D1.5 Report on ongoing standardization work relevant to the project

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Authors

Name	Organisation
Nick Ward	IALA

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Review

Name	Organisation
Bjørn Borbye Pedersen	DMA
Mike Card	IALA
Peter Andersen	Cobham

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1 Introduction

In WP1 of EfficienSea 2, IALA leads Task 1.3: Coordinating standardization of solutions. IALA manages the work In Task 1.3, preparing reports and deliverables in conjunction with the other members of the Task Group (CIRM, UKHO).

The first deliverable of Task 1.3 is D 1.5: Report on ongoing standardization work relevant to the project. This report sets out the strategy for carrying out the work, identifies the organizations involved with standards relevant to the project and relates these organizations to the services that it is planned to develop in E2.

The method of providing access to the information for E2 partners is discussed and the next steps to be carried out in this Task are described.

The term 'standard' is used in its broadest sense in this report. Some of the organizations identified do produce standards, others produce recommendations or technical specifications. All of these are considered here, if they are relevant to the work of E2.

2 Background

It is important to understand the standards development process and to facilitate that process within E2. Many relevant standards already exist and will be used as the basis for work within the project. Others will be developing in parallel with the project and some will be initiated by the work of the project.

However, the timescale of standards development can be long and the progress of the project work cannot be dependent on completion and adoption of these standards. Prototype equipment and systems may be developed within the project, prior to the adoption of related standards, in order to test and demonstrate principles and ideas.

Task leaders may use the information compiled in this report to identify the organizations and standards of most relevance to their tasks and establish a dialogue with those organizations, with support from Task Group 1.3, as required.

3 Strategy

3.1 Purpose

A strategy has been prepared for identifying and coordinating standards emerging from E2, considering both proposed new standards and updating of existing standards. The purpose is to give partners in E2 awareness about emerging standards that might influence their tasks/solutions and enable them to assist with the development of these standards. Forming links with the various standards bodies will facilitate this process.

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This strategy will be developed and maintained through review meetings and conferences that provide an opportunity to identify emerging standards within E2.

3.2 Timetable

Deliverable D 1.5: Report on Standardization Work, including this strategy was submitted by the end of October 2015. At a project meeting on 20 November 2015 it was decided that a revised version should be prepared incorporating a matrix showing the mapping of E2 services against the IMO Strategy Implementation Plan Work Items (Table 1).

The information on standards was provided to E2 Partners and other interested parties, in November 2015 through version 1.2 of this report on the E2 website and by posting the report and the tracking spread sheet on the Teamwork site.

The identification of standards bodies and topics relevant to E2 should be mostly completed by the end of December 2015, although the list will be kept under review throughout the project. Contacts will also be initiated with standards bodies by the end of December 2015.

An improved version of the tracking tool (an Excel spread sheet in database format), will be posted on the E2 and Teamwork sites during December 2015 and will be maintained throughout the life of the project.

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4 Standards Organizations

The organizations identified as carrying out standardization work relevant to EfficienSea 2 are IMO, ITU-R, IHO, ISO, IEC, IALA, CEPT and ETSI. A brief description will be given of each organization and its relevant committees, sub-committees, working groups and working parties.

4.1 IMO

The International Maritime Organization (IMO) is the United Nations Specialized Agency with responsibility for the safety and security of shipping and the prevention of marine pollution by ships.

The IMO Maritime Safety Committee (MSC) and its sub-committee on Navigation Search & Rescue and Communications (NCSR) are responsible for matters relating to safe navigation, including Maritime Safety Information, radio navigation and communication systems.

The Facilitation Committee (FAL) has responsibility for ship reporting and its documentation needs to be taken into account when considering a common reporting scheme, such as that being developed by EMSA and the Norwegian Single Window Solution.

The links between planned E2 services and the Work Items in the IMO Strategy Implementation Plan are shown in Table 1 below.

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Services to improve navigational safety and efficiency	IMO SIP Work Item						
	Human Centred Design	Software QA Guidelines	Revised PS for INS	Harmonized Display Guidelines	S-mode Guidelines	BIIT requirements	MSP development
Nautical charts based on S-101	xx	xxx	xx	xx	x		xxx
MSI & NM	xx	xxx	xx	xx	xx		xxx
METOC	xx	xxx	x	xx	xx		xx
Smart buoy	x	xxx				xxx	xx
Ice charts	xx	xxx	xx	xx	x		xxx
Route exchange	xxx	xx	xx	xxx	xx		xxx
No-go area/comfort zone	xx	xx	xx	xx	xx		xxx
Generic route optimization services	xx	xxx	xx	xxx	xx		xxx
Services to arctic navigation and emergency response							
Arctic live position sharing	xx	xxx	xxx				
Crowd-sourcing of ice information	xxx	xxx	x				
Arctic SAR tool	xxx	xx	xx				
Space weather forecast	xx	xx		x			xxx
Services to decrease administrative burden							
Automated VTS/SRS reporting	xxx	xxx		x	x		xxx
Reliable port reporting	xxx	xxx	x	x			xxx
Reliable port information	xx	xxx	x	x			xxx
Services to improve environmental monitoring & enforcement							
Emission monitoring solution	x	xxx		x		xx	x
Enabling actions to improve availability and accessibility							
Communication framework/Maritime Cloud	xxx	xxx	x	x	X	X	xxx
Communication channels and other technologies	xx	xxx	xx	xx	xx	xx	xxx

Table 1 Mapping of IMO SIP work items to EfficienSea 2 services

x slightly relevant; xx relevant; xxx highly relevant

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4.2 ITU-R

ITU is the United Nations specialized agency for information and communication technologies. ITU-R is the Radiocommunication Sector of ITU.

World Radiocommunications Conferences (WRC) are held every three to four years to review, and, if necessary, revise the Radio Regulations, the international treaty governing the use of the radio-frequency spectrum and the geostationary-satellite and non-geostationary-satellite orbits.

Working Party 5B deals with radio determination matters, including maritime radiocommunication and radionavigation systems.

4.3 IHO

The International Hydrographic Organization is an intergovernmental consultative and technical organization that supports safety of navigation and the protection of the marine environment.

The IHO Working Groups dealing with matters most closely related to E2 are the S-100 WG, Nautical Information and Publications WG, Electronic Navigational Charts WG and World Wide Navigational Warning Service WG.

4.4 ISO

The International Standardization Organization (ISO) is an international standard-setting body composed of representatives from various national standards organizations.

Technical Committee 8 (TC8) deals with Ships & Marine Technology, specifically standardization of design, construction, structural elements, outfitting parts, equipment, methods and technology, and marine environmental matters, used in shipbuilding and the operation of ships, comprising sea-going ships, vessels for inland navigation, offshore structures, ship-to-shore interface and all other marine structures subject to IMO requirements. This excludes electrical and electronic equipment on board ships and marine structures (IEC / TC 18 and IEC / TC 80). However, Working Group 16 (WG16) deals with Ship Communication Network Systems.

4.5 IEC

The International Electrotechnical Commission (IEC) is the international standards and conformity assessment body for all fields of electrotechnology. Technical Committee 80 deals with maritime navigation and radiocommunication equipment and systems

4.6 IALA

The International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) is a non-profit, international technical association that gathers together marine aids to navigation authorities, manufacturers, consultants, and, scientific and training institutes from all parts of the world.

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There are four IALA Committees relevant to E2: e-Navigation (ENAV), Aids to navigation Requirements and Management (ARM), Vessel Traffic Services (VTS) and Aids to Navigation Engineering and Sustainability (ENG).

4.7 CEPT

The European Conference of Postal and Telecommunications Administrations (CEPT) is the coordinating body for European state telecommunications and postal organizations.

The Maritime Forum Group deals with maritime radio matters and many of its deliberations are relevant to E2. However, CEPT does not publish standards.

4.8 ETSI

The European Telecommunications Standards Institute (ETSI) was set up by CEPT and is the recognized regional standards body – European Standards Organization (ESO) – dealing with telecommunications, broadcasting and other electronic communications networks and services.

ETSI technical committee, ElectroMagnetic Compatibility and Radio Spectrum Matters (ERM) deals with standardization of radio technologies and related topics. Task Group 26 handles maritime equipment standards.

4.9 Other

WMO is the United Nations Specialized Agency for meteorological matters and its standards for data collection and dissemination may have relevance for E2 solutions and applications. In particular the Manual on Marine Meteorological Services could be useful.

Several classification societies and test houses, such as Det Norske Veritas, produce standards that could be of relevance to E2 services. For example DNV has just published a new minimum performance standard for Portable Pilot Units (PPU).

Inmarsat is a satellite communications company using geo-stationary satellites to provide global communications services. Inmarsat SDM (System Definition Manuals) are proprietary, and not generally available, but these are the standards for the various Inmarsat terminals.

Iridium is a satellite communications company using Low Earth Orbit satellites. Manufacturers can only make their own interfaces to the proprietary transceiver module.

V-SAT (Very Small Aperture Terminal) is used as a general term for many different narrowband and broadband satellite systems used to provide communications services.

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5 Standards Identified

The lists below show the standards, recommendations, guidelines and specifications from each organization identified as relevant to E2.

5.1 IMO

SOLAS Chapter IV	Radio Communication
Resolution MSC 148(77)	Adoption of the revised performance standard for narrow band direct printing telegraph equipment for the reception of navigational and meteorological warnings and urgent information to ships (NAVTEX).
Resolution A.807(19)	Performance standards for Inmarsat-C ship earth stations capable of transmitting and receiving direct-printing communications, as amended.
Resolution A.808(19)	Performance standard for ship earth stations capable of two-way communications
Resolution A.570(14)	Type approval of ship earth stations
Resolution MSC.130(75)	Performance standards for Inmarsat ship earth stations capable for two-way communications
Resolution MSC.306(87)	Revised performance standards for enhanced group call (EGC) equipment.
Resolution A.699(17)	System performance standard for the promulgation and co-ordination of maritime safety information using high-frequency narrow-band direct printing.
Resolution A.803(19)	performance standards for shipborne VHF radio installations capable of vice communication and digital selective calling, as amended.
Resolution A.804(19)	performance standards for shipborne MF radio installations capable of voice communication and digital selective calling, as amended.
Resolution A806(19)	Performance standards for shipborne MF/HF radio installations cable of voice communications, narrow-band direct-printing and digital selective calling, as amended.
Resolution A811(19)	Performance standards for a shipborne integrated radiocommunication system (IRCS) when used in the GMDSS.
Resolution MSC.74(69), May 1998	Adoption of New and Amended Performance Standards,

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SN.1/Circ.289 Jun. 2010	Guidance on the Use of Application-Specific Messages,
SN.1/Circ.290	Guidance for the Presentation and Display of AIS ASM Information, Jun. 2010
Resolution MSC.74(69)	Performance standards for AIS, May 1998
Resolution A.1046(27)	World Wide Radionavigation System Dec. 2011,
FAL.5/Circ.36	Guidelines for Setting up a Single Window System in Maritime Transport
FAL.5-Circ.40 Business	Revised IMO Compendium on Facilitation and Electronic

5.2 ITU-R

Recommendation ITU-R M.626-0, Jul. 1986 Evaluation of the Quality of Digital Channels in the Maritime Mobile Service

Report ITU-R M.1158, 1990 Data Communication in the Maritime Mobile Services Using MF, HF and VHF Frequencies

Recommendation ITU-R M.489-2, Oct. 1995 Technical Characteristics of VHF Radiotelephone Equipment Operating in the Maritime Mobile Service in Channels Spaced by 25 kHz

Recommendation ITU-R P.680-3, Oct. 1999 Propagation Data Required for the Design of Earth-Space Maritime Mobile Telecommunication Systems

Recommendation ITU-R P.838-2, Apr. 2003 Specific attenuation model for rain for use in prediction methods

Report ITU-R M.2084, 2006 Satellite Detection of Automatic Identification System Messages

Recommendation ITU-R M.1039-3, Mar. 2006 Co-frequency Sharing between Stations in the Mobile Service below 1 GHz and Mobile Earth Stations of Non-geostationary Mobile-Satellite Systems (Earth-space) Using Frequency Division Multiple Access (FDMA)

Report ITU-R M.2122, 2007 EMC Assessment of Shore-Based Electronic Navigation (eNAV)* Infrastructure and New Draft Standards for Data Exchange in the VHF Maritime Mobile Band (156-174 MHz)

ITU-R P.1406-1, Aug. 2007 Propagation Effects Relating to Terrestrial Land Mobile and Broadcasting Services in the VHF and UHF Bands

Report ITU-R M.2127, 2008 Example of Maritime Wideband VHF Data System

Recommendation ITU-R M.1842-1, Jun. 2009 Characteristics of VHF radio systems and equipment for the exchange of data and electronic mail in the maritime mobile service RR Appendix 18 channels

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Report ITU-R M.2141, Jun. 2009 Study of the Isolation between VHF Land Mobile Radio Antennas in Close Proximity

Recommendation ITU-R P.1407-4, Oct. 2009 Multipath Propagation and Parameterization of Its Characteristics

ITU-R P.1546-4, Oct. 2009 Method for Point-to-Area Predictions for Terrestrial Services in the Frequency Range 30 MHz to 3 000 MHz

Recommendation ITU-R M.493-13, Oct. 2009 Digital Selective-Calling System for Use in the Maritime Mobile Service (is under update to 493-14)

Report ITU-R M.2169, Dec. 2009 Improved Satellite Detection of AIS

Report ITU-R M.2202, Nov. 2010 Maritime Broadband Wireless Mesh Networks

Recommendation ITU-R M.2010, Mar. 2012 Characteristics of a Digital System, Named Navigational Data for Broadcasting Maritime Safety and Security Related Information from Shore-to-Ship in the 500 kHz Band

Radio Regulations, vol. no. 2, Geneva, 2012 Appendices

Recommendation ITU-R M.690-2, Mar. 2012 Technical Characteristics of Emergency Position-Indicating Radio Beacons Operating on the Carrier Frequencies of 121.5 MHz and 243 MHz

Recommendation ITU-R M.693-1, Mar. 2012 Technical Characteristics of VHF Emergency Position-Indicating Radio Beacons Using Digital Selective Calling

Report ITU-R M.2287-0, Dec. 2013 Automatic Identification System VHF Data Link Loading

Recommendation ITU-R M.2058-0, Feb. 2014 Characteristics of a Digital System, Named Navigational Data for Broadcasting Maritime Safety and Security Related Information from Shore-to-Ship in the Maritime HF Frequency Band

Recommendation ITU-R M.1371-5, Feb. 2014 Technical characteristics for an automatic identification system using time division multiple access in the VHF maritime mobile frequency band

PDNR Document 5B/TEMP/336-E, Oct. 2014 Technical Assessment of RR Appendix 18: Channel Usage to Protect Automatic Identification System Channels and also Protect Any Additional Channels That May Be Allocated to Support Automatic Identification System Technology Applications

Preliminary Draft New Report, Oct. 2014 Selection of the Channel Plan for a VHF Data Exchange System

WP 5B, PDRR ITU-R M.2231, Nov. 2014 Use of Appendix 18 to the Radio Regulations for the Maritime Mobile Service

Draft New Report, Nov. 2014 VHF Data Exchange System Channel Sounding Campaign

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Report ITU-R M.2201 (11/2010) Utilization of the 495-505 kHz band by the maritime mobile service for the digital broadcasting of safety and security related information from shore-to-ships

Recommendation ITU-R M.2010 (03/2012) Characteristics of a digital system, named Navigational Data for broadcasting maritime safety and security related information from shore-to-ship in the 500 kHz band

Ongoing work ITU-R M.[VDES]

5.3 ISO

ISO/TC 008/SC 06/WG 16 "Ship Communication Network Systems"

ISO/DIS 16425 Ships and marine technology — Installation guideline for ship communication network of improving communication for shipboard equipment and systems

5.4 IHO

Existing standards relevant to EfficienSea 2:

S-100 The Universal Hydrographic Data Mode 2.0.0

S-99 Operational Procedures for the Organization and Management of the S-100 Geospatial Information Registry 1.1.0

S-102 Bathymetric Surface Product Specification 1.0.0

S-63 IHO Data Protection Scheme 1.2.0

Standards under development relevant to EfficienSea2:

S-101 Electronic Navigational Chart (ENC)

S-112 Meteorological and Hydrographic Data AIS Application-Specific Message Dynamic Water Level Data Product Specification

S-124 Navigational Warnings

S-411 Sea Ice

S-412 Met-ocean forecasts

5.5 IEC

IEC 61162-1 Ed.5: Maritime navigation and radiocommunication equipment and systems - Digital interfaces - Part 1: Single talker and multiple listener

IEC 61162-2 Maritime navigation and radiocommunication equipment and systems - Digital interfaces - Part 2: Single talker and multiple listeners, high-speed transmission

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IEC 61162-450 A1 Ed.1: Amendment 1 to IEC 61162-450 Ed.1: Maritime navigation and radiocommunication equipment and systems - Digital interfaces - Part 450: Multiple talkers and multiple listeners - Ethernet interconnection

IEC 61174 Ed.4: Maritime navigation and radiocommunication equipment and systems - Electronic chart display and information system (ECDIS) - Operational and performance requirements, methods of testing and required test results

IEC 62923 Ed.1: Maritime navigation and radiocommunication equipment and systems - Bridge alert management - Operational and performance requirements, methods of testing and required test results

IEC 62940 Ed.1: Maritime navigation and radiocommunication equipment and systems - Integrated communication system (ICS) - Operational and performance requirements, methods of testing and required test results

IEC 62320-1 Ed.2: Maritime navigation and radiocommunication equipment and systems - Automatic identification system (AIS) - Part 1: AIS Base Stations - Minimum operational and performance requirements, methods of testing and required test results

IEC 62320-3 Ed.1: Maritime navigation and radiocommunication equipment and systems - Automatic identification systems (AIS) - Part 3: Repeater station - Minimum operational and performance requirements - Methods of test and required test results

IEC 61162-460 Ed.1: Maritime navigation and radiocommunication equipment and systems - Digital interfaces - Part 460: Multiple talkers and multiple listeners - Ethernet interconnection - Safety and security

IEC 62320-2 Ed.2: Maritime navigation and radiocommunication equipment and systems - Automatic identification system (AIS) - Part 2: AIS AtoN Stations - Operational and performance requirements, methods of testing and required test results

5.6 IALA

IALA Maritime Radio Communications Plan, Edition 2, Oct. 2012

IALA Guideline No. 1108 on The Challenges of Providing AtoN Services in Polar Regions, Edition 1, Dec. 2013

Recommendation e-NAV-147 on Product specification development and management May-15

Recommendation e-NAV 140 on The Architecture for Shore-based Infrastructure ‘fit for e-Navigation’ May-15

Guideline 1114 on A Technical Specification for the Common Shore-based System Architecture (CSSA) Dec-13

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Guideline 1113 on Design and Implementation Principles for Harmonised System Architectures of Shorebased Infrastructure Dec-13

Guideline 1082 on An Overview of AIS Jun-11

Recommendation e-NAV – 144 Harmonized Implementation of ASM Jun-11

Guideline No. 1106 on Producing an IALA S-100 Product Specification Dec-13

Guideline No. 1107 on Reporting of Results of e-Navigation Testbeds Dec-13

5.7 ETSI

ETSI EN 303 135 V1.1.1 (2014-09) Electromagnetic compatibility and Radio spectrum Matters (ERM); Coastal Surveillance, Vessel Traffic Services and Harbour Radars (CS/VTS/HR); Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive (may be outside scope)

ETSI EN 302 885-3 V1.2.2 (2014-03) Electromagnetic compatibility and Radio spectrum Matters (ERM); Portable Very High Frequency (VHF) radiotelephone equipment for the maritime mobile service operating in the VHF bands with integrated handheld class D DSC; Part 3: Harmonized EN covering the essential requirements of article 3.3(e) of the R&TTE Directive (may be outside scope)

ETSI EN 302 885-2 V1.2.2 (2014-03) Electromagnetic compatibility and Radio spectrum Matters (ERM); Portable Very High Frequency (VHF) radiotelephone equipment for the maritime mobile service operating in the VHF bands with integrated handheld class D DSC; Part 2: Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive (may be outside scope)

ETSI EN 302 885-1 V1.3.1 (2014-03) Electromagnetic compatibility and Radio spectrum Matters (ERM); Portable Very High Frequency (VHF) radiotelephone equipment for the maritime mobile service operating in the VHF bands with integrated handheld class D DSC; Part 1: Technical characteristics and methods of measurement (may be outside scope)

ETSI EN 301 929-2 V1.2.1 (2007-02) Electromagnetic compatibility and Radio spectrum Matters (ERM); VHF transmitters and receivers as Coast Stations for GMDSS and other applications in the maritime mobile service; Part 2: Harmonized EN under article 3.2 of the R&TTE Directive

ETSI EN 301 929-1 V1.2.1 (2007-02) Electromagnetic compatibility and Radio spectrum Matters (ERM); VHF transmitters and receivers as Coast Stations for GMDSS and other

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applications in the maritime mobile service; Part 1: Technical characteristics and methods of measurement

ETSI EN 301 925 V1.4.1 (2013-05) Electromagnetic compatibility and Radio spectrum Matters (ERM); Radiotelephone transmitters and receivers for the maritime mobile service operating in VHF bands; Technical characteristics and methods of measurement

ETSI EN 300 065-3 V1.2.1 (2009-05) Electromagnetic compatibility and Radio spectrum Matters (ERM); Narrow-band direct-printing telegraph equipment for receiving meteorological or navigational information (NAVTEX); Part 3: Harmonized EN covering the essential requirements of article 3.3 (e) of the R&TTE directive

ETSI EN 300 065-2 V1.2.1 (2009-05) Electromagnetic compatibility and Radio spectrum Matters (ERM); Narrow-band direct-printing telegraph equipment for receiving meteorological or navigational information (NAVTEX); Part 2: Harmonized EN covering the essential requirements of article 3.2 of the R&TTE directive

ETSI EN 300 065-1 V1.2.1 (2009-01) Electromagnetic compatibility and Radio spectrum Matters (ERM); Narrow-band direct-printing telegraph equipment for receiving meteorological or navigational information (NAVTEX); Part 1: Technical characteristics and methods of measurement.

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5.8 Relationship with E2 Services

Table 2 below shows the relevance of the various international standardization bodies to each of the services that it is planned to develop during EfficienSea 2. This should assist the relevant task groups to identify the bodies with which they need to establish contact.

Services to improve navigational safety and efficiency	Standardization bodies						
	IMO	ITU-R	IHO	IEC	IALA	ISO	WMO
Nautical charts based on S-101	xx		xxx	xx	x		
MSI & NM	xx		xxx	xx	x		x
METOC	xx	x	xx	xx	x		xxx
Smart buoy	x	x	x	x	xx		xxx
Ice charts	xx		xxx	x	x		xx
Route exchange	xxx	xx	xx	xx	x		
No-go area/comfort zone	xxx		xxx	xx	xx		x
Generic route optimization services	xxx		xx	xx	x		x
Services to arctic navigation and emergency response							
Arctic live position sharing	xx	xx	xxx	xx	xx		x
Crowd-sourcing of ice information	xxx		xxx	xx	x		xx
Arctic SAR tool	xxx	xx	xx	xx	x		x
Space weather forecast	xx	xxx		xx	xx		xx
Services to decrease administrative burden							
Automated VTS/SRS reporting	xxx	xxx		xx	xxx		
Reliable port reporting	xx	xx	x	x	x		
Reliable port information	xx	xx	x	x	x		
Services to improve environmental monitoring & enforcement							
Emission monitoring solution	xxx			x			
Enabling actions to improve availability and accessibility							
Communication framework/Maritime Cloud	xxx	xxx	xx	xx	xxx	x	xx
Communication channels and other technologies	xx	xxx	x	xx	xxx	x	x

Table 2 Mapping of Standardization bodies to EfficienSea 2 services

x slightly relevant; xx relevant; xxx highly relevant

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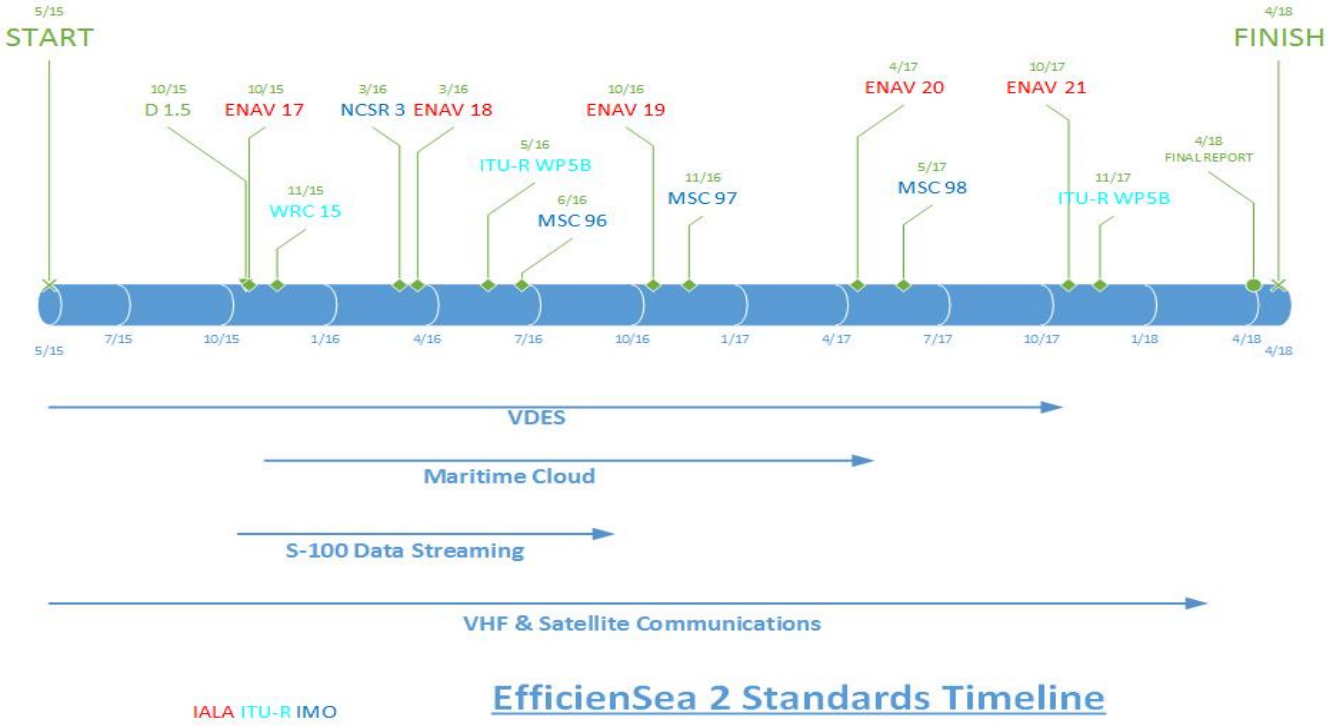
6 Standardization Timeline

The timeline shown below indicates the relevant meetings in IMO, ITU-R and IALA and the likely duration of standardization work on the main topics of interest.



7 Information Access

An objective of Task 1.3 is to make the required information on relevant standards available to E2 partners and other interested parties in an easily accessible form. The spread sheet used as an information tracking tool has now been formatted as a database, to facilitate searching and the current version will be posted on the E2 website. It will continue to be updated and the latest version posted on Teamwork.

Note: many of the documents, including IMO resolutions, IHO and ETSI standards are already available on the internet at no cost.

8 Next steps

The next step will be to set up contacts with the standardization bodies and this process will be initiated by the end of December 2015.

The IMO work on e-Navigation is continuing, in particular the definition and development of Maritime Service Portfolios, which will establish the applications for systems developed in E2, such as VDES and the Maritime Cloud, should follow consideration at MSC 96 in June 2016.

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An update to the mapping process may be required at that time. The timeline above may also need to be updated.

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