D1.2 Plan for dissemination, exploitation and communication, v2.0

Project no.	636329
Project acronym:	EfficienSea2
	EFFICIENSEA2 – efficient, safe and sustainable traffic at sea
Funding scheme:	Innovation Action (IA)
Start date of project:	1 May 2015
End date of project:	30 April 2018
Duration:	36 months
Due date of deliverable:	01.06.2017
Actual submission date:	01.06.2017
Reject date:	16.03.2017
Due date for revision:	01.06.2017
Revision submit date:	01.06.2017
Organisation in charge of deliverable:	Danish Maritime Authority

Background

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Document History

Version	Date	Initials	Description
Draft	20.11.2015	KSC	Draft of plan presented to EU coordinator at meeting, Brussels
1.0	31.10.2016	BBP	Submitted plan as part of mid-term report
2.0	31.05.2017	KSC	Revised plan according to comments from EU

Review

Name	Organisation
Executive Board, November 26th 2015	BIMCO, Chalmers University, CIRM, Cobham, Danish Geodata Agency, Danish Maritime Authority, FORCE Technology, IALA, OFFIS, MDC, SMA, TRANSAS
All WP1 members, December 3-4th 2015	
All WP leads, February – March 2016	
Executive Board, June 2nd 2016	
Version 2.0 reviewed by Mads Friis Sørensen	Danish Maritime Authority

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Table of Contents

1. Background 5
   1.1 Introduction 5
   1.2 Challenges 5

2. Aim and objectives 6
   2.1 Aim 6
   2.2 Objectives 7

3. Target groups 8
   3.1 End users 8
   3.2 Industry 8
   3.3 Organisations 9
   3.4 Authorities 9

4. Strategy 10
   4.1 Strategic focus areas 10
   4.2 Timeline: Three phases 10

5. Plan 12
   5.1 Objective 1: Create awareness and engage users to support solutions 12
   5.2 Objective 2: Liaise and coordinate with other projects, test beds and policies 19
   5.3 Objective 3: Create and coordinate standardisation of solutions 20
   5.4 Objective 4: Clarify governance and future potential of solutions 23
   5.5 Objective 5: Identify user needs and get feedback on solutions 25

6. Responsibilities 29
   6.1 Project structure 29
   6.2 Lead partner 29

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6.2 Work package leads 29
6.3 Individual partners 29

7. Evaluation 31
7.1 Maintaining the plan 31
7.2 Evaluation 31

Appendix 1. Efficiensea2 target groups

Appendix 2. EfficienSea2 Information Plan to promote VDES

Appendix 3. Correlations between STM Validation Project and EfficienSea2

Appendix 4. The Korean SMART project and EfficienSea2

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1. Background

1.1 Introduction

EfficienSea2 creates and implements innovative and smart solutions for efficient, safe and sustainable traffic at sea through improved connectivity for ships. EfficienSea2 is a demonstrator in the Arctic and Baltic Sea and the first generation of a coherent e-Navigation solution. Through global collaboration, use of open-source software and an explicit aim for standardised solutions, EfficienSea2 paves the way for a global roll-out of e-Navigation. In other words, EfficienSea2 is an ambitious project with a high innovation barrier and a wide variety of technical solutions. This is a strategy and plan for how EfficienSea2 intends to communicate, disseminate and exploit the solutions developed within the project.

1.2 Challenges

EfficienSea2 is faced with several challenges regarding communication, dissemination and exploitation of results. Firstly, with the wide variety of solutions from e-Navigational and e-Maritime end user services to web-based platforms for accessing these services, communication channels and the innovative communication framework the Maritime Cloud, the coherence of the solutions is important to communicate. Secondly, the innovation centrepiece of EfficienSea2, the Maritime Cloud – a communication framework enabling efficient, secure and reliable information exchange in and around the maritime sector – has huge potentials with its disruptive characteristics. The same characteristics are also potentially challenging in terms of getting broad adoption of the Maritime Cloud. Thirdly, the potential benefits of the Maritime Cloud are very different to the highly different target groups.

2. Aim and objectives

2.1 Aim

The aim of the plan for communication, dissemination and exploitation is *to maximise the impact of the developed solutions* by:

- disseminating the project results to targeted audiences in a strategic manner,
- engaging potential users in dialogue, and
- paving the way for innovations to reach the market.

In this way, the plan for communication, dissemination and exploitation makes it likely that EfficienSea2's overall aim for post project impact is reached, namely a service coverage of 80% in the Arctic Sea and 15% in the Baltic Sea in 2018, a global spread emerging from the Baltic and the Arctic by < 50% in the Baltic Sea and 15% world fleet in 2020; and continued global expansion by 40% world fleet in 2025 (see Figure 1).

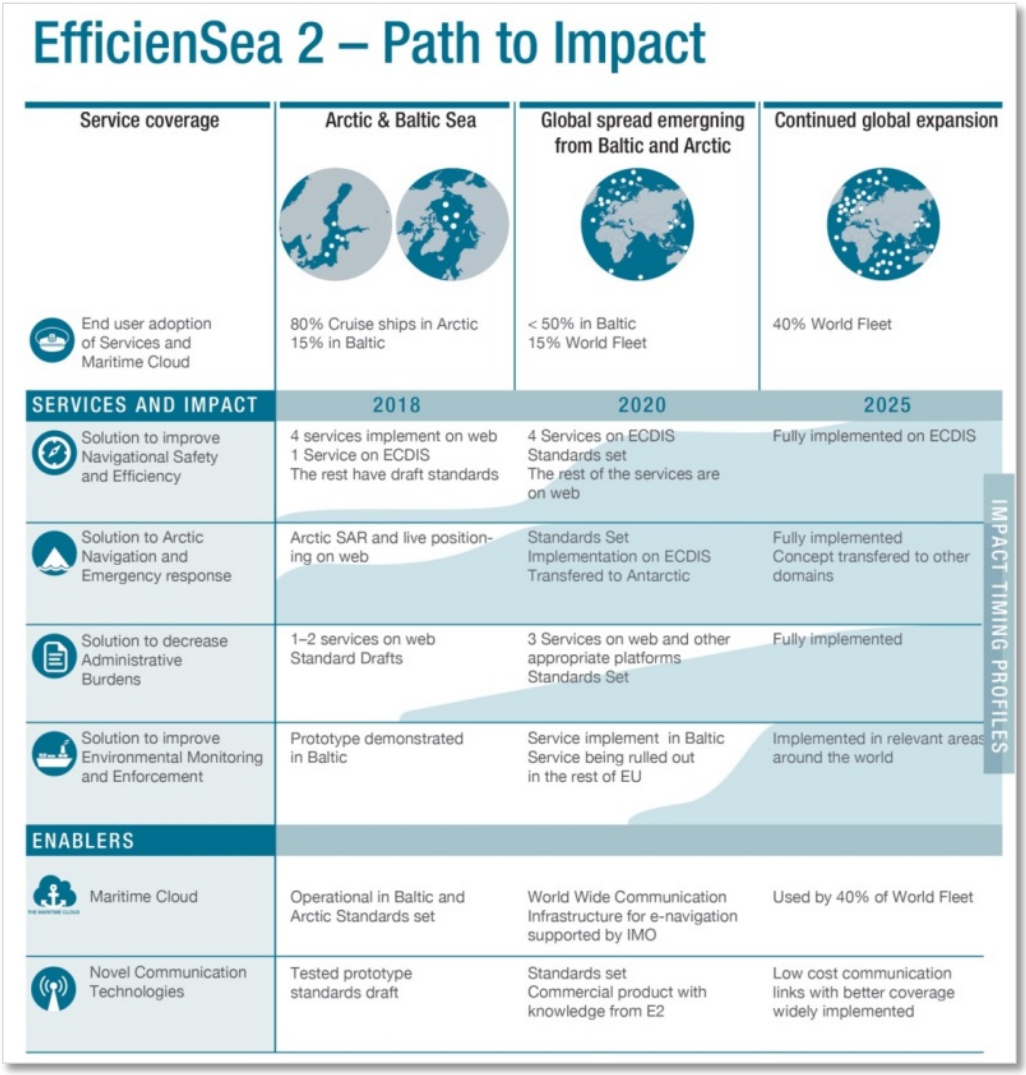

Figure 1: This infographic visualises the ambition of the EfficienSea2 project in regard to the expected post-project impact of the developed solutions (the figure originates from the Grant Agreement)

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2.2 Objectives

The concrete objectives of the plan for communication, dissemination and exploitation, which will help us reach the aim, are:

1. Create awareness and engage users to support solutions.
2. Liaise and coordinate with other projects, test beds and policies.
3. Create and coordinate standardisation of solutions.
4. Clarify governance and future potential of solutions.
5. Identify user needs and get feedback on solutions.

The five objectives and related activities are further specified in Section 5.

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3. Target groups

EfficienSea2 has identified nine target groups that will be reached and engaged to obtain maximum impact of the developed solutions. The groups fall within four categories:

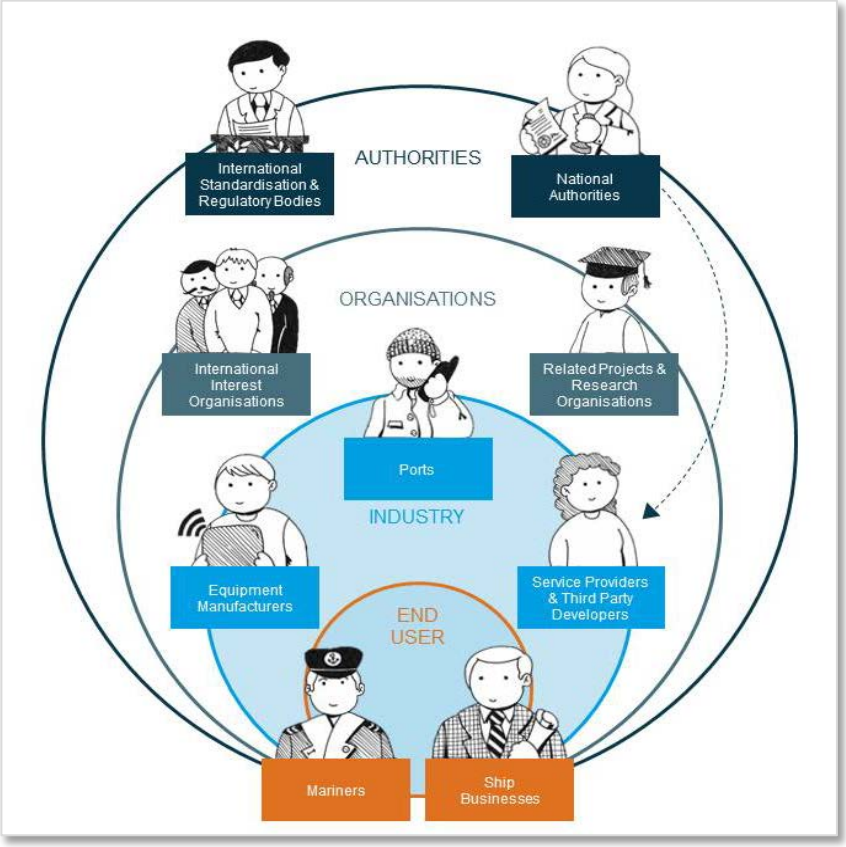

Figure 2: The important target groups of EfficienSea2 are found at different levels from end users and industry to organisational and political level

3.1 End users

- Mariners – final end users who will use and benefit from solutions on board ships (primary benefit: simplified workflows).
- Ship owners – end users who decide what kind of solutions they want on board their ships (important that they become aware of the value and demand solutions).

Mariners and ship owners are represented in the next group as well, namely industry:

3.2 Industry

- Equipment manufacturers – develop, provide and sell equipment to ships (important that they adopt and integrate standards etc.).
- Service providers – develop, provide and sell services to ships (important that they adopt and integrate standards etc.).
- Ports – competitive expedition of ships (important that they adopt solutions for efficient workflows).

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3.3 Organisations

- International interest organisations – represent users and influence policy bodies (important that they become ambassadors).
- Research institutions and related projects – developing complementary solutions (important with cooperation and harmonisation of solutions).

3.4 Authorities

- National authorities – maritime and other associated authorities (important that critical authorities support and implement solutions).
- International regulating and standardising bodies – making regulations and standards (important to obtain support and promote regulation where relevant).

It is of high priority to EffcienSea2 to reach the industry (ad 3.1 and 3.2) since its final adoption of the solutions is crucial for reaching an impact. The needs, drivers, goals and barriers that characterise the nine target groups in relation to EfficienSea2 are described in more detail in Appendix 1.

Additional people, groups and organisations that are important to reach, engage or consider for EffcienSea2 – such as e.g. ship agents, insurance companies and terminal owners – will be identified and dealt with in relation to specific, relevant EfficienSea2 solutions.

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4. Strategy

The strategy for reaching the five objectives of the plan for communication, dissemination and exploitation is tied to the specific objectives and described in relation to each of them (see section 5, pages 8-23).

4.1 Strategic focus areas

Five strategic focus areas summarise the total number of applied strategies and set the overall direction for how to reach the five objectives. The strategic focus areas are shown in Figure 3 below:

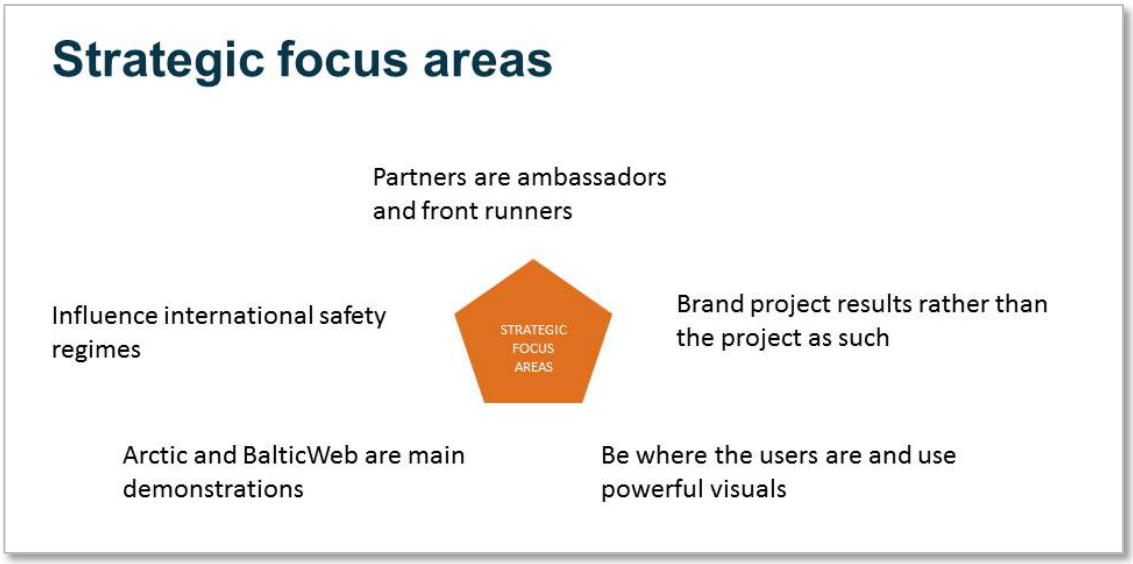

Figure 3: The model shows the focus areas that direct the way the objectives are reached

Each of the focus areas is applied in more or less depth in relation to the five objectives of the plan and are described in more detail in Section 5.

4.2 Timeline: Three phases

Dissemination and exploitation will be undertaken throughout the 36-month lifespan of EfficienSea2, but the following phases will roughly guide the planned activities:

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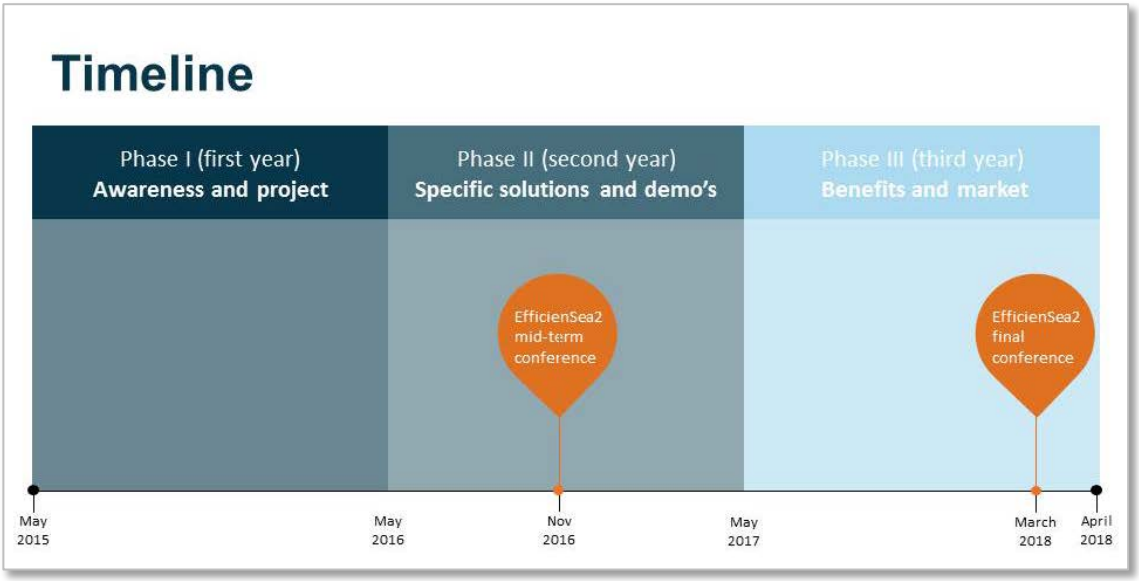

Figure 4: The EfficienSea2 dissemination activities are roughly guided by these three phases: 1. Awareness and project, 2. Specific solutions and demonstrations, and 3. Benefits and market

- Phase I (first year): Awareness and project – raising awareness about the project ambition, solutions and impact.
- Phase II (second year): Specific solutions and demonstrations – showing the results as they are being developed.
- Phase III (third year): Benefits and market – emphasis on value proposition and business aspects.

The three phases are rough guides and will in practice overlap; especially phase II is expected to be extended and run in parallel with phase III since some solutions will not be completed until the end of the project.

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5. Plan

This section reviews the number of activities performed under EfficienSea2 in order to reach the five objectives and maximise the impact of the developed solutions. Each objective is elaborated on with a short description, the applied strategy, defined success criteria and the complete list of activities, including responsible partner, time, target groups and output for each activity.

5.1 Objective 1: Create awareness and engage users to support solutions

5.1.1 About this objective

Efficiensea2 develops a wide range of complicated solutions with heavy focus on standardisation and harmonisation. This means that the communication will have to combine challenging technical aspects, the broader concept of standardisation as well as the specific solutions developed. In the first project year, before any solutions have been 100 per cent completed, focus will be on creating awareness of the project and gathering support for the ambitious plans for solutions and the Maritime Cloud.

In the second and third project years, presentations, news stories, social media activities, etc. will focus more on the individual solutions and how they contribute to the maritime world. As the Maritime Cloud itself will evolve as the project moves on, communication about the Maritime Cloud will follow a similar pattern, where the first aim is to create awareness and then later to engage potential users by highlighting the practical benefits of the Maritime Cloud. Responsible for taking care of this objective is T1.1 led by the DMA.

5.1.2 Applied strategy

- Make partners ambassadors.
- Focus on user benefits.
- Communicate where users are – specific conferences and specialised media.
- Use individual services to highlight the benefits of the Maritime Cloud.

5.1.2 Success criteria

- Coverage in maritime/popular media: 50 unique articles (incl. first time press releases that are picked up by the media, news).
- Coverage at maritime events: 130 presentations.
- Targeted participation in EfficienSea2 conferences: Top prioritised target groups represented (see section 3, pages 5-7).

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5.1.3 List of activities

Activity	EfficienSea2 partner(s)	Target group	Time (M = project month)	Short description	Outcome
Corporate identity					
Develop corporate identity	DMA	Broad maritime audience + the public	M1-6	The project identity is built around these keywords: Safety, efficiency, maritime domain, digital/smart solutions, and innovation	• Logo and graphic profile • Tagline and message • Templates (presentations, reports)
Project website					
Design and maintenance of project website www.efficiensea2.org	DMA	Broad maritime audience	M1-3	The purpose of the website is to disseminate the project and its solutions; and communicate contact to EfficienSea2 solution experts	**D1.1 Project website** The website provides: • Information about the project • Access to project deliverables • Possibility to follow the project/solutions (news, events etc.) • Possibility to engage in the project, and establishment of a project archive
Reports					
Create and distribute plan for communication, dissemination and exploitation	DMA	Partners, EU	M18	Plan and strategy for how EfficienSea2 communicates, disseminates and exploits the developed project results	**D1.2 Plan for communication, dissemination and exploitation**
Create final report on communication, dissemination and exploitation	DMA	EU	M36	Final report on how EfficienSea2 has communicated, disseminated and exploited the developed project results	**D1.3 Final report on communication, dissemination and exploitation**
Project Newsletters					
Prepare and send out project newsletters	DMA	Broad maritime audience, partners	M1	News stories are published on the project website; subscribers are notified by email	From M19: Monthly news about the developments in EfficienSea2
LinkedIn					

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Prepare and post project updates on LinkedIn	DMA	Professionals with specific interest in the project	First half (M1-M18)	Post stories when they are relevant for the professionals who closely follow EfficienSea2 and potentially become ambassadors	Post on LinkedIn private group when needed
		Industry, broad maritime audience	Second half (M18-M36)	Interesting developments, questions for stakeholders, news, upcoming events and so forth are shared on LinkedIn	Post on LinkedIn public page
Promotion material					
Create and distribute promotion material to partners	DMA	Broad maritime audience + specific target groups	First half (M1-M18)	Support partners in their efforts to promote EfficienSea2	• Film (Maritime Cloud) • Project leaflet • Infographics (Maritime Cloud, four solution areas) • Conference kits (EfficienSea2 mid-term conference), including posters, floor graphics etc. • Roll-ups (project + four solution areas)
		Specific target groups	Second half (M19-M36)	Support partners in explaining the specific results from EfficienSea2	• Pptx-scenarios/videos (benefits + business cases) • Workshops/videos, e.g.: How to communicate the Maritime Cloud • Conference kits (EfficienSea2 final conference)
Articles					
News/articles targeting the popular press	DMA, IALA, Danelec Marine and others	Maritime audience	First half (M1-M18)	Create awareness of the project and its ambitions	• 12 news stories/articles
	DMA + all partners	Targeted audience	Second half (M19-M36)	Tell the story of the specific solutions, including explanations of the benefits of the Maritime Cloud	• +30 news stories/articles
Publications					
Scientific publications	NIT, Latvian Maritime Academy, others	Scientific audience	First half (M1-M18)	The relevant partners will present research papers on different topics to their peers, usually in conjunction with conferences.	• 2 scientific publications

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	All relevant partners	Scientific audience	Second half (M19-M36)	The relevant partners will present research papers on different topics to their peers. In the latter half of the project, the majority of papers will be based on real life simulations and tests.	• Up to 10 scientific publications
Presentations					
Presentations (given at conferences, seminars, workgroups, workshops etc.)	All partners	Maritime sector, industry, authorities	First half (M1-M18)	*International maritime conferences, e.g.: Green Shipping Summit, e-Navigation Underway; Smart Operations, and Digital Future* Present the scope of the project	• +60 presentations • E.g.: INC 2016, IALA Council, and IALA e-Navigation Committee. Participation will contribute to increase the overall awareness of EfficienSea2.
	All partners	Maritime sector, industry, policy	Second half (M19-M36)	*International conferences/forums, e.g.: IMO, e-Navigation Underway Asia Pacific.* Present the specific solutions and explain the specific benefits of the Maritime Cloud	• +60 presentations • E.g.: IALA e-Navigation Committee. Participation will contribute to the exploitation of the solutions provided by the EfficienSea2 project.
Events					
Plan, organise and host EfficienSea2 mid-term conference	DMA and MDC	Maritime industry, authorities, academia, policy	M19 (8-9 Nov 2016)	Focus on 1) Efficiency at sea: Maritime Cloud and efficiency-boosting services, 2) e-Navigation made real: BalticWeb and navigational services. Targeted at four primary target groups	• Dissemination and demonstration of developed concepts and solutions • Feedback from target audience
Plan, organise and host EfficienSea2 final conference	DMA and MDC	Maritime industry, authorities, academia, policy	M35	Focus on the four solution areas: Maritime Cloud, BalticWeb, end user services and communication channels/VDES, including implementation of solutions and impact	• Dissemination and demonstration of project results and future perspectives

5.1.4 Dissemination plan per developed solution

This plan provides a preliminary overview of the dissemination activities related to each solution. It is primarily focused on the second half of the project since the activities of the first half of the project were documented in the mid-term report. Regular presentation activities for the individual solutions are not included in this overview, but all services will be disseminated at a number of conferences.

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Solution	M 1-6	M 7-12	M 13-18	M 19-24	M 25-30	M 31-36
	Phase I: Awareness and project		Phase II: Specific solutions and demonstrations		Phase III: Benefits and market	
EfficienSea2 project/all solutions	**Heightened effort**					
	• E2 press release • E2 news story	• E-Navigation Underway Europe Conference	• E2 mid-term conference	• Presentation, PA Safe meeting • Presentation , Crew Connect Europe Conference • Presentation, PA Safe Conference		• Final Conference as a whole • Summarising press release
The Maritime Cloud	**Ongoing efforts**					
	• E2 news story	• Presentation, E-Navigation Underway Europe Conference	• Beta release/ demonstration, E2 mid-term conference	• Presentation + exhibition, E-Navigation Underway Europe Conference • Presentation, Green Shipping Summit Conference • IALA e-Nav 20 Committee • E2 news story: IALA guidelines • E2 news story: Endorsements • Presentation, E-Navigation Underway Asia Pacific Conference	• Presentation at e-Navigation Underway North America Conference (DMA/OFFIS) • E2 News stories on different smaller developments	• E2/IALA workshop • Presentation + demonstration, E2 final conference • E2 News stories on the different benefits of the Maritime Cloud
VDES (IALA has provided a detailed information strategy to promote VDES, see Appendix 2)			**Heightened efforts**			
			• Presentation, E2 mid-term conference: Concept	• E2 news story: Test • CIRM news story: Test • Cobham news story: Test	• E2 news story: Results • CIRM news story: Results • Cobham news story: Results • IALA News Story • Presentation at IMO MSC 98	• Demonstration/live streaming, E2 final conference • Included in the IALA Bulletin (newsletter)
BalticWeb			**Heightened efforts**			
			• E2 mid-term conference: Beta release/demonstration	• Presentation, PA Safe meeting: Demonstration • Presentation, CESMA: Demonstration • Presentation at NIPWG3, Korea	• Bringing BalticWeb forward in many different news stories • Chalmers: Scientific research paper on results from simulator	• Presentation, E2 final conference • Presentation at NIPWG5, Italy (Chalmers)

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				(Chalmers)	tests • Presentation at e-Navigation Underway North America Conference: Simulator trials (Chalmers)	
Navigational Warnings / Notices to Mariners			• E2 mid-term conference: Demonstration	**Heightened efforts**		
				• Presentation + exhibition, E-Navigation Underway Europe Conference • Presentation, Crew Connect Europe Conference • News story on NW • IALA Newsletter on NW		• Presentation, E2 final conference • Possible E2 News story: Country X adopts S-124
Weather on Route			• Presentation, E2 mid-term conference: Concept		• E2 news story: Simulator test	• Presentation, E2 final conference
Nautical Charts based on S100 Standards			• Presentation, E2 mid-term conference: Concept		• DGA article: S-100 and the S-101 standards • E2 news story: Simulator test • Rocket Brothers article/news story: app to seafarers	• Presentation, E2 final conference
No-go Areas and Comfort Zones			• Presentation, E2 mid-term conference: Concept		• Article/News story: Result • E2 news story: Simulator test	• Presentation, E2 final conference
Route Optimisation			• Presentation, E2 mid-term conference: Concept		• E2 Article/News Story: Results of simulator trials • BIMCO/FORCE article: Result of adm. burden measurement analysis • Gatehouse: Whitepaper on integration with ERP	• Presentation, E2 final conference
Route Exchange			• Presentation, E2 mid-term		• Article/News story: Result	• Presentation, E2 final conference

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			conference: Concept		• E2 news story: Simulator test	
Smart Buoy Interaction			• Presentation, E2 mid-term conference: Concept			• Presentation, E2 final conference
Ice Charts			• Presentation, E2 mid-term conference: Concept			• Presentation, E2 final conference
Crowd Sourcing of Ice Information			• Presentation, E2 mid-term conference: Concept			• Presentation, E2 final conference
Arctic Live Position Sharing			• Presentation, E2 mid-term conference: Concept		• Vissim News story: Focus expected to be on the testing of the service	• Presentation, E2 final conference
Arctic SAR Tool			• Presentation, E2 mid-term conference: Concept		• Vissim News story: Focus expected to be on the testing of the service	• Presentation, E2 final conference • Chalmer: Scientific research paper expected on test
Space Weather Forecast			• Presentation, E2 mid-term conference: Concept	• E2 News Story: space weather campaign		• E2 News story – results of space weather campaign • Presentation, E2 final conference
Automated VTS/SRS reporting			• Presentation, E2 mid-term conference: Concept		• Vissim News Story: Integration of VTS reporting	• Presentation, E2 final conference
Automated exchange of port information			• Presentation, E2 mid-term conference: Concept		• BIMCO Newsletter/story • E2 News Story • Active Press activity	• Presentation, E2 final conference: Result of adm. burden measurement analysis • BIMCO/FORCE article: Result of adm. burden measurement analysis
Sulphur emission monitoring			• Presentation, E2 mid-term conference: Concept			• Presentation, E2 final conference

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5.2 Objective 2: Liaise and coordinate with other projects, test beds and policies

5.2.1 About this objective

In order to ensure harmonisation and maximum impact of the solutions developed under EfficienSea2 and to minimise duplication or conflicting developments, EfficienSea2 coordinates innovations and liaises with other relevant projects, test beds and policies. Responsible for this objective is T1.2 led by IALA with CIRM, OFFIS and DMA as contributors.

5.2.2 Applied strategy

The strategy is twofold: 1) Establish links to a wide variety of relevant projects, test beds and policies relevant to EfficienSea2, and 2) Establish close integration with projects, regionally and globally, that have a major influence on EfficienSea2, especially those critical to adoption/implementation of the Maritime Cloud. The EU-funded STM Validation Project in particular, but also the Korean SMART project, has been identified as implementation critical projects, and therefore close collaboration has been established with the respective projects. For elaboration on the collaboration and synergy between EfficienSea2 and the STM Validation Project, please see Appendix 3. For an introduction to the Korean SMART Project and how EfficienSea2 benefits from collaboration, see Appendix 4.

5.2.3 Success criteria

- Contacts established and information exchanged with 21 projects.
- Close collaboration with 1-2 critical projects.

5.2.4 List of activities

Activity	EfficienSea2 partner(s)	Target group	Time (M = project month)	Short description	Outcome
Mapping of external test beds, projects and policies					
Mapping of external test beds and projects	IALA	All partners	M1-24 (ongoing)	A complete list of projects and test beds that are relevant for EfficienSea2	**D.1.4 Report on relevant ongoing projects and test beds** An overview of where to focus EfficienSea2's efforts to establish contacts with other projects
Create list of relevant projects	IALA	All partners	M1-24 (ongoing)	List provided in D1.4 and spreadsheet on website	Contacts established and information exchanged

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Presentation at IALA e-Nav Committee	IALA	All partners	M1-24 (ongoing)	Results presented and discussed in WG2 at IALA e-Nav Committee	Further contacts and information on other test beds invited through IALA e-Nav WG
STM Validation Project					
Cooperation with STM Project	DMA	N/A	M1-36	A close partnership is established with the European STM Validation project	A great boost to the exploitation possible with the Maritime Cloud, see more in separate part on partnership with Korean SMART project and STM Validation
Bi-weekly GTM-meetings + ongoing phone calls	DMA, STM, Frequentis, OFFIS,	N/A	M1-36	Technical development and alignment of the Maritime Cloud and SeaSwim	A functional Maritime Cloud/SeaSwim test bed
Technical workshops approx. every third month	DMA, STM, Frequentis, OFFIS,	N/A	M13-36	Helping STM partners develop their SeaSwim services so they fit the Maritime Cloud	STM services implemented on the Maritime Cloud
Meetings in Maritime Cloud Development Forum 2-3 times a year	DMA OFFIS, SMA, Frequentis	N/A	M3 -36	Development and exploitation of the Maritime Cloud, alignment of activities, ensuring common direction	A sustainable Maritime Cloud, including governance model, business model, operational structure, business case, etc.
Cooperation with Korean Smart Navigation project					
Cooperation with Korean SMART Navigation Project	DMA	N/A	M3-36	A close partnership was established with the Korean SMART project	A great boost to the exploitation possible with the Maritime Cloud, see more in separate part on partnership with Korean SMART project and STM Validation
SMART Navigation project takes part in the Maritime Cloud Development Forum (MCDF).	DMA, Frequentis, OFFIS.	N/A	M1-M36	The MCDF undertakes the overall coordination of the Maritime Cloud development between the 3 projects.	Collaborates on implementing all aspects of the Maritime Cloud, from software to governance.

5.3 Objective 3: Create and coordinate standardisation of solutions

5.3.1 About this objective

EfficienSea2 recognises the importance of global and harmonised standards in the global roll-out of e-Navigation. Standardisation is of paramount importance for getting adoption and penetration for interoperable services and equipment. Therefore much effort is put into creating solutions that can help test and create the global standards needed. WP1 creates

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an overview and coordination of relevant standards, which is important because of the interdependencies of the standards. The work with the relevant standardisation organisations on the individual standards is primarily performed by other individual work packages. Responsible for this objective is T1.3 led by IALA with CIRM and UKHO as contributors.

5.3.2 Applied strategy

- Provide an overview of relevant standards and follow progress continuously in relevant standardisation bodies.
- Develop a strategic standardisation plan.
- Influence international safety regimes through collaboration and testing of proposed standards.

5.3.3 Success criteria

- Number of standards contributed to as part of EfficienSea2: 6 (3 VDES, 3 MC)
- Number of standards in process of adoption/implementation as part of EfficienSea2: 7

5.3.4 List of activities

Activity	Efficien Sea2 partner(s)	Target group	Time (M = project month)	Short description	Outcome
Report on relevant ongoing standardisation work					
Report on the relevant ongoing standardisation work	IALA	N/A	M1-6	Mapping of standards with relevance for EfficienSea2	**D.1.5 Report on ongoing standardisation work relevant to EfficienSea2** An overview of standards related to EfficienSea2 that ensures that project standardisation work is in harmony with industry standardisation work
Assisting the work with standards	IALA	N/A	M6-36	Preparation of standards by IALA E2 team members, by teleconference and participation in meetings	Constant input provided to EfficienSea2 team members
Present standards at IALA	IALA, CIRM, UKHO	IALA Members	M6-36	Participation in IALA e-Nav WG 1 and WG3 meetings to present and discuss standards	IALA working groups engaged in the standardisation work in EfficienSea2
IALA working groups					
Participating in IALA working group, writing a recommendation	IALA, CIRM	N/A	M1-36	EfficienSea2 engages with IALA's working group to write a recommendation for ITU-R M.2092. The working group also coordinates outside partners relevant for the work	An expected outcome is, if possible, to energize the development of ITU-R m.2092 and start drafting the related IEC standard

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Guideline on VDES	IALA, CIRM	N/A	M1-36	IALA E2 team members actively involved in preparation and review of standardisation docs	Draft IALA Recommendation and Guidelines on VDES
Test specification for VDES	IALA, CIRM	N/A	M1-36	IALA E2 team members providing documents to other standards bodies (IEC, ITU)	Draft IEC Test Specification on VDES
Technical specification for AtoN	IALA, CIRM	N/A	M24-36	IALA E2 team members preparing technical specification for AtoN information exchange	Service specification and data exchange standard (S-201)
Smart Buoy guideline	MOG, IALA	N/A	M24-36	IALA E2 team members preparing recommendation and guideline for Smart Buoy	IALA Recommendation and Guideline
On-board architecture					
Defining protocols for cyber secure on-board networks	Danelec		M6-36	In order to utilize the advantages of the Maritime Cloud, the on-board network architecture must be cyber secure. WP2 works to secure a common IEC standard for this.	Drafting of an IEC standard for on-board architecture
Requirements interview with ship owners	Danelec	N/A	M6-12	Interviews have been carried out with the ship owners Maersk and Torm to establish their requirements for communications channels.	A report has been completed on the requirements for communications channels for Maersk and Torm.
IALA e-Navigation Committee					
Submission of three service specifications to the IALA e-Navigation Committee's 19th session.	DMA & OFFIS	N/A	M6-12	EfficienSea2 submitted three levels of service specifications for the IALA e-Navigation Committee's 19th session for discussion.	The specifications were submitted for discussion and were planned to be re-submitted for the 20th session.
Submission of three service specifications to the IALA e-Navigation Committee's 20th session.	DMA & OFFIS	N/A	M18-24	EfficienSea2 submitted three levels of service specifications for the IALA e-Navigation Committee's 19th session.	Drafts approved at e-Nav 20 for discussion with other organisations (IHO, CIRM etc.)
WHO standardisation					
Standard for weather and ice	DMI	N/A	M24	S-411 and S-412	Reviewed in IALA e-Nav Committee
IHO standardisation					
Standard for Navigational Warnings and	DMA	N/A	M1-30	A draft for the IHO S-124 Standard has been proposed in a working group under the	Standards are being tested by the DMA. Expected to result in an agreed standard by the end of 2017.

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Notices to Mariners				IHO	
Standards for S-101 based sea charts in IHO	DGA	N/A	M18-30	Standards for the S-101 and S-102 are underway in IHO	The standard is expected to be agreed by 2019
Other standardisation work					
Route exchange & reporting – RTZ for route	FTA	N/A	M1-36	Within the already adopted IEC 61174:2015, EfficienSea2 is striving to make route sharing in the Baltic possible	It is expected that the solutions produced by EfficienSea2 will be further developed in other projects and by private companies (the WP partners)
Ship Reporting Systems	IALA, CIRM, OFFIS, DMA	N/A	24-36	Standardises, automated reporting of information on voyage and cargo	Contribution to development of Maritime Service Portfolio on ship reporting for approval by IMO.
Draft recommendation for common port reporting	Gatehouse and others	N/A	M1-36	A draft recommendation for common port reporting was submitted in late January 2017	The work being done has attracted attention from many different projects and partners. WP5 will continue to promote a shared standard.

5.4 Objective 4: Clarify governance and future potential of solutions

5.4.1 About this objective

This objective is about clarifying strategic/political, legal and financial issues in bringing concepts and demonstrations to market. The main focus is to define a governance and business model for the Maritime Cloud. The work will be done in collaboration with relevant WPs and involve the maritime community, e.g. through workshops. Both sceptical and supportive actors will be invited to discuss the issues. The task will also identify and conceptualise future uses and applications of the developed solutions. The communications channels are being developed with a commercial aim, and the individual solutions are run by partners in the project. Therefore, while all parts of the project will focus on the future potential, the specific governance activities will mainly be developed for the Maritime Cloud. Responsible for this objective is T1.4 led by the MDC with the DMA as contributor and T1.5 led by the DMA with CIRM, IALA and MDC as contributors.

5.4.1 Applied strategy

- Partners as first movers (early adopters/users of solutions) + focus on Maritime Cloud first.
- Establish international cooperation with projects continuing after end of EfficienSea2.

5.4.2 Success criteria

- Qualified recommendation on governance and future perspectives of the Maritime Cloud.

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5.4.3 List of activities

Activity	Efficien Sea2 partner(s)	Target group	Time (M = project month)	Short description	Outcome
Maritime Cloud Development Forum					
Establishment of the Maritime Cloud Development Forum	DMA, OFFIS, MDCE, SMA	N/A	M1-6	The Maritime Cloud Development Forum was established as a partnership between STM, the Korean SMART project and EfficienSea2	The future perspectives have been greatly strengthened by the MC Development Forum. See more about the partnership with STM and the Korean SMART project in Appendixes 2 and 3
Input from high-level user group					
High-level User Group workshop about the Maritime Cloud	DMA & MDC	N/A	M7	**D.1.7 HLUG workshop** A workshop with important actors in the maritime domain gathering input on governance, business and legal issues regarding Maritime Cloud	A report has been produced to gather the inputs given by the high-level users (available at www.efficiensea2.org > Publications)
High-level User Group workshop about automated reporting	DMA & MDC	N/A	M15	**D.1.7 HLUG workshop** A workshop with important actors in the maritime domain gathering input on their need for automated reporting	A report has been produced to gather the inputs given by the high-level users (available at www.efficiensea2.org > Publications)
High-level User Group workshop about BalticWeb	DMA & MDC	N/A	M19	**D.1.7 HLUG workshop** A workshop with important actors in the maritime domain gathering input on BalticWeb	A report has been produced to gather the inputs given by the high-level users (will be available at www.efficiensea2.org > Publications)
High-level User Group workshop about communication channels	DMA & MDC	N/A	M26 or M33	**D.1.7 HLUG workshop** A workshop with important actors in the maritime domain gathering input on communication channels	A report will be produced to gather the inputs given by the high-level users (will be available at www.efficiensea2.org > Publications)
Governance and future perspectives of solutions					
Recommendations on governance and future perspectives	DMA, CIRM, IALA, MDC	N/A	M32 (draft), M36 (final)		**D1.6 Recommendation on governance and future perspectives**
Project workshops on Maritime Cloud governance and business models	CIRM & DMA	Partners representing potential users	M22-35	A high number of partners participated in a workshop at the EfficienSea2 work meeting in Warsaw, and gave feedback on draft models – more workshops are being planned	Qualified Maritime Cloud governance model and business model
Project work meetings on	IALA & DMA	Partners represen	M24-35	Partners participated in a work meeting (GTM) and gave	Qualified Maritime Cloud business case

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Maritime Cloud business case		ting potential users		feedback on a draft business case – more meetings are currently being planned	
Plan, organise and host the workshop 'How to run the Maritime Cloud'	IALA (hosting, organising) and DMA	Business experts, maritime industry, policy	M31 (21-22 Nov 2017)	Focus on the implementation of the Maritime Cloud – reviewing governance and business model options, identifying the preferred models and an exploitation plan for global information exchange	Validated and qualified Maritime Cloud governance model, business model, business case, and roadmap
Roadmaps/user cases/business cases	MDC & DMA, all partners	Industry	M32 (draft), M36 (final)	For BalticWeb, developed end user services, Maritime Cloud and communication channels	Four user cases, including business potential/benefits and roadmaps
IPR Strategy					
Strategy for Intellectual Property Rights (IPR)	DMA	EU, project partners	M6	The IPR strategy has two main lanes: 1) Creating a new global market, and 2) Growth and jobs through first mover advantages and proprietary implementation	**D1.9 IPR Strategy** The strategy is reviewed by WP1, CIRM, IALA and FORCE Technology
Individual exploitation plans					
Individual exploitation plans	All 32 partners	N/A	M32 (draft), M36 (final)	Each project partner makes an exploitation plan stating how they will exploit EfficienSea2 results in their organisation	32 partner exploitation plans

5.5 Objective 5: Identify user needs and get feedback on solutions

5.5.1 About this objective

EfficienSea2 develops human centred solutions. Objective 5 is about ensuring that the proper methodology is used for identifying and solving user needs as well as harmonising the human element and usability aspects across the project. Particular focus will be on measuring the influence and impact of the proposed services and their potential to support users in strategic and tactical decision-making. This includes coordination of both design and evaluation activities involving actual users (through a variety of methods such as simulator studies, usability analysis, contextual inquiries, user interviews and focus groups); education of project partners by preparing guideline documents and models on how to incorporate human factor perspectives and knowledge about user needs in the development process; as well as organisation and performance of a workshop for project partners in human factor principles. Finally, assisting other WPs in actual user involvement in field test and simulator test campaigns is a task. Responsible for this objective is T1.6 led by Chalmers with FORCE Technology, the DMA and MDC as contributors and T1.7 led by the DMA.

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5.5.2 Applied strategy

- Teach, demonstrate and integrate the value of human centred design.

5.5.3 Success criteria

- At least 12 activities involving actual users will be conducted (simulator studies, usability analysis, contextual inquiries, user interviews, focus groups).
- A guideline on human factor principles and identification of user needs has been provided and presented to the project partners.
- At least one partner in each workgroup has been assisted in user involvement activities.
- Overall, at least 150 users have given feedback on EfficienSea2 solutions.

5.5.4 List of activities

Activity	Efficien Sea2 partner(s)	Target groups	Time (M = project month)	Short description	Outcome
Usability analysis					
SAR User Workshop	DMA & Chalmers		M6-12	Input was received in Reykjavik from a variety of SAR parties	Input gathered for the development of a SAR service. A report is produced
Expert walk through – ArcticWeb	FORCE Technology	Service provider/authority (DMA)	M1-6	A report on the usability of services was produced	A report was produced – providing input for optimisation of the ArcticWeb interface
Interviews with stakeholder representatives	Chalmers	Service provider/authority (SSPA and DMA)	M1-6	Chalmers has conducted interviews with VTS operators, a representative from an authority and pilots from different areas.	The interviews combined with previously gathered material have resulted in concrete recommendations for comfort zones/no-go-areas
Usability analyses of ArcticWeb	Chalmers	Service provider/authority (DMA)	M1-6	A report on the usability of services was produced	A usability report was produced – providing input for the ArcticWeb from a human centred design perspective
Value proposition analysis					
Value proposition analysis of the Maritime Cloud	Chalmers and MDC	Mainly industry: Service providers, ship owners, equipment	M23-36	Chalmers is conducting focus groups and interviews with target groups to uncover the value and potential benefits of the Maritime Cloud to future users and	A report on the value propositions of the Maritime cloud will be produced. The insights will guide the development of appropriate business models and business cases of the Maritime Cloud and pertinent

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		manufacturers		stakeholders. The study also focuses on the impact that the Maritime Cloud has on potential users' business cases etc.	regulatory guidelines for future development in the maritime eco system
HCD training					
Workshop on Human Centred Design	Full Project Team	Service providers, authorities	M12-18	The entire project team was brought in to ensure that the human factors were addressed, and WP4, WP5 and WP6 spent some extra days to secure an understanding of user needs	The project team gained an understanding of the end user needs
Prototyping and test beds / Testing Human Factors					
Simulator studies – baseline group + intervention group	Chalmers + Force Technology	Service providers, authorities	M24-25	The BalticWeb interface will allow services to be tested from a human factor perspective	A report will be produced – evaluating baseline group with intervention group on aspects such as workload, usability and teamwork
SAR test – ArcticWeb	Chalmers (Christopher)	Service providers, authorities	M24-30	Greenland	Report
Test of Smart Buoys	MOG	Ports	M18-30	MOG will deploy smart buoys for testing in the waters outside Gdynia	??
Test of VDES	Cobham & NIT	Ship owners, equipment manufacturers	M18-30	Cobham is testing the VHF Data Exchange System in the Baltic Sea within the Efficiensea2 project	When the results are available, they will be evaluated by Cobham and other partners in WP5. The results are expected to take the Maritime World a step closer to exploiting the possibilities of VDES
Measuring administrative workload	FORCE Technology	Service provider (BIMCO)	M24-30	BIMCO seeks to minimize the adm. workload for the end users on board ships – in this regard, FORCE Technology will assist in the development of a measurement tool	The outcome will be a baseline measurement that can be used in development of service and later comparisons with solution effectiveness.
Contextual inquiries and interviews	Chalmers	Service provider (DMA)	M1-6	Field studies focusing on rapid prototyping and design proposals/optimisations	Three presentations were made regarding 1) theoretical aspects related to e-Nav., 2) visualisation of risk in the BalticWeb, 3) route exchange through BalticWeb
Pilot implementations					

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Maritime Cloud Beta release	DMA	Maritime domain	M18-24	Maritime Cloud was released in a Beta version to open for testing and feedback from potential users	Feedback has been received and the project has taken a step towards fulfilling the visions of the Maritime Cloud
BalticWeb Beta Release	DMA	Maritime domain	M18-24	BalticWeb was released in a Beta version to the public, and has since been used to test the new S-12 standard for Navigational Warnings and the Maritime Cloud	The BalticWeb Beta version will make it possible to test BalticWeb amongst a broader test group
Evaluation					
Evaluation of usability and test activities	Chalmers	EU, project partners	M33	Evaluation based on collection of observations from simulator tests during the project	**D1.8 Final usability evaluation report** The evaluation results are reviewed by project members of WP1 and project participants connected to observations

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6. Responsibilities

6.1 Project structure

The EfficienSea2 project has created roles and responsibilities within the project structure for implementing the plan for communication, dissemination and exploitation. The structure for undertaking the plan is provided below:

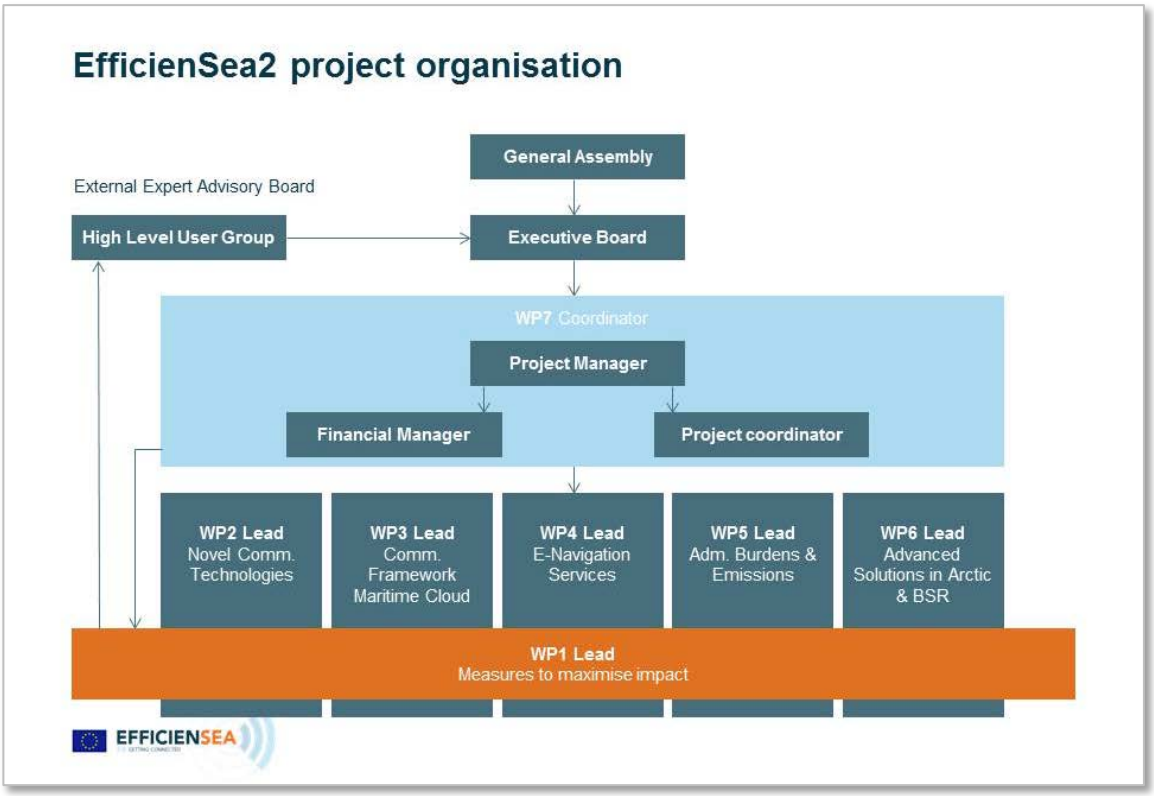

Figure 5: WP1 operates across the entire EfficienSea2 project to ensure maximum impact of the developed solutions. WP1 is responsible for making and implementing the plan for communication, dissemination and exploitation

6.2 Lead partner

As the lead partner, the DMA arranges for the facilities (office, communication links, etc.) to construe and implement the plan for communication, dissemination and exploitation.

6.2 Work package leads

The responsible partner for each work package will be responsible for ensuring the passage of information to and from the participating partners, their contractors/external experts and relevant maritime stakeholders. This will be achieved primarily by the use of monthly WP lead meetings, the TeamWork collaboration platform, and GoToMeetings, when relevant.

6.3 Individual partners

Each partner is responsible for adopting information provided by the plan for communication, dissemination and exploitation within their individual activities and ensuring that the results are disseminated and exploited.

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6.3.1 EU requirements

This includes that each partner is required to:

- Report all dissemination activities in this template: https://esea2.wufoo.com/forms/dissemination-activity/
- Produce minimum two dissemination products, e.g.: 1) A publication targeted at the public (e.g.: a newspaper article, a TV news story, press release in local, national or international media); and 2) A scientific publication targeted at a specialised audience (e.g.: an article in a scientific magazine, a thesis in national or international media).
- Create an individual exploitation plan: A document (1-2 pages) that explains how project results are exploited in the partner organisation (e.g.: using them in further research activities (outside the project); developing, creating and providing a service or product; using them in standardisation activities).

The Project Manual provides further information on the use of internal project communication tools, such as TeamWork, GoToMeetings etc., as well as communication guidelines.

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7. Evaluation

7.1 Maintaining the plan

The plan for communication, dissemination and exploitation will be maintained and updated by the communications team (T1.1) during the project, approximately every sixth month following our internal work meetings.

7.2 Evaluation

EfficienSea2's communication, dissemination and exploitation activities will be evaluated on the basis of the success criteria that have been defined under each of the five objectives and will be reported in the final report on communication, dissemination and exploitation.

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EFFICIENSEA 2.0 GETTING CONNECTED

Appendix 1: Target groups

31-05-2017

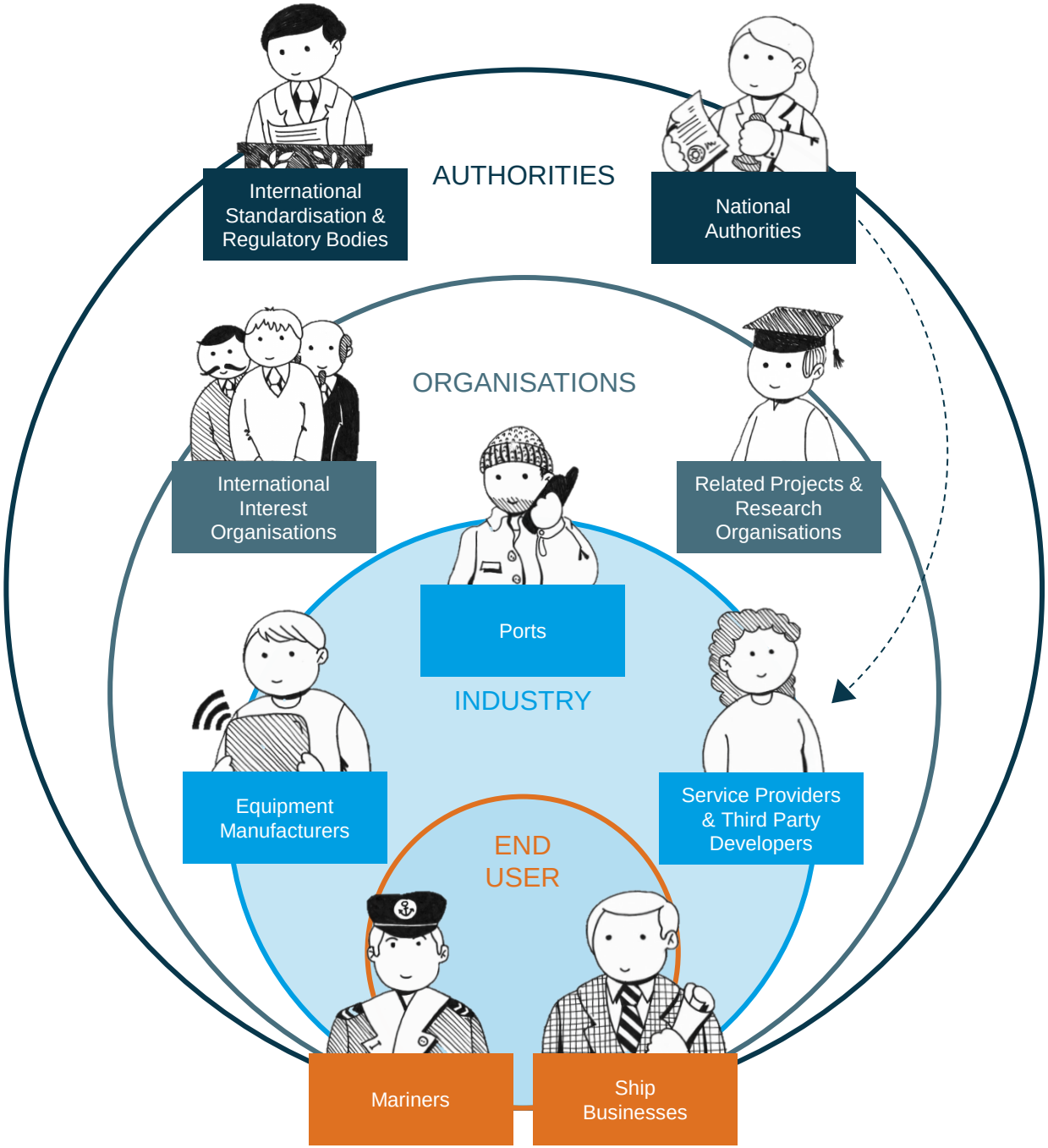
Katja Øder Schlesinger, Danish Maritime Authority

This project has received funding from The European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement no. 636329

Target groups

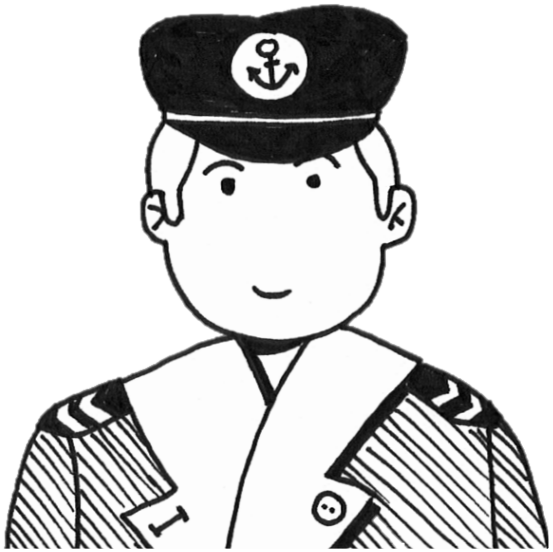
The most important people, groups and organisations that EfficienSea2 wants to affect with the Maritime Cloud concept and the developed solutions

… or that can influence EfficienSea2 in a significant way (or be influenced by it)



EFFICIENSEA 2.0 GETTING CONNECTED

1 **Mariners** (ship officers, engineers, pilots, and VTS Centers)



Relevant EfficienSea2 solutions:
e-Maritime services/automated reporting, E-Navigation services/ArticWeb and BalticWeb

Characteristics
- End users at sea (primarily)
- VTS Centers and pilots are also included in this group since their navigation focus overlap
- Challenges: Information overload
- Variation in influence on ship owners' purchase decisions about equipment/services on board (some have limited influence, others are involved)

Needs
- Simpler and reliable solutions with minimal and only relevant information
- User friendly solutions – keep it simple!
- Similar solutions at all ships (standardised solutions)
- Training in solutions

Drivers
- Efficiency and safety in operations
- Improved welfare on board (infotainment, social media ect.)
- Decision support from online and on-shore sources to increased safety
- Reduced administrative burden
- Focus on benefits (not technology)

Information
- Seminars and videos rather than text (from shipp.comp. to mariners)
- Educational inst./courses (ECDIS)
- Informal info via FB and other social media and mails, peer-to-peer
- Info-dissemination via associations
- Annual conferences like MSSM
- Publications/newletters for mariners at sea, e.g. Søfart in Denmark

Barriers
- Too many new systems and too much information
- Limited awareness of new systems
- Reliance on old systems
- Widespread perception of automation/smart ships as a threat
- Some has limited influence on ship owners purchase decisions

Goals
- Fulfill their needs and challenges – reduction of cognitive burden
- Reduction of human errors
- Empower the mariners
- Adoption the new solutions (6 monts after the project: 15% uses BalticWeb, 80% ArcticWeb)

Means
- Involvement via participation in prototype testings (particular end solutions)
- Represented at HLUG meetings
- Awareness raising via interest groups
- Information dissemination

2 **Ship businesses** (ship owners and ship managers)

Relevant EfficienSea2 solutions:
e-Martime services/administrative burdens, Maritime Cloud

Characteristics
- End users ashore
- Key role in terms of adoption since they decide equipment/services on board (high power as buyers)
- Complex group with different interests
- Nautical inspectors and communication operators are particularly relevant to involve (they convince technical directors and CEO's afterwards)

Needs
- Reduce costs by automation, e.g. crew
- Monitor ship performance on real time to perform benchmarks between ships, reduce down time and secure optimal operationsas and ship maintenance
- Perform benchmarks between shipping companies
- Increase safety – the core product
- International regulations necessary

Drivers
- Efficiency – better asset utilisation
- Cost effectiveness
- Quantifiable key benefits

Information
- Shipping Watch magasine/newsletters (and Maritime Denmark in Denmark)
- Conferences (knowledge-intensive, networking, minimum travel)
- Networks and professional forums (technical commitees etc.)
- BIMCO events
- Lloyd's List (news media)

Barriers
- Dislike monolithic concepts and solutions
- Cyber security – is the Maritime Cloud trustworthy?
- Unwillingness to assume costs and short return of investment cycles

Goals
- Aware of opportunities and value Support the concept
- Implement the solutions, when developed (if good and cheap)
- Ambassadors for solutions
- Feedback on the business perspectives of the developed concepts

Means
- Involvement via participation in prototype testings and HCD activities (particular end solutions)
- Represented at HLUG meetings (possibly more later in the project)
- Targeted workshops
- Articles in magasines
- Presentations at ship owners' conferences

3 Equipment manufacturers

Relevant EfficienSea2 solutions:
Mainly Maritime Cloud

Characteristics
- Equipment for communication, navigation and information exchange
- Enablers of E2 solutions and therefore a highly important group
- Complex/mixed group, approx. 20 actors (integrated solutions)
- High influence on equipment
- Somewhat competitive relations
- Great interest in E2 solutions

Needs
- Clear benefits to end users
- Clear business model and commercial benefits
- Vendor independent standards and interfaces to related software and hardware
- International regulations necessary

Drivers
- New business opportunities – competitive advantages
- A Maritime Cloud that provides business opportunities instead of disrupting the existing ones

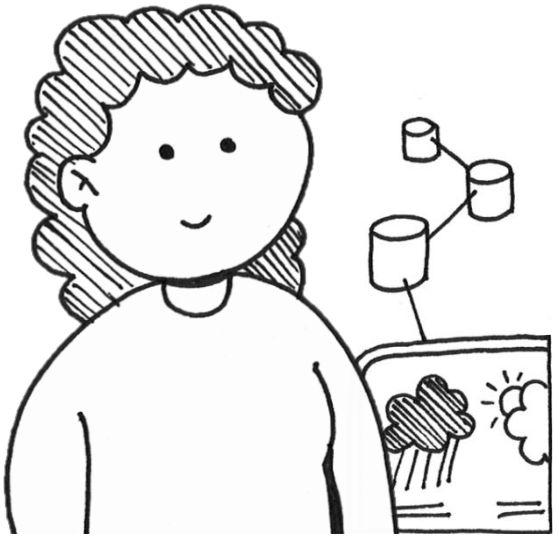
Information
- Conferences, seminars and fairs with product demonstrations
- B-2-B influence
- Publications/newsletters like Digital Ship (Danske Maritime in Denmark)
- Shipping Watch magasine/newsletters
- CIRM events
- Lloyd's List (news media)

Barriers
- Potential bottleneck role since they are enablers of E2 solutions
- Some resistance to open standards and sharing solutions due to commercial competition
- Tendency to retain market shares by opposing outside innovation and implementation of new technologies

Goals
- Adopt the Maritime Cloud concept and integrate it with their systems (as many as possible)
- Adopt new standards and services in their products
- Support standards
- Get the business model

Means
- Close involvement in projects (?)
- Demonstration of commercial benefits
- Vendor independent standards
- Representation via interest organisations (e.g. CIRM)
- Dissemination of concept and solutions
- External workshops/conferences
- Articles in Digital Ship and presentations at their conferences

4 Service Providers and Third Party Developers



Relevant EfficienSea2 solutions:
Maritime Cloud, ArticWeb and BalticWeb

Characteristics
- Providers of e-Navigation and e-Maritime services (commercial/public)
- Large and diverse group, not easily identifiable
- Primary focus on providers in BSR and Arctic, secondly globally
- Some opposition – E2 partners are front runners and will affect the rest
- Competitive relations (commercial)

Needs
- Clear commercial benefits
- Dissemination of project results

Drivers
- New standards and their technical standardisation organisations
- E2 solutions add to my competitive advantages

Information
- Keep me informed about the E2 project
- Conferencens, seminars and fairs
- Publications
- TINV (in DK) platforms to drive innovation within the transport sector (sub groups)

Barriers
- To a large extend dependent on other companies
- Often relatively small companies/organisations, responsive and with limited power to push for changes
- Tendency to retain market shares amongst commercial actors

Goals
- Awareness of commercial benefits
- Adopt and integrate Maritime Cloud
- Eagerness to deliver their services in developed standards
- Support standards
- Get the business model
- Supply services on ArcticWeb and BalticWeb

Means
- Demonstration of commercial benefits
- Collaboration
- Workshops and conferences
- Arctic & BalticWeb
- One-to-one meetings
- Service Provider Training (some)
- Dissemination in technical for a
- Dissemination of results via campaigns and ads

5 Ports

Relevant EfficienSea2 solutions:
Automated reporting (e-Maritime services)

Characteristics

- Complex group with great diversity, e.g. various sizes and ownership models (private and public – major ports like Rotterdam, Hamburg, Shanghai and Singapore operate individually)
- Important group regarding implementation
- Terminal owners is an influential sub-group
- Many different companies such as stevedoring, logistics, supply etc. as well as authorities such as police, customs etc. work at the ports

Drivers

- Business relevance and clear commercial gains (not all ports are driven by government regulations)
- Efficiency and safety is important (how quick can we expedite ships?)

Needs

- Competitive expedition of ships, ensuring efficient work flows
- Reduction of administrative burdens and paper work

Information

- Discuss business at conferences

Barriers

- Diversity of conditions, systems and interests
- Numerous (small) stakeholders that doesn't want changes, e.g. unions
- Local focus and patient approach towards business development
- Sometimes in short of technical skills

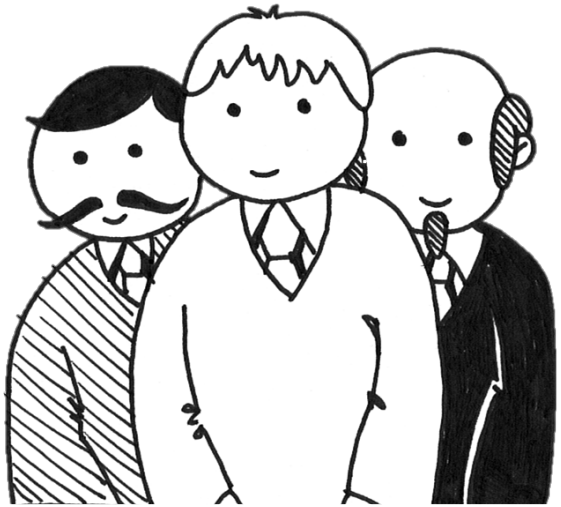
Goals

- Convince them of the value of the solutions – sales work
- Adopt port related solutions
- Demonstrate business case (economic relevance)
- Keep them satisfied throughout the project – address their concerns

Means

- Segmented communication to different types of ports
- Involvement via interest organisations
- Conference participation
- Presentations
- Participation in prototype testing
- Close collaboration with the STM project (where ports are highly involved)

6 International Interest Organisations



Relevant EfficienSea2 solutions:

Characteristics
- E.g. CIRM, BIMCO, ICS, IMPA, Habour Master Association, INTERTANKO, and Nautical Institute
- Opinion makers - influence policy organisations like IMO and EU
- Can be slow to officially change posistion if they need the members' approval

Needs
- Speak and act in the interest of there members
- Needs to be update in the trends in the industry

Drivers
- Create value for their members
- Influence regulation and other industry developments like standards

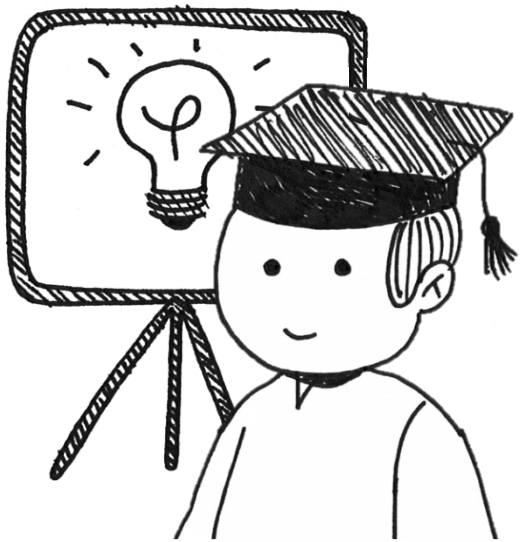
Information
- Quite keen to follow the developments in the industy in maritime media and at conferences

Barriers
- Needs aproval of their members for bigger decisions (can slow down processes)
- Limited size of secretariat

Goals
- Keep them happy (opinion makers) and manage closely
- Become ambassadors and lobbyists and influence policy bodies in favour of E2 results
- Affect and inform their members

Means
- Close collaboration and active engagement
- Early involvement in order to 'keep them hot'
- HLUG meetings
- Conferences (e-Navigation Underway, Midterm conference)
- Input papers

7 Related Projects & Research Organisations



Relevant EfficienSea2 solutions: Maritime Cloud (STM) and Automated reporting

Characteristics
- Other e-Navigation and e-Maritime projects like STM, MONA LISA II, CPCE (OFFIS), Sessame Strait
- Other organisations like research organisations and other partners in Korea
- Important group due to close project interdependencies or competing solutions

Needs
- To go as far as possible to delvelop their solutions
- Some work for standardising and hamonising solutions
- Get support for solutions

Drivers
- Co-development
- Seaking support of their solutions

Information
- Coordinated workshops and events as well as formal meetings, conferences and seminars like IALA e-Nav Committee and seminars
- Publications

Barriers
- Potentially conflicts due to interdependencies
- Competing agendas and interests
- Lack of business drive
- Lack of formal authority
- Short term focus
- Regional focus rather than globally

Goals
- Harmonisation and standardisation in relation to projects like STM
- Get related projects to promote MC and solutions
- Promote harmonisation and standardisation
- Work to the benefit of standardisation

Means
- Co-development of solutions
- Standardisation work
- Maritime Cloud Development Forum
- Coordination and harmonisation activities
- One-to-one meetings with other projects in WP's
- Liaise with the STM project, e.g. Liaison Officers

8 **National Authorities** (Maritime and other sectors)

Relevant EfficienSea2 solutions: Maritime Cloud, Automated reporting (e-Maritime), ArticWeb and Baltic web (e-Navigation)

Characteristics
- Maritime national authorities – flag, port and coastal states, e.g.: SMA, Marshal Islands etc.
- Other authorities like customs, immigration, environmental, weather etc.
- Possibly opponents amongst, possibly disinterested (how supportive is this group?) – quite powerful
- Identify which types of authorities are critical to the specific solutions

Drivers
- Keep the industry and society/politicians satisfied
- Increase safety, security and environment
- Securing compliance with regulations

Needs
- Finding the right balance between safety, efficiency, operations and enforcement
- How to enforce new regulations
- Compliance with regulations

Information
- Conferences at standardisation and regulatory bodies like IALA, IHO and IMO
- B-2-Bmeetings (border collaboration)

Barriers
- Lack of dedication
- Different barriers depending on task
- Possible negative approach to the project
- Lack of business drive but focus on administration and national interests

Goals
- Support solutions in standardisation and regulatory bodies
- Implement solution in their own operations (post-project)
- Coordination and harmonisation
- Liaison with other projects
- Awareness of E2 and solutions
- Support the Maritime Cloud concept

Means
- Workshops
- Conferences (E-navigation Underway & E2 Midterm Conference)
- One-to-one meetings
- HLUG meetings
- Possibly IMO receptions

9 International Standardisation and Regulatory Bodies

Relevant EfficienSea2 solutions:

Characteristics
- E.g.: EU, IMO, IHO, ISO, ITU, IALA and IEC
- Direct influence/impact
- Overall perspective, not technical
- Somewhat traditional and conservative institutions

Needs
- Following trends and developments in the industry
- Information flow and project overview for strategic work

Drivers
- Achieve consensus among members
- Socio-economical balance – sustainable machinery
- Easy to reach (and control) ships

Information

Barriers
- Different competencies and power level of the individual bodies
- Some scepticism towards new, smart systems

Goals
- Adopt solutions as their standards
- Convince them of the value of the common framework
- Promote regulation where relevant
- Support MC

Means
- One- to-one meetings (eg. IALA)
- Conferences
- Liaison with other projects/policies
- Involvement in their processes (IALA-committees etc.)
- IMO receptions
- Standardisation work

Appendix 2

Information Plan to promote VHF Data Exchange System (VDES)

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Appendix 2

DOCUMENT STATUS

Authors

Name	Organisation
J Carson-Jackson / N Ward	IALA

Document History

Version	Date	Initials	Description
V 1.0	12/12/2016	JACJ	Initial document

Review

Name	Organisation

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Appendix 2

1 Table of Contents

DOCUMENT STATUS 2
Authors 2
Document History 2
Review 2
Introduction 4
Document 4
2 Introduction 5
2.1 Background 5
2.2 Reference 6
3 Information objectives 6
3.1 Information approach 6
3.2 Information Plan Focus 7
4 Target Audience 7
4.1 Stakeholders 7
5 Key messages 9
5.1 Broad messages 9
5.2 Stakeholders and key messages 10
6 Information Methods 11
7 Information requirements 12
8 Information timeline 17
8.1 Short term (6 months) August 2016 – January 2017: 17
8.2 Mid-term (6 – 12 months) January 2017 – August 2018 17
8.3 Longer term (12 – 24 months) August 2018 – August 2019 17
9 Budget 20
10 Monitoring and evaluation 20
10.1 Measurement of success 20

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Appendix 2

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).

Document

Deliverable D.1.22 – Information Plan to promote the VHF Data Exchange System (VDES) – is attached.

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VHF Data Exchange System

Information Plan

2 Introduction

This Information Plan provides a framework for managing and coordinating communications; promoting support and engendering commitment and ownership amongst those stakeholders involved in the development and implementation of the VHF Data Exchange System (VDES).

This Information Plan has been designed to promote VDES by responding to the following questions:

- Who needs to know about VDES development?
- What do they need to know? (message)
- What methods can be used to tell them? (channel / communications method)
- Who is going to do the telling? (responsible person)
- When are they going to be told? (deadline)

2.1 Background

AIS is well recognized and accepted as an important tool for safety of navigation and is a carriage requirement for SOLAS vessels (Class-A). However, because of its effective and useful technology, the use of AIS has expanded to vessels not subject to the SOLAS carriage requirement, and to completely different applications. This expanding use of AIS technology has caused significant increase in VHF Data Link (AIS VDL) loading which has become an active concern in IMO and ITU. It is necessary to consider urgently allocation of new frequencies for new and emerging applications in order to mitigate overloading of AIS VDL.

Simultaneously, because of increasing demand on radio spectrum for digital communication such as mobile phone and data, ITU now requests more efficient and effective use of radio spectrum.

The VHF Data Exchange System (VDES) is seen as an effective and efficient use of radio spectrum, building on the capabilities of AIS and addressing the increasing requirements for data through the system. New techniques providing higher data rates than those used for AIS will become a core element of VDES. Furthermore, VDES network protocol should be optimized for data communication so that each VDES message is transmitted with a very high confidence of reception.

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2.2 Reference

This document should be read taking into account to the documents listed below:

Document	Description	Status / Location
IALA Maritime Communications Plan Edition 2 – October 2012	Provides basis for development of enhanced digital communications in the maritime VHF mobile band	IALA website (Published)
Draft IALA Guideline – VDES	Provides the business / user requirements for VDES with high level overview of technical aspects of VDES.	In development / IALA E2 work / ENAV committee
Draft IALA Guideline – Strategy for digital communications	Working towards IALA Maritime Communications Plan Edition 3 / based on outcomes of trials carried out by GLA (ENAV17/11/20)	In development / IALA E2 work / ENAV committee
ITU-R Recommendation M.2092-0	Technical Characteristics for VHF data exchange system in the VHF maritime mobile band	ITU / published 10/2015)

3 Information objectives

The information objectives are:

- Raise awareness and understanding of VDES
- Promote development of full VDES capability (including terrestrial and satellite elements)
- Keep stakeholders informed and up to date on VDES developments
- Encourage support for, and engagement with, the development of VDES
- Foster cooperative and collaborative stakeholder relationships to enable mutually beneficial outcomes.
- Establish and maintain effective and transparent methods for timely communications about VDES.

3.1 Information approach

Information will be provided in coordination with the EfficienSea 2 Communications Plan and in accordance with IALA policies. The EfficienSea 2 Project Team and the IALA Secreatriat will be fully informed of the objectives and implications.

The information plan will take the following approach:

- Information will be kept as simple as possible with respect to the target audience
- Information will be provided in a timely, consistent and appropriate manner
- Information methods will make use of credible and accepted communications channels, with opportunity for feedback.
- Information methods and content will be revised as required to reflect changing objectives and feedback received.
- Information will be consistent in format; content and presentation and will reflect the IALA style guide.

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3.2 Information Plan Focus

This Information Plan focuses on the coming 18 months of development, and will be revised as VDES continues to develop. The plan will tailor messages to different stakeholders. The overall goal for VDES is to:

- Provide information on the development of the VDES that will be available from the IALA website, with ongoing development of a focus area for VDES. Implementation by January 2017.
- Present and seek input on the development of VDES to all IALA Committees with a focus on specific aspects appropriate to the objectives of each Committee. Presentations, with opportunity for input to operational and technical development aspects of the VDES, will be completed by July 2017.
- Promote and seek input on the development of the VDES to identified international bodies including: IMO, ITU, IHO, IEC, IMPA, IHMA, CIRM, NI and other organisations as may be identified. This will be completed by December 2017.

4 Target Audience

The target audiences (also called 'stakeholder') for this information plan are those individuals, groups or organisations who are:

- Primary (Directly involved in the development of VDES) – this includes those who are involved at the technical and operational levels and those who are supportive and critical. Primary stakeholders are people, or groups of people, directly affected, either positively or negatively, by VDES
- Secondary (Indirectly involved in the development of VDES) – this includes those who will review the development; implement systems once developed; promote VDES as delegates to ITU, IMO and other international organs.
- Tertiary (Not involved in the development of VDES) – this includes general public and those not directly involved in VDES development or implementation.

The target audience can be further identified as 'internal' (IALA staff / IALA membership/E2 partners) and 'external' (IMO, ITU, other international organs).

4.1 Stakeholders

The stakeholders for VDES development are identified in

Table 1. In addition to identifying them as primary, secondary or tertiary, each stakeholder has been assigned a priority for engagement from 1 - 4 where:

1 = highest priority (must to address - critical stakeholder; will require conscious effort with time / resources)

2 = strong priority (need to address – important stakeholder)

3= lesser priority (needs communications, but less attention required)

4 = low priority (general communications required only)

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Table 1 - Stakeholders / Target Audience for VDES development

Stakeholder	Priority	Description	Type
Internal			
Group 1 – Internal Decision Makers			
IALA Secretary General /Deputy SG	1	Confirming IALA's role / leadership in development.	Secondary
IALA Council	2	Confirming IALA's role / leadership in development.	Secondary
IALA PAP	1	Coordination of work of IALA Committees	Secondary
Efficiency 2 oversight (IALA)	1	Ensuring elements identified for completion by IALA are addressed	Primary
IALA ENAV Committee	1	Managing overall development of VDES (IALA perspective)	Primary
Group 2 – Internal Operational / technical development			
IALA VTS Committee	1	Overall development of VDES (meeting VTS requirements)	Primary
Other IALA Committees	2	Possible implications of VDES on work of the Committees	Secondary
IALA Industry members	1	Technical development / test bed implementation and reporting	Primary
IALA members (general)	3	General overview and awareness (those who are not IALA Committee members)	Tertiary
External			
Group 3 – External Decision Makers			
IMO	1	Status of development / link to e-Navigation and GMDSS modernisation. Receives reports.	Secondary
ITU	1	Spectrum allocation / focus work satellite component. Receives reports.	Secondary
Group 4 – External operational / technical development			
IEC	1	Needs performance standard to develop testing standard	Primary
IHO	2	Implications on S-100 series / presentation of information received through VDES	Secondary
IMSO	3	Expected to monitor developments.	Secondary
IMPA	1	Expected user of VDES	Secondary
Satellite (LES) providers	1	Participate in test beds / provide input to support satellite spectrum requirements at ITU	Primary
AIS technology providers (other than IALA industry members)	1	Participate in trials test beds / provide reports.	Primary

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Stakeholder	Priority	Description	Type
Nautical Institute	3	Opportunity to gather input from maritime professionals / members will be users of VDES	Secondary
IHMA	3	Opportunity to gather input from HM / VTS personnel	Secondary
Group 5 – External - Other			
General Maritime Interests	4	Monitoring developments	Tertiary

5 Key messages

Key messages help to ensure that information shared and promoted is consistent. There are a number of global key messages that apply to all stakeholders. In addition, there are sub sets of key messages that need to be tailored to different stakeholder groups.

To support and promote the development of VDES, key messages used in communications will articulate the expected benefits of VDES. These messages will be reviewed and refined over the course of the development of VDES, and the life of this information plan.

The key message and broad message themes will be tailored to engage the target audience. The intent is to highlight VDES benefits and then use this as a hook to communicate more detailed information about VDES capability. Depending on the communication activity, it may also be appropriate for more detailed or specialised sub-themes to be developed.

The overriding key message for VDES is:

"VDES will provide enhanced digital communications on the VHF maritime mobile band, supporting the transfer of information to support safe and secure navigation, protection of the environment and the efficient movement of vessels."

Key catch phrases to use in the promotion of VDES are:

VDES – a digital maritime communications evolution!

VDES – enhancing maritime communications in a digital world.

VDES – a truly global, standard, digital maritime communications capability.

5.1 Broad messages

Broad message themes for VDES include:

1. VDES is a digital evolution of data exchange over existing VHF channels.
2. VDES is a truly global, digital maritime communications solution, making use of terrestrial and satellite developments.
3. VDES is made possible by the use of software defined radios and enhanced digital communications techniques.

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4. VDES uses 'banded' VHF channels to provide increased capability for data exchange. While AIS can be regarded as a single lane country road with a 50km/hr speed limit (30 mph) for car traffic only; VDES can be regarded as a multi-lane highway with a 110 km/hr speed limit (60 mph) where cars, buses and trucks can transit – transferring more data, more quickly.
5. VDES is a 'system' that includes existing AIS VHF channels, including long range AIS; Application Specific Message (ASM) channels and VHF data exchange (VDE) channels.
6. VDES supports e-navigation requirements identified in the IMO Strategic Implementation Plan (SIP), and detailed in the Maritime Service Portfolio (MSP) work of the IMO on e-navigation.
7. VDES can support some communications requirements as part of the GMDSS modernization work at IMO.
8. VDES is a communications medium to transfer information – it is the communication link layer, on which applications can be developed.
9. The full VDES capability envisioned includes the ability to send data to, and from: ships (ship to ship); shore (ship to shore / shore to ship); and low earth orbiting satellites (LES) (ship to satellite/ shore to satellite; satellite to ship / satellite to shore)
10. VDES builds on the success of AIS, with packets of digital data transmitted over VHF channels that were agreed at ITU WRC-2015.
11. The current agreement from ITU does not yet include the transfer of data on the VDE channels to / from satellites.
12. VDES development needs input from stakeholders.

5.2 Stakeholders and key messages

Each stakeholder has specific expectations and issues with regards to the development of VDES. As appropriate, the overriding messages and additional key messages will be tailored to each stakeholder. This is to help ensure that the content of the communication is relevant and promotes understanding of VDES.

It is important that all communications are consistent, with the overriding message promoted at all levels. Repetition of messages is effective in ensuring comprehension, understanding and promoting further communications from the stakeholders identified.

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6 Information Methods

A range of information methods will be used to engage stakeholders and promote the key and broad messages related to VDES. These are presented in Table 2.

Table 2 – Information Methods

Channel*		Information Activity
Face to Face	Briefings	Verbal updates as side bar to other events Scheduled updates (IALA SG)
	Meetings (participate in)	IALA ENAV/VTS Combined meeting, Malaysia, August 2016 IALA ENAV 19, France, September 2016 ITU-R WP 5B, Geneva, November 2016 IALA ENAV 20, France, March 2017 ITU-R WP 5B, March 2017 [date TBC]
	Presentations at Workshops / Symposiums / Conferences	IALA VTS Symposium, Malaysia, August 2016 IALA Virtual AtoN Workshop, Korea, October 2016 INC 2016, Glasgow, November 2016 IMO MSC 98 (2017) (Information paper and presentation)
Published	Progress reports	E2 project reports (updates from IALA into overall E2 reporting) Newsletter (IALA / IALA sister organisations)
	Printed media	Articles in maritime publications – Seaways, Navigation News, IALA Bulletin, WMU Alumni Magazine, Safety@Sea Media Statements
	Other	Test bed reports IALA documents related to VDES
Online	Website	VDES information, FAQ, including major announcements 'News' section of IALA website
	Social Media	VDES linkeIn / forum, including updates and documents
	Other?	Podcast / VDES updates for IALA youtube channel

Note: This list is not intended to be exhaustive.

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7 Information requirements

Communication efforts will be developed and appraised against each stakeholder's information requirements.

Stakeholder	Priority	Description	Type	Communication Method	Responsibility
Internal					
Group 1 – Internal Decision Makers					
IALA Secretary General /Deputy SG	1	Confirming IALA's role / leadership in development.	Secondary	F2F – Briefing Published – Progress Reports	N Ward
IALA Council	2	Confirming IALA's role / leadership in development.	Secondary	Published – Progress Reports Online – website	N Ward
IALA PAP	1	Coordination of work of IALA Committees	Secondary	Published – Progress Reports Online – website	N Ward
Efficiency 2 oversight (IALA)	1	Ensuring elements identified for completion by IALA are addressed	Primary	F2F – Briefing Published – Progress Reports Online – website	N Ward
IALA ENAV Committee	1	Managing overall development of VDES (IALA perspective)	Primary	F2F – Briefing; Meetings; Presentation Published – Progress Reports; other Online – website; social media	J Carson-Jackson; S Doyle; N Ward; E Batty

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Stakeholder	Priority	Description	Type	Communication Method	Responsibility
Internal					
Group 2 – Internal Operational / technical development					
IALA VTS Committee	1	Overall development of VDES (meeting VTS requirements)	Primary	F2F – Briefing; presentation Published – Progress Reports; Articles; other Online – website; social media	W vH N Ward; J Carson-Jackson
Other IALA Committees	2	Possible implications of VDES on work of the Committees	Secondary	Published – Progress Reports; other Online – website; social media	N Ward
IALA Industry members	1	Technical development / test bed implementation and reporting	Primary	Published – Progress Reports; other Online – website; social media	N Ward
IALA members (general)	3	General overview and awareness (non IALA Committee members)	Tertiary	Published – Progress Reports; Articles Online – website; social media	N Ward; J Carson-Jackson

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Appendix 2

Stakeholder	Priority	Description	Type	Communication Method	Responsibility
External					
Group 3 – External Decision Makers					
IMO	1	Status of development / link to e-Navigation and GMDSS modernisation. Receives reports.	Secondary	Published – Progress Reports; other F2F – Presentation (MSC 98; with inf paper) Online – website	N Ward To be advised
ITU	1	Spectrum allocation / focus work satellite component. Receives reports.	Secondary	Published – Progress Reports; test bed reports; appropriate IALA Documents related to VDES (Draft / for comment) F2F – Presentation (ITU-WP 5B) Online – website	N Ward E Batty S Bober

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Appendix 2

Stakeholder	Priority	Description	Type	Communication Method	Responsibility
External					
Group 4 – External operational / technical development					
IEC	1	Needs performance standard to develop testing standard	Primary	Published – Progress Reports; test bed reports	N Ward
IHO	2	Implications on S-100 series / presentation of information received through VDES	Secondary	Published – Progress Reports F2F – Presentation Online – website	N Ward To be advised
IMPA	1	Expected user of VDES	Secondary	Published – Progress Reports; media release; article F2F – Presentation Online – website; social media	N Ward; J Carson-Jackson To be advised
IMSO	3	Expected to monitor developments.	Secondary	Published – Progress Reports Online – website	N Ward To be advised
Satellite (LES) providers	1	Participate in test beds / provide input to support satellite spectrum requirements at ITU	Primary	Published – Progress Reports; other Online – website	N Ward To be advised
AIS technology providers (other than IALA industry members)	1	Participate in trials test beds / provide reports.	Primary	Published – Progress Reports; other Online – website	N Ward To be advised
Nautical Institute	3	Opportunity to gather input from maritime professionals / members will be users of VDES	Secondary	Published – Progress Reports; other F2F – presentation Online – website; social media	N Ward; S Doyle To be advised
International Harbour Masters Association	3	Opportunity to gather input from HM / VTS personnel	Secondary	Published – Progress Reports; other F2F – presentation	N Ward; S Doyle To be advised

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Stakeholder	Priority	Description	Type	Communication Method	Responsibility
				Online – website; social media	
Group 5 – External - Other					
General Maritime Interests	4	Monitoring developments	Tertiary	Published – Articles Online – website; social media	J Carson-Jackson To be advised

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8 Information timeline

IALA has identified a number of focus areas for effort with regards to maritime communications, including VDES, in the short, mid and long term.

8.1 Short term (6 months) August 2016 – January 2017:

1. IALA is finalising the first version of the user requirements document for VDES, with a focus on the requirements of IALA members.
2. IALA is working with other organisations to ensure the requirements of other users are included in the user requirement documentation. IALA will support input to IMO, ITU, IHO and other organisations as required to promote VDES.
3. The Communications working group of the e-Navigation Committee (ENAV 19) is working to develop technical specifications to address the user requirements. This work requires input from all user groups and stakeholders.
4. IALA is engaging with sister bodies to promote VDES at the IMO and ITU. This requires a coordinated approach to ensure delegates are aware of the development status; benefits and limitations of VDES.
5. Key meeting of ITU WP-5B – November 2016.
6. IALA is participating in a VDES focus work element for the Efficiensea 2 project.
7. IALA is developing appropriate recommendations and guidance for IALA membership on maritime communications options, including VDES.

8.2 Mid-term (6 – 12 months) January 2017 – August 2018

8. IALA will complete the project work with Efficiensea 2 related to VDES.
9. Appropriate recommendations and guidelines regarding maritime communications will be published to assist IALA membership. (through IALA ENAV Committee – ENAV 20 – March 2017 and ENAV 21 – September 2017.
10. IALA will continue to publish reports on studies into maritime communications, with a focus on VDES and a focus area devoted to VDES on the IALA website.
11. Key meetings with ITU WP-5B (dates to be confirmed, likely May 2017; November 2017 and May 2018)
12. Plan presentation at IALA Conference – June 2018
13. IALA will continue to work closely with sister bodies to develop VDES, including focus work to highlight the approach to be taken for communications to and from shore stations for both terrestrial and satellite elements.

8.3 Longer term (12 – 24 months) August 2018 – August 2019

14. IALA will work with CIRM to develop testing standards for VDES equipment.
15. IALA will work closely with other organisations, including IALA members, to promote VDES at the ITU. This will include specific studies into VDES terrestrial and satellite components for input to ITU in the lead up to ITU WRC 2019.

Communication activities will be planned and managed to align with key international meeting deadlines.

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Information objectives	Short term Aug 2016-Jan 2017	Mid-term Jan 2017 – Aug 2017	Longer term – Aug 2017 – Aug 2018
Raise awareness and understanding of VDES	Developed and promote information for stakeholders covering: • What VDES is • What are the benefits • Timing for development Develop fact sheet / brochure on VDES	Develop input to IMO / ITU Review Q & As on IALA VDES web page and identify any gaps or requirements in communication efforts	Develop materials and/or means to gauge understanding of VDES: • Feedback forms • Awareness session
Promote development of full VDES capability (including terrestrial and satellite elements)	Engage with satellite providers / key persons with ITU to promote satellite component Promote test beds / reporting	Promote test beds / results Analyse results of test beds / present on findings Input to IMO, ITU, other…	Work with IALA / ITU members to coordinate approach for ITU WRC2019 Input to ITU to support all aspects of VDES
Keep stakeholders informed and up to date on VDES developments	Identify opportunities for stakeholders to have input into the VDES program Presentations to IALA Council / Committees / workshops / etc. Set up and promote the IALA VDES web page with	Update Presentation to IALA Council Review and refine communication objectives, messages and strategy Updated articles in maritime publications Presentation to IMO, ITU,	Update presentation to IALA Council

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Appendix 2

Information objectives	Short term Aug 2016-Jan 2017	Mid-term Jan 2017 – Aug 2017	Longer term – Aug 2017 – Aug 2018
	FAQ VDES articles in maritime publications	other	
Encourage support for, and engagement with, the development of VDES.	Identify and develop channels to promote stakeholder engagement Participate in E2 project	Review Information products Fact Sheet Brochure	Review Information products • Fact Sheet • Brochure
Foster cooperative and collaborative stakeholder relationships to enable mutually beneficial outcomes	Engage stakeholders in meetings / workshops / user requirement and technical requirements the VDES Promote regional / technology focused workshops. Develop materials for workshop leaders to use	Promote information sharing through test bed / trial results Continue to engage stakeholders through workshops / meetings Develop materials for workshop leaders to use	Develop communication products targeting external audiences
Establish and maintain effective and transparent mechanisms for timely information about VDES.	Develop and release Communications Plan for information Work with E2 project / other projects developing VDES.	Review / Update communication strategy and products Work with E2 project / other projects developing VDES.	Review communication strategy

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9 Budget

While many activities will be based on opportunity, some activities will require funding. Budget for these activities will be identified through E2 and related activities.

10 Monitoring and evaluation

Evaluation is critical to measure whether the communication objectives have been achieved. The effectiveness of the communication activities will be regularly monitored and evaluated by the e-Navigation committee, WG3 (*Communications* working group) and the IALA E2 Project Manager and reported through the Secretary General, IALA to IALA Council.

10.1 Measurement of success

As part of monitoring and evaluation process, mechanisms will be developed and implemented to measure the success or otherwise of the communication objectives. The initial parameters for measuring success are as set out below.

Communication objectives	Measurement of success	Mechanism
Raise awareness and understanding of VDES	Stakeholders have an increased awareness and knowledge of VDES	Short survey using surveymonkey to samples stakeholders as a benchmark, then resend at intervals.
Promote development of full VDES capability (including terrestrial and satellite elements)	Participation at meetings related to VDES remains steady, with effective engagement. Stakeholders have an understanding of what VDES will mean for them	Status of VDES at international meetings Agreement for VDES satellite component
Keep stakeholders informed and up to date on VDES developments	Stakeholders are knowledgeable of VDES capabilities and embrace VDES.	Level of participation in VDES related meetings / workshops.
Encourage support for, and engagement with, the development of VDES.	Stakeholders identify opportunities for test beds / highlight issues and questions to appropriate forums.	Tests beds / trials of VDES completed and promulgated. Activity on VDES area of IALA website monitored.
Foster cooperative and collaborative stakeholder relationships to enable mutually beneficial outcomes	Stakeholders have a positive perception of the changes VDES program will bring about	Q&A analysis of feedback to determine issues, knowledge gaps, level of interest; and identify successful mechanisms for engagement
Establish and maintain effective and transparent mechanisms for timely communications about VDES.	Stakeholders remain informed and active in VDES development.	Short email survey using surveymonkey to samples stakeholders as a benchmark, then resend at intervals.

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Appendix 3

EfficienSea 2 and the STM Validation Project Synergies and Opportunities

Date 16 February 2016

Reviewed and approved by
Magnus Sundström, Ulf Siwe, Per Setterberg (SMA, STM Validation Project)
Omar Frits Eriksson, Thomas Christensen (DMA, EfficienSea 2)

Table of Contents

1 Introduction 1
2 Introduction to the two projects 2
2.1 EfficienSea 2 2
2.2 STM Validation Project 3
3 Analysis of the links and synergies between EfficienSea 2 and STM Validation Project 4
3.1 Maritime Cloud in the Maritime Service Infrastructure 4
3.2 Port information 5
3.3 Route exchange and route optimisation 5
3.4 Winter navigation 5
3.5 VDES 6
3.6 Development of different e-Navigation services and solutions 6
4 External project collaboration on technical level 7
5 High level collaboration 7
6 Conclusion 9
Annex 1. Budgets and activities for partners in both EfficienSea 2 and STM Validation Project 1
Annex 2. EfficienSea 2 - Summary of Activities 3
WP1. Measures to Maximise Impact 3
WP2. Novel Communication technologies 4
WP3. Maritime Cloud 5
WP4. E-navigation services 6
WP5. Administrative burdens and exhaust emissions 8
WP6. Advanced e-navigation solutions in the Arctic and Baltic Sea Region 9
WP7 Project Management 10
Annex 3. STM validation project, summary of activities 11
Activity 1: Port CDM Testbed 11
Activity 2: Voyage Management Testbed 12
Activity 3: EMSN Testbed 13
Activity 4: Maritime Service Infrastructure 14
Activity 5: Analysis and Evaluation 15
Activity 6: Coordination and Communication 16

1 Introduction

The Innovation and Networks Executive Agency (INEA) has identified that the EfficienSea 2 project and STM Validation Project have similarities and strong potential synergies and therefor requested a paper specifying:

- A quick summary of each project mentioning what are the particularities of each project compared to the other
- A quick outline of the budgets, per tasks and activities
- A quick outline summarizing the outcomes of each of the two projects, per activity
- The synergies and complementarities already identified and the actions put into place (in terms of members of the consortium; tasks and work to be done…)
- The potential overlaps identified (our intention is not to decrease the budget but to optimise the use of resources)
- The cooperation envisaged, be it structural (cross membership), technical (which topics, tasks) or more general (dissemination events, conferences, working groups…)
- A 4 year planning to consolidate this cooperation. This could be based on regular meetings between both consortium; the systematic invitation of the counterpart coordinator to each important meeting; regular meetings with EC/INEA; joined dissemination events etc…
- Strategy put into place to ensure that no double funding would happen (for the coordinators but also for all members of the two consortium)

This report is a reply on the request by INEA.

The STM Validation Project and EfficienSea2 were both established to close gaps and develop means for advanced information exchange between the various stakeholders in the maritime sector. The projects depend on each other as EfficienSea2 advances the concept of the Maritime Cloud which will be the foundation of SeaSWIM and STM services of the STM Validation Project. Vice versa, the requirements that STM services put on the under-laying technical infrastructure have been used as input to the development of the Maritime Cloud in EfficienSea2. Furthermore, since many partners are active in both projects, it is being ensured that the respective advancements in the areas of e-Navigation and e-Maritime are conducted in a coordinated and compatible manner. This helps avoiding parallel developments which could hamper interoperability between different categories of information systems.

STM Validation Project is a CEF-funded project in a validation phase where the aim is to carry out tests and prototypes in a real environment. EfficienSea2 is an Innovation Action, funded by Horizon 2020, with more focus on creating and developing services to be used in the maritime. A profound difference between the projects is that services developed in EfficienSea2 typically reach a lower technological readiness level where prototypes are tested on a limited scale in an operational environment. The STM Validation project's industrial partners advance the abilities of their commercial systems and thus aim for a first deployment step of STM services after the end of the project.

The main objective for each project reads:

STM validation project

The main goal of the STM Validation Project, is to provide a validated concept for STM and to demonstrate the STM concept in test beds and the European Maritime Simulator Network

EfficienSea 2

The overall objective is to co-create and deploy innovative solutions for safer and more efficient waterborne operations

2 Introduction to the two projects

2.1 EfficienSea 2

The overall objective is to co-create and deploy innovative solutions for safer and more efficient waterborne operations.

With a total of seven specific objectives, all interacting within one framework, the project targets the following:

1. Create and implement a ground-breaking **communication framework – the 'Maritime Cloud'** that will enhance information sharing in and around the maritime sector for smarter traffic management, facilitating a comprehensive e-maritime and e-navigation environment, enabling the maritime internet of things.

2. Identify, develop, test and, where possible, standardise and implement **e-navigation solutions** that will reduce the risk of accidents, especially in dense waterways, as well as increase the efficiency of the transport chain.

3. Develop, test and, where possible, implement **e-maritime solutions** for **automated reporting** and **efficient port information**

4. Create and implement navigational support services and a new self-organizing **emergency response solution** in remote and difficult environments such as the Arctic in order to reduce the risk of loss of life.

5. Develop solutions to **monitor emissions** with a focus on SO_x and conduct validation trials in the Baltic Sea Region.

6. Create innovative and cost-effective solutions with **novel communication technology** to deal with ships' challenge of getting access to information services at a reasonable price, especially in remote places such as the Arctic.

7. **Set the technical and governance standard** for the above areas, particularly in regards to e-navigation solutions.

For more information about the services and solutions developed within the EfficienSea 2 project, see Annex 2.

EfficienSea 2 – project facts summary

Project consortium: 32 partners from 10 European countries

Lead Partner: Danish Maritime Authority
Timeframe: 36 months (May 2015-April 2018)
Total project budget: 11.5 M EUR
Total EU funding: 9.8 M EUR

2.2 STM Validation Project

The main objective of the STM Validation Project is to validate the target concept of Sea Traffic Management (STM), which was defined and elaborated within the MONALISA 2.0 project 2012-2015), funded by TEN-T.

The project is part of a global Sea Traffic Management programme. With MONALISA and MONALISA 2.0 projects, significant steps have been taken in bringing advancements in technology and innovation into the maritime sector for the future Sea Traffic Management, creating a more sustainable shipping industry, reduced environmental impacts and improved safety and efficiency[1]. In the first MONALISA project, the first concept development for route exchange and route optimisation has been carried out and in MONALISA 2.0 a definition phase of Sea Traffic Management was completed with very positive results. The STM vision and strategic objectives have been defined within MONALISA 2.0, jointly with a complete system of Key Performance Indicators oriented to measure the progressive STM implementation within the maritime industry. A Common Technical Protocol for route exchange has also been elaborated within MONALISA 2.0 and is now an international standard. This is an important achievement and a pre-requisite for further development and deployment of Sea Traffic Management.

In the STM Validation Project, the theoretical definition work carried out in MONALISA 2.0 will be taken into practice by establishing large-scale test beds for Sea Traffic Management in the Nordic region and in the Mediterranean Sea. In these test beds, Voyage Management, Flow Management and Port Collaborative Decision Making (Port CDM) will be tested and validated in practice. An infrastructure for the information exchange in the test beds will also be set up. The Maritime Cloud, which is developed within the EfficienSea 2 project, is foreseen to be an important component in that infrastructure.

The project will also refine and develop the existing analyses on the effects on charter parties, legal and liability aspects, operational aspects such as usability and cyber security, as well as provide a cost benefit analysis with compelling business cases for affected parties.

For more information about STM Validation Project, see Annex 3

STM Validation Project – project facts summary
Project consortium: 38 partners from 13 European countries
Lead Partner: Swedish Maritime Administration
Timeframe: 48 months (January 2015 - December 2018)
Total project budget: 43.0 M EUR
Total EU funding: 21.5 M EUR

[1] www.monalisaproject.eu

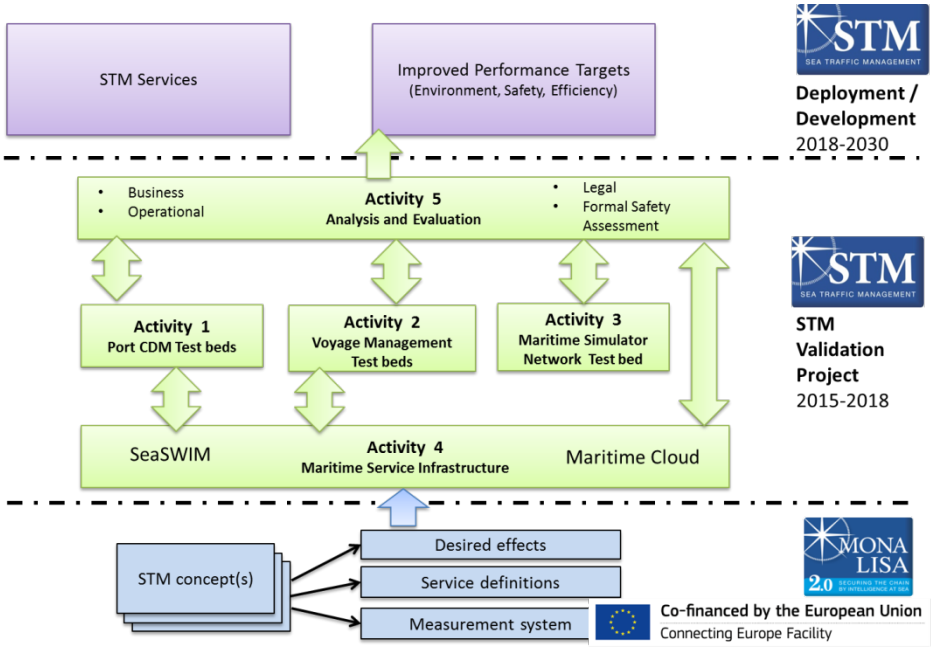

Figure 1 Project set up – STM Validation Project

3 Analysis of the links and synergies between EfficienSea 2 and STM Validation Project

As stated above, there are clear dependences and synergies between the EfficienSea 2 and STM Validation projects.

3.1 Maritime Cloud in the Maritime Service Infrastructure

One great dependency between the two projects lies within the communication framework called the Maritime Cloud, which is currently under development within EfficienSea 2 and which will be used by both projects. In the STM Validation Project, Maritime Cloud is intended to be one component of the Maritime Service Infrastructure that will facilitate the exchange of information in the Sea Traffic Management test beds. Maritime Cloud is not developed in the STM Validation Project. In order to have a fully operational Maritime Service Infrastructure for efficient, secure and reliable exchange of information, the basic infrastructure of Maritime Cloud will be complemented by SeaSWIM, an architecture concept adapted from the aviation domain and is not as such an architecture solution competing with the Maritime Cloud. SeaSWIM will use The Maritime Cloud as a connector for the information transfer to be used in the STM Validation Project. The STM Validation Project is one important user of Maritime Cloud and sets its requirements to the Maritime Cloud architecture.

There are a number of partners working in the EfficienSea 2 project Work Package 3 with Maritime Cloud development and in the STM Validation Project Activity 4 with establishing the Maritime Service Infrastructure. This will ensure that no overlapping work is carried out, but will instead enable the two projects to bring out the synergies.

STM activity 4 is led by OFFIS/University of Oldenburg who is also partners in EfficienSea2 WP 3 (Maritime Cloud). Other partners involved in both these activities are: Swedish Maritime Administration, Danish Maritime Authority, Frequentis and Transas.

3.2 Port information

One of the main objectives of Sea Traffic Management (activity 1) is to optimize precision in the ships arrival time to the ports by connecting all actors involved in a port call to achieve a timewise synchronized operation. The benefits are amongst others improved efficiency and decreased environmental effects. The PortCDM sub-concept of Sea Traffic Management is inspired by AirportCDM, developed and deployed with very positive effects in the aviation sector.

EfficienSea 2's scope in relation to the port call is to facilitate the information exchange between ship and port in a digital world. The tasks of EfficienSea 2 (Work package 5) on port information are more linked with the EU Single Window approach and the EU reporting formalities directive 2010765/EU as well as the AVANTI project on online availability of static port information, coordinated by the International Harbour Masters´ Association.

These two tasks are not directly linked and there is no overlapping between the work done in the two projects. The leads of **STM activity 1** - Victoria Swedish ICT and **EfficienSea WP5** - BIMCO - are collaborating on establishing standardized event definitions for port calls, which are relevant to both projects. BIMCO is a partner in EfficienSea2 and associated partner of the STM Validation Project.

3.3 Route exchange and route optimisation

Enabling hassle-free route exchange has been a task in several EU projects (MONALISA, ACCSEAS, EfficienSea and MONALISA 2.0). Route exchange is a facilitator for providing different services within the area of e-Navigation and Sea Traffic Management and will at the same time improve situational awareness and improve maritime safety. In the STM Validation Project, route exchange will be part of the test beds of Sea Traffic Management. It will be tested by 300 ships and several shore based stations and in the PortCDM test beds. In EfficienSea 2, the route exchange format, defined in the MONALISA 2.0 project and approved by the International Electrotechnical Committee, will be used by the Finnish Transport Agency in their ENSI system for route exchange. The lead of these tasks in both the STM Validation Project (Activity 2) and EfficienSea 2 (WP 6) is the Swedish Maritime Administration, which ensures that no overlapping work will be carried out, instead interfaces and data formats applied will be harmonized.

The joint aim of the two projects is to establish vendor independent common interface standards that enable a marketplace, where a multitude of providers of optimization services can innovate their solutions for different purposes or geographical regions, while being interoperable with standardized equipment onboard ships.

Common partners: SSPA, Finnish Transport Agency, SMA, Transas, Furuno.

3.4 Winter navigation

A firm cooperation between the projects on winter navigation has been initiated by their shared involvement in the Swedish R&D project MICE (MONALISA ICE). In EfficienSea 2, the MICE concepts and results will be integrated with the Arctic and Baltic web, common web-based information

platforms developed by the Danish Maritime Authority. By sharing and showing routes, safer passages can be planned, for example by minimising distances to nearby vessels which could assist in case of emergency. By using some vessels as “base stations” for AIS, more accurate data will be displayed.

In STM, winter navigation will be one application of Sea Traffic Management that will be included in the Voyage Management test bed in the Baltic Sea. It will allow Swedish and Finnish icebreakers to share route directions to ships electronically system to system, thereby reducing manual work and increase efficiency in the planning process.

There are no overlapping development activities carried out in the two projects in the area of winter navigation. There will be an opportunity for EfficienSea 2 to make use of the MICE test beds, with its 15 ships including two icebreakers.

Common partners in these tasks are: SMA, DMA, Chalmers, Finnish Transport Agency, Transas, Furuno

3.5 VDES

Within the EfficienSea 2 project, Thrane & Thrane is investigating and developing the VHF Data Exchange System (VDES) in order to assess its potential as the new and efficient way to communicate. They will simulate and set up prototypes of radio equipment for evaluating the different on-air alternatives.
Since a couple of years, SAAB has been deeply involved in the development of VDES and presented its results in international conferences. Within the STM Validation Project, the VDES prototype developed by SAAB will be tested for the capability of transferring routes based on the standardized route exchange format established in the MONALISA 2.0 project on a number of ships in the Voyage Management test beds.

3.6 Development of different e-Navigation services and solutions

Within the EfficienSea 2 project, a large number of e-navigation services and solutions will be developed and tested in lab environment and in small scale by using the Maritime Cloud as discovery and authentication infrastructure and the Arctic Web and Baltic Web as presentation platforms. A primary goal is to develop good practice guidelines on how to develop interoperable services, based on a variety of different scenarios.

Examples of Services and Solutions are:

- Maritime Safety Information and Notices to Mariners;
- METOC information;
- Sea charts in the e-navigation era;
- Smart buoy service, Ice chart service;
- Emission monitoring solution;
- Single reporting in Ship Reporting System;
- Self-organising emergency response and decision support for ice navigation;
- Human factors in integration of the e-navigation services developed within the EfficienSea 2 project; and

- Advancement of METOC data for improving maritime safety.

In the STM Validation Project, such kind of services will not be developed. Instead, the objective of the STM Validation Project is to validate the Sea Traffic Management concept, defined in the MONALISA 2.0 project through large scale test beds in the Nordic Region and in the Mediterranean Sea, using 300 ships, 5 shore centres and 13 ports.

No overlapping between the projects is foreseen, however, the STM testbeds offers the opportunity for EfficienSea 2 to test the different services and solutions developed.

4 External project collaboration on technical level

The EfficienSea 2 project, Work Package 1, has an explicit task (1.2) under the leadership of IALA aimed at mapping and seeking liaison with external projects and initiatives.

In order to avoid development of any competing initiatives and solutions in regard to the digital infrastructure functions targeted by the Maritime Cloud concept, a technical collaboration forum between concrete projects has been established. This forum, the Maritime Cloud Developer Forum, or MCDF, has so far gathered key IT architects and standardization experts from the STM validation Activity 4, EfficienSea 2 Work Package 3 and as well as similar initiatives in South Korea. The intention is to expand collaboration with other concrete projects, as long as the forum participants agree that this does not jeopardize the aims and progress of the individual projects. The forum currently has three technical working groups harmonizing the efforts on

- Identity Management and Authentication functions
- Service registration and discoverability
- Seamless maritime communication

When the MCDF has matured the projects envisage to seek funding through a COST action in order to further open the forum including standardisation bodies and other interested parties.

5 High level collaboration

In order to align and secure a harmonized progression of project development cooperation on a higher level has also been organised. Both projects have means to gather the project partners. In EfficienSea2 this group is called *General Assembly* while in STM is called *High Level Steering Group*. The partners that are represented in both of these groups are:

- Chalmers University of Technology
- Danish Maritime Authority
- Finnish Transport Agency
- Frequentis
- Furuno
- OFFICE/University of Oldenburg
- SSPA
- Swedish Maritime Administration
- Transas

Swedish Maritime Administration as Lead Partner in the STM Validation Project has representation in EfficienSea2 through the High Level User Group (Ulf Siwe, STM communicator) and in the Executive board (Magnus Sundström, STM strategic project leader). Furthermore, the Swedish Maritime Administration is WP lead in EfficienSea 2 WP6, Advanced Solutions in the Arctic and Baltic Sea Region.

Danish Maritime Authority, being Lead Partner of the EfficienSea 2 project is represented in the High-Level Steering Group of the STM project and also involved with the task to provide the results from the development of Maritime Cloud in EfficienSea 2 project to the Maritime Service Infrastructure, set up in the STM Validation Project.

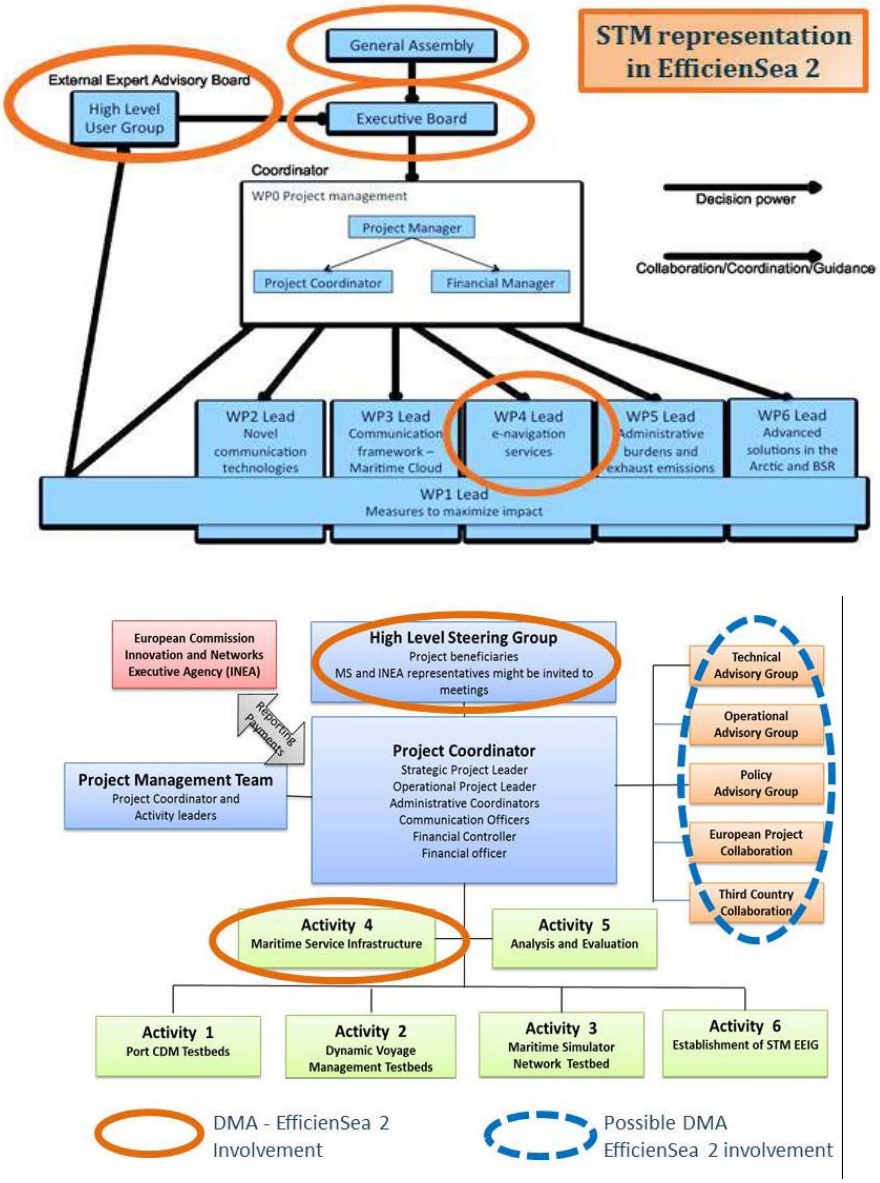

Figure 2 Organigrams of the two consortia.
Involvement of respective coordinators in each project is highlighted.

Apart from the collaboration highlighted in the two organigrams, cooperation is found in the previously described MCDF. The partners represented in the MCDF are: Offis (STM and E2), Frequentis (STM and E2), DMA (STM and E2), Victoria ICT (STM), KRISO (Korea), ETRI (Korea).

6 Conclusion

Both the EfficienSea 2 and STM Validation Project operates in the area of e-Navigation and e-Maritime. This does not automatically mean that they do overlapping tasks.

There are no overlapping activities in the EfficienSea 2 and STM Validation Projects. Instead, we see significant synergies between the projects, as infrastructure and services developed in the EfficienSea 2 project, for example the authentication infrastructure of the Maritime Cloud will be used in the STM Validation Project, and experience from the validation of STM services will feed back into the design guidelines developed by the EfficienSea 2 project.

EfficienSea 2 typically reaches a lower technological readiness level where prototypes are tested on a limited scale in an operational environment. It develops both the Maritime Cloud, Arctic Web and Baltic Web, together with a large number of different solutions that are foreseen to improve the maritime transport system.

STM Validation Project validates in large scale the Sea Traffic Management concept that has been defined in MONALISA 2.0.

The projects don´t have funding or resources to make overlapping work, but work very closely together to ensure that the objectives of the two projects are reached. The two coordinators of the two projects – Danish Maritime Authority and Swedish Maritime Administration have a longstanding cooperation and will continue to work closely together for the sake of efficiency, maritime safety and environment.

Annex 1. Budgets and activities for partners in both EfficienSea 2 and STM Validation Project

Project	EfficienSea 2		STM Validation Project	
Partner	**Tasks**	**Budget €**	**Tasks**	**Budget €**
Chalmers University of Technology	WP1 WP6 Mainly implementing the Human Centred Design concept	150.000 350.000	Activity 2 Activity 3 Activity 3 Lead - coordinating & manage the planning, preparation and running of simulator test campaigns Activity Lead of Activity 3 – European Maritime Simulator Network	30.000 720.000
Danish Maritime Authority	WP1 WP2 WP3 WP4 WP5 WP6 WP7	350.000 15.000 320.000 300.000 55.000 170.000 330.000	Activity 4 Integration of Maritime Cloud in the Maritime Service Infrastructure	600.000
Finnish Transport Agency	WP3 WP4 WP6	5.000 5.000 90.000	Activity 1 Activity 2 Activity 4 The main task of Finnish Transport Agency (FTA) is to coordinate the application of STM for Winter Navigation in the Nordic test bed. FTA is also attending work of Port CDM and Maritime Service Infrastructure	7.000 960.000 25.000
Frequentis	WP3	430.000	Activity 4 Participating in the establishment of the Maritime Service Infrastructure	280.000
Furuno	WP2 WP4 WP6	340.000 340.000 30.000	Activity 2 Developing prototypes for testing in the Voyage Management test beds. Participating in the standardisation work for STM-related equipment	100.000
OFFIS / University of	WP1 WP2	60.000 60.000	Activity 4	120.000

Oldenburg	WP3	180.000	Lead partner of contributor to the establishment of the Maritime Service Infrastructure	
SSPA	WP4 WP6	100.000 200.000	Activity 2 Activity 3 Activity 5 Providing route optimisation services for the Voyage Management test beds. Participation in a small extent in the EMSN. Providing competences for the evaluation and analysis of STM	310.000 50.000 575.000
Swedish Maritime Administration	WP3 WP4 WP6 Contributing to the development of Maritime Cloud. Participating in the work of Maritime Safety Information. Lead of WP6 and contributing to Single Reporting between Sound VTS and GOFREP	25.000 50.000 500.000	Activity 1 Activity 2 Activity 3 Activity 4 Activity 5 Activity 6 Lead partner of the project. Lead partner of Voyage Management test beds Participating actively in all the Activities of the project	800.000 2.500.000 770.000 350.000 800.000 2.600.000
Transas	WP2 WP3 WP4 WP6	110.000 50.000 120.000 150.000	Activity 1 Activity 2 Activity 3 Activity 4 Contributing to the Port CDM test bed. Developing prototypes for testing in the Voyage Management test beds. Participating in the standardisation work for STM-related equipment Initiator and partner of the EMSN. Contributing to the establishment of the Maritime Service Infrastructure	500.000 770.000 200.000 50.000

Annex 2. EfficienSea 2 - Summary of Activities

WP1. Measures to Maximise Impact

The objective of WP1 is to keep the project's focus on the desired impact. The WP will be responsible for the dissemination, exploitation and communication plan. This includes strategic planning of standardization, fostering liaison with other projects and securing adoption of solutions in the maritime community. The WP will also be responsible for the project innovation strategy and innovation process. It will support the technical work in the other WPs, while constantly keeping focus on the user need, securing that suitable innovation methods are used throughout the project.

Task 1.1 Communication

Communication activities will be closely linked to dissemination. As much communication as possible should be dialog based to promote understanding and feedback from the audiences.

Task 1.2 Liaison and coordination with other projects and test beds

- Identifying and initiating liaison with related European projects
- Initiating liaison with relevant European institutions, such as EMSA
- Mapping and keeping track of other ongoing initiatives that could be of relevance to coordination and harmonization

(to be updated internally at regular intervals)

- Organising and executing workshops and other coordination activities
- Integration strategy with other projects and test beds regionally and globally.

Task 1.3 Coordinating standardization of solutions

Standardization is of paramount importance for getting adoption and penetration for interoperable services and equipment. It thus plays a vital role in the project. The work with the relevant standardization organisations on the individual standards is primarily performed in the other individual work packages. WP 1 is responsible for overview and coordination. This is of paramount importance because of interdependencies of the standards. E.g. for one service to function, standards may be needed for data structures, portrayal and operational scope, as well as communication and equipment.

Task 1.4 Governance and future perspectives of solutions

This task will work with strategic/political, legal and financial issues in bringing concepts and demonstrations to market – e.g. governance and business model for Maritime Cloud (feasibility studies). The work will be done in collaboration with relevant WPs and involve the maritime community e.g. through workshops. Both sceptical and supportive actors will be invited to discuss the issues.

Task 1.5 Ensuring inputs from High Level User Group

EfficienSea 2 has established a High Level User Group (HLUG) consisting of specific maritime stakeholders such as shipowners, pilots, ports, agents or their respective organisations. This group

will be expanded dynamically during the project and will be invited regularly to comment on the results of or participate in project activities related to concept development, user- and field testing, evaluation, legal and governance aspects and needs for training. One project partner, the MDCE, has been specifically tasked to liaise with this group.

Task 1.6 Ensuring the proper methodology is used for identifying and solving user needs
This task will be responsible for ensuring that the proper methodology is used for identifying and solving user needs. IMO's Human Element Vision, Principles and Goals, Res. A.947(23), draft guidelines on human-centred design and Test Beds will be used as reference. The task will harmonise human element and usability aspects across the project, especially the services related to WP4, WP5 and WP6.

Task 1.7 Ensuring the relevant innovation methodology is used throughout the project
This task will be responsible for the innovation strategy and innovation process

WP2. Novel Communication technologies

Information services for ships related to safety or administrative routines are limited by availability, cost and ease of communication. The carriage requirement for GMDSS (Global Maritime Distress and Safety System) is primarily based on voice communication and broadcast or point-to-point telex services. Internet connectivity at sea is only fitted voluntarily, based on expensive satellite links, providing limited bandwidths. This work package will develop innovative and cost-effective solutions based on novel communication technology to address the challenge of getting robust information exchange to and from ships, including node to node communication. The technologies will improve the availability and robustness of communication, especially in remote places like the Arctic.

Task 2.1 VDES (VHF Data Exchange System)
This task will provide momentum into the introduction of a globally interoperable and potentially cost free ship-to-ship and ship-to-shore digital communication link based on VDES, a novel system related to the existing AIS system, for which the frequency allocations are available for testing, and expected to be confirmed by the World Radio Conference 2015.

Task 2.2 Evaluation of communication technologies
The characteristics of available and emerging communication technologies, such as quality of service, bandwidth, availability, robustness or vulnerability, will be considered for technologies such as AIS, INMARSAT, Iridium, Argos, V-Sat, VDES, NAVDAT and the Galileo return link or other relevant systems. These characteristics will be compared with the requirements of services developed in other work packages of this project. In order to promote the competitive availability of satellite communication services, and thus lower costs, special attention will be paid to the evaluation of the Iridium satellite service, currently seeking introduction into the GMDSS.

Task 2.3 Robust & seamless roaming
With radio communication systems integrated into a network, it will be possible to route information and data through the most feasible or lowest cost external communication channel. Based on a study of existing and new solutions and requirements, strategies will be developed for hybrid solutions for

compression, queuing and channel selection based on availability, cost, restrictions in bandwidth and other technical parameters, but also content priority.

Task 2.4 Shipboard system integration, onboard networks

This task will address the shipboard systems integration, in terms of cyber security, onboard network integration and firewalling, as well as the integration of systems with the shipboard component of the Maritime Cloud concept, in liaison with Work Package 3.

WP3. Maritime Cloud

Based on a consolidation of user requirements, to develop, standardize and implement an innovative and ground breaking communication and service provision framework (the Maritime Cloud) that will connect all maritime stakeholders and users with maritime information services of all kinds. This novel framework will enable interoperability between existing and future communication and information systems. The framework will enhance information sharing in and around the maritime sector for smarter traffic management and facilitate a comprehensive e-maritime and e-navigation environment, enabling a maritime internet of things. A regional instance of the Maritime Cloud will be operated to support demonstration and first generation integrated provision of e-navigation and e-maritime services in the BSR and arctic regions.

Task 3.1 Requirement, analysis and conceptual model

This task will gather inputs from work packages 4, 5 and 6 as well as the maritime community via IALA's enavigation committee and CIRM on requirements relevant to the design of the Maritime Cloud, and related requirements (bandwidth, latency, QoS, etc.) for communication links supporting ship-to-shore interaction, for provision of maritime information services. These requirements will be analysed and consolidated into a manageable set of core user requirements for the Maritime Cloud. Liaison with WP 2 will provide iterations of defining which requirements are relevant for communication links to support different categories or variants of maritime services.

Task 3.2 Service specification

The concept of a service is central to the Maritime Cloud. With a strong focus on interoperability and seamless service roaming, this task will develop a standard for making service specifications that will support all services using the Maritime Cloud as an entry point. A service specification includes: Data modelling, protocols and user functionality description. Data modelling will be done according to the IHO S-100 standard. For other aspects of a service specification, standardized methods like UML will be considered. Furthermore, it is envisioned that parts of a service specification can be defined in a machine-readable format called the Maritime Service Definition Language (MSDL). This will allow automatic generation of source code and automatic testing.

Task 3.3 Technical specification

Based on the requirements identified in task 3.1, the conceptual model in task 3.2, this task concentrates on the development of the technical architecture for the Maritime Could. The Maritime Cloud will be based on a service oriented architecture (SOA) that will provide an easy-to-use method to publish, provide and use e-maritime and e-navigation services. Since these services can be routine information services as well as safety critical services, the Maritime Cloud is a safety critical system

itself. To consider this aspect, we will investigate concepts like contract based design and requirement traceability. Furthermore, the Maritime Cloud is also a cyber-physical system since, via this platform, numerous systems are connected to each other and to the internet, continuously interacting with their environment. Therefore, we will also investigate architectural principles of cyber-physical systems for the development. We will investigate the re-use of established technologies and platforms with respect to extensibility, maintainability and flexibility like dependency injection and OSGi concepts. This will facilitate adding new services and systems into the Maritime Cloud.

Task 3.4 Implementation

Using a state of the art and agile software development approach, this task will, in parallel and tight collaboration with task 3.3 and other WPs, implement the identified modules and interfaces that constitute the Maritime Cloud. A cooperative open source software development environment will be set up by the DMA, including:

• Source code repository with version control for collaborative development.
• A Continuous Integration (CI) environment to prevent integration problems and automate testing and staged deployment.
• A project management tool for planning and organizing the software development process.
• Coding conventions and automated tools to check compliance.
• A team collaboration platform for documentation and discussions.

Task 3.5 Deployment and testing

This task focuses on deployment and testing of the Maritime Cloud in its later environment. The Maritime Cloud will be deployed in a testbed in the Baltic Sea and in the e-maritime Integrated Reference Platform (eMIR – testbed at the German coast). Services will be installed using the same approach as will be used by end users later on. Afterwards, a test campaign will be conducted. This will include testing the look-up of services in a registry, authentication of end users and the seamless switching of services while sailing in different regions. Having installed the first version of the Maritime Cloud midterm of the project, it will be incrementally enhanced and improved in the second half of the project. Technical tests in simulated and real-life environments will be conducted as a proof of concept of the developed solutions. For the aspects of the Maritime Cloud with direct user interaction, user functionality tests with focus on human factors and usability will be conducted.

WP4. E-navigation services

Develop a range of e-navigation services and deploy a subset of these at least on web-based platforms, aiming for global standardisation of the services, based on S100 data models to the extent possible. Enable delivery of services on regional web-based platforms and in prototypes of commercial navigational systems.

Task 4.1 – Establishing an operational framework for service provision

A major goal of the project is to establish a number of operational services on web-based platforms and, to some extent, through commercial navigational systems to a large number of users in two different geographical areas (the Arctic & Baltic). In order to accomplish this, there are various operational aspects that need to be in place, which is the focus of this activity.

Task 4.2 – MSI and NM (T&P) service

Based on the outcome of previous projects (ACCSEAS), a S100 product specification will be validated and promoted. Procedures for service provision will be drafted, and authorities and service providers will cooperate to develop an open source reference implementation of a single window system for registering MSI and NM (T&P) that can be customized to fit organizational procedures and workflow, and implemented by relevant MSI and NM providers. This will allow for reuse of information as an event may evolve into first a current navigational warning, later into a longer term highly quality assured NM and potentially further move toward a longer term chart/publication correction. The reference implementation will enable early operational service provision. User presentation standards will be drafted, user evaluated and promoted, and commercial product manufacturers will implement presentation of the service in upgrades of relevant display systems. Operational service provision will be available in the web-based platforms (ArcticWeb and BalticWeb) and commercial systems. This will achieve a reference implementation of 'MSP 5' as defined in the IMO e-navigation strategy implementation plan.

Task 4.3 – METOC service

This service will be made available on the web-based platform (ArcticWeb and BalticWeb) and tested on prototypes of commercial systems. The METOC (Meteorological and Oceanographic) service will be evolved in versions. New versions with improved quality, derived from research activities in WP6, will be implemented in operation for upgraded versions. For the Baltic Sea, an ensemble prediction approach will be used to generate forecast products of improved quality and to estimate the forecast uncertainties. For the Arctic region, new forecasts of ice and waves from the DMI operational forecasting system will be used; the iceberg data (both individual and statistics) derived from synthetic aperture radar will be included. In METOC Version 0, forecasts of wind, air/sea temp, currents and ice in the Arctic will be provided; for the Baltic, wind, sea level, visibility, waves, air/sea temperature and ice forecast will be provided.

Task 4.4 – Sea charts in the e-navigation era

The service will deliver charts in selected areas in which S101 data will be generated. Data will be made available on EPD and commercial prototypes. A prototype service for delivering sea charts and updates will be developed. The service will build on the generic service framework delivered by WP3 and will be based on S101. The task will cover Associated with document Ref. Ares(2015)1348781 - 27/03/2015 generation of trial S101 data, possibly converted from existing S57 data, the development of a prototype service for delivering the data, and rendering of the information in both the EPD and prototypes of commercial systems.

Task 4.5 Smart buoy service

In this task an experimental service for interaction with smart buoys will be developed, based on the framework delivered by WP3. An outline data model based on S100 for buoy data will be made. Information exchange will both cover access to sensor data (meteorological and hydrological) from buoys to end users such as navigators, but also information to AtoN management in order to monitor and control buoy parameters such as light intensity/power consumption remotely.

Task 4.6 – Route optimisation services, including arctic challenges
This task will develop a prototype service for route optimisation based on the framework developed in WP3. The service will use the IEC adopted route format and take its outset in concepts and methods from the MONALISA projects. The prototype service will be made available on EPD and prototype commercial systems. A proposed standard will be developed and multiple providers (SSPA, FORCE, GateHouse) will provide route optimization using the same service interface. The service will build on other services developed in the project, such as METOC, ice charts and route exchange.

Task 4.7 – Ice chart service
An ice chart service will be provided in the Arctic and BSR. The service will be delivered on a web platform (ArcticWeb and BalticWeb) and prototype commercial systems. The ice chart service will be an operational service, and will evolve in versions. New features derived from research activities in WP6 will be implemented in operation for upgraded versions.

WP5. Administrative burdens and exhaust emissions

This work package will deliver new solutions to two important challenges: Administrative burdens and exhaust emissions: A. The WP will develop, test and, where possible, implement administrative e-maritime solu-tions for automated reporting to ports and for transferring port information from the port to the ship and other maritime stakeholders. B. This WP will develop solutions for monitoring emissions with focus on SOx and conduct validation trials in the Baltic Sea Region.

Task 5.1 – Automated port reporting
Based on the requirement to provide reports prior to port entry, the various reporting parameters need to be defined, analysed and a data model needs to be developed, based on the work on IMO FAL forms. This data model will be based on S-100 concepts. An S-100 type product specification will be developed to provide a standard definition of how the information should be structured. The necessary features will be registered in the IHO feature concept dictionary. Objectives: Development of a prototype application of an automated port reporting system – easing the mariners' administrative burdens in regards to reporting when entering ports.

Task 5.2 – Efficient port information/port information in a digital world
EfficienSea 2 will develop vital changes to today's way of gathering port safety and port logistics and access information by establishing an easily accessible service based on the Maritime Cloud platform. This will help the shipping industry to remain competitive compared to other modes of transport. The solution will be evolved to fit into an e-maritime concept based on an electronic world of updates and information exchange. The various reporting parameters need to be defined and analysed as part of the project.

Task 5.3 – Emission monitoring solution
This task will work with new emission monitoring concepts to be used by both shipowners and authorities. The starting case will be SOx emissions in the Baltic Sea Region and the initial thinking is to combine onboard sensor data with external sensor data in order to validate models and strategies for compliance monitoring. The project will evaluate possible incentive structures that could

counteract the economic incentive of non-compliance due to the lower cost of undesirable fuels. A new effective solution will help level the competitive playing field of shipping companies.

WP6. Advanced e-navigation solutions in the Arctic and Baltic Sea Region

Objective of WP6: further mature advanced e-navigation services in the following areas:
- Reporting
- Route exchange
- Safety of navigation in the Arctic

Ensure the human factor in the development and integration of services.

Task 6.1 – Route exchange, reporting and negotiation

In this task, development will be made on services capable of handling and exchanging information with regard to vessels' routes and voyage plans in line with HELCOM Recommendation 34E/2. The task will build on the framework for MSP developed in WP3. The task will develop a basic route handling/exchange functionality which will be used both to develop more advanced solutions in this task and in other tasks that need a basic route handling/exchange functionality such as 'route optimisation' and 'decision support for ice navigation'.

Task 6.2 – VTS and SRS reporting

This task will develop services for reporting to VTS centres and SRS, in coordination with WP5, task 5.1. The service will build on the framework from WP3 and will take elements from the MONALISA projects and the existing ENSI system to achieve this task. It will be possible to submit the necessary reporting information to the BalticWeb platform, and the aim is that this only needs to be done once for the entire BSR. The information will then be made available to all necessary authorities, either through the appropriate national single window system, SafeSeaNet or directly based on the Maritime Cloud.

Task 6.3 – Self-organising emergency response and decision support for ice navigation

This task will advance different services with the aim of improving maritime safety in the Arctic. The current ArcticWeb will be used as the baseline. It will be expanded functionally and geographically through the course of the project. The main target will be to develop means for self-organising emergency response capabilities. This functionality will build on several elements including the route exchange capabilities developed in task 6.1, results from the MICE project and the VOCT (Vessel Operations Coordination Tool) prototype developed in the ACCSEAS project.

Task 6.4 Human factors in integration of e-navigation services

The human element will be taken into account in all project tasks involved in developing services for the end-user. This task will focus on the human element of using an integrated system in which all services are available where and when they are needed, whether for tactical or strategic decision-making, for navigation, administration or communication between control centres on board. In addition to the study report, this task will give feedback to service developing tasks in order to allow them to take the findings into consideration when further developing the services. The Maritime Cloud framework aims to provide seamless and efficient flow of information between ship and shore; however, the risk of information overload or miscommunication on board remains. By taking a socio-

technical perspective and trying to support the human as an integral part of the ship-shore system, this sub-task would aim to take a holistic view on the information flow and the e-navigation services to be developed within the project, both the novel services in preceding WPs and the advanced solutions in WP6.

Task 6.5 – Advancement of METOC data for improving maritime safety

This task has two main goals of specific relevance to the arctic region. The first element is to work with the continuous improvement of the models for forecasting ice conditions. This in turn means improvements to the models of those parameters that effect the ice movements, like current and waves. The improved models developed in this task will be continuously deployed and thereby improve the accuracy of the METOC service in T4.2 and those services relying on the METOC service like the route optimisation task in 4.6.

WP7 Project Management

Objectives

- To ensure the sound, responsible and effective daily management of the project via capable project management and management support
- To ensure that the tasks assigned to it in the grant agreement as well as in the consortium agreement are performed
- To ensure high quality of the project work and project results
- To ensure efficient legal, contractual and financial management of the project
- To ensure effective monitoring of the WP's work and progress
- To ensure the full participation of all beneficiaries and effective and constructive conflict management

Annex 3. STM validation project, summary of activities

Activity 1: Port CDM Testbed

The main objective of this activity is to increase the efficiency and accuracy of port calls and to enable increased performance for the involved actors. The overall goal is to provide approaching vessels with accurate estimations of when it is desired that the vessel arrive to the traffic area and consequently arrive at, and later on departure from, berth. By sharing information about estimates of different states and actual state changes, Port CDM aims at improving the efficiency and sustainability in the maritime transport chain. In MONALISA 2.0, a small-scale first version of a Port CDM demonstrator was carried out in Port of Gothenburg and Port of Valencia. In the STM Validation Project, a number of 12 ports will participate in the Port CDM test bed and the amount of services will be increased in comparison with MONALISA 2.0.

The ambition with this validation effort of the Action is also to take first steps towards the establishment of Port CDM Council at European level. The Port CDM tests beds will be arranged in four Sub-activities.

Sub-activity 1.1 Establishment and maintenance of developers' zone
The scope of this Sub-activity is to enable a virtual arena for Port CDM service developers to share codes, specifications, standards and/or methods and experiences from local adaptations. The developers' zone thereby becomes an important asset for the efficient introduction of Port CDM in various ports.

Sub-activity 1.2. Demonstration of the Port CDM concept
The scope of this Sub-activity is to demonstrate the effects of Port CDM services in a larger number of ports within EU: the ports of Valencia, Barcelona, Civitavecchia, Genova, Napoli, Venice, Limassol, Gothenburg and Kvarken will take part in the test bed, together with three ports in the neighbouring country Norway. The demonstration is based on the development of processes, collaboration and information, exchange services before, during and after port calls, as basis for the evaluation of the Port CDM concept.

Sub-activity 1.3. Refinement of the Port CDM concept
The scope of this Sub-activity is to continuously develop the port CDM concept with adjacent services based on the experience made by the port CDM demonstrations in the Baltic Sea and Mediterranean Sea developed within Sub-activity 1.2.

Sub-activity 1.4. Collaboration for definition and sharing of Port CDM commonalities
The aim of this Sub-activity is to establish a European Port CDM Council that will have the role of dealing with common issues like common measurement system definition, identification and dissemination of best practices, Port CDM Service portfolio management and establishment of a wiki for sharing of processes, solutions and experiences for efficient port calls. The Port CDM Council will initially be set up by the ports taking part in the Activity, but the purpose is that the Port CDM Council will be open for all ports to join. Additional ports and relevant associations will thus be invited to the Council during the lifetime of the Action. The Council will meet on a regular basis.

Activity 2: Voyage Management Testbed

The objective of this Activity is to validate and operationalise STM services and stimulate system manufacturers to develop STM functionality in prototype systems such as onboard navigation systems. Another aim is to provide data for evaluating the effects on the maritime transportation system as a whole as well as benefits and costs for shipping companies when utilising STM services. STM services in the test beds encompasses single reporting area with enhanced information sharing between Shore Centres, route exchange, route validation and route optimisation for just-in-time arrival and enhanced environmental performance, enhanced monitoring and shore based Deep Sea Assistance as well as e-Certificates.

The demonstration of STM services carried out in the Action is of a much larger scale (i.e. testing on 300 vessels) compared with the MONALISA project where route exchange was tested on two vessels. In the STM Validation Project the test beds will also include more services and STM functionalities (i.e. STM for Search and Rescue and for Winter Navigation). Activity 2 is divided into 6 Sub-activities.

Sub-activity 2.1 Prototypes and STM functional standards
The purpose of this Sub-activity is to produce functional specifications setting minimum requirements for onboard and shore-based systems as well as for services and optimisation tools which engage in Voyage Management and Flow Management. Providers of maritime navigation systems will develop interoperable software prototypes of either ECDIS (Electronic Chart and Display Information System) systems or planning stations, which support route exchange and other information exchange as defined by the STM concept in MONALISA 2.0. The different STM services and tools will be operationally integrated in the test beds via the Maritime Service Infrastructure (Act. 4). VDES (VHF Data Exchange System) will be used as communication infrastructure onboard some vessels in the Nordic test bed for demonstration purposes.

Sub-activity 2.2 Refinement of Prototypes and STM functional standards
The purpose of this Sub-activity is to identify shortcomings and propose improvements of the Prototypes and STM functional standards so that needs identified during the test bed are met and progress of the service development is not hampered. This Sub-activity will continue the work conducted in Activity 2.1, but with lower intensity than in the initial development.

Sub-activity 2.3 Establishment of test beds
The purpose if this Sub-activity it to set up the test beds needed by carrying out a public procurement of STM compliant prototypes for on-board installations in order to validate the STM concept. The target number of merchant ships that will be engaged in the two geographical areas (the Mediterranean and the Nordic) is 300 ships. Different types of ships (e.g. passengers, roro, container, bulk, tanker), carrying navigational equipment from different manufacturers that operates in the geographical areas of the two test beds will be included.

In addition to the merchant fleet, some Search and Rescue (SAR) vessels from the Italian Administration and the Swedish Search and Rescue (SAR) services will participate for validation of the SAR functionalities of STM.

Sub-Activity 2.4 Mediterranean test bed
The objective of the Sub-activity is to validate Voyage Management, demonstrate STM services in the Mediterranean area and to provide test data for Activity 5 – Analysis and Evaluation. The Mediterranean test bed will focus on test and validation of STM services for crossing traffic, Dynamic Voyage Management and SAR operations.

The use of the Italian Administration´s vessels will make it possible to go beyond the commercial applications of STM, allowing an increase of the level of performance in SAR operations, providing and validating the coordination and the information exchange between the shore based centers and the Administration´s vessels deployed in crisis scenarios.

Sub-activity 2.5 Nordic test bed
The objective of the Sub-activity is to validate Voyage Management, demonstrate STM services in the Nordic area and to provide test data for Activity 5 – Analysis and Evaluation.

STM services have a great potential in overcoming many of the challenges of communication between different actors in winter navigation in the Baltic Sea. Within the Sub-activity, Swedish and Finnish icebreakers, test-ships and land organisations will share routes and other operative information, leading to increasingly automated communication within winter navigation through machine-machine interfaces and with less human intervention.

Within the Nordic test bed, testing of STM for more efficient SAR operations will also be carried out.

Sub-activity 2.6: E-certificates
The objective of the Sub-activity is to define, prototype and validate, through a test bed, requirements for ship e-certification, according to the on-going discussion at the IMO (FAL Committee) of information required for the construction of e-certificates derived from National Maritime Single Windows.

Activity 3: EMSN Testbed

The objective of this Activity is to make use of the European Maritime Simulator Network (EMSN), which was established within the MONALISA 2.0 project, to test and validate advanced applications of Sea Traffic Management. These applications such as area management and traffic coordination, will be developed or enhanced under this Action as they are currently difficult to test in real life, in order to evaluate their impact of STM on overall traffic flows, taking into account both users and operating procedures. This approach makes it possible to perform large-scale testing of a future STM in certain geographical areas, hence creating a virtual sea traffic environment for conceptual studies. In such an environment, all simulated ships within a defined area are able to act under the new circumstances arising from the introduction of STM. Thereby, the full effect of introducing new services such as route exchange and traffic flow optimization can be studied holistically in a real like environment.

The EMSN will also provide a test environment where STM-compliant systems from different manufacturers can be tested and evaluated before installation on test ships in Activity 2. Usability and evaluation analyses of the observed effects of introducing advanced STM services will be performed in Activity 5 using data collected from simulation tests, forming recommendations to support a future decision making process regarding implementation of such services. Activity 3 is divided into 3 Sub-activities:

Sub-activity 3.1 EMSN coordination
The aim of this Sub-activity is to coordinate and manage the planning, preparation and running of simulator test campaigns. These tasks are based on experience gained in the MONALISA 2.0 project in how to manage a complex test environment. This includes establishing the EMSN test framework,

including test planning and scenario development.

Sub-activity 3.2 EMSN campaigns preparation and development
The aim of this Sub-activity is to prepare the simulation test campaign. Hence, this Sub-activity contains all tasks related to technical preparation, simulator network development, equipment integration, shore station development and EMSN system integration. The Sub-activity will also explore the possibility to develop support for handheld devices such as tablets, smartphones and Pilot Portable Units to greatly enhance stakeholders´ common situational awareness on a portable level which will improve performance for such services as pilotage, different port operations and emergency services.

Sub-activity 3.3 EMSN simulation tests campaign
The main aim of this Sub-activity is to conduct the simulator tests. Approximately five larger EMSN simulator tests campaigns will be conducted, simulating various part of the STM concept together with scenarios simulating the overall STM system, evaluating the potential in increasing the vessel traffic safety, environmental friendliness and efficiency. EMSN tests results are systematically collected, pre-analyzed and the evaluation methods are refined. The results are then used in analyses performed in Activity 5.

Activity 4: Maritime Service Infrastructure

Activity 4 aims at building a Maritime Service Infrastructure based on the SeaSWIM (System Wide Information Management) principles, defined in MONALISA 2.0 project, and will provide the basis for the test beds being realised in Activity 1 and Activity 2 of the Action.

The SeaSWIM infrastructure – consisting of rules, regulations, governance structures and supporting SeaSWIM management services - built and validated in Activity 4 will enable interoperability and collaboration among different actors engaged in service distribution and consumption related to the Sea Traffic Management concept.
Activity 4 is divided into 4 Sub-activities:

Sub-activity 4.1: Technically developed SeaSWIM Services to Support STM Operations
The objective of the Sub-activity is to provide the rules, regulations, management services and governance structures to enable Activity 1 and Activity 2 to develop and demonstrate SeaSWIM-enabled interoperable STM applications and services. This Sub-Activity also includes the definition and the role of a unique voyage identity necessary to facilitate communication about the voyage from planning to realisation of the sea voyage.

Sub-activity 4.2: Application and adaptation of the MCeNAV Framework for SeaSWIM STM
The objective of the Sub-activity is to enhance, deploy and maintain MCeNAV as SeaSWIM communication infrastructure – based on the specifications from Sub-activity 4.1. The SeaSWIM-enabled applications and services from Activity 1 and 2 shall be realized by applying SeaSWIM principles and the Maritime Cloud as SeaSWIM communication infrastructure. In this Sub-Activity, the Maritime Cloud for e-navigation (MCeNAV) will be enhanced and deployed to support all aspects of the SeaSWIM concept.

Sub-activity 4.3: Implementation of SeaSWIM management and governance services

The objective of this Sub-activity is to provide a trustworthy and inclusive information sharing environment supporting SeaSWIM federation/collaboration principles. In this Sub-activity, the management and governance services that have been specified in Sub-activity 4.1 will be implemented.

Sub-activity 4.4: Evaluation of SeaSWIM-specific services and communication infrastructure
The objective of this Sub-Activity is to iteratively evaluate and improve the SeaSWIM STM-specific services and the enhanced SeaSWIM communication infrastructure (MCeNAV) in the different test beds. In this Sub-activity, the MCeNAV enhancements and the SeaSWIM-specific services, specified in Sub-activity 4.1 and implemented in Sub-Activity 4.2 and 4.3, are evaluated in the test beds using applications and services developed in Activity 1 and 2. The results of these evaluations will be used to enhance the MCeNAV and SeaSWIM functionalities iteratively (three iterations in total).

Activity 5: Analysis and Evaluation

The purpose of the Analysis and Evaluation Activity is to provide a detailed analysis of data, qualitative and quantitative information as well as lessons learned with regard to long-term feasibility of the STM concept as tested and demonstrated in Activities 1-4 of the Action. This will also include the evaluation of feasibility of wider deployment of the STM concept. Activity 5 is divided into 8 Sub-activities:

Sub-activity 5.1 Collection, Organisation and Analysis of Data from the test beds
The objective of the Sub-activity is to set up a common framework for information sharing between Activity 5 and Activities 1-4. Based on it, all the processes regarding data collection, loading, filtering, and analysis and reporting generation, will be defined, produced, tested and validated.

Sub-activity 5.2 STM impact of Charter Parties and Business Models
The objective of the Sub-activity is to study the live effects of STM and to analyse these effects in relation to relevant Charter Parties and business models of involved stakeholders. Based upon identified effects, potential changes to relevant Charter Parties will be proposed and related key business drivers for involved stakeholders highlighted.

Sub-activity 5.3 Data exploitation and pre-defined/ad-hoc evaluation reporting
The aim of the Sub-activity is to capture, filter and load data and information from test beds as to be able to execute predefined and ad hoc analyses, obtaining and reporting global and specific evaluations, conclusions and recommendations.

Sub-activity 5.4 Legal and Liability Issues of STM
The objective of the Sub-activity is to study the impact of STM and to thoroughly analyse its compatibility with COLREG, UNCLOS, MARPOL and other relevant international regulations and eventually propose mitigation measures in case of incompatibility. Additionally studies and analyses of the effects of STM in relation to liability with regard to information security issues, navigational safety, and business models will be carried out.

Sub-activity 5.5 Operational Aspects of STM
The objective of this Sub-activity is to study the effects of STM on navigational safety as well as operational aspects such as port operations and usability requirements. Based upon identified effects, changes to the STM concept, covering both conceptual and technical aspects, where deemed necessary, will be proposed, as well as further development added. In this work, it is highly important

that the project is aligned with developments within IMO, IALA, EU and other projects relating to the development of e-Navigation and e-Maritime solutions.

Sub-activity 5.6 Formal Safety Assessment of the STM concept
The objective of this Sub-activity is to conduct an extended Formal Safety Assessment (FSA) in order to study the effects of STM on navigational safety, on-board administration, Flow, Strategic and Dynamic Voyage management, Port CDM, bunker, emissions, the concept of just in time, and communication costs. The FSA will encompass a Cost Benefit Analysis of the STM effects.

Sub-activity 5.7 STM Competence and Training
This Sub-activity aims to study the effects of STM on maritime operations, including safety of navigation and land operations. The study also includes an analysis of the need for competence and training of operational staff, both on-board as well as shore based systems and tools for providing professional and operational skills to staff involved in all types of traffic scenarios.

Sub-activity 5.8 Refinement of the Holistic STM Concept and Final Report
The objective of this Sub-activity is to provide a holistic perspective of the STM Validation project, including a meta-analysis on the feasibility of the STM concept on cost-benefit and envisaged future work.

Activity 6: Coordination and Communication

The objective of this activity is to coordinate, manage and communicate the Action in an efficient way.

Sub-activity 6.1 Project Coordination and management
The purpose of this Sub-activity is to coordinate the technical and financial implementation of the Action in a way so that the Action achieves its objectives and fulfils the requirement set in the Grant Agreement. The Swedish Maritime Administration as Project Coordinator shall assume overall responsibility for the coordination and management of the Action and is the organisation responsible for reporting on the technical and financial progress of the Action to the European Commission/INEA, in accordance with the requirements in the Grant Agreement. The Project Coordinator shall be the recipient of the CEF financial contribution and will distribute the funds to the project beneficiaries in accordance with the budget and actual spending. The Project Coordinator shall be the contact point for all communication with the European Commission/INEA in the project.

Sub-activity 6.2 Project Communication
The purpose of this Sub-activity is to disseminate the Action and its outcome to the relevant stakeholders in order to ensure highest possible impact. The Action will continue the extensive stakeholder dialogue that was initiated in MONALISA 2.0. There will be three Advisory Groups linked to the Action: a Technical Advisory Group, consisting of manufacturers of STM related equipment, an Operational Advisory Group consisting of different operational actors in the maritime cluster and a Policy Advisory Group consisting of policy makers at different levels. They meet regularly, depending on the needs of the project. These three advisory groups were established in MONALISA 2.0 and will be maintained and further developed in the STM Validation Project.

Korean SMART Navigation and EfficienSea2

Short introduction to the Korean SMART Navigation Project

The SMART-Navigation Project aims to:

1. Improve the quality & efficiency of maritime transport while enhancing the quality of life for mariners at sea

2. Contribute to IMO's strategic implementation of e-Navigation
   by Developing e-Navigation technologies, Verifying effectiveness of e-Navigation services

3. Create accompanied growth of world maritime community via e-Navigation
   by Reducing maritime accidents, Enhancing shipping efficiency, Maritime Domain Awareness, and Etc.

The SMART Navigation Project has a specific focus on early implementation of e-Navigation services in Korean waters, and particularly involving both SOLAS and non-SOLAS vessels.

Collaboration between E2 and SMART Navigation project

At the beginning of the E2 project, a forum was established between three projects that all would develop/use the Maritime Cloud; The E2 itself, the STM validation project and the Korean SMART Navigation project. The forum (MCDF, Maritime Cloud Development Forum) would consist of partners in the respective projects that are heavily involved with the Maritime Cloud. The MCDF consists of the following organisations:

DMA	E2, STM	Denmark
OFFIS	E2, STM	Germany
Frequentis	E2, STM	Austria
Rise	STM	Sweden
SMA	STM	Sweden
KRISO	SMART	Korea
ETRI	SMART	Korea
KR	SMART	Korea

The MCDF has five subgroups focusing on the development of different aspects of the Maritime Cloud.

1. Identity Management and security

Responsible for developing and maintaining the identity registry and API, led by DMA

2. Service specification and provision

Responsible for the service specification guideline, service registry and API, led by Frequensis

"This project has received funding from the *European Union's Horizon 2020 research and innovation programme* under grant agreement No 636329".

3. Communication and Messaging

Responsible for the development and specification of the messaging services (MMS), led by KR

4. Governance and business model

Responsible for identifying sustainable governance and business model for the Maritime Cloud, led by Offis

5. Maritime Cloud Development Team (MCDT)

Responsible for coordinating software releases and prioritising new features and bug-fixes, led by KR

The overall Maritime Cloud Development Forum meets physically 2-3 times a year and occasionally on teleconferences. The MCDT group has bi-weekly teleconferences. The other groups meet as needed.

The MCDF is also actively promoting the Maritime Cloud with external stakeholders and documents relating to the Maritime Cloud are collectively submitted by its members to different fora.

It is the intention to establish a successor to the current MCDF before the end of the E2 project, so that the activities can be sustained.

Written by Thomas Steen Christensen, Work Package 3 Leader in EfficienSea2

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