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IMDatE principles

Submitted by EMSA

<i>Summary</i>	This document is intended to mark the beginning of a period of dialogue, during which comments, input and feedback on the potential future use of integrated data services within the development of the IMDatE project will be encouraged from all interested parties.
<i>Action to be taken</i>	As per section 3.
<i>Related documents</i>	HLSG 6, Agenda item 10: Integrated Maritime Data Environment - IMDatE (EMSA)

1. BACKGROUND AND OBJECTIVES

The objective of the IMDatE project is to develop an interoperable data exchange which brings together the existing EMSA monitoring and tracking systems that are used for maritime safety, security and protection of the marine environment (SafeSeaNet, CleanSeaNet, the EU Long Range Identification and Tracking Cooperative Data Centre [EU LRIT CDC], and THETIS), and also other external systems (e.g. satellite AIS). With such a tool, comprehensive information on ship positions, dangerous cargoes, pollution and other key data could be made available to users via a single interface. Information obtained via IMDatE could assist considerably in improving the situational awareness of Member States, and could also contribute to improving the cost effectiveness of maritime traffic monitoring operations.

By combining, and in some cases processing, the various available data, IMDatE aims to achieve the following objectives:

- provide easy and common access to the various operational systems;
- share data between various applications, while fully respecting the defined access rights rules;
- support enhanced functionalities (fusion, enrichment), and;
- harmonise the interfaces (web and machine-to-machine) between different EMSA applications and between the EMSA applications and those of Member States.

IMDatE should not be viewed as a new stand-alone system developed as an additional pillar of the EMSA portfolio of services, and it does not aim to replace any of the existing EMSA systems. IMDatE is the development of a flexible and configurable data exchange, which provides an interface between the existing systems, which will be capable of combining and correlating data from different sources in order to provide end users with improved services and functionalities.

There are different pieces of legislation which refer to the exchange of information between the maritime applications as follows:

a. Links between SafeSeaNet/LRIT

Directive 2002/59/EC (as amended by Directives 2009/17/EC and 2011/15/EC)

Annex III, paragraph 3 of the amended Directive states: "*Where internationally-adopted rules allow routing of LRIT information concerning third country vessels, SafeSeaNet networks shall be used to distribute amongst Member States, with an appropriate level of security, the LRIT information received in accordance with Article 6b of this Directive*".

Council Resolution of 2 October 2007

- Paragraph 12 states that "*LRIT and AIS information are complementary and agree to progress toward an integration of these two systems. The Council also stressed that synergies should be identified with other existing or developing ship identification and tracking systems*".
- Paragraph 10 states that "*subject to completion of necessary technical work, the EU LRIT DC should make use of the existing SafeSeaNet system communication platform in order to facilitate the sharing of LRIT information between Member States*".

Council Resolution of 9 December 2008

Paragraph 10 invites "*the Commission and the Member States, in the context of the EU master plan for AIS, to continue working to achieve the availability of integrated LRIT and AIS data through SafeSeaNet*".

b. Links between SafeSeaNet/THETIS

Directive 2009/16/EC

Article 24, paragraph 2 requires "*arrival and departure information to be provided to THETIS through SafeSeaNet*". Article 9 also requires 24 hour pre-arrival information to be communicated.

SafeSeaNet and THETIS have been linked since January 2011. The exchange of information is efficient and allows Port State Control officers to access SafeSeaNet data via THETIS.

c. Links between SafeSeaNet (AIS)/CleanSeaNet

Directive 2005/35/EC (as amended by Directive 2009/123/EC)

Article 10, paragraph 1 states that "*In accordance with its tasks as defined in Regulation (EC) No 1406/2002, the European Maritime Safety Agency shall work with the Member States in developing technical solutions and providing technical assistance in*

relation to the implementation of this Directive, in actions such as tracing discharges by satellite monitoring and surveillance

CleanSeaNet is the tool that has been developed by EMSA (with the support of the Commission and the MSs) for the identification of potential pollution and polluters. CleanSeaNet is linked to SafeSeaNet in order that it can receive AIS data to support the monitoring and early detection of ships (as required by Directive 2005/35/EC as amended).

d. Commission Communication on a Common Information Sharing Environment

The Commission communication on CISE (October 2009) states that *"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."*

e. EMSA Work Programme 2011

The EMSA Work Programme 2011 states that *"The information produced by these (EMSA) systems will be integrated in a variety of combinations... The range of data sources available, or potentially available, includes terrestrial and satellite AIS, LRIT, satellite imaging, coastal radar, ship-borne radar, vessel monitoring systems, and additional data provided by Member States. During 2011, and extending into 2012, the Agency will integrate and combine this data, where available, through the Integrated Maritime Data Environment (IMDatE)."*

f. Satellite AIS (SAT-AIS)

With respect to the distribution of SAT-AIS data through SafeSeaNet, the issue was discussed at the SafeSeaNet HLSG, which agreed that *"the distribution of SAT-AIS data to Member States will be materialised through the web interface/SafeSeaNet via Graphical Interface (GI) and will create no impact to the existing systems of the Member States. At a later stage, further possibilities will be explored. Member States would receive SAT-AIS data stream through the SafeSeaNet platform free of charge"*.

The business rules to allow the distribution of SAT-AIS data through SafeSeaNet were introduced and agreed at SafeSeaNet 15. Clarification of the project architecture highlighting the role of IMDatE was provided at SafeSeaNet 16. The distribution of SAT-AIS data using a machine-to-machine interface is also planned for development in the very near future. During the ESA-EMSA SAT-AIS information meetings held in January 2011 and more recently on 26 January 2012, ESA and EMSA jointly presented the functionalities of the SAT-AIS data processing centre, and referred to SafeSeaNet as the platform via which SAT-AIS data will be distributed to governmental and institutional users.

Conclusion

There is a legal basis for the sharing of SafeSeaNet AIS and LRIT data within the SafeSeaNet platform, as well for the provision of specific SafeSeaNet AIS data to CleanSeaNet and port call information to THETIS. Moreover, the Commission communication includes an integration policy based on the use of the Community system SafeSeaNet as the main platform for information exchange.

This document presents the IMDatE driving principles.

2. IMDatE DRIVING PRINCIPLES

2.1 Principle 1: Reinforce cooperation

The work to be undertaken on IMDatE will serve and reinforce cooperation between users in the "maritime transport community"¹ both at the national and EU levels, and will promote its importance within the overall maritime sector.

It is worth noting that, within EMSA, several different units have been involved in the development and operation of SafeSeaNet, THETIS, CleanSeaNet and LRIT. The development of IMDatE has improved cooperation, and prompted the further development of ideas on interfacing, data sharing, integration and fusion mechanisms. This has been a useful exercise so far, and it is anticipated that the results will benefit all of the actors involved by adding to the information/knowledge of the operation and rules of the various systems. This will ultimately contribute to improved systems quality.

Similar benefits are expected at Member States level. The anticipated IMDatE functionalities will promote cooperation between the various national competent authorities. For example, it would be technically feasible for the management of users, which is currently done by the relevant NCAs, to be done by a single NCA. Such a decision would result in operational benefits, and could promote cooperation between the NCAs concerned.

Such successful coordination would be seen as a good example by other user communities with maritime responsibilities (e.g. customs, fisheries and border control), and would strengthen the central coordination role of the maritime transport community at national level.

A significant outcome of such work would be the reinforcement of the role and reputation of the maritime transport community in being able to break down the barriers within, and to it being seen as a prime example of collaboration in developing a high level of interoperability between systems. This would demonstrate the ability of the maritime transport community to play a key role at national and EU level within the framework of the EU integrated maritime policy and CISE in particular.

2.2 Principle 2: additional operational support

IMDatE could potentially provide benefits in terms of economies of scale and efficiency of data usability. These would be achieved because a user entitled to access the SafeSeaNet, CleanSeaNet, EU LRIT CDC and THETIS applications could have access to all four systems on the same geographical background via a single interface connection, instead of dealing with each of them separately.

At present, depending on the national situation, a Search and Rescue (SAR) centre in a Member State **could** theoretically have access to relevant SafeSeaNet, LRIT, CleanSeaNet and THETIS information via:

- a. a web interface, by opening all of these applications on several computers in order to simultaneously display all the available information using four screens, or via one PC by switching from one to the other when necessary.

¹ The term "maritime transport community" has been recently adopted in the framework of CISE to indicate the user community engaged in the area of maritime safety, security and pollution prevention.

- b. a machinetomachine interface for SafeSeaNet and LRIT, whereby the national application has to connect separately to SafeSeaNet and LRIT, using the appropriate interface, in order to receive the required information. (In this case, the CleanSeaNet and THETIS information would be accessed separately).

However, in the future, the IMDatE pilot project would be able to provide the following:

- Access to all applications using a single web interface, while fully respecting the defined access rights rules. Efforts would be made to support all the functionalities of the existing systems in a harmonised and homogenous way. The operational use of the data would be increased, leading to anticipated improvements in the operational cost/benefit situation.
- A homogeneous and harmonised machine-to-machine interface for existing SafeSeaNet/LRIT services, with the ability to implement optional new services, such as additional queries, a pushed data mechanism and enriched data.

It should be noted that certain functionalities would continue to be supported separately and independently from IMDatE. For example, the PSC inspection reports would continue to be supported via the existing THETIS web interface. The co-display of some THETIS data via SafeSeaNet for IMDatE (e.g. ship risk profile, ships detained, banned, etc.) would be possible in order to provide relevant and authorised users with information that might be important for improved monitoring/management of events.

The first diagram in Figure 1 illustrates the available existing interfaces, while the second shows the improved situation offered by IMDatE:

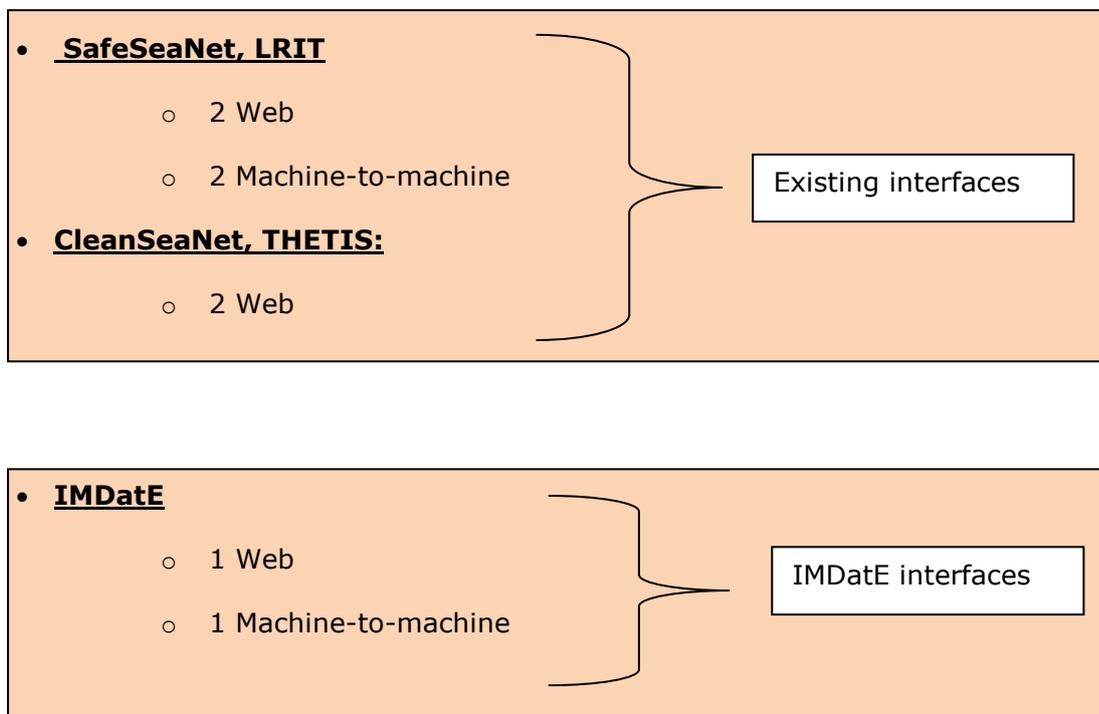


Figure 1: existing and future interfaces to access maritime data

Conclusion

By using IMDatE, a far more user friendly service can be provided to MSs by providing a consolidated graphical interface without the necessity for the user to change from one application to another (using different web interfaces). With respect to "machine-to-machine" interfaces, IMDatE can offer more **uniformed** and **enhanced** services via a single machine-to-machine interface.

2.3 Principle 3: t Share common modules

One of the main objectives of IMDatE is to be able to develop and update certain functionalities, and allow them to be shared between the different applications (SafeSeaNet, THETIS, CleanSeaNet and LRIT), thereby benefitting national systems and users. Here are some examples of possible benefits:

a. Single Sign On (SSO) access

A user entitled to access data in more than one application will be able to enter via a single log-in interface (instead of different interfaces, as is the case today), thus avoiding the need to deal with several different logins, passwords, lost password processes, etc. This functionality would be implemented for all existing web interfaces and IMDatE.

b. Reference registry database (RVR)

Three of the operational systems (SafeSeaNet, THETIS, and LRIT) maintain their own ship registry databases, based on their own legal basis and data collection methods. For example, the LRIT ship database was created on the basis that it is updated by Member States, while the information in the SafeSeaNet ship database comes from notifications received.

In each of the reference databases, the relevant information is stored, but not fully exchanged between systems. The aim of IMDatE is to develop/update an enriched Reference Vessel Registry, which obtains and uses data from LRIT, SafeSeaNet, THETIS (plus external sources) based on a uniform set of business rules. The result will be a consolidated reference registry for ships particulars which could be shared with Member States, contributing to the overall data quality in all systems at central and national level.

c. LOCODES

Within the first year of the exchange of information between SafeSeaNet and THETIS, it was found that the two user communities used different LOCODES lists, and that this resulted in the rejection of a proportion of messages due to LOCODES incompatibility. In order to address this issue, the units dealing with SafeSeaNet and THETIS have informed the respective MSs, and a checking and harmonisation process is underway.

One of the benefits of IMDatE would be the set-up of a common LOCODES list which would store all LOCODES used by different applications in a single location. Each system would use its own LOCODES (according to its own rules), but these will be shared, thus ensuring improved harmonisation.

d. Fusion module

Since there are a number of different sources of ship positioning information (AIS, LRIT, S-AIS and others), there is a requirement to organise it in a way which makes sense to users. This process has been termed the "fusion" functionality, and it can be accessed by different users depending on their access rights.

IMDatE would propose a solution for achieving a fusion module which is capable of incorporating all of the ship positioning sources available. This would be a single module which would be made available to all users in order to provide them with an accurate and uniform picture based on the consolidated information from the different sources.

e. Data quality

Currently, the EMSA units perform data quality checks individually for each application, and report the results to the various user communities. The problems encountered are then analysed separately by each EMSA team.

The IMDatE project would substantially improve the efficiency of the data quality checks by consolidating the rules and checks as far as possible, and by generating a single report for all of the applications. The SafeSeaNet and THETIS teams have already begun to assess by what means rules and checks can be consolidated between the applications; a subsequent step might be to provide a tool to allow fine-tuning and improvement of these checks. A positive impact on the workload for the teams at EMSA and on the Member States side is also anticipated.

2.4 Principle 4: Use of state of the art technologies

One of the objectives of IMDatE is to investigate the latest available technologies, and to implement the latest state-of-the-art ICT tools and management methods available. For example, web services have become more widely used (i.e. by SafeSeaNet, THETIS and CleanSeaNet). IMDatE will make use of this technology in order to provide MSs with efficient access to the additional services that will be developed.

Internally within EMSA, there is also the possibility of using a service bus enterprise that will define the specific exchange between SafeSeaNet, CleanSeaNet, THETIS and IMDatE. The IMDatE project will benefit from the existing experience of operating the different systems to date, and benefit from the state of the art improvements in future.

2.5 Principle 5: Phased in implementation

Another key objective of IMDatE is the use of a phase-in approach to delivering the different services. However, it is important to note that no users would need to change their systems or undertake any further development work. Member States would continue to work with the existing systems, and would be offered the possibility to benefit from the new IMDatE services as they become available, should they wish to do so.

Every effort would also be made to offer the possibility to partially use the IMDatE services (e.g. web or machine-to-machine), and once a Member State decided to participate in IMDatE, a dedicated training and a testing capability would be offered.

The possible phase-out of the current web interfaces would be assessed, and a decision would be taken only if all Member States agreed. The same approach could be followed for the machine-to-machine interface in order to homogenise the automatic exchange.

2.6 Principle 6: Further evolution/functionalities

Users will be provided with an extended list of alert and monitoring functions which will allow them to build user-customised monitoring profiles. These might include area-centric search and/or monitoring, labelling and tracking of particular ships, off-track alarm, encounter-at-sea alarm, etc. These functions will be extensively discussed with experts from Member States in order to ensure that they fully meet user requirements.

IMDatE will provide a machine-to-machine interface which can provide streamed integrated data into national systems so that users can use their own visualisation interface if they wish. The user would be able to visualise the data on a single Graphical User Interface, irrespective of the source of the data (instead of using different interfaces). In addition, the new interface would include a 3D visualisation option, which can be very useful in specific maritime operations.

An additional objective of IMDatE is the development of a platform to identify additional services that could be offered. An example is the use of S-AIS data to enrich the ship positioning information in the maritime applications.

IMDatE could also be the platform to run pilot projects (test and experiment new functionalities), and the front end for other communities to access maritime data, in accordance with the agreed access rights.

3. ACTION REQUIRED

Member States are invited to take note of the information provided and provide their comments.