October 2018 www.nautinst.org

Seaways

The International Journal of The Nautical Institute

Sea Traffic Management

The Nautical Institute

Sea Traffic Management on trial

The Sea Traffic Management Validation Project made use of the European Maritime Simulation Network (EMSN) to trial complex concepts in a safe environment

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The Sea Traffic Management (STM) Validation Project is a three-year project that aims to improve safety, operational efficiency and environmental performance in the maritime industry by proposing a standardised digital method of information sharing between all actors in the maritime chain.

It is a good example of the IMO's e-navigation policy, following on from the MONA LISA and MONA LISA 2.0 projects, which defined the concept of sea traffic management. STM sets out to validate the concepts in large-scale testbeds in the Nordic and Mediterranean regions. The project will encompass up to 300 vessels, 13 ports and five shore-based service centres, along with 13 simulation centres in the connected European Maritime Simulation Network (EMSN).

Using the EMSN for STM validation

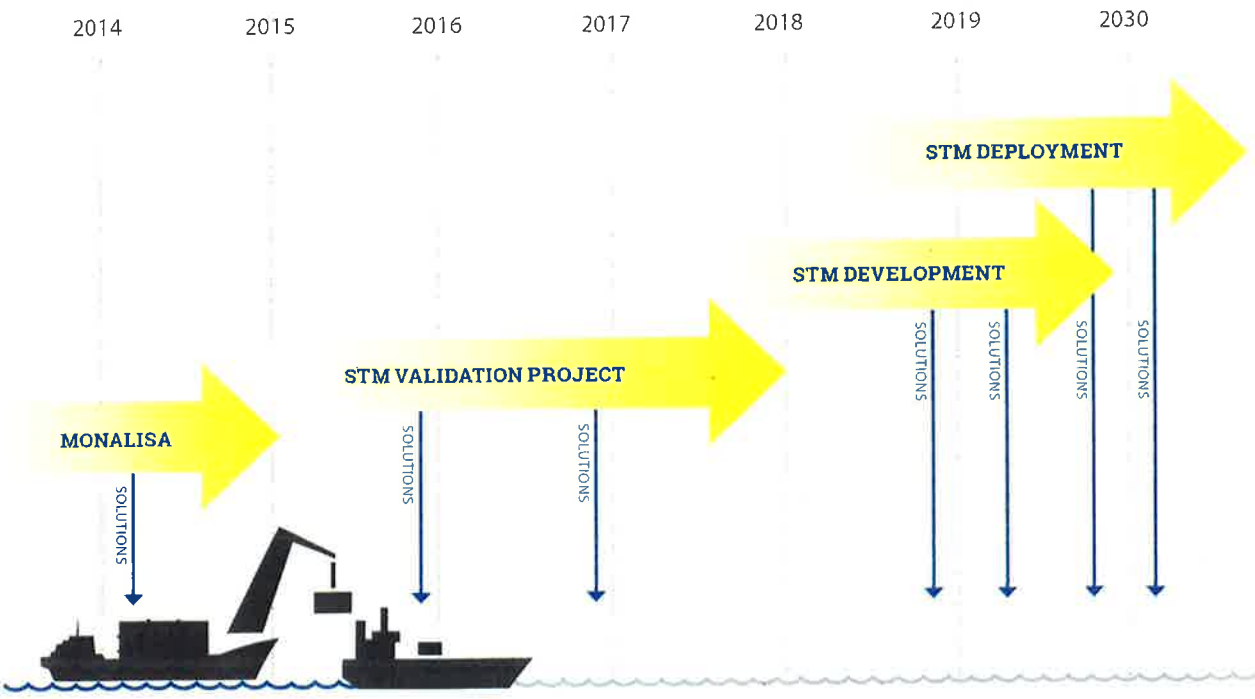
To evaluate the STM concepts, a series of carefully crafted simulation exercises were created and run in a controlled environment using the EMSN (see box). The primary purpose of the EMSN is to gain experience with STM features and to understand how the people and institutions involved deal with its capabilities. Doing this in a simulated environment saves considerable time, cost and environmental impact. For certain situations, such as complex traffic situations, search and rescue and ice navigation, it offers a safer alternative to live testing.

The exercises included:

- Two 90-minute exercises in the English Channel and Southern Baltic regions; these were run both with and without STM tools in order to establish a baseline;
- Search and rescue exercises in the Gibraltar Strait area;
- Ice navigation in the Kvarken area of the Gulf of Bothnia;
- Six short controlled scenarios to explore the use of Ship to Ship Route Exchange to enhance situational awareness in anti-collision situations.

Participants manning the bridges were volunteers holding either

STM past, present and future



Master's, Chief Mate's or OOW certification depending on the role they were carrying out. They were given identical briefings at each simulation centre.

First EMSN simulator runs

Between 13 and 16 March 2018, Warsash Maritime Academy (WMA) welcomed 16 enthusiastic mariners from a variety of backgrounds to take part in the first week of EMSN simulation runs with the STM Tools enabled. Briefing each day started at 07.30. After an introduction to the bridge and a familiarisation exercise, participants adopted the role of either Master or OOW on one of the two WMA bridges in two main simulation exercises.

The scenarios have been carefully designed to test as many aspects of STM as possible both on the ship's bridges and at the simulated shore centres. One of these shore centres was located at WMA, simulating Sea Traffic Control Southampton for the English Channel Scenario.

WMA Staff taking part in the EMSN activities: from left, Terry Mills, John Saunders and Zakirul Bhuiyan

STM services tested include:

- Ship-to-shore route exchange
- Route cross-checking
- Shore centre sending suggested changes to routes as well as complete 'pilot routes'
- Enhanced monitoring
- Navigational assistance
- Use of chat
- Ship to Ship Route Exchange (S2SRX).

STM EMSN simulations analysis

This was split into:

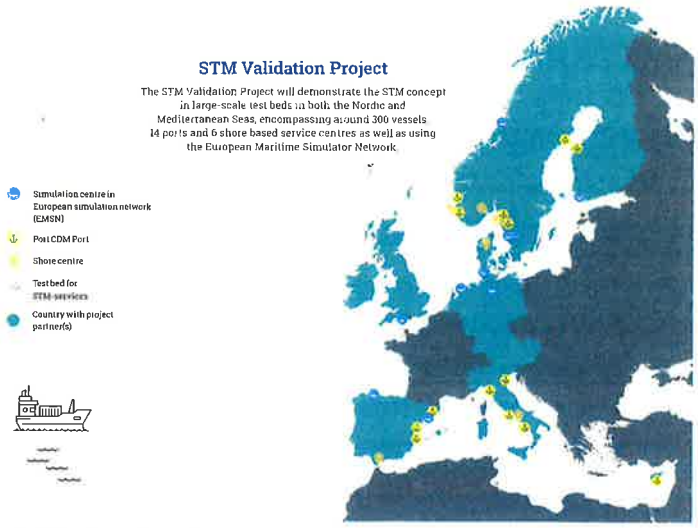
- Performance analysis: comparing the differences (if any) between the baseline exercises and those run with the STM Tools;
- Human factors analysis: use of a background questionnaire, in-scenario workload diary to assess mental workload and situational awareness, post-scenario questionnaires, human factors behavioural observations, and verbal debrief session.
- Safety analysis: using a safety index model developed by Chalmers University in Gothenburg.

There were some technical hurdles to overcome in the few short weeks leading up to the trials and although not everything worked as well as hoped, some excellent lessons were learned and much valuable feedback was obtained from the participants.

STM results

As the STM Validation Project is not due to complete until the end of 2018, the full analysis and report writing is yet to take place. But it is the next step towards a safer, more efficient and more environment-friendly maritime sector. The STM will connect and update the maritime world in real time, with efficient information exchange. Through data exchange among selected parties such as ships, service providers and shipping companies, STM will create a new paradigm for maritime information sharing, offering tomorrow's digital infrastructure for shipping.

For more details on the 'Sea Traffic Management', project please see the Solent University's link: https://www.warsashacademy.co.uk/about/our-expertise/maritime-research-centre/project-sea-traffic-management/home.aspx



The STM Validation Project

The STM validation project is a three-year project with a €43 million budget, co-financed by the European Union, which will run from 2015 to the end of 2018. It was partly inspired by the European SESAR programme, which looked at the next generation of air traffic management. More than 50 partners are involved from 13 countries, including private, public and academic sectors. The Swedish Maritime Administration is acting as the lead authority. For more information, see the project web site http://stmvalidation.eu/

The European Maritime Simulation Network (EMSN)

The EMSN connects several simulator centres around Europe, involving three simulator manufacturers. It gives users a unique possibility to create scenarios with a large number of participating ships to test out STM scenarios.

The EMSN was set up during the MONA LISA projects in 2014 and has been enhanced for the STM Validation Project by the addition of more centres. It now offers more than 30 simulated own ships, and further organisations have expressed an interest in joining.

Information is shared between the simulation centres by the Distributed Interactive Simulation (DIS) protocol and all bridges are connected by Teamspeak VOIP to simulate VHF communications. Special ECDIS systems have been fitted to each 'bridge', and all bridges are equipped with prototype STM tools, including a facility for route sharing between other simulated ships and shore centres.