implemented the XML distribution mechanism, SafeSeaNet send an e-mail notification to the 24/7 NCA and to other preselected recipients. The possibility to receive both XML and emails is also envisaged.
5) Each recipient MS, which has received the "pushed" notification message, sends back to SafeSeaNet a confirmation message (synchronous connection).
6) In case of a failure in the distribution of an Incident Report to a recipient MS, SafeSeaNet initiates a failure management process, where it sends a warning e-mail to the 24/7 NCA.
7) The distribution is considered as having failed in the case of XML distribution if:
    - The receipt confirmation message (SSN_Receipt) sent by the recipient MS contains a negative status code,
    - No SSN_Receipt notification is received from the recipient MS after 3 attempts of distribution of the SSN2MS_IncidentDetail_Tx notification,
8) The distribution is considered as having failed in the case of e-mail distribution if:
    - A non-delivery notification is received from the mail server(s) of the recipient MS,
    - No acknowledgment message is received from the mail server of the recipient MS after 3 attempts of distribution of the Incident Report by e-mail.
9) As a last step in the distribution workflow, the central SSN sends a consolidated acknowledgment notification message to the original Data Provider, indicating the consolidated status of the distribution.

[10] This configuration is done by the MS utilising the configuration utilities incorporated in the central SSN textual interface.

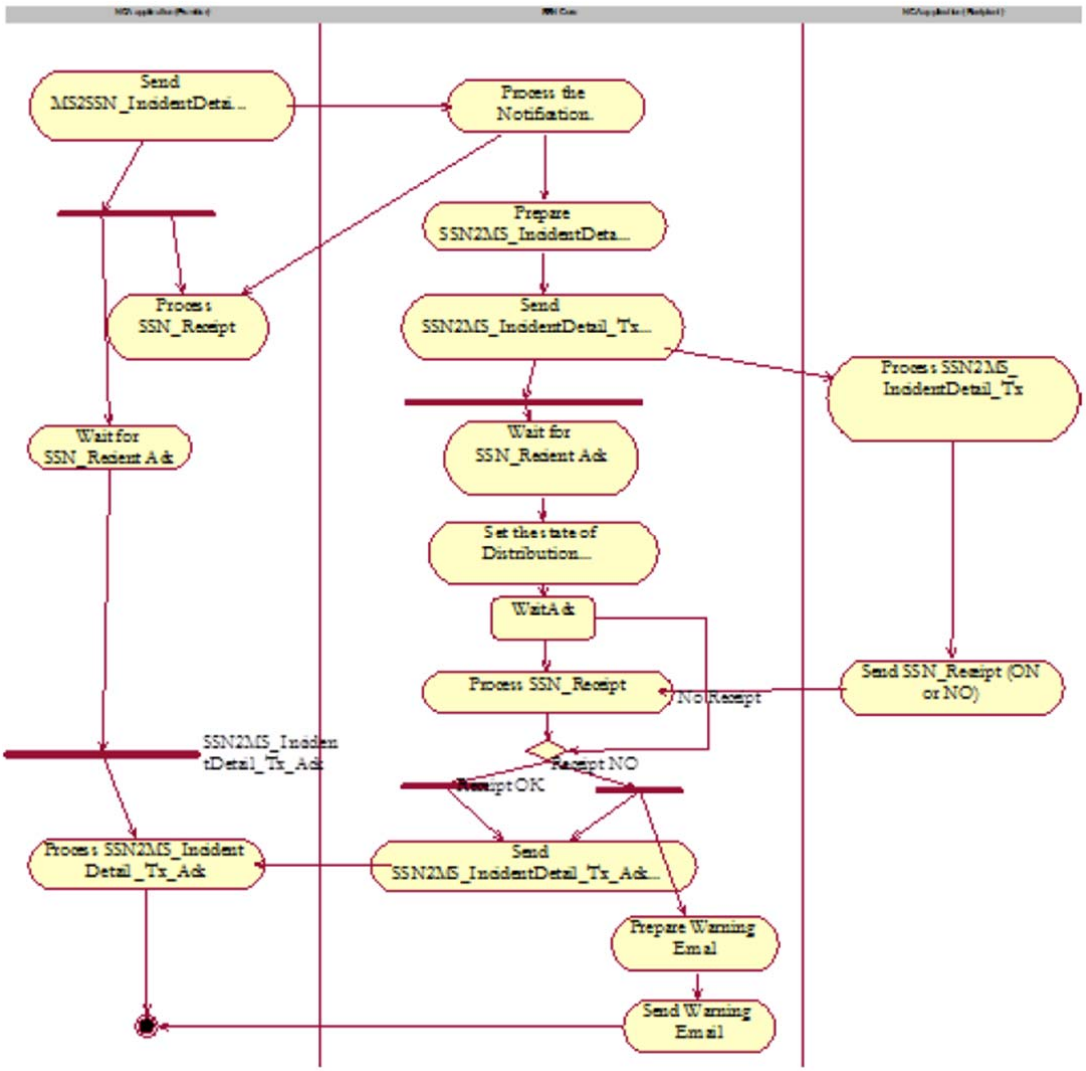


**Figure 5 Incident distribution process**

#### 2.4.1.2 Streaming mechanism (STIRES)

The streaming mechanism incorporated in SSN system enables the near-real-time exchange of ship positions obtained via the AIS network. The streaming interface is implemented at the regional and national levels in order to enable national SSN systems to provide AIS information to regional servers and/or directly to the central SSN system.

### 2.4.2 SSN interoperability with other EU system

As indicated in the picture below (extracted from SSN IFCD) the SSN is interfaced, at present, with several EU systems. The interfacing is described below.

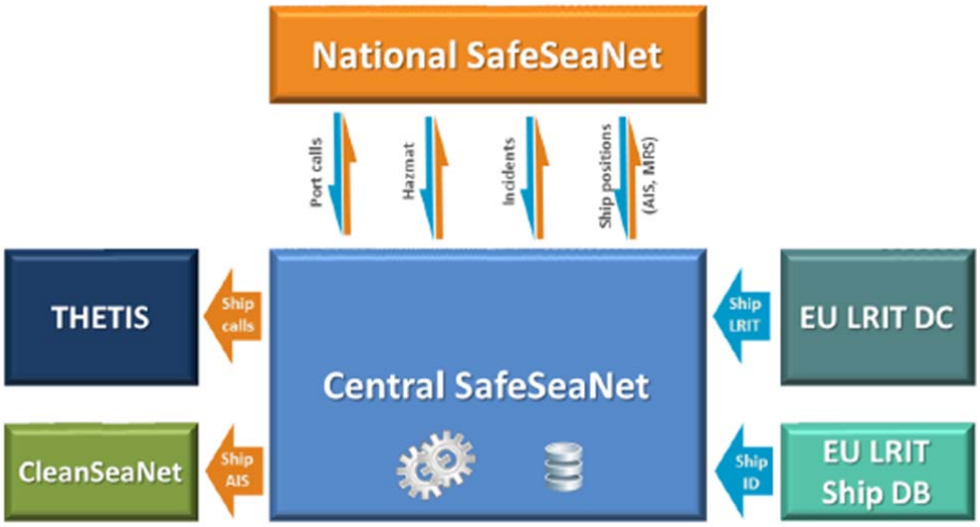


**Figure 6 EU systems currently interfaced to SSN (Source: SSN IFCD)**

#### 2.4.2.1 EU Long-Range Identification and Tracking Cooperative Data Centre (EU LRIT CDC)

Following the adoption of amendments to the International Convention for the Safety of Life at Sea (SOLAS Chapter V), which introduced the long-range identification and tracking of ships, the Council of the EU (in its Resolution of 2 October 2007 and 9 December 2008) agreed to the establishment of a European LRIT Data Centre managed by the Commission through EMSA. Subject to the provisions in SOLAS Chapter V/19.1, Contracting Governments are able to receive LRIT information for security, safety and marine environment protection purposes. Search and rescue services are also entitled to receive, free of charge, LRIT information in relation to the search for, and rescue of, persons in distress. Within Directive 2002/59/EC as amended, the Council agreed to make use of SSN to facilitate the sharing of LRIT information between MSs. The EU LRIT CDC has been in operation since 4 June 2009.

As already mentioned above the present interface established between SSN and LRIT CDC enables the distribution, via the SSN graphical interface, of mandatory LRIT reports to LRIT flag state users. The technical implementation enabling the full distribution of LRIT data to MSs through SSN is under development. Details, in this respect, are not publically available.

#### 2.4.2.2 EU LRIT Ship Database:

The EU LRIT Ship Database (EU LRIT Ship DB) is a component of the EU LRIT CDC. The purpose of the database is to allow for the registration of ships which have been instructed by their national administrations to report to the EU LRIT CDC. It is accessible online by administrations which are responsible for registering ships, and for updating the identification details as requested by SOLAS Chapter V/19.1. An updated version of the EU LRIT Ship DB is automatically sent on a daily basis to the EU LRIT CDC.

The SSN/ EU LRIT ship database interface provides the central SSN system with ship information in order to validate the ship information held in the SSN system.

#### 2.4.2.3 THETIS

The Port State Control (PSC) information system developed for the implementation of PSC Directive 2009/16/EC, as well as the New Inspection Regime applicable to the Paris MoU. The system is essential to the daily PSC activities of states operating under the Paris MoU. The entire process (port call registration, targeting, selection, reporting of inspections with corrective actions, publication of details and production of statistics), as stipulated in Directive 2009/16/EC and its implementing regulations, is facilitated by the system.

The central SSN system provides to the THETIS system information received from national SSN systems on the pre-arrival, arrival or departure of ships calling at EU ports and anchorages.

#### 2.4.2.4 CleanSeaNet (CSN)

CSN is the satellite based monitoring system for marine oil spill monitoring and vessel detection in European waters. Operating under Directive 2005/35/EC on ship sourced pollution, CSN provides a monitoring service to national maritime administrations in EU coastal Member States, EFTA countries and candidate countries in their area of interest. Upon request, CSN provides the European Commission with services in and around the waters of these participating countries. The main objectives of CSN are: the identification and tracking of oil pollution on the sea surface, the monitoring of accidental and deliberate pollution and contributing to the identification of polluters. The system is based on the provision and analysis of Synthetic Aperture Radar (SAR) satellite images.

The central SSN system provides ship positions and identifiers (transmitted by national AIS networks) to the CSN system in order to assist in the identification of vessels and possible polluters (within a limited timeframe and area).

# 3 Initiatives related to SSN evolution

## 3.1 CISE (Common Information Sharing Environment)

Integrated Maritime Surveillance is about providing authorities interested or active in maritime surveillance with ways to exchange information and data. The way maritime surveillance activities are currently set up in the EU leads to a partial understanding of incidents involving ships at sea. At present, there exist several surveillance functions executed by a number of systems at EU national or EU level that collect data separately and often do not share it. These functions are:

1. Maritime safety (including search and rescue), maritime security and prevention of pollution caused by ships. For these functions a number of systems hold information, e.g. SSN (at EU and national level), VTS and MRCC systems at national level and CSN system of EMSA (for oil spill monitoring)
2. Fisheries control. The satellite-transponder-based Fishing Vessel Monitoring Systems (VMS), operated by national Fishing monitoring centers as well EFCA, hold information related to this function.
3. Marine pollution preparedness and response. National systems but also systems like EMSA-operated CSN hold some information related to this function.
4. Customs. The import and export systems implemented by Custom Authorities at national level hold information related to this function.
5. Border control. National systems as well as EU systems under implementation (like the SIS) hold information related to this function
6. General law enforcement, and
7. Defense

The user communities related to the above functions (at EU and/ or national level) collect data currently separately and often do not share them. As a result, the same data may be collected more than once.

In 2009, the European Commission put forward a communication (COM (2009) 538 final) towards a 'Common Information Sharing Environment (CISE)[11] for the surveillance of the EU maritime domain and, in 2010, adopted a six step roadmap to achieve it. Within the context of CISE and as described in the Communication, SSN functions are described as follows:

*"The Community system SafeSeaNet should be used by all relevant user communities and be developed further to function as the main platform for information exchange in the EU maritime domain with regard to port arrival and departure notifications, notifications on dangerous goods, maritime security notifications, incident and accident information, AIS, LRIT and pollution monitoring. The management and future evolution of this system is*

[11] http://ec.europa.eu/maritimeaffairs/policy/integrated_maritime_surveillance/index_en.htm

*carried out by the Commission, assisted by the SafeSeaNet High Level Steering Group, as defined by Directive 2002/59/EC"*

At present there is no decision on the way CISE shall be developed and be implemented in Europe. Public Authorities should formalize cooperation agreements and clarify:

- what data is to be shared
- how data will be processed (transformed, correlated, fusioned, etc); and
- how data will be communicated.

The draft "CISE Architecture Vision document" [12]is providing a number of "visions" on the potential architecture concepts for CISE. The document defines the architectural options for CISE by drawing inspiration from related initiatives and by building on the study of "current maritime surveillance IT landscape"[13]. Each vision is described in a structured template based on commonly agreed terminology to allow for easy comparison of visions, which in turn facilitates the selection of a target state according to well-defined criteria. Describing aspirational visions for CISE is imperative, because creating an information-sharing environment without a defined target state and an agreed way forward is likely to lead to an unsuccessful result. The Architecture Visions document makes visible the possible levels of intricacy (i.e. the number of different elements) and complexity (i.e. the number of relationships between elements) of all possible future target states (also known as could be states).

The table here-after, extracted from the currently publically available draft Vision document summarizes six potential architecture visions for CISE. The visions are presented in such an order that each vision gradually adds the level interoperability agreements, one on top of the other. The table provides a summary of the interoperability agreements that are required to realize each vision.

[12] On line on https://webgate.ec.europa.eu

[13] Deloitte, "Study on the current surveillance IT landscape and resulting options," 2012. Available: https://webgate.ec.europa.eu/maritimeforum/content/295

**Table 2 CISE- Architecture "visions"**

| Vision Nr. | Vision Name | Description | Interoperability agreements |
|---|---|---|---|
| 1 | Interconnected Authority Systems | Each maritime authority independently exposes a set of services using a commonly agreed information exchange model (the technical service interface and transport protocol are not standardised). Authorities acting as service consumers have to find and connect point-to-point to the services of the information sources of their interest. Technical bilateral agreements are needed to overcome the lack of a commonly agreed service interface. | • Organizational – None.<br>• Semantic – Commonly agreed information exchange model; access rights and licensing model.<br>• Technical – None. |
| 2 | Interconnected Authority Gateways | Each authority, as service consumer, needs to understand which services are made available by the authorities in each Member State and User Community. To facilitate information exchanges, a standardised "gateway" is specified. It consists of an information exchange model, a transport protocol and the technical service interface. Each information source uses the gateway specifications to enable access to its information. Information consumers also rely on the gateway specifications to use services from other authorities. | • Organizational – None.<br>• Semantic – Commonly agreed information exchange model; access rights and licensing model.<br>• Technical –transport protocol and technical service description, packaged as gateway specifications and reference implementation. |
| 3 | Interconnected National Gateways | Each authority independently implements a set of services using a commonly agreed information exchange model, transport protocol and service interface through a standardised "gateway" at national level. The national gateway is used by all public authorities in a Member State. The gateway has routing functionalities, meaning that public authorities no longer need to be aware of where to get information. Service consumers request information through the national gateway (which is interconnected to other national gateways), which routes the request to the authorities offering that information. Point-to-point connections are possible between 2 authorities if needed. | • Organizational – Connections to national gateway, based on a community agreement. This enables cross-sector information exchanges.<br>• Semantic – Commonly agreed information exchange model; routing rules; access rights and licensing model.<br>• Technical –transport protocol and technical service description, packaged as gateway specifications and reference implementation. |
| 4 | Interconnected National Nodes | Each authority connects its information sources holding information relevant to maritime surveillance to a national node. The node stores the information from the several information sources within a Member State, pre-processes it and exposes a set of services to CISE users through a commonly defined service interface, transport protocol and information exchange model. Authorities retrieve maritime surveillance information by connecting to their national node (which is interconnected to other national nodes). Unlike the previous visions, the node is an advanced gateway, which could fuse information. Point-to-point connections are possible between 2 authorities if needed. | • Organizational – Connections to national node, based on a community agreement. This enables cross-sector information exchanges.<br>• Semantic – Commonly agreed information exchange model; routing rules; access rights and licensing model; aggregation rules.<br>• Technical – Node specifications and reference implementation. |
| 5 | Sea-Basin Coordinated National Nodes | Each authority connects its information sources holding information relevant to maritime surveillance to a national node. The node stores information from several information sources within a Member State, pre-processes it and exposes a set of services to CISE users through a commonly defined interface and information exchange model. These nodes are then clustered per sea-basin to a higher level node that coordinates information sharing within the given sea | • Organizational – Connections to national node, based on a community agreement. This enables cross-sector information exchanges. Agreement on single access point in sea-basin.<br>• Semantic – Commonly agreed information exchange |

| Vision Nr. | Vision Name | Description | Interoperability agreements |
|---|---|---|---|
| | | basin area. Authorities retrieve maritime surveillance information by connecting to their national node, which is interconnected to the sea basin node (which in turn is interconnected to other sea basin nodes). Point-to-point connections are possible between 2 authorities if needed. | model; routing rules; access rights and licensing model; aggregation rules.<br>• Technical – Node and coordinator specifications and reference implementation. |
| 6 | EU-Coordinated National Nodes | Each authority connects its information sources holding information relevant to maritime surveillance to a national node. The node stores information from several information sources within a Member State, pre-processes it and exposes a set of services to CISE users through a commonly defined interface and information exchange model. These nodes are then connected to a single, central coordinator that coordinates information sharing between all Member States. Authorities consuming information services connect to their national node, which is interconnected to the central coordinator. Point-to-point connections are possible between 2 authorities if needed. | • Organizational – Connections to national node, based on a community agreement. This enables cross-sector information exchanges. Agreement on single access point in EU.<br>• Semantic – Commonly agreed information exchange model; routing rules; access rights and licensing model; aggregation rules.<br>• Technical – Defines node and coordinator specifications and reference implementation. |

As stated in the meeting report of the Technical Advisory Group of CISE[14], DG MARE presented in the meeting a "Hybrid" architectural Vision for the CISE, that was requested by MSs to "allow" all the different Visions to co-exist. The Hybrid architectural allows a high degree of flexibility in the interconnection. EU Agencies will connect directly to CISE, Member States can choose different options, either connecting through a Single National Node, or through more community level nodes; furthermore, even Public Authorities (at individual level) can directly connect to CISE.

The comments from the TAG members were generally appreciative for this approach due to the increased flexibility offered by this new development although the risks related to the increased complexity of the governance were also underlined. The transport community stressed the importance of a full "use" of existing and upcoming systems (National Single Window); **they also required to consider the feasibility of using SSN as a core system for CISE**. The transport community also reminded the commercial value of information for owners and port communities. They also requested to keep the governance as light as possible reminding that in their view the purpose of CISE should not be to make all the information available to everybody. Many parties in the TAG reiterated the need to avoid any duplication and increase in administrative burdens.

Chapter 5 further details the potential role of an evolving SSN in CISE, taking into consideration the scope outlined in the above mentioned COM (2009) 538 and the on-going discussion on the CICE Visions.

## 3.2 Blue belt

The efficiency of customs clearance procedures for goods transported between EU ports has a considerable impact on the timely and efficient flow of trade between EU companies and businesses. Additional costs are either borne by the shipping company, constituting an economic drag in an ever more competitive marketplace, or passed on to their clients with a price increasing effect for the EU consumer.

The Blue Belt, according to the Communication 510 of the EC (published on 8/7/2013) is an sea *"area where vessels can operate freely within the EU internal market with a minimum of administrative burden while safety, security, environmental protection as well as customs and tax policies are enhanced by the use of maritime transport monitoring and reporting capabilities (processes, procedures and information systems)"*.

The central SSN system hosted by EMSA could be utilized, in this context, to provide a basis for traffic monitoring and reporting services. This could be achieved by making available to Customs Authorities information on vessels movements and cargo

[14] https://webgate.ec.europa.eu/maritimeforum/content/3430

movements (the latter remains to be decided). This would enable Custom Authorities to assess whether ships are indeed meeting the conditions imposed by the Directives. It will also allow them to eventually reduce the reporting burden currently imposed to shipping companies and cargo forwarders.

A pilot project was set by the Commission in 2011 in collaboration with EMSA, aimed at demonstrating to National Authorities the potential benefits of utilizing SSN. As many as 253 vessels participating in the pilot exercise were monitored and customs authorities received a notification report before the arrival of a ship to a port, giving information on routes, ports of call and vessel behaviour (e.g. encounters at sea with other vessels). The Blue Belt pilot project showed that useful information could indeed be provided to customs on the voyages of the vessels. During the evaluation exercise of the pilot project, customs authorities pointed out that the information regarding the vessels movement should be completed with information regarding the goods carried, in particular on their status (Union versus non-Union).

This distinction would allow Customs authorities to ensure the appropriate customs supervision of non-Union goods while at the same time facilitating the procedures for Union goods.

The above requirement of Custom Authorities implies that:

1. An electronic cargo manifest (eManifest) should be introduced which, among other information, will include indication of the status of goods on board a ship (Union, Non-Union) and the potential changes of this status during the voyage. The structure of this manifest should be agreed among MS and “harmonized” to the extent is possible and feasible. As mentioned in the COM (510), when the eManifest will be lodged in an EU port, the Union status of the goods on board will be indicated and, if confirmed, customs controls would no longer be needed for Union goods apart from random checks. This represents a considerable facilitation of trade for shippers and shipping companies, as well as a simplification for customs authorities not required to check Union goods, unless identified for random or specific checks. Goods loaded at non-EU ports would by definition be non-Union goods and would be mentioned as such on the eManifest. In addition, if a vessel calls at a third country port between two EU ports but Union goods remain on board, the goods will maintain their status as declared upon departure from the last EU port.

2. A close monitoring of ship movements among EU ports and between EU ports and non-EU ports is required as well as reporting of ship movements to Custom Authorities.

SSN could play a significant role in facilitating the exchange of eManifest and monitoring of the ship movements as it is further discussed in the chapter 5

## 3.3 IMDATE

The Integrated Maritime Data Environment (IMDatE) is a technical framework currently under development by EMSA[15]. In future, it will combine and process data from EMSA's maritime applications (SSN, CSN, LRIT, THETIS) and other external sources to provide a more complete maritime picture to users.

IMDatE will combine different data sources available in the EU systems operated by EMSA to provide a complete near real-time maritime picture. This will include, as a minimum, AIS, LRIT, Satellite AIS, coastal radar, VMS, and Earth Observation data. IMDatE will provide data fusion functionality in order to provide enhanced information from the combination of data sources.

It will also provide the ability to grant access to different data sets and services according to individual user access rights. These may be delivered via a user friendly web interface or distributed automatically to authorized external systems.

The following services are currently envisaged (based on information made available at EMSA web site):

1) **Integrated Ship Profile Service** - This service will provide a combined view of all information related to a ship or fleet based on information available in the different systems, which are connected to the IMDatE.
2) **Area Centric Service** - This service will provide a complete maritime and oceanographic picture of a selected area, built-up from different layers of information, such as ship traffic data (full range of available ship position reports), satellite SAR picture of the defined area, optical image of the area, weather forecast associated to the area, oceanographic data (currents, waves, sea temperature, algae, etc).
3) **Maritime Surveillance Service** - This service will allow users to analyze all available ship traffic information in order to identify activities of interest for the purposes of Maritime Surveillance activities.

[15] according to the information published at http://www.emsa.europa.eu/lrit-home/117-lrit-cooperative-data-centre/489-integrated-maritime-data-environment-imdate.html

4) **EU Common Maritime Space Monitoring Service** - This specific service will support the implementation of EU Common Maritime Space (CMS) applications. In particular, the service will monitor ships engaged in EU (coastal) trade and ships (ferries and coasters) engaged in scheduled and/or regular services between EU ports.

## 3.4 SSN pilot project on a Central Ship Database

According to information currently published in EMSA web site[16] the Central Ship Database is *"a SafeSeaNet pilot project agreed by the High Level Steering Group at its 7th meeting (July 2012) and is being developed and hosted by EMSA. The purpose of this project is to test the development of a common ship database at EU level, which can be used by EU/EEA Member States in their national systems (for example in the national single windows and national SafeSeaNet systems) to cross-check the data stored within their national ship databases or received from reporting parties``.*

The following services are foreseen in this pilot project:

- Request/response service:

  To request the content of specific ship records in the Central Ship Database

- Ship particulars notification web-service:

  Used by Member States to notify the insertion of a new ship in the national flag registry, and provide updates on ship particulars that have been verified manually by national authorities.

- Ship record history retrieval:

  For the retrieval of changes in the ship particulars records in the Central Ship Database

- Ship particulars announcement ("push") (available via subscription:

  To be used for the proactive announcement of a change to the ship particulars of a ship already registered in the database or the creation of a new ship record in the Central Ship Database..

Users will also have access to the Central Ship Database via the web interface of SSN.

[16] http://emsa.europa.eu/2014-07-02-10-35-18/central-ship-database.html

# 4 Setting the scene for the future

## 4.1 The Reporting Formalities Directive

The Directive 2010/65/EU of the European Parliament and of the Council of 20 October 2010 aims to simplify and harmonize the administrative procedures applied to maritime transport by establishing a standard electronic transmission of information and by rationalizing reporting formalities for ships arriving in and ships departing from European Union (EU) ports.

The RFD applies to the reporting formalities listed in the Annex of RFD – refer to sections 4.1.1, 4.1.2 and 4.1.3 below). The EU MS as well as EFTA Countries that had adopted the RFD (Norway, Iceland) must ensure that the reporting formalities at their ports are requested in a harmonized and coordinated manner. The master, or any other person duly authorized by the operator of the ship, must provide the competent national authority with notification, prior to arriving in an EU port, of the information required under the reporting formalities.

According to the Directive EU countries shall accept electronic reports ***via a national single window*** (NSW) as soon as possible and, at the latest, by 1 June 2015. The single window will be the place where all information is reported **once** and made available to various competent authorities and the EU countries. EU countries must ensure that information received in accordance with reporting formalities is made available in their national SafeSeaNet systems and make available parts of such information to other EU countries via the SafeSeaNet system.

Every EU country must ensure that the reporting formalities at their ports are requested in a harmonized and coordinated manner.

The sections 4.1.1, 4.1.2 and 4.1.3 below list the reporting obligations mandated by the RFD. At the time of writing this report the EU Member states have agreed to exchange via SSN central system operated by EMSA the information as per bullet points in sections 4.1.1 (1), (3), (4) & (5). The information listed in section 4.1.2 below (related to FAL forms 1/3/4/5/6/7 and the Maritime declaration of Health) as well as the information on border checks (passenger/ crew list), should be handled at national level and notified by ship representatives to the NSW (international exchange of this information is not required).

At present time there is no agreement of EU Member States on the exchange of FAL 2 form (pending the decisions to be made on the eventual introduction of a harmonized eManifest). Furthermore there is no agreement, at present, for the notification of Entry summary declaration (ENS) to the NSWs although this is mandated in the RFD.

### 4.1.1 Reporting formalities resulting from legal acts of the Union

This category of reporting formalities includes the information that shall be provided in accordance with the following provisions:

1. Notification for ships arriving in and departing from ports of the Member States

   Article 4 of Directive 2002/59/EC of the European Parliament and of the Council of 27 June 2002 establishing a Community vessel traffic monitoring and information system (OJ L 208, 5.8.2002, p. 10).

2. Border checks on persons

   Article 7 of Regulation (EC) No 562/2006 of the European Parliament and of the Council of 15 March 2006 establishing a Community Code on the rules governing the movement of persons across borders (Schengen Borders Code) (OJ L 105, 13.4.2006, p. 1).

3. Notification of dangerous or polluting goods carried on board

   Article 13 of Directive 2002/59/EC of the European Parliament and of the Council of 27 June 2002 establishing a Community vessel traffic monitoring and information system.

4. Notification of waste and residues

   Article 6 of Directive 2000/59/EC of the European Parliament and of the Council of 27 November 2000 on port reception facilities for ship-generated waste and cargo residues (OJ L 332, 28.12.2000, p. 81).

5. Notification of security information

   Article 6 of Regulation (EC) No 725/2004 of the European Parliament and of the Council of 31 March 2004 on enhancing ship and port facility security (OJ L 129, 29.4.2004, p. 6).

6. Entry summary declaration

   Article 36a of Council Regulation (EEC) No 2913/92 of 12 October 1992 establishing the Community Customs Code (OJ L 302, 19.10.1992, p. 1) and Article 87 of Regulation (EC) No 450/2008 of the European Parliament and of the Council of 23 April 2008 laying down the Community Customs Code (Modernised Customs Code) (OJ L 145, 4.6.2008, p. 1).

### 4.1.2 FAL forms and formalities resulting from international legal instruments

This category of reporting formalities includes the information which shall be provided in accordance with the FAL Convention and other relevant international legal instruments.

1. FAL form 1: General Declaration
2. FAL form 2: Cargo Declaration
3. FAL form 3: Ship's Stores Declaration
4. FAL form 4: Crew's Effects Declaration
5. FAL form 5: Crew List
6. FAL form 6: Passenger List
7. FAL form 7: Dangerous Goods
8. Maritime Declaration of Health

#### 4.1.3 Any relevant national legislation

Member States may include in this category the information, which shall be provided in accordance with their national legislation. Such information shall be transmitted by electronic means.

## 4.2 EC initiatives to collect/ agree with MS the business rules for implementation of NSWs

To ensure a harmonized approach in the development of the NSWs, the European Commission took the initiative in 2011 to establish an expert group on "maritime administrative simplification and electronic information services" the so-called 'eMS' group. According to the rules and procedures agreed with the Member States, the eMS should help to develop specifications and services for the electronic data exchange and single windows for the EU Maritime transport.

The eMS Members have agreed to first develop distinct rules for the various reporting formalities and then attempt to harmonize them, once the development of business rules for each of the notifications mandated in the RFD have been completed. The eMS set-up 6 sub-groups – Security, Waste, Customs, General Maritime, Border and Health – in order to establish rules for the exchange of the relevant reporting formalities. At the time of preparing this report a definite set of business rules have been agreed on (refer to the relevant Annexes of the report for more details):

- General maritime Information ((Arrival notification, dangerous goods, FAL 1 and 7)
- Border Checks on Persons
- Maritime Declaration of Health
- Security Message
- Waste Message

Furthermore the eMS agreed on a first set of "harmonized" rules concerning the identification of ships (by IMO and/or MMSI); the use of UN/LOCODEs and IMO Port Facility Numbers (GISIS database; the traceability of users submitting notifications;

User Profiles; information that shall be exchanged via SSN or maintained in the NSW; date storage intervals; data availability and the classification of the information exchanged via the NSWs.

At the time of preparing this report, there is still on-going work on:

- Customs related information (e.g. Entry Summary Declaration, FAL 2 (Cargo Declaration), FAL 3 (Ship Stores), and FAL 4 (Crew's Effects) .The relevant business rules have been discussed by the Customs sub-group but have not been validated, so far, by the eMS).
- Data mapping (identification and definition of the individual data elements to be reported when fulfilling the reporting formalities)
- Guidelines for the development of single windows

The reader should refer to the relevant Annexes of this report for more details on the definite set of rules agreed by eMS as well as on the work in progress.

Another worth noting deliverable of the eMS Group is the conceptual definition of the National Single Windows and data flows among them (refer to picture below).

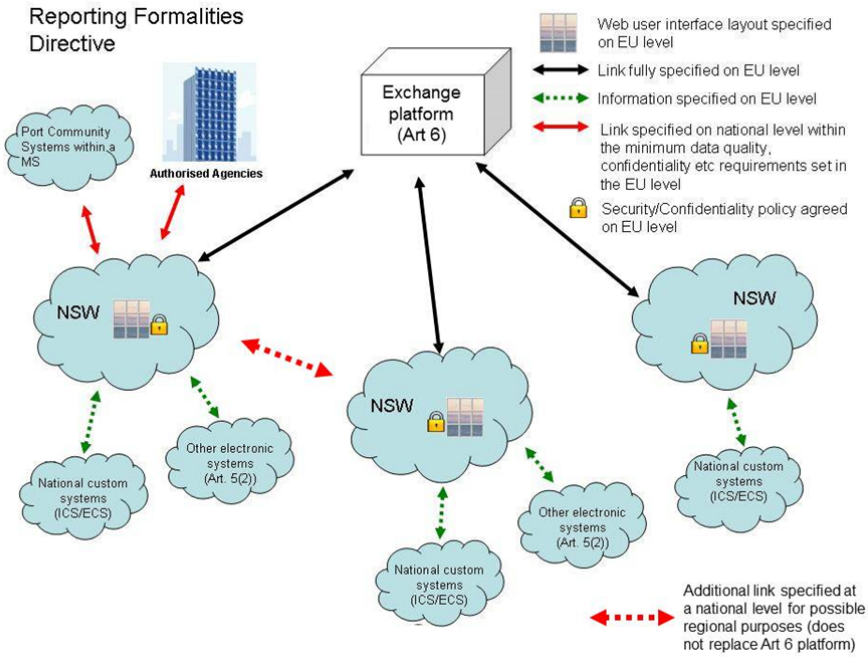


**Figure 7 Single window data flows according to eMS conceptual approach**

Furthermore according to the eMS framework:

1. The single window will link SSN, e-Customs and other electronic systems and will consist the point where all information is reported once and made available to various competent authorities. This requirement means that the information submitted through this single window should be made available to relevant authorities. In addition, the relevant information provided through e-Customs, SSN and other electronic systems should be accessible through the Single Window. Technically this means that a common defined interface is to take place in order to enable interoperability among the systems.
2. Given that the Directive 2010/65/EU establishes minimum requirements for National Single Window and does not exclude national enhancements, the Single Window consists of two parts: the mandatory/harmonized part and the optional national additions.

In the conceptual approach for SWs agreed at the 6th meeting of the Group the two parts of SWs are defined as follows:

### 4.2.1 Mandatory/harmonised part of NSWs (eMS conceptual approach)

***Note :*** *the definition below is copied from the eMS concept paper*

*"The Single Window (SW) is an environment for collection, dissemination and exchange of vessel reporting information with a structured and commonly defined data structure, and rules and rights management of information, which are in accordance with relevant international, national and local legal requirements. The goal of the SW is to simplify and harmonize the administrative procedures applied to maritime transport by making the electronic transmission of information standardized and by rationalizing reporting formalities.*

*The minimum requirements for the quality, the content and the submission time frame of the data are or can be defined and regulated by EU legislation and International agreements. Individual data elements should be only submitted once.*

*The SW consists of the user web interface and interfaces requirements, harmonised on the EU level in regard to a common set of services and specific layout, semantics, for submitting the information or, where applicable by legislation, by a party with delegated rights. Addition to this user web interface, the National Single Windows (NSW) can provide optional data transmission means as long as they do not compromise the minimum requirements on the data stated above.*

*The NSW should be able to exchange information with SSN (which is currently the only EU system for exchanging data). The Port Community Systems could be included under the NSW umbrella, respecting the same requirements (harmonized layout, information, validation rules, etc).*

*The business activity flows used by the Shipping industry for submitting notifications, updating data in the notifications and receiving feedback by the Authorities concerned via the NSWs should be harmonized at EU level.*

*The transmission of the data to the NSW should be made either directly through business entities / governmental agencies or via a trusted-third-party (certified and authorized party).*

*All the reporting formalities should be accepted by the NSW. Only one NSW should be set up per MS"*

### 4.2.2 National additions in NSWs (eMS conceptual approach)

***Note :*** *the definition below is copied from the eMS concept paper*

*"The NSW serves as "Single Point of Contact" for the exchange of information. The quality, the content and the submission time frame of the data are or can be defined and regulated by national or local legislation. Individual data elements should be only submitted once. The NSW should aim to have the flexibility to incorporate additional developments or requirements at national level (e.g. other regulatory systems or multimodal connections).*

The NSW allows the exchanges of information between:

- *Actors in trade or transport chain and governmental agencies (B2G or G2B);*
- *Governmental agencies on the local and national level (G2G); and*
- *Governmental agencies on the supra-regional and international level (G2G, for example NSW DE and SSN, or between the national single windows.)"*

## 4.3 The AnNA project

AnNA is an on-going (runs from 2012 – end 2015) EU Member States driven project aiming to support the effective implementation of the EC Directive 2010/65/EU (Reporting Formalities for Ships arriving in/departing from EU ports).

The AnNA project involves:

- 14 partner countries (Belgium, Bulgaria, Cyprus, Greece, France, Italy, Latvia, Netherlands, Portugal, Romania, Slovenia, Spain, Sweden and United Kingdom).
- 10 observer countries (Croatia, Denmark, Germany, Iceland, Ireland, Israel, Finland, Malta, Montenegro and Norway).
- 10 observer organizations: CESMA (Confederation of European Shipmasters'Associations), CLECAT (European organisation for freight forwarding, logistics and customs), FIATA (International Federation of Freight Forwarders Associations), ECASBA (European Community Association of Ship brokers and agents), ECSA (European Community Shipowners' Association), EHMC (European Harbour Masters' Committee), EPCSA (European Port

Community Systems Association), ESPO (European Sea Port Association), WSC (World Shipping Council), WCO (World Customs Organisation).

The AnNA project develops a master plan for the period 2012-2015 setting the framework for the efforts required in achieving the minimum requirements for the implementation of the RFD including: - identification, legal, organizational and operational aspects. Furthermore the project will execute a series of pilots (whose definition is currently ongoing) demonstrating the following scenarios:

- Category 1 pilots: electronic data submission by the reporting party ;
- Category 2 pilots: the national (internal) solution for maritime single windows;
- Category 3: electronic data exchange between the EU Member States including existing exchange mechanisms.

Worth-noting (from the point of view of eMAR given the synergies that could be developed) is the work of AnNA on the definition of a WCO standard - based messaging framework for the exchange of messages between the maritime industry and maritime single windows (MSWs). The first definite version of the AnNA Message Implementation Guide (MIG v1.0) was published in the AnNA web site on 11/7/2014. The report covers the exchange of messages, via EDIFACT and XML, from business to MSW (B2MSW. The MIG is based on, and maps the GOVCBR[17] message of the WCO

More specifically, the MIG 1.0 version consists of the following files:

- MIG MSW 1.0 Section 1 General
- MIG MSW 1.0 Section 2 B2MSW Data Model
- MIG MSW 1.0 Section 2 B2MSW EDIFACT
- MIG MSW 1.0 Section 2 B2MSW XML
- MIG MSW 1.0 Section 4 Appendices
- MIG MSW 1.0 Section 5 Message scenarios
- MIG MSW 1.0 B2MSWSchema
- MIG MSW 1.0 B2MSW WCO Data model

The documents concerning the MSW2B (Response) messages are not included in the MIG v1.0. as their specification is pending the finalization of the discussion between the Member States participating in AnNA initiative later this year.

## 4.4 The Integrated Maritime Policy (IMP) Demonstrator project

Note: The summary on IMP project below is based on information uploaded at http://www.up.gov.si/fileadmin/up.gov.si/pageuploads/SI_SSN/OOPP/IMP_demonstrator-objectives_and_technical_specifications__6_May_2013_.pdf) and EMSA web site (http://www.emsa.europa.eu/2014-07-02-10-35-18/nsw.html )

[17] for the GOVCBR refer also to the section 4.6.1.

EMSA has been delegated to implement a project whose main objective is to evaluate and demonstrate the setting up of a simplified single window at national level and its interfaces as required by the reporting formalities directive 2010/65/EU. This is done within the framework of the Integrated Maritime Policy (IMP) initiatives of the European Commission. This objective will be met through a demonstrator project, which will develop software and services components that will simulate:

- a National Single Window (NSW);
- the distribution of data to national authorities and;
- the exchange of relevant information via the central SSN system

The figure (from EMSA web site) provides the general outlook of the information flows between the main stakeholders in the NSW prototype.

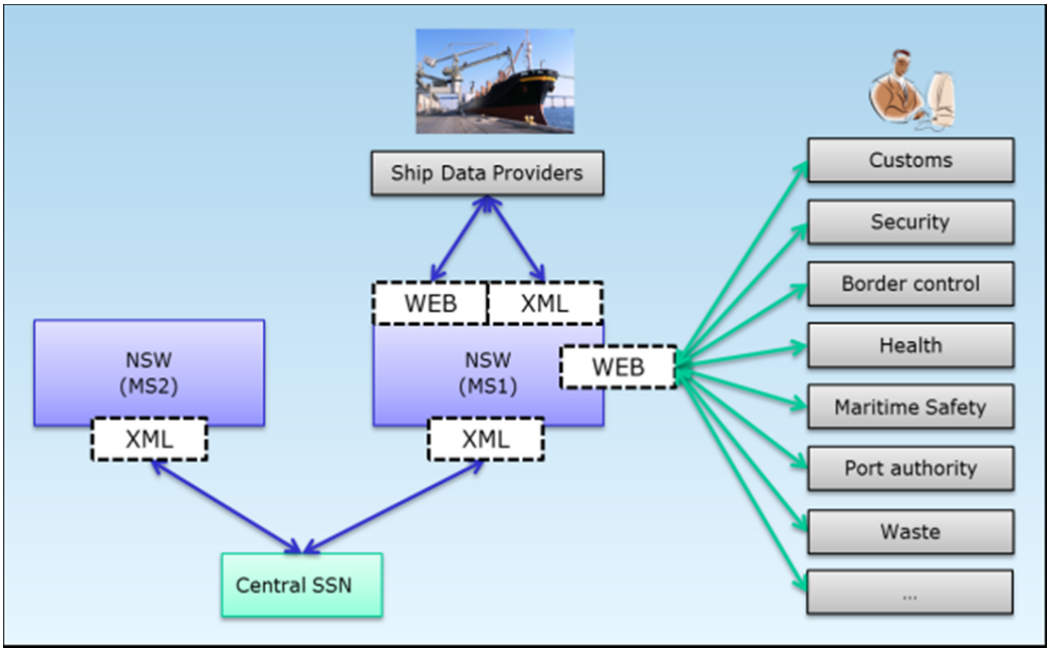


**Figure 8 The NSW demonstration concept (EMSA IMP project)**

The NSW prototype also includes the following features:

- Configuration of user access rights to specific data groups and to ports or areas
- Management of shipping agencies to allow reporting by several agents for the same ship
- Distinction between formalities required at arrival and formalities required at departure
- Possibility to re-use data from previous notifications
- Possibility to work on a draft notification before submitting
- Upload of data in XLS format (dangerous and polluting goods, crew list, passenger list)
- E-mail notifications to ship data providers and to authorities

- Support of national languages
- Contextual help for each individual field
- Download of notification content in PDF.

The data structure and formats used in this project are based on the results of the work of the eMS Group (refer to the section 4.2). The XML message structure is based on ISO 28005 standard for Electronic Port Clearance.

The eMAR partners working on the prototype of a "ship data provider" application[18] have very recently concluded successfully a first cycle of tests of data exchange with the NSW prototype.

Finally it should be noted that six Member States are participating in the project: Bulgaria, Greece, Italy, Malta, Romania and Norway. In addition, Denmark participates as an observer.

## 4.5 The European e-Customs initiative

The European electronic customs initiative is essentially based on the following three pieces of legislation:

- The Security and Safety Amendment to the Customs Code, which provides for full computerization of all procedures related to security and safety;
- The Decision on the paperless environment for customs and trade (Electronic Customs Decision) which sets the basic framework and major deadlines for the electronic customs projects;

The modernised Community Customs Code which provides for the completion of the computerisation of customs. The e-Customs initiative which started in 2008 has been aimed to create secure, interoperable electronic customs systems for the exchange of the data.

The design approach advocated by DG TAXUD, shown in Figure 7, emphasizes on an iterative process to specify a streamlined SW model which will then guide the automation of compliance related processes.

[18] Reference is made to the **i-ship** reporting application which is based on the conceptual approach presented in the Appendix D of this report

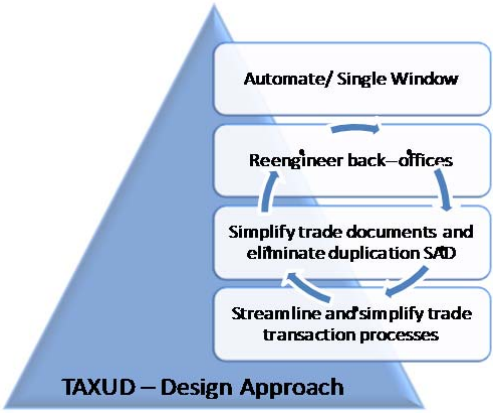


**Figure 9 TAXUD Single Window Design Approach**

The single administrative document, SAD[19], provides the documentary basis for EU customs declarations in the EU The document covers the placement of any goods under any customs procedure (Export, import, transit where the new computerised transit system (NCTS) is not yet used, warehouses, temporary import, inward and outward processing, etc.) whatever the mode of transport used.

A number of Customs Trans-European Systems are in operation, including:

- New Computerised Transit Systems (NCTS)
- Export Control System (ECS)
- Import Control System (ICS)
- Centralised Databases:
  - Economic Operators' System (EORI)
  - Tariff Systems

Customs related information concerning the outcome of the health controls could be retrieved from the Trade Control and Expert System, introduced by Decision 2002/459/EC19, which creates a trans-European network for the notification, certification and monitoring of imports, exports and trade of sanitary and phytosanitary products.
The interaction of a Maritime Single Window with the above systems needs careful deliberation.

[19] http://ec.europa.eu/taxation_customs/customs/procedural_aspects/general/sad/

## 4.6 International standards and "de-facto" specifications of interest

The following international standards and "de-facto" specifications deserve attention from the perspective of the work in eMAR.

### 4.6.1 The WCO data model and EDIFACT messaging standards

WCO Data Model (currently at version 3.0) is developed for optimized electronic data exchange, providing a global standard for whole-of-government cross-border data requirements. WCO model mainly applies the release and clearance of goods. It also takes into account the requirements of security and ship reporting under the FAL and SOLAS Conventions and ISPS.

The model is a toolbox containing material that can be used for a variety of purposes. It is consistent with other international standards such as the United Nations Trade Data Elements Directory (UNTDED), and will be also aligned with UN/CEFACT's Core Component Library (CCL). Previous versions of the WCO Data Model catered for UN/EDIFACT standard-based messages such as CUSCAR (Customs cargo report message – identified in the IMO revised "Compendium on facilitation and electronic business" as a message for the exchange of FAL form 2 and 3), CUSDEC (Customs declaration message) and CUSREP (Customs conveyance report message - identified in the IMO FAL Compendium as a message for the exchange of FAL form 1 – General Declaration).

WCO Data Model Version 3 has been developed to be the kernel of a Whole-of-Government Cross- Border Single Window. The GOVCBR as developed from Version 3 onwards, will eventually make the CUSXXX messages superfluous. GOVCBR makes it feasible to comply with the key element of a Single Window, namely to send a piece of information only once within one cross-border transaction. GOVCBR allows regulatory agencies to create and specify electronic messages from the same structure to any cross-border situation involving the release of goods, containers or conveyances. As stated in the EPCSA (European Port Community Systems Association) reference message guide[20], it is anticipated that GOVCRB, developed in both and EDIFACT and XML version, will start gradually replacing the currently utilized messages of the CUSXX family following the launch of maritime single window in Europe in mid 2105 (as RFD entails).

AnNA project, mentioned above, uses the WCO model as the basis for the development of the AnNA messaging framework.

[20] Could be downloaded from www.epcsa.eu

### 4.6.2 The EDIFACT messaging standards

Nowadays, within the Transport and Logistics sector in Europe, the exchange of data between the various parties is performed primarily by means of EDIFACT standardized messages. The following EDIFACT messages could be used for exchange of information with Port Community systems and Single Windows:

1. Those defined in the IMO Compendium for the exchange of FAL Forms (**CUSREP** for FAL 1, **CUSCAR**-for FAL 2/ FAL 3 (Option 2), **INVRPT** for FAL3 (Option 1), **PAXLST** for FAL4/FAL5, FAL6).
2. BERMAN (Berth management message; a message from a carrier, its agent or means of transport to the authority responsible for port and waterway management, requesting a berth, giving details of the call, vessel, berth requirements and expected operations)
3. IFTGN (International Forwarding and Transport Dangerous Goods Notification message; is a message from the party responsible to declare the dangerous goods (e.g. carrier's agent, freight forwarder) to the party acting on behalf of the local authority performing the checks on conformance with the legal requirements on the control of dangerous goods, normally Port Authority, conveying the information relating to one conveyance/voyage of a means of transport such as a vessel, train, truck or barge, on the dangerous goods being loaded, unloaded, and/or in transit).
4. WASDIS (message to convey information on last inspection and/or on waste and cargo residues on board of a means of transport (e.g. vessel) and/or equipment related to a means of transport and still to be disposed in the next place or port of call of the means of transport)

BERMAN, IFTGN, WASDIS messages are currently available also in an XML structured variant.

### 4.6.3 The Electronic Port Clearance standards of ISO

These international standards contains definitions of messages (ISO28005-1) and core data elements (ISO28005-2) for electronic messaging between ships and shore in the areas of safety, security and marine operations. The standard covers all data reporting requirements for ship to shore and shore to ship reporting as defined in the following:

1. All FAL standard declarations (FAL 1 to 7) as defined in the FAL Convention.
2. ISPS reporting requirements as defined in ISPS and MSC 1305
3. All general ship reporting requirements as defined in IMO A.851
4. Recommended reporting on ship generated waste as defined in MEPC 644 and which is mandatory in Europe as described in EU/2000/59.
5. Required reporting as defined in the bulk loading and unloading code A.862.

6. ETA reporting to pilot station as defined in A.960.

The standard may also be used for information exchanges between the ship and the ship agent, the port as well as ship operator or manager.

Although the standard includes the definition of cargo elements and could be used, in this sense, for the exchange of FAL 2 form, will not necessarily cover issues such as customs clearance of imported or exported goods or transport service provisions to goods owners.

### 4.6.4 The SSN XML Reference Guide

The XML Reference Guide describes the data exchange mechanism established between EU MS, Norway and Iceland for the SSN system (refer to section 2.3 for the changes to the specifications related to the implementation of the RFD). As described in the paper "SSN Interface" [21] presented in SSN workshop 20, changes were introduced in the structure of the PortPlus notification message as well as the ShipCall request/response messages for addressing the waste and security requirements. As mentioned in the paper, the Group that developed the proposal on the changes took into account the business rules approved by the eMS Group. The data elements identified by the eMS "Data Mapping" sub-group were added to the SSN messages following a structure similar to the current PortPlus. The detailed information is stored at national level, and is made available upon request using the current ShipCall request and response messages.

The technical definitions and coding of data elements were based on the existing technical definitions in SafeSeaNet, the ISO 28005-2 and the WCO data model.

### 4.6.5 The DDNIA specification on ICS

Considering i) the requirement for the exchange of Entry Summary Declaration (ENS) via the national single windows, ii) the discussions related to the development of an eManifest in the context of the BlueBelt initiative and iii) the ambiguity that exists in the way data exchange shall be established, if to be established between Customs and NSWs, attention is drawn to the DG-TAXUD specifications for the for National Import Applications. The reference set of documents for these specifications[22] is the DDNA (Design Document for National Applications), which is applicable to every Transit, Export and/or Import Control Application and must be considered as a mandatory document for all implementation and verification activities. ENS is specified in DDNIA volume of the DDNA referring to Import control (workflows) and DDCOM (Common Operations and Methods) volume as far as the XML decisions.

[21] http://emsa.europa.eu/documents/workshop-presentations-a-reports.html (see SSN Workshop 20)

[22] Specifications could be downloaded from http://www.masp.belgium.be/en/content/ics-0#ics_downloads_current

The Information Exchanges supported and the different parties involved in the exchange of ENS are summarized in Figure 10 below.

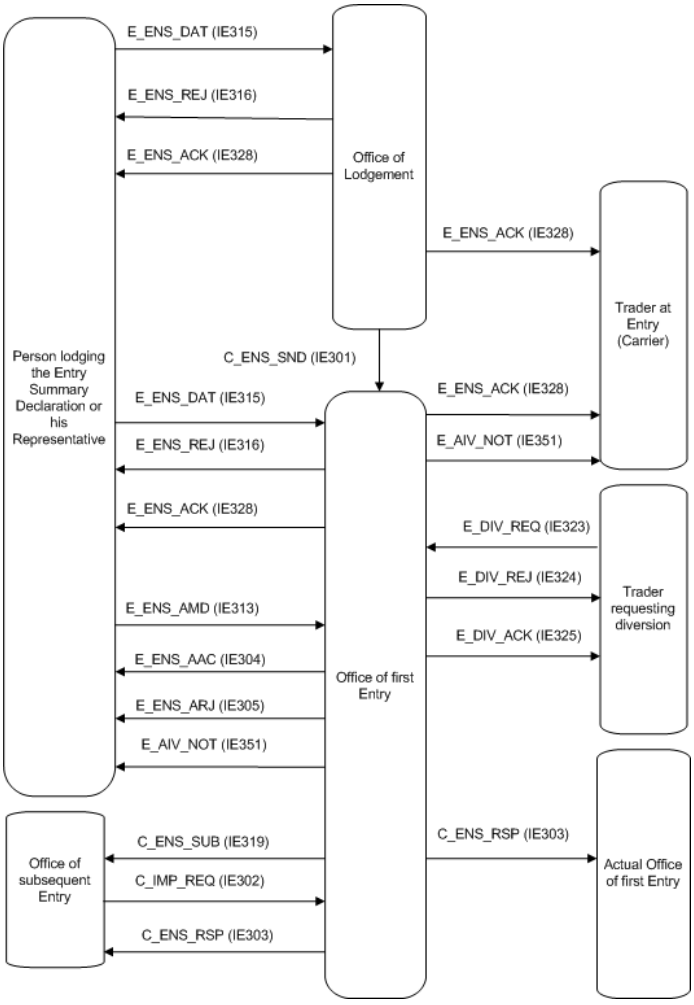


**Figure 10 Overview of Information Exchanges for ICS Phase 1 (Source DDNIA version 9.0 EN)**

In particular, Figure 10 illustrates the different exchanges foreseen for the Import Control System. A prefix of “C_” denotes exchanges within the Common Domain between the roles Office of Lodgment, Office of first Entry and Office of subsequent Entry. A prefix of “E_” denotes exchanges in the External Domain (between National Administrations and Traders)

## 4.7 eMAR project interaction with eMS, AnNA, EMSA and Norwegian Maritime Coastal Administration

In order to ensure that the needs of maritime Administrations, in terms of systems evolution are well understood by the eMAR consortium partners and are well taken into consideration in the work of the project, eMAR project representatives are following up closely (with active participation in meetings) the activities of eMS group, AnNA project. Furthermore a number of meetings have been organized in the recent past with EMSA and Norwegian Coastal Administration and a number of initiatives were undertaken to ensure eMAR is aligned with and compliments the EU developments for the implementation of the reporting formalities directive. The most notable activity relates with the on-going tests of data exchange between the **i-Ship** Reporting Gateway application and the NSW prototype (implemented in the framework of the IMP demonstration action – refer to 4.4).

# 5 System landscape of 2015 and beyond

## 5.1 "Meta-2015" landscape overview

No-one could determine with a certain degree of certainty how the system landscape in Europe shall evolve in the meta-2015 era. However, one should take into account:

- The Commission's vision on e-Maritime to develop an integrated EU system enabling the identification, monitoring, tracking and reporting of all vessels at sea and on inland waterways building on resources currently available such as SafeSeaNet.
- The envisaged role of SSN in future CISE and the wish of EU transport Community stressing the importance of a full "use" of existing and upcoming systems (NSWs and SSN).
- The current "state of affairs" (briefly described in the previous chapters) in the implementation of the RFD at Europe.

Based on the above assumptions the following conclusions may be drawn.

### 5.1.1 Reporting formalities

The following situation could affect the Industry[23] (refer also to the **Error! Reference source not found.**):

1. Maritime reporting formalities notifications mandated in the legal Acts of the Union and related with:
    a. Port clearance,
    b. Maritime Safety including the notifications on dangerous cargos
    c. Border control on persons

    will be forwarded by the shipping industry to NSWs. The NSWs should have:

    - A direct connection to a reporting gateway application (e.g. a web interface) managed by the NSW
    - A direct connection to a reporting gateway application managed by Port Community systems / Port Window Systems or third-party value adding services
    - A system2system connection to NSWs or PSWs or VAS who then will route the notification to NSWs
2. Cargo reporting formalities (ENS , FAL2 and/ or cargo manifest and, if to be established, will consist an electronic eManifest to be forwarded by the shipping industry to Customs:

[23] The term "Industry" here is used for identifying ship managers, ship agents, cargo forwarders/ carriers and ship cargo agents. PCS/ PSWs and third party VAS services (which might be operated by a Business, a Public Authority or a Public-Private Partnership are considered as art of the infrastructure that National Administration will use to exchange information with "Industry"

- With a direct connection to a reporting gateway application (e.g. a web interface) managed by the Customs
- With a direct connection to a reporting gateway application managed by Port Community systems / Port Window Systems or the NSW
- With a system2system connection to Customs, NSWs or PSWs or VAS. If the declaration is sent to NSWs or PSWs or VAS then these systems will route the notification to NSWs

In such a situation the functions of the existing SSN NCAs related to the collection and processing of notifications related to the VTMIS Directive and PSC Directive could be fully merged into the NSW. Other functions of the SSN NCAs (e.g. related to the collection of incident reports and/ or maritime reporting systems information, arrival/ departure information, etc.) could be also "merged" into the NSWs or remain outside of it. In this sense, one may anticipate that Authorities dealing with Maritime Safety (SSN Coastal stations) and generating such information may utilize an "event" gateway application for reporting.

This application will be operated by the NSW or an "independent" SSN NCA. The application shall be utilized to record event information and exchange, via NSW and/ or SSN, event information with other Authorities. In the case that an event gateway is not established nationally, maritime Authorities may report the events directly to SSN via a web interface made available by the SSN central system.

In such a landscape SSN central system:

- Shall continue "Indexing" information stored into the national systems (NSWs or event gateways operated by SSN NCAs) to enable the exchange of information between Authorities at international level in case of need
- Shall continue storing and processing information on ship calls and ship movements (independent of ship flag) in a pan-European scale.
- Shall continue tracking EU flag state movements (via LRIT, Satellite AIS, terrestrial AIS) on global scale
- May develop further functionalities concerning:
    - Provision of reference data to MSWs (e.g. vessel information)
    - Proactive distribution of information related to ship incidents and voyages[24]
    - Collection and distribution of EU Maritime Reporting Systems information[21]
    - Provision of statistical information on ship movements to Eurostat and facilitating, in this sense, the implementation of the requirement in the preamble of the RFD Directive[25]

[24] Refer to EMSA work-programme for 2013 , section 4.2

One could also foresee a key role for SNN in the further development of the BlueBelt project. Possible options include:

- providing voyage related information to Custom Authorities in "real time" (including warning on e.g. deviations of ships from the expected route and ship to ship activities at sea). This would require the development of a voyage data distribution system2system service between SSN central and Customs User Community.
- facilitating the exchange of e-Manifests at international level
- doing both (on this refer also to the next section)

### 5.1.2 CISE

In terms of developments in the maritime surveillance domain and the implementation of CISE in the "meta-2015" era the following notes could provide an indication of the potential evolution:

1. Existing Port Community systems / Port Windows or Internet-based value adding services providers may resume, in CISE terms, the functions of CISE node. PCS/ PSWs, in this case, shall operate gateway mechanisms to exchange data with Businesses/ Authorities at local level.
2. In some MS, Maritime Single Windows would resume, in CISE terms, the role of the national Aggregator and/ or Coordinator node, aggregating information from all the seven CISE communities in a Country.
3. In other MS, Maritime Single Window would act, in CISE terms, as an aggregator primarily for the Maritime Safety Community. The node shall be interoperable with other nodes established in the Country (e.g. the eCustoms node). MSWs in this case may establish own gateway mechanisms to exchange data directly with ships/ ship representatives and / or interact with ship representatives via gateway mechanisms established by third parties.
4. A "next-generation SSN" (which shall integrate functions made available in the EMSA systems presented in the chapter 2 and 3, namely the present SSN/ LRIT DC/ CSN/ IMDATE and THETIS) may evolve in a number of ways, e.g.:
    - Acting as a EU-wide coordinator node for NSWs and, accordingly, for all the User Communities participating in the NSWs.
    - Acting as the Coordinator node for the Maritime Safety and Marine pollution preparedness and response Communities. The SSN in this case

[25] In bullet point (6) of the preamble one may read: *"**Detailed statistics on maritime transport** should be available to assess the efficiency of and the need for policy measures aiming at facilitating maritime traffic within the Union, **taking into account the need not to create unnecessary additional requirements with regard to the collection of statistics by the Member States** and to **make full use of Eurostat**. For the purposes of this Directive, **it would be important to collect relevant data concerning ship traffic within the Union and/or ships calling at third country ports or in free zones**"*

shall be interfaced with specific Authorities at EU, Regional or national level and/ or with the aggregators, in CISE terms, potentially established by the other CISE Communities (Customs, Border Control, Fisheries, etc.). One may note that in this direction a lot of activities are already underway by EMSA. Reference is made, for example, to:

- The antipiracy Anti-piracy monitoring service[26] developed for EUNAVFOR to track vessels in the high risk area of Somalia
- The operational support provided by EMSA to FRONTEX activities[27]
- The pilot projects exploring the possibility of adding new streams of data to the existing maritime picture provided by EMSA, such as Vessel Monitoring Systems (VMS) data for fisheries and Satellite AIS data[28]

## 5.2 eManifest – setting the scene

**Editor Note:**

The information provided here-in is based on an analysis of papers submitted by Industry and the Commission services in meetings (attended by representatives of the eMAR consortium) concerning the BlueBelt service and eManifest concept definition. Furthermore is based on analysis of the Communication 510 of the EC (published on 8/7/2013) "Blue Belt, a Single Transport Area for shipping"

### 5.2.1 eManifest, a tool to facilitate voyages of vessels calling also in third country ports

As explained in the COM (2013) 510:

*"The status of the goods carried on-board (i.e. Union or non-Union, Export, Freight, Remaining On Board, etc.) needs to be known in order to determine the appropriate customs supervision. Therefore, facilitations can be achieved by introducing a tool for easy notification of the required information, including information to be provided by the shipping company to customs on the status of the goods. This will allow the authorities to determine the procedure to be applied according to the status of the goods. Such a tool will allow customs at the discharge port to arrange for a swift release of Union goods while ensuring that non-Union goods remain under necessary customs and other administrative controls, such as health controls, pending their release for e.g. free circulation.*

*The electronic cargo 'eManifest' with information on the status of goods is considered a practical solution to achieve this. The eManifest would take the form of a harmonised*

[26] See http://emsa.europa.eu/combined-maritime-data-menu/anti-piracy-monitoring-service-marsurv.html
[27] See http://emsa.europa.eu/combined-maritime-data-menu/interagency-cooperation.html
[28] See http://emsa.europa.eu/integrated-maritime-data-environment-imdate.html

*and electronic cargo manifest and is an instrument to achieve further facilitation of maritime transport for vessels calling at EU and also at third country ports.*

*When the eManifest is lodged in an EU port, the Union status of the goods on board will be indicated and, if confirmed, customs controls would no longer be needed for Union goods apart from random checks. This represents a considerable facilitation of trade for shippers and shipping companies, as well as a simplification for customs authorities not required to check Union goods, unless identified for random or specific checks.*

*Goods loaded at non-EU ports would by definition be non-Union goods and be mentioned as such on the eManifest. In addition, if a vessel calls at a third country port between two EU ports but Union goods remain on board, the goods will maintain their status as declared upon departure from the last EU port. Furthermore, the verification of accuracy of the information provided from the port of departure to the port of arrival will be facilitated due to the harmonised eManifest.*

*The eManifest would introduce a further simplification: the indication of the goods' status in the eManifest could be endorsed by an operator if he is authorised to do so. Traders who do not have such an authorisation will have to rely on confirmation by the customs authorities.*

*The eManifest needs to be made available electronically to the customs authorities in the subsequent EU port of call where goods will be unloaded, the Union status of the goods being used to guarantee a quick release. A reference in the eManifest to the cargo-related information collected in previous ports of call would provide an additional element for tracking compliance not only with the fiscal but also with the safety and security requirements of the EU.*

*The eManifest will need to be fully harmonised across the EU. IT systems also need to be fully interoperable for the eManifests to be lodged and information to be exchanged between authorities. However,* ***the intention is not to create a new system*** *which would imply additional costs, but* ***to build on existing systems or systems which are being developed, such as the National Single Window, developed in the framework of the Reporting Formalities Directive, which would allow the eManifest to be exchanged between national customs administrations and with other relevant authorities****".*

### 5.2.2 eManifest, issues to note

Considering what is stated in the BlueBelt Communication and the on-going dialogue on its definition it appears that a harmonized eManifest, in order to fulfil its purpose:

- Should provide a customs status indicator for goods appearing on the manifest e.g. e-manifest to be marked with a 'C' for Union goods, an 'N' for non-Union goods, an 'X' for export procedure goods.
- Fulfill the core requirements of the RFD and the Customs-related legal Acts concerning cargo/ customs clearance of goods. Industry expects, in this expect[29], that following the introduction of eManifest the further use of FAL1 and FAL2 forms should be suppressed.

The eManifest could be indeed proven to be a solution for:

- Reducing reporting burden for Industry
    - Assuming that data previously provided (e.g. those submitted via ENS) could be fully re-used
    - Assuming that the EU infrastructure set-up for collection and exchange of data would eliminate the need for double/ triple reporting of cargo information or part of it to different authorities in custom declaration lodging, cargo loading/ unloading or temporarily storing goods carried by ships
- Facilitating Customs/ Maritime Authorities work
    - Assuming that it shall providr means to trace and verify the "Proof of Union Status" of the goods
    - Assuming that it shall aggregate information related to "Pentalogy"[30] and thus allow a simplification of custom procedures for export, transit, safety and security assessment.
    - Assuming that it shall provide a concise view of ship cargo (including dangerous cargo information) for Maritime Authorities for e.g. ship safety assessment/ evaluation.

In relation to the content of a harmonized eManifest, it is important to draw attention on the following:

[29] Refer to http://www.annamsw.eu/documenten/item/wsc-presentation-emanifest.html

[30] The term "Pentalogy" refers to the following customs formalities: Entry Summary Declaration (ENS), Notification of Arrival of the means of transport (NA), Presentation Notification (PN), Declaration for Temporary Storage (DTS) and Customs Declaration (CD).

1. The harmonized eManifest should include:

    a. An "Arrival" Notification with brief cargo description (integrating information currently included in FAL 1)

    b. Detailed cargo information on arrival, possibly including all elements required for the "Pentalogy". Thus it should integrate all the information currently submitted via FAL 2 **and** FAL 7 forms.

2. It appears that there is a consensus achieved between all Stakeholders on a phased approach for the implementation of an eManifest[31] (IMO FAL 1 and 2 information inclusion in the eManifest is considered as a basic requirement for the first phase of the implementation, while the inclusion of IMO FAL 7 'Dangerous goods' is considered as 'nice to have'.
3. It appears that there is a consensus to reference ENS MRN (Movement Reference Number) for the eManifest.
4. There is still divergence of opinions among Stakeholders on a number of issues:
    a. **The Form** of the eManifest (a single message consolidating FAL 1 and FAL 2 information as opposed to two messages one including an "Arrival" manifest with FAL1 information and a "Cargo" Manifest with FAL content
    b. **The Reporting party** for eManifest: Currently FAL 1 is lodged by the vessel operator, while FAL 2 is lodged by the carrier (s) of on-board cargo. EU Custom Authorities wish the eManifest to be lodged by authorized Consignors who shall self-certify the status of goods. Industry considers the procedures for acquiring the status of "Authorised Consignor" status very complex and suggests its simplification. Furthermore, industry encourages the consideration of a creation of another category of eManifest reporting parties identified as "registered carrier". "Registered maritime carriers" shall not have the right to self-certify the goods status and it will be required to request confirmation from Customs in the EU port of loading of the Union status of the goods to be loaded onto the vessel. The confirmation could be done in the form of annotations on the transport documents
    c. **Workflow** for eManifest submission: there exists an overarching agreement that trade should provide the eManifest only once using a single channel. The recipient of the eManifest on the side of the authorities would then have to organize the availability and distribution to all the government bodies that need the eManifest. However there is a divergence of opinions on which this channel would be. Industry

[31] See http://www.annamsw.eu/documenten/item/consolidate-minutes-emanifest-workshop-june-2013.html

seems to be in favour of transmission via EU's ICS system (used currently for ENS submission) and made available, via ICS, at national level to relevant entities such as NSW and port community systems. Several MS participating in the recent eManifest workshop[25] are in favour of utilizing the NSWs, while others wish to have full freedom in establishing a channel of their choice.

d. **eManifest updates**: Industry suggested that the administrations would be responsible to update the eManifest based on the information they received as part of the clearance procedure (presentation or exit of goods) or coming from B/L information of the goods loaded. In contradiction, the view of Authorities is that the provision of manifest information in a port is a core responsibility of trade; it cannot be handed over to the authorities.
e. **Data re-use**: Industry is in favour of the full reuse of information previously submitted (e.g. via the ENS). Custom Authorities see merits in this idea and it could be contemplated in mid-term, depending on the requirements imposed on ICS from other initiatives.

### 5.2.3 A proposal on the definition of the eManifest notification

Considering the aforementioned, the definition of the messages related to the eManifest exchange should be based on the present family on messages defined by DG TAXUD on ENS taking into consideration the relevant work conducted by AnNA project (e.g. on the definition of the good status indicator).

The proposal below assumes that the data of previously submitted ENSs or eManifests submitted on arrival to the loading port shall be pushed to (or could be requested by) the ports where goods are to be unloaded.

The "push" or "pull" of previously submitted ENS or eManifest could be achieved by establishing an exchange mechanism based on the utilization of SSN system or based on ICS.

The proposal below warranties to Industry the full re-use of data previously submitted via e.g. an ENS but also ensures to the Authorities (Custom or Maritime) full transparency on the cargo on-board the arriving ship. The proposal is also compatible with VTMIS Directive requirements and the requirements of Authorities because in the content of the message are included (given that the aggregation and/ or the update of the information is made by the Industry) all the necessary information enabling Authorities to trace previously submitted cargo declarations.

In summary the following proposal should be considered and further developed by the eMAR technical partners (consultation with European Commission and Industry is recommended for further fine-tuning of the proposal below).

**Proposal of D4.2/D.3 of eMAR on the principal data echange rules for eManifest**

1 The eManifest should be ideally submitted in a single modular message before the arrival of a ship to an EU port by an authorized reporting party
2 The notification should contain two parts
   **Part1**: General Cargo declaration referring to the cargo detailed in part 2 (corresponding to the FAL1 content submitted on arrival)
   **Part2**: List of all the consignments placed on board by the reporting party or consignors that the reporting party represents
      I. For the consignments in part 2 on which details has been provided in a previous declaration to EU Custom Authorities and has not been updated since the consignment was last declared, the UCR (and MRN number, if applicable) shall be provided only
      II. Consignment details (description of goods items) shall be provided only for those consignments that:
         a. Were first time loaded (original loading or transhipment) at the loading port of the ship for her current voyage and the goods nature did not require the lodgement of an ENS.
         b. Have an update to their data (e.g. because of a cargo diversion) and the goods nature did not require the lodgement of an ENS

## 5.3 Role of SSN in a future BlueBelt service

As it is highlighted in the BlueBelt pilot project evaluation report[32], the pilot project has demonstrated that SSN can deliver accurate and timely information about vessel voyages to Customs and that indeed this information is useful and can support customs procedures. As stated in the annex of the evaluation report "*it was realised that a Blue Belt service could improve operational procedures by providing information that would help coordinate customs operations between different Member States in order to avoid missing inspections or duplicating them*". The questionnaire survey indicated customs users wish to receive the Blue Belt information through a system-to-system connection, in order to gather ship and voyage information from traffic monitoring systems and display this information on their own customs applications. Furthermore the pilot service users suggested:

1. To include consignee/consignor and goods item level data in the reports by linking the notification reports to the ENS, where available;
2. To link/include cargo manifests and customs status of goods;
3. To provide information on the licenses of vessel operators;

[32] Refer to http://emsa.europa.eu/operations/safeseanet/113-safeseanet/1463-blue-belt-pilot-project-evaluation-report.html

4. To include the previous port(s) and the entire route of the vessel in the report that SSN provides to Customs as well as information on the last non-EU port of call;
5. To include reports of the blacklisted Ships;
6. To include information of the unexpected ship behaviour;
7. To offer an indication of serious differences between estimated and actual time of arrival when they arise;
8. To include information on ships voyage and behaviour outside of the European Maritime Space using satellite AIS information;
9. Using satellite images for targeted ships for customs inspections;
10. To include information about the vessels declared next port of call. This could be checked against the actual next port of call of the ship upon its arrival;
11. To include an alert and information about vessels that switch off their AIS transponders;
12. To include the IMO FAL documents.

It appears, considering the above, that it is highly likely that a system2system interface is to be established between SSN and EU Custom Authorities in the near future (in the context of an operational Blue Belt service for providing vessel and voyage information to Customs). One could envisage that if a decision for such a service is taken, it could be also considered to include a mechanism for exchanging eManifest among interesting parties. The following scenarios could be envisaged:

1. An eManifest "pull" scenario: The European Index Server integrated into SSN is upgraded to support the exchange of eManifest in a request/ response scenario. In this scenario in case of a request from a Custom Office or a Maritime Authority in the port of arrival of a ship, SSN shall fetch and make available to the requestor the Arrival Manifest submitted in the port of departure.
2. An eManifest "push" scenario: The eManifest provided in the port of departure is included in the data that SSN pushes to the port of arrival along with vessel and voyage information

## 5.4 Potential contributions of the eMAR project in the application land-scape of the "meta-2015" era

This report attempted so far an analysis of the current state of play and forthcomings in the e-Maritime domain from the perspective of systems operated by Administrations at national or EU level with a special focus on those interacting with SSN currently or in the near future. An effort was made, via the analysis of information collected, to identify issues to be addressed and areas of work where eMAR project can contribute to support the development of ***an integrated information management system*** in Europe based on existing systems such as AIS, LRIT and SSN.

We have identified that the greater challenges, that eMAR work should focus, relates with:

1. The implementation of reporting gateways and Maritime Single Windows for port clearance, border controls on persons and maritime declaration of health
2. The collection and distribution of cargo information in the form of a harmonized eManifest
3. The interoperability framework between Maritime Authorities, Custom Authorities and Industry.

In all these three areas eMAR may contribute by:

a. Proposing a reference specification for the data exchange mechanism utilized for maritime and customs formalities. This would be based on a modification of the CRS initially developed in the eFreight project taking into account recent developments, especially the work carried out by eMS Group and AnNA project on business rules and data mapping.
b. Proposing a conceptual approach (refer to 5.2.3) on the content of the eManifest based on a principle of full re-usability of previously reported data.
c. Devising and proposing reference specifications for a number of “interoperable” applications which could be utilized in a multi-node environment for the collection and distribution of information related to port and cargo clearance

In the next chapter are summarised the recommendations of this report as regards to the above (ab), (b), (c). Furthermore in the Appendix D is included a thorough overview the relevant functional requirements for e-Maritime applications that this report proposes to be developed

# 6 Concluding remarks / Policy, Standardisation recommendations and recommendations for further research work.

The great challenge in the forthcoming years, requiring effort and investments from all the stakeholders in the e-Maritime field, Industry and Administrations, relates with the implementation of the National Single Windows and the implementation of the interoperability framework between the IT systems of Maritime and Customs Users Communities.

Industry is looking forward to a simplification of the applicable reporting procedures. Industry hopes that the process towards this simplification would be initiated with the implementation of NSWs and the promotion of initiatives such as BlueBelt in an operational service. This service could be based in a more proactive and efficient utilization of available systems, like the SSN and the implementation of a harmonized eManifest.

The eMAR project could play a role in this evolution by devising reference specifications and intelligent application design concepts, which could be utilized by Industry and Administrations in their applications. This report provides proposals on the direction to be taken, in terms of IT developments within the eMAR project.

The intensive work that took place in eMAR in 2013/2014 (notably the implementation of the **i-ship** Reporting Gateway application) actually proved the baseline of the application concept detailed the Guide included as Appendix D in this report. This allows us to conclude this report with the following recommendations on e-Maritime services, Policy/ Standardisation- related recommendations as well as recommendations for further research work.

# Proposed services portfolio (SSN/ NSW-related)

| Application family | Proposed Service / Application[33] | Relevant-maritime Domains | Applicability[34] | Notes |
|---|---|---|---|---|
| eMAR Common Reporting Gateway | Ship/ Cargo Reporter | (a).Submitting data to and from Port Electronic Data Systems<br>(b).Obtaining updates to berth/terminal/port services and restrictions<br>(c). Communicating with clients/ shippers/ forwarders regarding transport planning and freight monitoring<br>(d).Submitting information to administrative and regulatory bodies/ authorities<br>(e).Obtaining real time information on affecting ETA<br><br>(g).Daily communication with trading partners, or logistics agents | B2B, B2A | Web Client/ server application hosted customised for ship or cargo agents. It communicates with web services with business associates (ship managers, cargo consignors) and reporting nodes (port community system or MSW, Customs) in the area of operation of the company hosting the application |
| | PortCall planner & Ship reporter | | B2B, B2A | Web Client/ server application hosted by a ship management company. It communicates with web services with business associates (cargo partners, ship agents) and reporting nodes (port community system or MSW, Customs) in Europe |
| | On-line ship/ cargo reporting services | | B2B, B2A | "Cloud"-based collaborative environment for ship managers and their associates (cargo/ ship agents and cargo consignors) acting as "European common reporting gateway to all reporting nodes" (port community system or MSW, Customs) in Europe.<br>The service could be hosted by a service broker providing services to several shipping actors (managers or agents). The service broker could be a private company or a public /private partnership. One possibility is that the service is made available by eMAR to EU MSs to be used for creating a harmonised MSW interface to industry |
| | EPC Gateway | | B2A | Web client/ server application acting as a B2A front-end for an MSW or Port single window system. It offers a web interface and a system interface |
| eMAR Maritime Single Window | NRI adaptor for MSWs | | A2A | Web client/ server application acting as A2A front-end for an MSW enabling national maritime or custom Authorities to be notified for declarations submitted by the industry.. It offers a web interface and system interface (s) for connection to the system of each Authority |
| | Events Gateway | | A2A | Web client/ server application acting as A2A front-end for an MSW or SSN NCA enabling SSN coastal Stations to submit/ consult incident reports. It offers a web interface to SSN coastal stations designated to handle incidents |
| | SSN adaptor for maritime MSWs | | A2A | Web client/ server application realising a system interface between a MSW and SSN central system for submitting/ querying reporting formalities and incident reports. |

[33] Refer to chapter 6

[34] B2B:Business2business, B2A:Business2Administation, A2A:Administration2Administration

# Policy recommendations

### 6.1.1 Permanent BlueBelt Service

(refer to section s3.2/ 5.2 and 4.6.5)

In relation to the establishment of a permanent BlueBelt Service the following issues could be considered:

1. European Commission should take all the necessary actions in the legislative domain for the:
    a. Clarification of the "conflicting" requirements in the currently applicable legislation. According to the RFD, ENS should be notified to national single windows while , according to the currently applicable Custom Code, the ENS should be submitted to the Custom Office of First Entry or an "Office of Lodgment" (refer to Figure 9/ section 4.6.5).
    b. Introduction of an electronic e-manifest based on a EU-level harmonized approach (data content and rules) addressing the needs of the Industry and both Maritime and Custom Authorities. The eManifest should include a way for uniquely identifying consignments carried on board for a given voyage and enable the tracing of goods during their transshipments (e.g. by making the reporting on the UCR[35] on the eManifest mandatory or other equivalent way). The e-manifest should always provide an method for identifying the "Community" status of goods and tracing the changes of this status during transshipments. The structure of this manifest should be agreed among MS and "harmonized" to the extent is possible and feasible. The definition of the messages related to the eManifest exchange should be based on the present family on messages defined by DG TAXUD on ENS taking into consideration the relevant work conducted by AnNA project (e.g. on the definition of the Community status indicator).
2. The use of central SSN system could be considered for the following possible uses:
    a. A close monitoring of ship movements among EU ports and between EU ports and non-EU ports. In this respect the specification of an appropriate system2system interface enabling the "push" of port call information to Custom Authorities should be considered for integration into the SSN XML specifications.

[35] Unique Consignment Reference (ref ISO 15459)

b. Relaying of eManifest information. A system interface should be established allowing either:
   i. The “proactive” push of the data included in an eManifest to the port of unloading specific consignments; or,
   ii. The establishment of a request / response mechanism enabling the “pulling” eManifest data: or
   iii. Both “push” and “pull” methods.

### 6.1.2 Central SSN role in CISE

(refer to the sections 3.1, 5.1.2 and information on EMSA systems and services in 2.4 and 3.3)

A “next-generation SSN” (which shall integrate functions made available in the EMSA systems presented in the chapter 2 and 3, namely the present SSN/ LRIT DC/ CSN/ IMDATE and THETIS) may evolve in a number of ways, e.g.:

- Acting as a CISE, EU-wide, coordinator node for NSWs and, accordingly, for all the User Communities participating in the NSWs.
- Acting as CISE Coordinator node for the Maritime Safety and Marine pollution preparedness and response Communities. The SSN in this case should be interfaced with specific Authorities at EU, Regional or national level and/ or with the aggregators, in CISE terms, potentially established by the other CISE Communities (Customs, Border Control, Fisheries, etc.).

## Recommendations on standards

(refer also to the sections 1.1 and 3.2.1 in Appendix D)

It is highly unlikely that the stakeholders would agree in time for the implementation deadline of the RFD (or even if ever agree on the adoption of a unique standard for the exchange of data formalities between:

- Industry and Port/ National Windows; and.
- Port/ National Windows and Maritime/ Custom Authorities at national level.

In this respect, instead of aiming in the acceptance of a single reference standard, the European Commission should take actions in the direction of enabling stakeholders’ agreement on:

- A framework of acceptable standards for the exchange of port-related or cargo-related formalities, and
- Cross-mapping of data elements foreseen in the standards that shall be included in the framework.

The framework of standards would be based on the following reference specifications:

1. ISO/DIS: Electronic port clearance (EPC) —Part 1: Message structures — Implementation of a maritime single window system
2. ISO 28005-2: Electronic port clearance (EPC) —Part 2: Core Data elements
3. DG TAXUD - Design Document for National Import Application (DDNIA)
4. EDIFACT standards referenced in the revised IMO compendium on facilitation and electronic business (FAL.5/Circ.40/ 4, July 2013)
5. WCO standards adopted by AnNA project and reflected to theAnNA Message Interface Guide.
6. SSN XML Reference guide

Regarding the ISO standards, it should be taken into account the existing proposals for potential changes/ refinement of the specifications (reference is made to those changes stemming from the current tests of EMSA and Members states in the IMP demonstrator project)

## Recommendations on further research work

Taking into account the current lack of agreement on a unique reference standard for the exchange of reporting formalities, there is a need to introduce in the e-Maritime gateway applications transformation engines. These engines should be as much as “intelligent” as possible, in order to:

a. Transform the internal representation of a data attribute (included in the domain model of the application) in the format required by a given data exchange standard,
b. Further adapt the content of a message to be exchanged using a specific standard to the very specific rules / constraints imposed by a specific country or port,
c. Address changes in the business rules concerning data exchanged in a way consistent with an ever evolving legal and operational framework.

This document suggests the introduction of the so called “data-sets” in the eMAR applications (refer to the relevant definition in Appendix D), in order to allow an abstract grouping of data elements in the domain model in the way required for

supporting a specific transformation. The proof of the data set concept[36] was attempted with the implementation of the i–ship reporting application and, so far it has, produced the anticipated results. However, the work on i-ship reporting also revealed that further research work is necessary on the development and implementation of intelligent "business rules" engines.

Such rule engines will allow the dynamic specification and application of rules without the need for hard-coded changes to the actual implementation of an e-Maritime application; instead, the responsible stakeholder (for example, the ship agent on port level) will define the rule for the applicable regulation (international, national, or port by-law), using an intuitive user interface. Alternatively, the rules can be derived automatically from the regulations, if there is a clear and commonly agreed definition and mapping of the ontological semantics for both domains (i.e. for the regulation clause and for the rule). This approach will resolve the need for human intervention and will limit the space for misinterpretations and ambiguities.

In more detail, the rule is the unambiguous definition of a regulatory clause in a machine-understandable way, using the concepts of the common domain model. An example of such a clause can be:

*"Ships that belong in category X must also submit the formality Y at least Z hours before arrival".*

As previously said, the definition can be done in two possible ways:

- Automatically from the regulation, if it is defined with ontological terms that can be mapped to the domain model of i-Ship Reporting System. The regulation must be specific and unambiguous in this case, which requires the use of a standardised structure by the authors of the regulations.
- Manually by the appropriate human stakeholder, using a graphical user interface that assists the user and checks the syntactical correctness of the rule. As an example, for the case of port-specific rules, the definition of the rules is a responsibility of the ship agent.

After the rules are defined, they are triggered automatically by the rule engine, when the prerequisite conditions are satisfied. The system then guides other users of the application (e.g. ship masters) to the appropriate actions in order to comply with the rule. For the example provided above, the rule would be triggered only when the current ship belongs to the category X, notifying the user a specified time before the deadline (i.e. before the hard deadline of "Z hours before arrival") that the formality Y must be submitted. The process continues as normal from this point on: the user is

[36] Data sets are used in the implementation of data transformations in the i-ship reporting application

directed to the appropriate form, which is automatically pre-filled with the available data, and after the user validates the included data or adds more content, he or she proceeds to the submission of the formality as an electronic message.

Given that such work is beyond the one foreseen to be undertaken within eMAR, it is highly recommended to continue this work in other research projects.

# Part III – Appendices

# 7 Appendix A: The VTMIS Directive

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# 8 Appendix B: The reporting formalities Directive

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# 9 Appendix C: NSW implementation in Europe / The business rules for data exchange agreed by the Countries implementing the reporting formalities Directive

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# 10 Appendix D "Guide for the implementation of SSN/ NSW – related e-Maritime services and interoperability of these services with National) and EU systems"

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