



STM Validation Project

Project Description

2015-04-07





What & Why?

Sea Traffic Management (STM) is an offshoot of the MONALISA projects and is the result of the positive response that the projects have received regarding the development of Sea Traffic Management for shipping. Dynamic and proactive route planning as developed in the MONALISA (1) project enables significant social benefits as shown in a study by Andersson and Ivehammar of Linköping University, available on www.monalisaproject.eu.

Sea Traffic Management will overcome many of the challenges of communication and information sharing between stakeholders in the maritime transport industry and create significant added value as a result in particular for ship- and cargo-owners and for shipping in the transport chain. With MONALISA (2010-EU-21109-S) and MONALISA 2.0 (2012-EU-21007-S), significant steps have been taken in bringing advancements in technology and innovation into the maritime sector for the future STM, creating a more sustainable shipping industry, reduced environmental impacts and improved safety and efficiency. Both projects have defined and tested core STM components and shown very promising results. STM Target Concept has been defined and within MONALISA 2.0, a Common Technical Protocol for route exchange has been developed and is in the phase of international standardisation. This is a huge achievement and a pre-requisite for further development and deployment of Sea Traffic Management. Europe is in lead in the development of traffic management solutions and e-Navigation globally and the potential to explore the benefits of STM and deploying STM Services is great.

The first MONALISA project, implemented in 2010-2013, showed that providing vessels with the ability to see each other's planned routes gives navigators a more complete picture of how surrounding vessels will influence their onward voyage. From this picture, shore services are able to retrieve valuable information and offer advice to vessels on their routes, such as recommendations to avoid congestion in areas with high traffic, avoidance of environmentally sensitive areas, and maritime safety information.

The MONALISA 2.0 project, currently underway with a consortium of 39 partners and a budget of 24 million euro, has defined STM, assessed the strengths and weaknesses of the current maritime ship- and transport systems, operations and interactions, and defined a target concept and key performance indicators for four STM strategic enablers:

1. **Voyage Management** services will provide support to individual ships in both the planning process and during a voyage including: route planning, route exchange, and route optimisation services.
2. **Flow Management** services will support both land organisations and ships in optimising overall traffic flow through areas of dense traffic and areas with particular navigational challenges.
3. **Port Collaborative Decision Making (Port CDM)** services will increase the efficiency of port calls and departures for all stakeholders through improved information sharing, situational awareness, optimised processes, and collaborative decision making during port calls and departures.
4. **SeaSWIM** (System Wide Information Management) will ensure interoperability of (STM) services facilitating data sharing using a common information environment and structure (e.g., the Maritime Cloud).

These strategic enablers constitute the target concept of STM, and their implementation will improve *safety, environmental sustainability, and operational efficiency* in shipping. These strategic enablers build on a number of technical enablers (route exchange, voyage ID, geo-location and Maritime Service Infrastructure).

MONALISA 2.0 has shown that performance targets within one area affect performance targets in other areas. For example, setting the right speed for reaching a destination according to an agreed ETA (estimated time of arrival) enables optimal consumption of bunker and also minimises impact on the environment. Thus, the orchestration and integration of the efforts of all actors involved in maritime transportation will be needed to achieve the goals of STM.

In addition, the project has developed and created a network of interconnected simulator centres in a number of EU countries. Inaugurated at the MONALISA 2.0 Midterm Conference in Barcelona in



November 2014 by the European Coordinator for Motorways of the Sea, Mr. Brian Simpson, this network enables testing of Sea Traffic Management and other operations, like for example Search and Rescue, as an alternative to live testing.

The MONALISA 2.0 project is now developing a strategic roadmap defining the path from the current situation to the target concept and elaborating a master plan for the further validation, development and deployment of STM (Figure 1.).

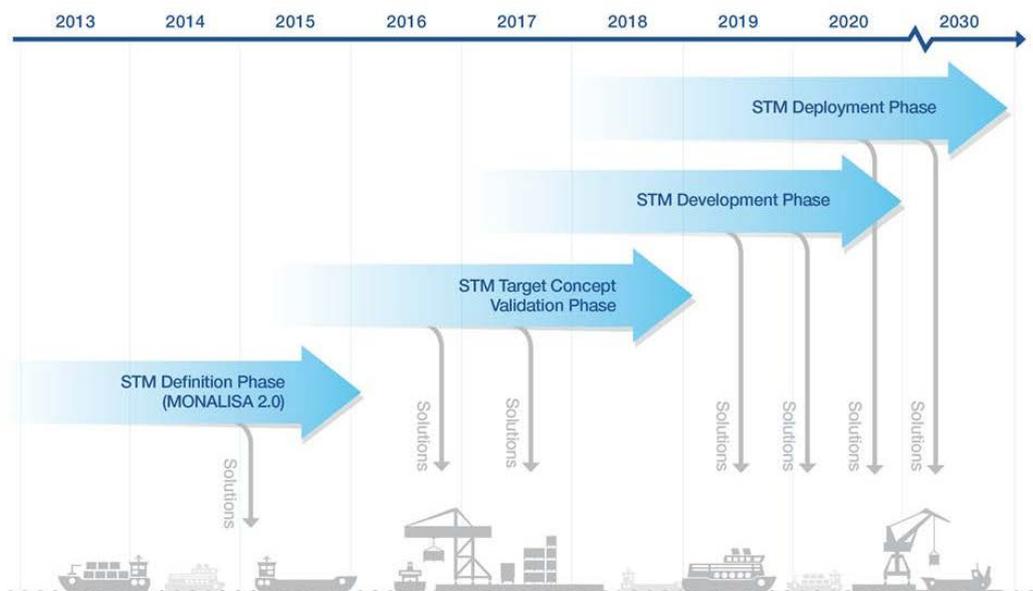


Figure 1: The Development, Validation, and Deployment of STM

Sea Traffic Management, as conceptualised in MONALISA 2.0, explores alternatives to centralised Traffic Coordination as in Air Traffic Management. Even though STM was inspired by Air Traffic Management, the findings of this project are that STM should be established through distributed traffic management (i.e. decentralised decision making) rather than rely on a concept like a “EuroControl for Sea Operations”. A decentralised approach recognises the culture and history of shipping that have given the various stakeholders a high degree of autonomy and which are directly opposed to a centralised command and control structure. A distributed data sharing design also gives more room for new actors to enter the domain and provide new services that build on data made available by the various stakeholders. Therefore, this concept of STM supports a cooperative and coordinated model of data sharing which respects the historical *modus operandi* and culture of shipping.

How?

As described above, Sea Traffic Management is an important instrument for meeting the challenges and needs of the maritime sector. Before entering into the development phase of STM, however, there is a need to validate the target concept of STM, which has been defined and elaborated within MONALISA 2.0. STM has been defined based on the discussions of the future needs with different actors. When the same actors are faced with demonstrations of the future concepts they might identify key modifications which will prevent the following development and implementation phases go in the wrong direction. Different aspects of the STM concept will be validated, such as the architecture of STM, the usability of Maritime Cloud as communication platform, the Key Performance Indicators and the business cases etc.



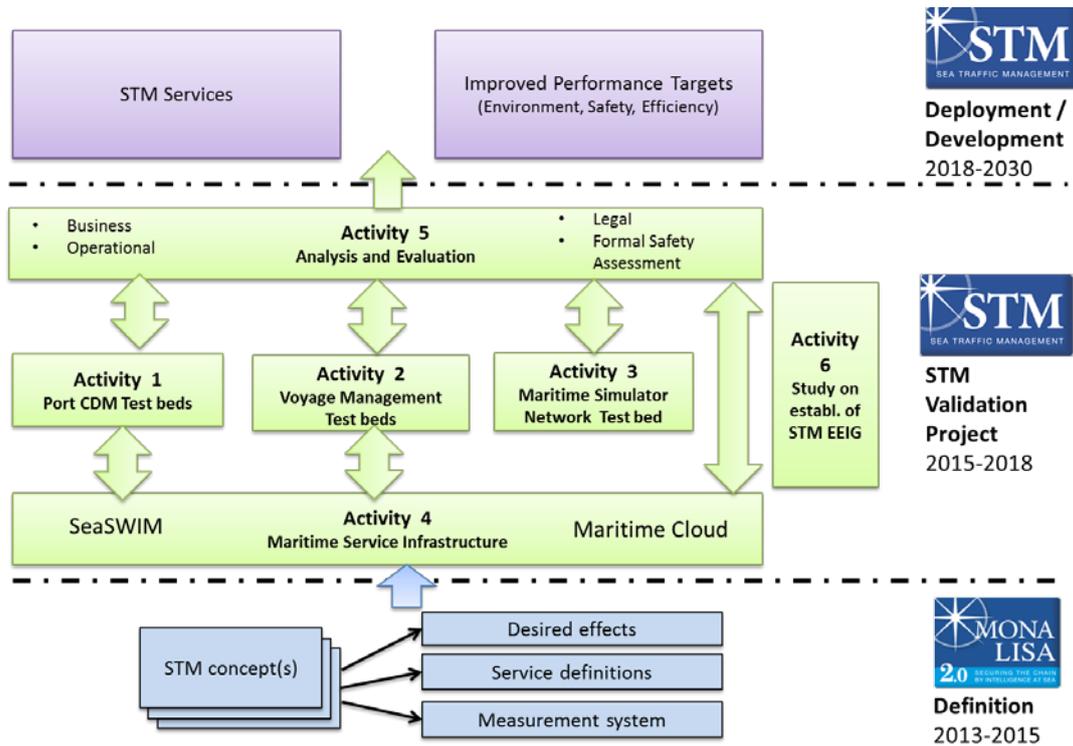


Figure 2: Project set-up

The main goal of the suggested **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.

The project shall demonstrate and validate the target concept for STM by using the European Maritime Simulator Network and by establishing large-scale test beds in both the Nordic and Mediterranean Seas, encompassing around **300 vessels, 10 ports** and **3 shore based traffic centres**. In the STM Validation Project, key strategic enabling concepts of STM (Voyage Management, Flow Management, and Port CDM) will be tested and validated. The project will also include preparatory studies for setting up a European Economic Interest Grouping for efficient coordination of the further development and deployment of Sea Traffic Management. (Figure 2)

The STM Validation Project encompasses:

- **Validation of Voyage Management** in two test beds. In the Nordic region, also the application of STM for more efficient winter navigation will be tested and validated. In the Mediterranean Sea, also the application of STM for crisis management (i.e., Search and Rescue) will be tested and validated.
- **Validation of Flow Management** utilising the European Maritime Simulator Network and the test beds for Voyage Management. This simulator network was developed within the MONALISA 2.0 project and will be used both to simulate different traffic conditions and further test and validate other parts of STM which are not possible to test and validate in real life at this stage, such as area management.
- **Validation of Port Collaborative Decision Making (Port CDM)** by expanding the network of ports and Port CDM services developed in MONALISA 2.0 in the Nordic and Mediterranean regions. The contextual differences between different port approaches will be gathered and analysed, together with other information that will serve as a basis for the concept's refinement. The test beds will also constitute a first step towards inviting both commercial and public service developers/distributors to further develop Port CDM Services.



- **Validation of System Wide Information Management (SeaSWIM)** using the Maritime Cloud as the infrastructure for information exchange in the validation test beds.
- **Establishment of a European Economic Interest Grouping (EEIG)** for STM to ensure efficient coordination of future actions in development and deployment of STM, communication and promotion of the STM concept, and the coherence of the development of the STM concept.

Extensive **Analysis and Evaluation** will be carried out by using Action Design Research methodology, which is appropriate for the continuous analysis and evaluation that is foreseen within the STM Validation project. Analysis will incorporate the different perspectives used in MONALISA 2.0: business, socio-economic, risk, technological, legal and institutional. Analyses and evaluation of the tests will be in line with the Guidelines on Harmonised Test Bed Reporting as adopted by IMO MSC 94 and IALA (1107). Competencies and training requirements for STM implementation will also be considered within this activity.

Based on lessons learnt from the MONALISA and MONALISA 2.0 projects, communication and dissemination are of utmost importance in order to keep the dialogue with the maritime community.

The STM Validation project strongly supports the development of e-Navigation within the international organisations IMO and IALA; the e-Maritime concept in the European Union as well as the implementation of HELCOM Recommendation no. 34E/2 which recommends "further testing and developing the concept of pro-active route planning as well as other e-navigation solutions to enhance safety of navigation and protection of the marine environment in the Baltic Sea Region".

The project will in no way duplicate the work done in projects like AnNa or the Single Window-initiative on the implementation of Directive 2010/65/EU on reporting formalities for ships, but STM can provide added value by providing for example updated ETA (Estimated Time of Arrival) to the Single Windows.

Who?

The consortium of the STM Validation Project encompasses leading manufacturers of navigational equipment, maritime authorities and Ministries from six European countries, recognised academic institutions and simulator centres, as well as other relevant partners with valuable knowledge for implementing the project effectively and successfully. The project is complex and the partnership extensive, but the experience of the Lead Partner of having coordinated TEN-T projects of similar complexity successfully as well as the fact that the partnership builds on many of the partners from MONALISA 2.0, will facilitate a successful implementation of the STM Validation Project.

Beneficiaries

Public Partners: Swedish Maritime Administration (SE), Swedish Meteorological and Hydrological Institute (SE), Danish Maritime Authority (DK), Ministry of Infrastructure and Transport (IT)*, Ministry of Transport and Communications (FI)**, SASEMAR (ES), Norwegian Coastal Administration (NO), Port Authority of Valencia (ES), Port Authority of Barcelona (ES)

* with the implementing bodies: RINA, IB, Port of Civitavecchia, Italian Coastguard, Riochiatori Napoletani and University of Genoa

** with the implementing body: Finnish Transport Agency

Private Partners: Valencia Port Foundation (ES), Carnival Corporation (UK), Costa Crociere (IT), CIMNE (ES), GS1 (SE), HiQ (SE), TRANSAS (IE), Furuno (FI), SAAB (SE), Jeppesen (DE), Navicon (DK), Signalis (DE), Frequentis (AT), SAM-Electronics (DE), Svitzer (SE), Magellan (PT)

Academic partners: Chalmers University of Technology (SE), Novia University of Applied Sciences (FI), Southampton Solent University (UK), University of Southampton (UK), University of Flensburg (DE), Maritiem Instituut Willem Barentsz (NL), Cyprus University of Technology (CY), OFFIS (DE), University of Oldenburg (DE), SSPA (SE), Polytechnical University of Catalonia (ES), Fraunhofer CML (DE), Rörvik Maritime Safety Center (NO), Viktoria Swedish ICT (SE)





Associated Partners

Port of Gothenburg, Kvarken Ports (Umeå-Vaasa), IBM, Ericsson, Cygate, Raytheon, Kongsberg Maritime, UK Hydrographic Office, BIMCO, SSAB, Rheinmetall, STENA

How much?

STM Validation Project has a total budget of 43 million euros. 50% is applied for from EU (Connecting Europe Facility/Motorways of the Sea)

When?

STM Validation Project will start in 2015 and run until year 2018, if granted EU-funding.

Who to contact?

Magnus Sundström

Project Leader, Swedish Maritime Administration

Phone: +46 10 478 46 81

E-mail: magnus.sundstrom@sjofartsverket.se

oooOOOooo

