Operators of vessel traffic service (VTS) systems are increasingly finding they have the ability to predict challenging traffic situations. This is made possible when ships share their voyage plans with a VTS centre via common digital infrastructure that has been specially designed for maritime actors. Research shows that 73% of the seafarers feel safer when they use enhanced monitoring services provided from shore and based on the digitalized sharing of their voyage plans. A large majority of port actors, including agents, port controllers and terminal operators, see huge potential for better decision-making by utilizing digitalized and standardized information sharing. Insights such as this are just some of the results of the Sea Traffic Management (STM) Validation Project we have been undertaking recently. The project finishes in mid-2019 and is co-financed by the European Union. STM was conceptually defined between 2012 and 2015 as part of the MONALISA 2.0 project, which was in turn inspired by digitalization in aviation and its corresponding SESAR programme. Both STM projects have been led by the Swedish Maritime Administration and have gathered dozens of partners from across Europe.

EMISSIONS
Another key facet of implementing digital standards is the potential for fuel savings and reduction of emissions. This has caught the eye of the IMO recently. We believe that in order to achieve a 50% reduction in greenhouse gas (GHG) by 2050, efficiency gains from digital communication—especially the synchronization of the port call between ports and ships—will play a vital role. Preliminary results indicate that large container vessels could save up to 20% of total fuel consumption with the right standards in place. For ferry, cruise, and ro-ro traffic, efficiencies are expected to be lower, while for bulk carriers, the potential for savings is considerably greater. To realise this potential, the ‘hurry up and wait’ mentality, which stems from the ‘first come, first serve’ operational nature of ports, needs to change. The BIMCO standard contracts provide a solution regarding the commercial aspects for goods owners and ship operators through a newly added STM clause. Nevertheless, old habits die hard, and they may take years to change.

CONNECTED DIGITAL INFRASTRUCTURE
The tests we have undertaken in the STM Validation Project have involved a growing...
number of regular merchant ships. At the time of writing (April, 2019) we have just passed 270 ships involved. Further to this, we have included six VTS centres, nine ports, and 13 simulation centres across Europe. Each of these have set up large scale exercises to gather data and evaluate the operational benefits of STM. All of these players rely on a common maritime digital infrastructure, which is backed by many of the dominating system suppliers for VTS and on-board systems (such as Wärtsilä, Transas, Furuno, Kongsberg Norcontrol, Airbus, SAAB and Adveto).

**STM PROJECT CHALLENGES**

Given the ambitious nature of the studies we have undertaken in the STM Validation Project, we have had to countenance some concerns that have arisen in the research. This has allowed us to identify the need for further study in particular areas. Key questions we’ve had to address include: Is there a risk of overreliance on the digitalized information? Could operators on-board and onshore be exposed to information overload? When will system suppliers have matured their user interfaces so they support the use of multiple digitalized services in a smart way? Will international regulations need to change with STM and which new training requirements will arise?

While we are endeavouring to provide answers to these questions, we can already see that the STM project results lean heavily towards positive effects on efficiency, safety and environmental impact when shipping moves from manual to digitalized or automated. The full stories of pros, cons and implementation barriers are too long for this paper, but can be found in reports published on our project website (see the enquiries section at the foot of this paper).

Of course, digitalization of the maritime domain does not come without some effort and cost. Therefore, STM project partners are investigating how to organize themselves to take ownership of the project outcomes. One of the core elements of STM is secure and trustworthy authentication of maritime actors. When a voyage plan is shared with the VTS, it may not be desirable for that information to end up in the hands of competitors or miscreants. For secure communication, STM relies on the ‘Maritime Connectivity Platform’ which has been developed in parallel with STM and for which a governing consortium founded by maritime administrations and research institutes saw the light of day in February 2019.

The Maritime Connectivity Platform (MCP) is an open source technology and digital maritime domain. It brings common internet standards to maritime navigation and transportation systems. MCP enables infrastructures for efficient, secure, reliable and seamless electronic information exchange among maritime stakeholders using available communication systems. MCP is an open and vendor-neutral technology.

A non-profit group comprising several competitors within the industry is looking at assuming long-term responsibility for the maintenance and development of MCP under the guidance of the governing consortium. This would guarantee 24/7 support and establish a truly operational platform for these companies and others to develop and deliver interoperable services.

**CONCLUSION**

The main enabler for interoperability is standards. An often-used comparison is the old battle of BetaMax versus VHS in the video player market during the 1970s and 1980s. In today’s digitalized era, the discussion about standards is often limited to data formats, leaving all other integration challenges to be solved individually, by companies or projects or countries. In the STM Validation Project, partners have worked through all levels of IT infrastructure, agreeing on which internet protocols to use, which digital certificates to implement, the proposed common APIs and – of course – they have identified a suite of data formats, which all system providers need to support. The MonaLisa2.0 project produced the first common voyage plan format, RTZ, which made its way into the ECDIS standard owned by the International Electrotechnical Commission (IEC). In the STM Validation Project, the standardization work has continued with a message format for port calls proposed to IALA as a new standard, S-211. Furthermore, Sweden has presented a proposed to IEC for a work item regarding a standard interface (API) for exchange of any kind of S-100 standard between IT systems.

Standards, agreements and common digital assets created together in the project are now complete to support interoperability between independent commercial and public IT systems. However, evolution never stops; emerging standards and technologies have to be constantly evaluated and considered for STM solutions to stay relevant. There will be a life after these projects. Stay tuned.

**ABOUT THE AUTHOR**

Ulf has a M.Sc. in IT and extensive experience in the IT industry. He joined the maritime world in 2013, and he is presently in charge of communications in the Sea Traffic Management (STM) Validation Project. Ulf is the author on several scientific papers on e-navigation and IT infrastructures, as well as a presenter at conferences.

**ABOUT THE ORGANIZATION**

Sea Traffic Management connects and updates 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 is creating a new paradigm for maritime information sharing offering tomorrow’s digital infrastructure for shipping.

**ENQUIRIES**

www.stmvalidation.com