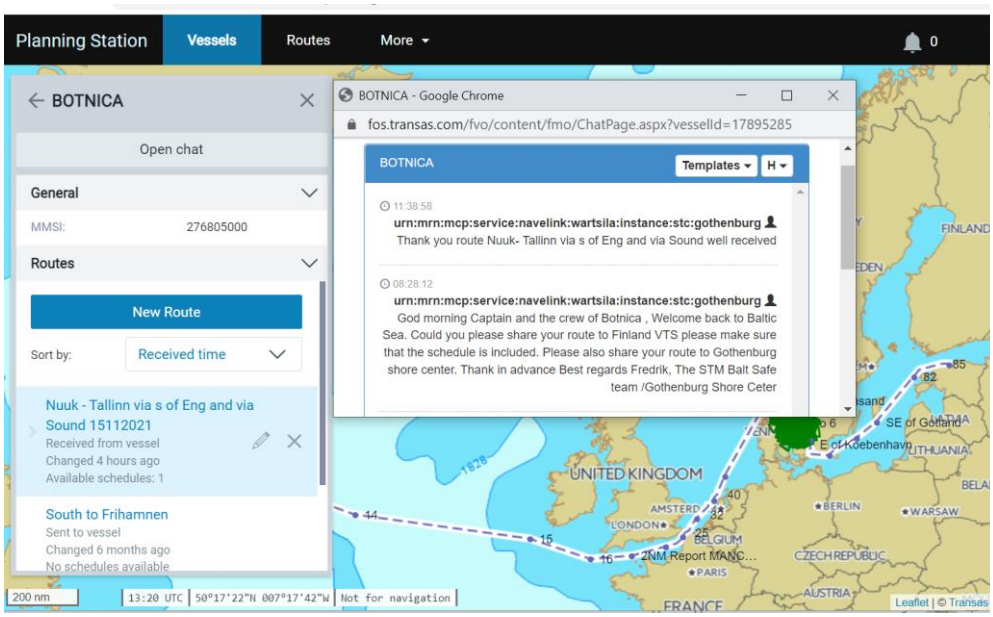

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1 Table of contents

2 Summary

As sharing voyage between ships and VTS is the main objective of the STM BALT SAFE project, a fleet of ships that were capable of sharing voyage plans were needed. On the one hand, the ships that participated in the STM validation project would be used, but also new vessels would be equipped with navigational equipment that are capable to share voyage plan. Following updated product specifications and a public procurement, one supplier was commissioned to equip 50 vessels in the Baltic Sea. Due to the pandemic, only a small part of these vessels were managed to be equipped, but still enough to be able to start exchanging routes with the VTSs that were ready to receive routes at the end of the project. As the task of sharing a route is a new task for the navigational officer on board, some form of incentive is needed to perform this task. During the project, the Gothenburg shore centre has performed this task, but now this will end when the project ends. Therefore, other ways maybe needed to get the ships to share routes such as, offer lower fees for ships that share a route. Another incentive would be for the authorities to legislate a route-sharing requirement and by that, increase safety or ports that starts to request digital ETA.

3 Testbed upstart and description

The scope for and primary objective of the testbed was to form a project testbed, that would transform into operational by supplying tankers trafficking the Baltic sea, with an ECDIS that has the capability to share a voyage plan according to the STM concept. With the VTSes becoming connected and getting the possibility to receive routes throughout the course of the project, the ships would be encouraged to exchange voyage plans with the VTSes of Finland, St Petersburg, Tallinn and Kvitsöy.
A secondary objective was to enlarge the testbed by upgrading the existing STM fleet from STM Validation project, to the new commercial operational maritime connectivity domain Navelink.

In the very beginning of the project, a meticulous work started to update the specification of a STM compatible ECDIS before the procurement could start. One major change from the existing requirements was the function giving a notification if the voyage plan lacked schedule. The schedule is vital to fully use the STM concepts services like route optimizations, navigational warnings, port call optimization and several of the VTS Services (Enhanced Monitoring Service, Close Quarter Situations, Predicted Rendezvous).The target of the Testbeds ships were oil and chemical tankers in traffic in the Baltic Sea.

To upgrade the existing STM fleet from the STM validation project (from 2019) were more complicated than expected. We did not anticipate that the upgrade to Navelink would require physical installations but it did, making it impossible to due during the lock down of the pandemic. The unexpected cost of such installations made it necessary to set up a new procurement, which was won by Adveto and Wärtsilä, and the update of the STM Validation fleet could start.

4 Procurement and installations

4.1 Procurement with new requirements.

The work packages first task was to procure ship systems for implementation purpose. The requirements for the procurements, where updated taking into account the findings from the project STM Validation. These new requirements stipulated some further development from the manufacturer´s side. With a procurement process that took somewhat longer than expected, we could appoint a winner and go into development mode with the winning supplier Wärtsilä.

Then we had a great challenge trying to install equipment on-board since they were not receiving any outsiders due to the pandemic. The prolongation of the project helped to some extent but it wasn´t until this summer 2021 that Wärtsilä was allowed on-board and had the opportunity to install.

As the aim of the Balt Safe project is to make installations for implementation, the installations will go on after the end of the project. All installations that are completed before the end of the project by the 2021-12-31 will be funded by the project.

4.2 Procurement of Navelink connection for existing STM fleet.

The use of the existing STM fleet from former STM validation project that ended 2019, needed an update since this testbed of ships were using an MCP instance, which were set up for project use. In addition, as we enter installation mode we needed an operational instance. The MCP created in EfficienSea 2 project were about to end together with the STM Validation project in 2019.

A new commercially operational MCP instance was created 2020, named **NAVELINK.** An industrial non-profit consortium created this operational MCP.

New vessels can easily enrol to the Navelink MCP, but the ship owners of the “old” STM validation fleet were not really interested of making an assignment to the new operational MCP, mostly due to lack of benefits in forms of services for the user, and the high prize.

Moreover, of course the uncertainty and the general economic situation in shipping due to corona, which meant that most shipping companies had a purchase stop.

As there were no new services and the new VTS functions were delayed, thus there were no incentive for the crew on board to use route exchange. The services that existed during the first two years of the project were limited to Gothenburg shore center Baltic Navigational service, Pilot route service and Port of Rotterdam ETA and Pilot boarding position.

To facilitate the change from the project MCP to operational MCP Navelink a procurement of updating the existing STM ECDIS were sent out to the ECDIS suppliers that were represented in the “old” STM Fleet. The most desirable vessels from STM BALT SAFE project’s point of view, was selected from respective ECDIS suppliers by the different VTS manages. And a “wish list“ was achieved:

Adveto	Furuno	Wärtsilä
Finlandia	Finnbreeze	Marinus
Finnmaid	Finnmill	Olympus
Gabriella	Finnpulp	Primorsky Prospect
Amorella	Finnsea	Tellus
Njord	Finnsky	Ternsund
	Finnsun	Ternvik
	Prima Queen	Ternfjord
	Prima Lady	Ternvind
	Prima Donna	
	Prima Madonna	

“Wish list” of ships from STM validation project

Wärtsilä and Adveto were the ECDIS suppliers' that received a calls-off due to performance and price according to the regulation of governmental procurement conducted by the procurement department at Swedish maritime administration during summer 2021. The reason why this work started late in the project were the voluntary "move over" from STM validation, up till now resulted only in approximately 60 vessels that had been registered in Navelink and the enrolment were quite low. Through these activities by new procurement, the aim was to include more vessels that sailed frequently in the Gulf of Finland, Baltic Sea area or trafficking the Norwegian waters. All to expand the STM fleet and thus get more vessels to exchange routes with the connected VTSs. This work are still on going and will be stopped by the end of the project 31 of December 2021.

5 STM BALT SAFE Testbed

The ferries that operate between Sweden and Finland that were connected in the former project Efficient Flow, did also participate in exchanging routes with Finland VTS. This was partly done directly in the form of a route exchange between the ship and Finland VTS, and partly via a hub service. From this "hub" service, routes were collected and then distributed to selected recipients, in this case Finland VTS. The hub that was developed in the Efficient Flow project will now be operative and called Route Distribution Service /RDS. This hub service is also distributing route from pilots onboard "any" vessel in Sweden or Finland, at this point as the route is shared via the portable pilot unit.

This leads to increased safety in the form of better information regarding when and where the ships will meet in a narrow fairway. And a common traffic picture between the captains on board the ferries and the Swedish and Finnish pilots during piloting.

The STM BALT SAFE project have been maintaining the ferries capabilities to exchange routes, thus the projects testbed was increased. During the project, a ship list has been drawn up and updated with information on which ships have STM functionality, and what position the ship had.

The ship's list was used by VTS operators to identify which vessels had STM functionality, and to see if they were heading to their VTS area. If this was the case, the operator contacted the vessel and requested that the vessel share its voyage plan with the VTS. The list was continuously updated from Navelink, where all ships were registered and thus could use the various operational services that are now available in STM.

Vessel name	**Position** **2021-12-07**
AMORELLA	Åbo/Mhmn/Sthlm
Baltic Bright	Amsterdam
Baltic Princess	Sthlm/Mhmn/Åbo
Baltic Queen	Moored Tallinn
BOTNICA	North Atlantic
Delphis Bothnia	Container ship North Sea
DMITRY SIROTKIN	Supply vessel, Moored St. Petersburg
EKFJORD	Rotterdam -> Porvoo Fi
EKFORS	-> GRANGEMOUTH GB

EK-RIVER	Riga Anchor
EK-STREAM	Naantali Fi- Rotterdam
ELANDRA ANGEL	Crude Oil Tanker WILHELMSHAVEN DE
ERMAK	Icebreaker Moored i St. Petersburg
FINLANDIA	Ro-Ro Baltic Sea
FINNFELLOW	Kapellskär/Mhmn/Åbo
FINNSWAN	Åbo/Mhmn/Kapellskär
GABRIELLA	Ro-Ro Baltic Sea
GALAXY	Ro-Ro Baltic Sea
HELENA KOSAN	LPG tanker Balearic Sea
HENRIETTA KOSAN	LPG tanker English Channel
ISABELLE	Ro-Ro BALTIC - Finland Gulf
ITIMOFEY GUZHENKO	Shuttletanker 77000 DWT anchor Murmansk
KAPITAN GOTSKY	Shuttletanker 72000 DWT anchor Murmansk
KAPITAN NIKOLAEV	Icebreaker moored St. Petersburg
KAPITAN PLAKHIN	Icebreaker moored St. Petersburg
KAPITAN SOROKIN	Icebreaker moored St. Petersburg
KAPITAN ZARUBIN	Icebreaker moored St. Petersburg
KARL ERIK	Tugg Baltic Sea
KIRILL LAVROV	Shuttletanker 69000 -> Murmansk
Kobe Express	Container ship USA - Mexico
MARKO POLO	Ro-Ro/Passenger Ship Ancona, It
MIKHAIL LAZAREV	Oil-Tanker Murmansk
Mikhail Ulyanov	Shuttletanker Murmansk
MSC DYMPHNA	Container ship East Africa
MUDYUG	Icebreaker moored St. Petersburg
REGAL STAR	Ro-Ro Baltic Sea
Rescue Gad Rausing	SSRS rescue SE
ROMANTIKA	Ro-Ro Baltic Sea
Rosella	Kapellskär/Mhmn/Åbo
SCA OBOLA	Ro-Ro Cargo Baltic Sea
SCA ORTVIKEN	-> HBG SE
SCA OSTRAND	Baltic Sea
SHTURMAN ALBANOV	Shuttletanker 41000 DWT Murmansk
SHTURMAN MALYGIN	Shuttletanker 41000 DWT mot Murmansk
SHTURMAN OVTSYN	Shuttletanker 41000 DWT underway Murmansk

SILJA SERENADE	Ro-Ro Baltic Sea
SILJA SYMPHONY	Ro-Ro Baltic Sea
TANJA KOSAN	LPG tanker Asia
TENNA KOSAN	LPG tanker UK
TESSA KOSAN	LPG tanker Mediterranean
UASC ZAMZAM	Container Ship East Coast South America
VASILY DINKOV	Shuttletanker 72000 anchor Murmansk
VICTORIA 1	Ro-Ro Baltic Sea
VIKNING CINDERELLA	Ro-Ro Baltic Sea
VIKING GRACE	Ro-Ro Baltic Sea

Operational STM Ship-list

6 Encouraging the ships in the STM Fleet to share their voyage plan

The core of STM is to share a voyage plan. As a result, thereof the ship will be able to use the different services in STM. Thus, it is vital that the ship share her voyage plan. Sharing a voyage plan with an organization outside one's own is a new task for the officers on board, as such, it is not part of the normal bridge routines and SOP Standard Operational Procedures.

It has been evident throughout the project that it is necessary to remind and encourage the crew onboard to perform the new duty.

The STM User Guide is the document that instructs the crew on how to use STM and which services are available. Latest version, of this User Guide and other user manuals can be found on the STM website. STM User Manual - STM – Sea Traffic Management

In order to get the crew to use the services, Gothenburg shore center have been in contact with the STM ships, reminding them to share. Their final destination has been identified and each ship has been contacted individually. The User Guide was distributed during the installation of the new STM connected ECDIS and the latest version can be found on the STM website. http://www.seatrafficmanagement.info

During the project, the work to encourage the crew to share voyage plans has been an ongoing task. It was done through identifying the ships position and contacting the crews on board the STM ship to help them to share routes. With the assistance of Marine Traffic AIS, the vessels have been located, and thereafter a contact has been made via the STM function TXT or/and by email, directly to the master of the designated ship. If a ship were heading for a destination with an operational VTS, they were encouraged to share their voyage plan with that particular VTS. The instructions have always been that the ship should share its route including schedule, as this is central to utilizing all functions optimally. To ensure that the voyage plan was shared correctly, it was often also shared with the Gothenburg shore center to be validated. With every received voyage plan, Gothenburg Shore Center performed an Enhanced monitored route service for testing purposes, but the result of the enhanced monitored route were never sent back to the ships as it was not in the ordinary service of Gothenburg Shore Center. Gothenburg shore center only respond back to the ship with the feedback and information that a correct route including a schedule was received from the ship. The system onboard do not inform the crew if the route is sent correctly. An automatic acknowledgement are not implemented in the ECDIS, to confirm back to the crew that a route have been sent. An acknowledgment have to be manually constructed so far.

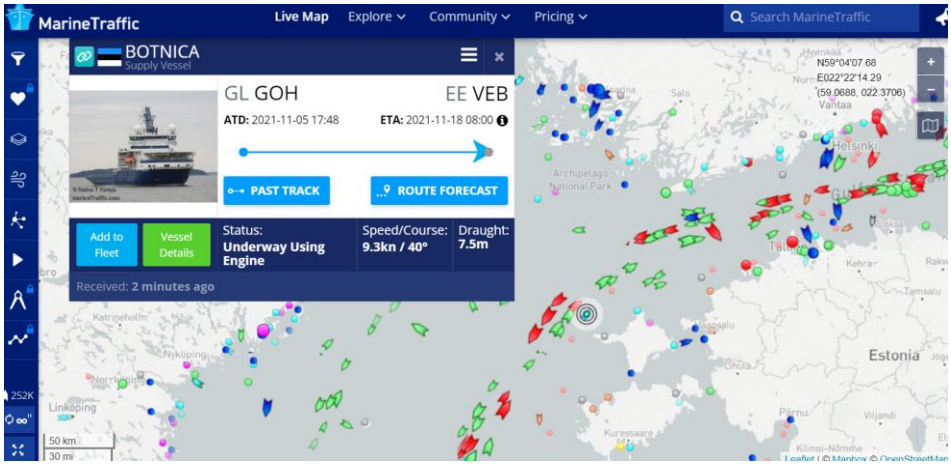
Description of the work in the Gothenburg Shore Center.

This description is a real life case. It describes the exchange that have been done several times with each ship in the STM Ship List, to describe how the work in Gothenburg shore center have been performed during the project, a case is now displayed step by step.

Estonian Supply vessel Botnica on her way back from Arctic end October 2021

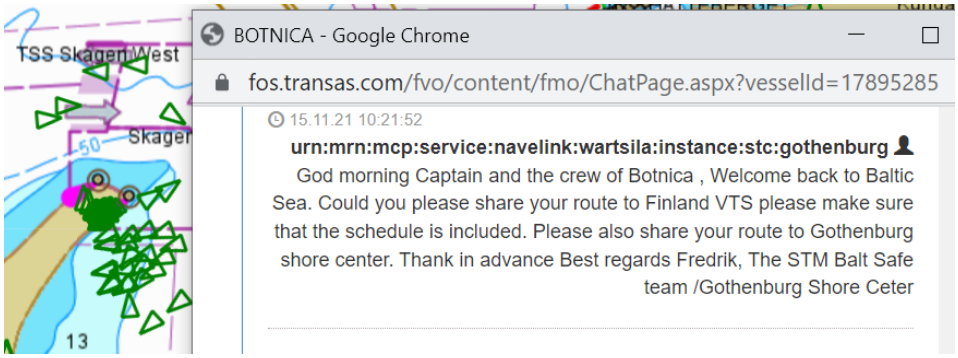
In the end of October 2021 Botnica, the state owned supply ship from Tallinn Estonia, started to sail back from a several month long expedition in the Arctic. Botnica has during the STM Balt Safe project been equipped with a new navigational system /ECDIS containing the STM functionality, connected via Navelink.

1. Gothenburg shore center searched Marine Traffic for AIS target from STM ships. Looking for ship sailing in the Baltic Sea and that are heading for the different VTSs.
2. When found, the final destination could be identified as well as the time of arrival ETA.
3. The STM Ship could now be contacted by Gothenburg shore center to request that the crew share voyage plans to the VTS of the final destination and any other VTS that they pass along the route



Gothenburg shore search for STM ships

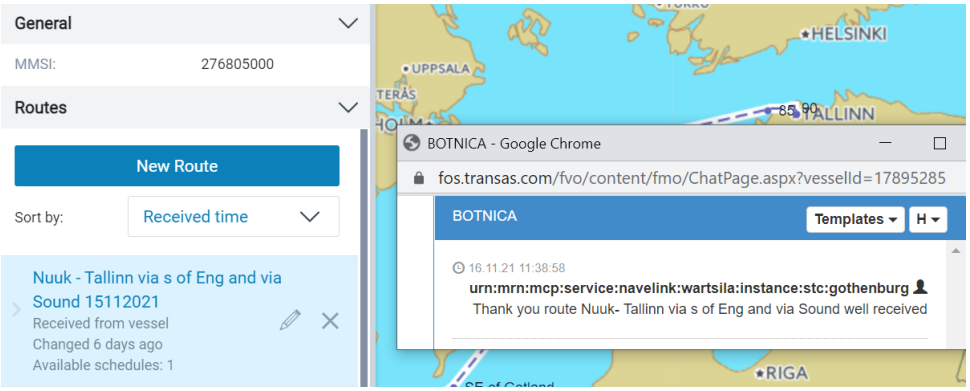
4. A ship is detected: Botnica were just to enter the Baltic Sea North of Skaw and Gothenburg shore center sent her a TXT via STM.



Gothenburg shore center request for voyage plan from Botnica

5. The crew on Botnica responded by sharing her voyage plan including schedule to Gothenburg shore center and to Finland VTS.

6. When the route is received and enhanced monitored, schedule checked, the Gothenburg shore center replayed by sending a TXT to Botnica and confirmed that a correct voyage plan was received.



Gothenburg shore center receive a voyage plan from Botnica

7 Findings and recommendations

The project has shown that it is difficult to get the crews to start with a new task such as a voyage plan with i.e. a VTS.

Throughout the different STM projects, there have been a support function in the Gothenburg Shore Center from which the onboard users could receive information on how to use the different STM services. If this support ceases, there is a risk that the vessels will stop using the STM services and share their voyage plan in the future. This support have to be continued if the ships should keep on sharing their voyage plans. Either by a new project, VTS operators or by staff from the supplier of MCP, Navelink in this case. The project have showed that STM are operational but will not “fly” without further support and development.

Continuous training at regular intervals is done by all ECDIS users in the form of a refresh course. We recommend that STM is included as a compulsory part. The ECDIS supplier holds this training.

There are different types of incentives for ships to continue to share their voyage plan.

Adding useful services

To add useful services such as an Ice route service; STM functionality is already installed in several of the icebreaker in St Petersburg and Tallinn.

The Swedish and Finnish Icebreakers in the Baltic Sea has been working for some time to get STM functions in their management system. Such services would add the value and increase the interest of connecting in an STM compatible way.

Giving discounts

Another type of incentive to increase the willingness to share a voyage plan is if an authority gives a discount on the fairway fee if the ship shares its voyage plan. This is justified by the fact that security is increased at the same time a ship shares its voyage plan with a VTS.

Automatic route sharing

Automatic route sharing is something that proved to be working well when the Efficient Flow project installed it on the ferries that operate between Finland and Sweden. It works when the

ships go on fixed routes but becomes problematic when the ships change end destinations continuously.

Port request digital ETA

When Just in Time /JiT becomes more common, the ports will need more accurate and updated ETA. If this is to be done digitally, the ports will request an updated ETA, which can be retrieved from the ship's navigation equipment, which also will be the case if the ship shares its voyage plan.

Legislation

In addition, as a last option, legislation is a way of demanding ships to share their voyage plans. First, however, recommendations from the relevant authorities should be issued and then the next step is to take mandatory measures.

Using STM to increase BALTic Sea SAFEty

Making the Baltic Sea even safer by improving the situational awareness on ships and shore, building tools that automate work and provide decision support to prevent risk situations and accidents.

Making STM happen!

SAFETY - ENVIRONMENT - EFFICIENCY

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