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TEN-T PROJECT NO: 2014-EU-TM-0206-S

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Annex 2: Business Model

2.2.1 The commercial background of shipping

2.2.2 GENCON 1994

Annex 3: EU Competence Report

Executive Summary

Sea Traffic Management introduces an entirely new paradigm of information exchange in shipping, optimising voyages and port calls and providing real-time data to navigators.

This report aims to contribute to Activity 5 (Analysis and Evaluation) and, more specifically, Sub-Activity 5.2 (Effects on Charterparties and Business Models) and Sub-Activity 5.4 (Legal and Liability Issues of STM). The analysis has 4 main parts:

A. The legal feasibility of STM, concerned with the compliance of STM with the International maritime law framework;

B. The business model and STM, concerned with the commercial aspect of STM;

C. New and additional risks linked with cyber-security, depicting the legal framework surrounding the relevant security obligations at the EU and UK level; and

D. Policies EU and Global for STM support, outlining some aspects of EU legislation and International activities that could support the use of STM.

The report provides the key findings from individual reports, which can be found in the Annex, in case the reader wishes to go into further detail.

Taking Sub-Activity 5.4 first, this report examines the various jurisdictional zones in which STM will be implemented, and the potential issues arising between the flag State and the coastal State in the regulation of the use of STM. The use of information exchange in navigation is also discussed, especially in relation to collision avoidance. Another major issue analysed throughout this report relates to the installation and carriage of an additional device assisting navigation, both from the aspect of installation and usage requirements, including manning and training, and from the apportionment of liability perspective. The analysis of the legal feasibility has 4 main pillars: the first three (Safety of Navigation, Manning and Training, Protection of the Marine Environment) deal with issues mainly concerning flag States and their obligations, while the fourth part deals with the liability issues, which involves coastal States as well.

The analysis of the business model recognises the effect that STM will have on the commercial obligations of the ship, but mainly focuses on those under voyage charterparties. It also includes the STM Clause for Voyage Charterparties, an innovative clause, adopted by BIMCO on 13 November 2018, drafted in collaboration with project stakeholders, which addresses some of the issues arising from the optimisation introduced by STM.

As regards the cyber-security issues, which are analysed in length in a separate annexed report, the nature of the data exchanged by the STM services is examined to check whether certain actors ought to abide by the stricter laws regulating the processing of personal data, while a framework is provided containing parameters that need to be taken into account when assessing the security measures to be implemented.

Finally, the EU and global policies part of the report is a summarised version of an annexed report, which deals with the competence of the EU to regulate shipping matters, and certain pieces of EU legislation that have an interrelation with STM.
## STM Concept and the international maritime law framework

<table>
<thead>
<tr>
<th>Service</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Route optimisation services</td>
<td>No problem - Speed suggestions must respect safe speed and any speed limitation in the area.</td>
</tr>
<tr>
<td>Ship to ship route exchange</td>
<td>Some potential for perception problem conveyed by shipowners acting collectively to create a self-fulfilling prophecy with indirect legal consequences affecting the right to limit liability under the LLMC.</td>
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<tr>
<td>Enhanced Monitoring</td>
<td>No Problem</td>
</tr>
<tr>
<td>Port Call Synchronisation</td>
<td>No Problem - Port Calls predominantly governed by National Law</td>
</tr>
<tr>
<td>Winter Navigation</td>
<td>No Problem</td>
</tr>
<tr>
<td>Importing Pilot Routes</td>
<td>No Problem</td>
</tr>
<tr>
<td>Navigational Warnings</td>
<td>No Problem</td>
</tr>
<tr>
<td>SAR – Search and Rescue</td>
<td>No Problem - STM Positively Endorsed</td>
</tr>
</tbody>
</table>

### STM Concept and the international maritime law framework graph

- **Limited relevance to STM**: No direct legal threat, but stakeholder reaction risks creating an indirect one that will need to be managed.
- **Careful Implementation is required**: No Conflict
- **Endorsement of STM or similar endeavours**:
  - STPS Agreement
  - NEP Nairobi
  - Load Lines
  - OPRC
  - 1910 Collision
  - Nuclear 1971
  - INMARSAT
  - LLMC 1976
  - Colregs
  - STCW
  - SOLAS
  - CLC 1969
  - MLC 2006
  - FUND
  - BUNKERS 2001
  - UNCLOS
  - SUA 2005
  - MARPOL
  - SAR 1979
  - Salvage 1989
  - Athens Convention
  - UNCLOS 1992
  - Kyoto 1997
  - Paris Agreement
  - SAR 1979
  - Nairobi WRC
  - CBD
  - FAL 1965

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STM VALIDATION 5.23 –LEGAL AND LIABILITY ISSUES
ASSESSED AND DOCUMENTED
Methodology

There was a different approach in each task, as the object of each objective was fundamentally different.

On sub-activity 5.2, regarding the assessment of the business model, the analysis focused on voyage charterparties, as it was considered to be a good start for the validation stage of the project, due to the fact that the optimisation concept fits in better to the voyage charterparty concept than to time charterparties. The Activity leaders suggested that the identified knock-on effects on other commercial obligations like the sale contract or on documentary credits would be dealt with in the next stage of the project in more detail. The research on voyage charterparties began by examining how the optimisation introduced by STM affects the obligations under a widely used standard form. The form in question was GENCON 1974, and the key aspects that could be affected by STM have been identified and commented on in an individual report. Other forms were also examined, and in order to address some of the issues that were identified, it was found to be essential to draft an STM Clause. To this end, the Baltic and International Maritime Council (BIMCO) joined the project, and an innovative STM Clause was produced, along with the relevant explanatory notes, which can be found in the "suggested changes to the business model" part of the report. The STM Clause, in the same part B of the report, mainly addresses issues of speed and exchange of information arising from the use of STM.

On sub-activity 5.4, the assessment of the regulatory framework, each convention implementing the obligations of UNCLOS was examined carefully in order to assess how the optimisation introduced by STM fits in or conflicts with its provisions. To this end, not only the text of the conventions themselves was taken into account, but also preparatory documents, secondary sources and current statements by States and organisations. The report is a compilation of the key findings of the legal research from the entire international maritime law framework. However, an individual report has been produced dealing with each convention in further detail, so that any reader wishing to go into more detail can refer to the Annex, where all the detailed reports are contained. A key component in the methodology has been the project meetings and the work camps. During these meetings the Southampton team presented its findings and exchanged ideas, obtained feedback and provided its view and plan about the progress of the legal validation of the project. The variety of backgrounds of the project partners and the stakeholders attending these meetings has been of great assistance in ensuring that the report covers the operation of STM from all potential aspects.

Before proceeding to the main part of the report, it is essential to refer briefly to the STM services, as the report will analyse their operation and their relationship with the international maritime law framework.
General Information

STM Services

Route Cross-check

The intended voyage plan is sent to a shore based service provider for cross-checking. The purpose is to include updated regional area information that could affect the ship’s voyage plan. The cross-checking can be done before the vessel’s departure or before arrival at a certain geographical area. The cross-check can include, but is not limited to, Under Keel Clearance (UKC), air draught, no violation of no-go areas, MSI and compliance with mandatory routeing. No optimisation service as such is included in the route validation.

Route Optimisation

The route optimisation tools will be different in nature with a common purpose to provide more information for the navigator on board. The STM concept will provide the means to get the ship’s route optimised from different service providers. The service providers have different focus including best route regarding: the weather forecast, surface currents, fuel consumption, no-go areas regarding draft, areas with sensitive nature, conflicts with other ships’ routes etc.

Ship to Ship Route Exchange

Introducing route exchange ship-ship will give the intentions of other ships. The route exchange will solely introduce a new tool which helps the Officer of the Watch to plan ahead, foresee possible dangerous situations and reduce route detours due to traffic conditions.

Nothing in the current “navigational process” will be changed, the master is still responsible and COLREGS are always in force. The route exchange should be used to avoid close quarter situations.
Navigational Warnings

With the new Baltic Navigational Warning Service, navigational warnings can be sent directly to the on-board ECDIS via digital communication, machine to machine. The new service allows warnings to be sent only to those affected and deleted when no longer relevant, thereby offering greater accuracy, relevance and less administrative burden and, thus, increased safety at sea.

Enhanced Monitoring

Enhanced monitoring will be supported by adding route information and a more detailed service than any present VTS can provide; shore centres will be able to detect if planned schedule is not kept or if the ship deviates from a planned route. Thus shore centres can monitor that ships are following their planned route and also foresee possible dangerous situations and suggest route modifications (geographic and/or speed) due to traffic or other impeding conditions.

Port Call Synchronisation

To make sure that the ship does not arrive before the port is ready, the ship and the port exchange estimates in order to find the first available time when all resources to handle the port call are available. This is made as early as possible to let the ship adjust the speed and possibly save fuel. The ultimate goal is for all ships to arrive just-in-time, and thus remove the need for anchoring.

Port Call Optimisation

The key actors within a port call make their plans transparent to the others. Transparency automatically leads to efficiency in the whole process chain. By sharing their plans, the port actors increase predictability and create just-in-time processes; not only the arrivals and departures of ships, but just-in-time operations all through the port call and further on just-in-time integration with hinterland transportation leading to optimised turnaround processes. This leads to improved resource utilisation for all port actors concerned.
Winter Navigation

Information regarding best route, waiting positions, preparations for assistance, position in convoy, time for departures from port is important for icebreaking services. The information should preferably be transmitted directly to the ship’s navigation system.

Introducing route exchange will give both icebreaker services and assisted ships better information in more automated procedures reducing workload and risk of misunderstandings.

Importing Pilot Routes

By importing and merging the approach routes when planning the ship’s route, replanning is avoided. It also means that the bridge officers and pilots will have a shared mental model of the voyage during the piloting stages of the voyage.

The service is currently available for all Swedish and Finnish ports.

SAR – Search and Rescue

Introducing STM in SAR services will greatly improve the Maritime Rescue Co-ordination Centres (MRCC) overview and possibility to control SAR units in search operations. The MRCC will be able to send areas and routes to SAR units, which will be directly visible in the electronic charts on-board.
Introduction

This report is part of Milestone 23, which is part of Activity 5 (Analysis and Evaluation) of the Sea Traffic Management (STM) Validation project. It deals with the following issues: it will (A) provide the key findings of the research on the legal feasibility of the STM, then it will (B) discuss the potential effect STM will have on the business model of shipping, while providing alternative solutions for any legal or commercial hurdles. It will also (C) refer to the cyber-security aspect from a legal point of view, and how the EU framework is interlinked with the operation of STM.

In this introduction it is essential to refer to the objectives of the legal research, and to the features of STM, as throughout this report the analysis will refer to them. Starting from those objectives, the major task of sub-activity 5.4 was to evaluate the consistency of the STM concept with the international maritime law framework. The legal research also had to specify the obligation to carry and use STM, especially who would be responsible for implementing STM. This is examined by referring to the zones of sovereignty and jurisdiction under the United Nations Convention on the Law of the Sea (UNCLOS).\(^1\) Another important objective was the evaluation of the effects of the STM concept on civil liability for accidents at sea through collisions, a part which was further developed into an academic paper published by some of the authors of this report.\(^2\) The evaluation of the present arrangements for Search and Rescue (SAR) and their consistency with the STM concept was also another objective, which was mainly done by analysing the operation of the STM SAR tool and how this would interact with the SAR Conventions.

The second main objective of the legal research was the tasks of sub-activity 5.2, which deals with the effect that STM will have on the business model of shipping. The legal research had to identify the relevant charterparties (CP) and business models, study and analyse the effects of STM on the relevant CP and business models of the involved key stakeholders as well as study and analyse the effects of STM on standard-form CPs, which are extensively used by the shipping industry.

However some additional work has been done, beyond what was contractually undertaken. The legal analysis was extended to the cyber-security obligations of STM, as well as to EU policies that support the optimisation of shipping.

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Furthermore, an article has been accepted for publication in the Journal of Navigation on the legal treatment of information technology in navigation and its regulatory and liability aspects, a version of which was also presented during the 9th International Conference on Maritime Law in Shanghai.

The legal feasibility of the STM

STM, as a form of exchange of navigational information, is feasible from all aspects of international maritime law. The United Nations Convention on the Law of the Sea provides for certain obligations which are implemented in various other conventions. These obligations are divided into ones concerning Safety of Navigation, Protection of the Environment and Manning and Training. These obligations, although separate, are interlinked and interconnected, as appropriate training and manning is connected to safer navigation, and safer navigation takes into account protection of the environment. It has to be underlined that STM is feasible and there is nothing legally contradicting the use of STM. There are commercial concerns, however, expressed by a leading shipowner’s association, relating to the use of ship-to-ship route exchange. This cannot be considered as a legal obstacle stricto sensu, however it may have some legal ramifications, as will be shown in the part of the report relating to the liability issues of STM.

As regards the obligations that arise directly from UNCLOS and not through the conventions implementing it, they focus on the following issue: the responsibility for the implementation of STM and the right to regulate its use. As far as internal waters including port areas and the territorial sea are concerned, the coastal State is responsible for the implementation of STM. Depending on the characterisation of the device providing the STM functionality on board the ship, the coastal State may mandate or forbid the use of STM for ships sailing in the aforementioned zones. It would depend on whether STM is considered to be “equipment” for UNCLOS purposes, which would then exclude it from the coastal State’s legislative powers. As regards the zones beyond the territorial sea (contiguous zone, EEZ, High Seas), the flag State would be responsible for STM’s implementation.

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3 For more on the matter, please see the UNCLOS report in Annex 1.
1. Safety of Navigation

Moving on to the first of the three main categories, namely Safety of Navigation, a series of conventions were examined in order to assess STM’s feasibility. These conventions were: SOLAS,\(^4\) COLREGS,\(^5\) FAL,\(^6\) Salvage 1989,\(^7\) SAR 1979,\(^8\) INMARSAT,\(^9\) COSPAS SARSAT,\(^10\) SUA 2005\(^11\) and the STPS Agreement.\(^12\) The analysis of each convention can be found in the Annex, and this part of the report will highlight the key findings of the legal research.

As far as the conventions on Search and Rescue operations are concerned (SAR, INMARSAT, COSPAS-SARSAT), there is no issue of conflict, and in fact, STM’s SAR tool can have a positive impact on achieving the goals of these conventions, because the SAR tool will share the prescribed (IAMSAR) routes of the other users, so that there are no duplicate routes and a larger area can be covered quicker. The FAL Convention poses no impediments to STM, and actually some of its features can assist in the more effective implementation of this Convention. Port Call Synchronisation and Port Call Optimisation can assist in minimising the waiting time in port, a key objective in a convention that, since the Single Window amendments, promotes the electronic exchange of information. The Single Window environment aims to expedite the information flow between all parties involved in cross-border trade, and FAL was amended in order to facilitate that concept.

The International Regulations for Preventing Collisions At Sea 1972 (COLREGS), as amended, do not forbid the use of the STM in any way. The research undertaken indicates that the STM concept, as presently described, is not formally in conflict with the COLREGS and can assist in achieving safer navigation by enabling navigators to avoid close quarters situations.

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\(^4\) The International Convention for the Safety of Life at Sea 1974 (SOLAS), (adopted on 1 November 1974, entered into force 25 May 1980) 1184 UNTS 278


\(^8\) International Convention on Maritime Search and Rescue, adopted in Hamburg on 27 April 1979, entered into force 22 June 1985, 1405 UNTS 97. Its latest amendments were issued on 20 May 2004 through MSC.155(78)


\(^10\) The International COSPAS-SARSAT Programme Agreement, adopted in Paris on 1 July 1988 and entered into force on 30 August 1988, 1988 UNTS 210


The introduction of other technologies provides robust guidance for the proper use of STM. It has to be underlined that the use of new technologies cannot supersede the Collision Regulations. The duty of good seamanship is the primary precaution against collision risks and COLREGS provides the general standard for discharging this duty by prescribing, to the extent possible, the appropriate behaviour of ships at sea. COLREGS (Rule 2) accepts that the departure from a rule is permissible, where adherence to the rules would result in a collision, and a violation of a rule would avoid it.13 Maintaining a proper look-out (Rule 5) and safe speed (Rule 6) are important navigational duties that need to be discharged by all ships under all conditions of visibility. Both require improved situational awareness, which must be optimised, according to extensive case law, with whatever information and means available.14 Therefore, if information technology can provide improved situational awareness, and it is available, then it should be used by navigators. The duty of good seamanship demands it.

The annexed report on the COLREGS15 provides an analysis on each individual rule and how the use of STM may affect it.

A concern raised refers to misuse and potential overreliance on the STM concept, in particular, in relation to ship-to-ship route exchange. This concern must be addressed through appropriate training and navigational systems integration. However, it is not a legal inconsistency with existing navigational rules but rather an issue concerning the shipowners’ obligation and duty to make the navigation of their ships safe.

The International Convention for the Safety of Life at Sea (SOLAS) is highly relevant, as its chapter V deals with the safety of navigation, which has some provisions of interest for the STM. Regulation V/19 provides a list of shipborne navigational systems and equipment16 that ships should carry and specifies the function each system and piece of equipment must serve. Whichever way the information is provided to the ship, it must be displayed either on an existing console on the bridge, or on a separate dedicated display. In addition, there is the possibility of using “other means” to perform the required function but such means must be approved by the national administration (SOLAS Regulation V/19(3)). All systems “shall be so installed, tested and maintained as to minimize malfunction”. (SOLAS Regulation V/19(4))

13 The Boanerges and Anglo-Indian (1865) 2 Mar L Cas (OS) 239; The Ida and Wasa (1866) 2 Mar L Cas (OS) 414; Handayside v Wilson (1828) 3 Car&P 528; The Lady Belle [1933] P 275; Marsden (2016) para. 5-113.

14 “The Court holds that Noordam (the vessel) should have kept a better look-out both visually and with the highly sophisticated equipment onboard.” Hal Antillen N.V. v Mount Ymitos MS 147 F.3d 447 (5th Cir. 1998) p. 451.

15 See Annex: International Regulations for Preventing Collisions at Sea 1972, as amended (COLREGS 1972) and STM

16 “Equipment” is not defined under SOLAS. UNCLOS Article 21(2) constrains coastal States from regulating the “design, construction, manning or equipment of foreign ships unless they are giving effect to generally accepted international rules or standards.” UNCLOS Article 94 imposes flag state responsibility on the High Seas.
Every new information system must be compliant with these requirements, which are normally embedded in the far more detailed requirements of IEC (International Electrotechnical Commission) and ISO (International Organization for Standardization). However, if the new information (e.g. real-time meteorological data) is overlaid on an existing screen, which is part of standardised equipment, for example ECDIS, the additional functionality is likely to render the equipment non-standardised and non-approved. This would then require further testing of the equipment to confirm two things: First that the new data stream does not affect the performance of the already standardised functions of the equipment. Second, that, a failure of one of the functions will not result in the loss or malfunction of the other functions. Failure to go through such a process could provide the basis of intervention by port authorities and could lead to demands to use solely standardised equipment, with a possibility to detain the ship. Currently, during certification, any additional functionality introduced by manufacturers is inspected to ensure that it does not interfere with the official requirements, although this does not avoid accidents arising from incorrect settings of such functionality.

The alternative option, that of displaying data onto a new dedicated console, is not illegal because SOLAS does not prescribe an exclusive list of equipment that should be available on the bridge. It does however require that the new console does not usurp any of the functions of the system or equipment prescribed by V-19 or be deemed to be an AIS-by-other-means exchanging data with shore-based facilities pursuant to Regulation V-19 2.4.5.4. At the same time, such an option does not make the usage of the new console unregulated.

Finally, as regards the last two conventions, the STPS Agreement has no potential overlap with STM and as far as SUA 2005 is concerned, being an anti-terrorist convention, it could become relevant only in very exceptional circumstances, i.e. cyberattacks with an intent to endanger navigation, which are analysed in the specialised annexed report.

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17 Standards for ECDIS require: “Nor should the connection of optional equipment degrade the performance of ECDIS below this standard” Resolution 232(82) paragraph 15.11. See Resolution 823(19), Paragraph 3.9.1 for ARPA. SOLAS Regulation V-19 (6), provides for segregation: Integrated Bridge Systems shall be so arranged that failure of one sub-system [...] does not cause failure to any other sub-system.
2. Manning and Training

Another requirement, which is interconnected with the introduction of STM, as with any new technology, is that the navigator is trained in the new functionality. As far as training and employment are concerned, the STCW Convention and Code were examined, along with the MLC, in order to assess if there is any formal requirement or impediment in this respect. The legal research concluded that insofar as the STM is not standardised and its use remains on a voluntary basis, there cannot be any formal training requirement. If the STM functionality or an STM device is standardised, then the STCW might involve some formal training requirements for seafarers that serve on board STM ships. As far as the MLC is concerned, the STM is not in conflict, as it will not affect the working arrangements or increase the working hours. Provided that the formal training requirements are abided by, and that the STM does not render the ship an unsafe environment to work in, the STM is fully compliant with the MLC. Both these conventions are analysed in their individual reports that can be found in the Annex.

18 There are many Marine Accident Investigation Board reports relating to accidents associated with the introduction of new technology, however all of them have to do with improper use and insufficient training. In particular, human errors in the usage of the system (CFL Performer, SLS Thames, Ovite, Commodore Clipper, Muros), as there were serious issues with the way the use of ECDIS was conducted. Thus the audible alarm was inoperative due to user settings (CSL Thames, Ovit, Commodore Clipper, Muros), the crew was either untrained (CFL Performer) or incompetent in its use (CSL Thames, Ovit), while in some the safety warnings were off, with the usage being in contravention of regulatory but more importantly, the manufacturer’s requirements (CFL Performer, Ovit, Commodore Clipper, Muros).

19 1978 International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, as Amended by the 2010 Manila Amendments to the Annex (STCW 78), (adopted on 7 July 1978, entered into force 28 April 1984) 1361 UNTS 190

3. Protection of the Marine Environment

The conventions that have been examined, in order to assess the compliance with the framework for the protection of the marine environment, are MARPOL,21 the Convention on Biological Diversity (CBD),22 the INTERVENTION Convention with its protocol on HNS,23 OPRC 1990 with its protocol on HNS,24 the Nairobi Convention for the Eastern African Region,25 and finally the UNFCCC 1992 with the subsequent agreements of Kyoto on 199727 and the Paris Agreement.28 There is nothing precluding STM's implementation in these conventions and recent developments in the IMO support the implementation of optimisation projects like STM.

MARPOL, being the cornerstone of the marine environmental law edifice, was at the epicentre of the research on the compliance of STM with environmental instruments. There was no significant overlap, other than the waste and sewage disposal process, which is a parameter that has to be taken into account during the optimisation of the voyage by STM. A development that was relevant to MARPOL's Annex VI and to UNFCCC, Kyoto and the Paris Agreement is that on 12 April 2018 IMO's Marine Environment Protection Committee, during its 72nd session, discussed the reduction of GHG (Greenhouse Gas) emissions from ships. The working group concluded an Initial Strategy, which aims at enhancing IMO's contribution to global efforts by addressing GHG emissions from international shipping, identifying the appropriate actions for the international shipping sector being mindful of the impact on States and at identifying measures appropriate to achieve these objectives including incentives for research and development. This strategy suggested some measures by dividing them according to their implementation timeframe to short-, mid- and long-term measures.

One of the short-term measures suggested is to “consider and analyse the use of speed optimization and speed reduction as a measure, taking into account safety issues, distance travelled, distortion of the market or trade and that such measure does not impact on shipping's capability to serve remote geographic areas”. This measure can be achieved by the implementation of optimisation projects like STM, which not only focuses on optimisation, but is also mindful of serving remote areas (development of Winter Navigation) and of any market distortions (development of business model and collaboration with BIMCO).

22 Convention on Biological Diversity (adopted on 5 June 1992, entered into force 29 December 1993) 1760 UNTS 79
23 International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties (adopted on 29 November 1969, entered into force 6 May 1975) 970 UNTS 211
28 The Paris Agreement (adopted on 12 December 2015, entered into force 4 November 2016)
It has to be noted however, that the addition of the “market distortion” parameter is hindering optimisation, as the current business model of shipping has deleterious effects on the environment, with the CO2 levels constantly rising. It is inevitable that a change in the process and the chain of international trade will be a distortion to the current practice, nevertheless it might have to be an essential distortion, as the current business model is not sustainable from environmental point of view.

As regards the preservation of protected areas, as required by Article 8 of the CBD and other conventions such as MARPOL and UNCLOS, this could be assisted by the implementation of STM, as Route Optimisation along with Enhanced Monitoring and the Navigational Warning feature, can transmit and inform the stakeholders in the STM ecosystem about the boundaries of such areas and the activities restricted. In other words, it could display information relevant to these areas to assist in implementing them better.

For the several conventions that have an environmental or navigational aspect but have not been mentioned yet, please refer to the part of the report that analyses how STM affects the various liability regimes.

4. The liability issues of STM

STM will not change anything in the existing liability regimes as set out by international maritime law. The liability on people that cause damage, as well as the ability of those who have suffered it to recover, will remain unaffected. What could change by STM is that there might be alternative routes for the victims of certain kinds of damage to recover from third parties, depending on the interpretation of a certain exception and on the legal characterisation of STM.

In order to examine STM’s effect on the existing liability regimes, several conventions were put under scrutiny. These conventions are the IOPC Conventions (CLC,29 FUND,30 BOPC,31 HNS Convention32), the LLMC 1976,33 the 1910 Collision Convention,34 the Athens Convention and Protocol,35 the Convention on Civil Liability for Oil Pollution Damage (adopted on 29 November 1969, entered into force 19 June 1975), 973 UNTS 3

29 International Convention on Civil Liability for Oil Pollution Damage (adopted on 29 November 1969, entered into force 19 June 1975), 973 UNTS 3


35 Athens Convention relating to the Carriage of Passengers and their Luggage by Sea (adopted on 13 December 1974, entered into force 28 April 1987) 1463 UNTS 19
from Nuclear Damage, 36 and the Nairobi Wreck Removal Convention. 37 The latter four conventions do not pose any impediments or have any issues that need to be referred to here, however an individual report has been produced for each of them that can be found in the Annex.

There are two main issues on liability: The first relates to the limitation of liability and the second to an exclusion clause, which can be found in almost all of the aforementioned conventions. 38

Arguably, the biggest challenge the STM has to overcome from a legal perspective arises out of the concerns for the use of ship-to-ship route exchange. A leading shipowners’ association expressed some concerns about ship-to-ship route exchange, as in their opinion, which of course can change, it is a feature adding difficulties in the assessment of a collision situation. Based on that scepticism, there is room for an argument that a shipowner might not be able to limit his liability, based on this characterisation of ship-to-ship route exchange.

However, this is just a potential argument, which is not conclusive, as it is also dependent on the views of national administrations or classification societies on the matter. In such a case, other charterers and managers are protected, as they are not involved with the navigational aspect of the ship. This is analysed further in the LLMC 1976 report, which can be found in the Annex.

The CLC establishes strict liability for the registered shipowner of a tanker carrying persistent oil in bulk cargo. The otherwise strict liability of the shipowner is, however, excluded under Article III (2)(c) of the CLC, if the pollution incident took place due to a failure of the authority responsible for the “maintenance of lights or other navigational aids in the exercise of that function.” This exception of the shipowner’s liability originally appeared in the CLC, but has been copied verbatim in several other liability conventions. These include the 2007 Nairobi Wreck Removal Convention (Article 10(1)(c)), the 2001 Convention on Bunker Oil Pollution Damage (Article 3(3)(c)), and the HNS Convention (Article 7(2)(c)). The reading of the provision suggests the term is referring only to failure in the maintenance of navigational aids external to the ship. However, there is case law suggesting otherwise.

The Tsesis, a Swedish Supreme court decision, concerned a ship’s grounding that led to oil pollution covered by the CLC. The Tsesis has been repeatedly characterised as a controversial case (Gauci 1997; Tiberg 1984; Gunasekera 2010). The shipowner raised a defence against the imposed strict liability by arguing that the incident was attributable to the failure of Sweden to update the charts of the area where the accident took place. The court examined whether this failure fell under Article III (2)(c) thus exempting the shipowner from liability. The Swedish Supreme Court held that the exception to the shipowner’s liability under CLC Article III (2)(c) was applicable, because the maintenance of navigational aids included hydrographical surveying for the purpose of producing new charts.

38 An extensive analysis of the exclusion clause issue can be found in the article cited in fn 2.
This aspect of the judgment was highly debated, as 3 judges dissented as to the character of charts as a “navigational aid”. (Tiberg 1984). The court tried to interpret the provision by considering which navigational aids can be subject to “maintenance”, and whether charts fell under this category. It has been suggested that if the fault alleged is a failure to establish or improve navigational aids, this is distinct from a failure to maintain them.

The Tsesis suggests that navigational aids within the CLC context may or may not be on board the ship, an interpretation which contrasts both with the UNCLOS and the IALA definitions of “navigational aids”. An effort to overcome this confusion has been undertaken by the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA), which has provided definitions of what is a “navigational aid” and what an “aid to navigation”. The distinction is based on the location of the device assisting navigation. “Navigational aids” are on board while “aids to navigation” are not (IALA 2018). Mariners and engineers actually use the term ‘Aid to Navigation’ or ‘AtoN’ when they refer to a buoy or lighthouse, things which can be effectively charted, while they consider the onboard equipment as navigational aids.

Despite this practical support of the IALA’s definition, this distinction cannot automatically be applied to pre-existing international conventions and therefore the confusion cannot be resolved in this way.

**Suggested changes to the regulatory regime**

The call for co-ordination and standardisation has two significant consequences. First, it delays the introduction of information technology on the ship’s bridge. The IMO regulatory mechanism, developed for the introduction of minimum standards for all ships, is thus used in a way that hinders the quick development of better, safer and more efficient ships. The second consequence is that any competitive advantage for companies that wish to invest in such technologies is removed, because they cannot reap the benefits of innovation. It is submitted that for an area of development like the use of information technology, where improvements can be rapid, standardisation is not the way forward, as the optimal way for the use of such information is yet unknown.

Thus, a more flexible regulatory system is required, which will facilitate the services. In other words, we need less regulation and a quicker adaptive process for the adoption of new technologies. The overarching principle is and should remain: Navigation must remain safe. Additional information must be used because this makes navigation safer. The current regime is delaying the use of additional information, which means that it delays a higher safety benchmark in navigation. If we take training into account, which inevitably will delay any introduction, as the seafarers have to be trained in order to ensure a safe use of the new technology, the prescriptive approach, which is currently the norm, appears to be even more problematic. Another potential solution, which could provide more autonomy to the shipowners, is the addition of a technological officer on board ships, who would be responsible for handling the electronic information and the exchange of information and routes with the shore centres. Finally, there has to be a formula so that ports will share the benefits gained by the reductions of GHG emissions, which is an issue mainly relating to Port CDM and berth-to-berth synchronisation.
In addition to the scepticism which arises from perceptions created by accidents linked with the introduction of technology in the past, there are important regulatory and liability issues worrying the owners and the operators of ships that need to be clarified. There are two interconnected legal issues: The first concerns the regulatory path that needs to be followed for new information streams to be introduced on the bridge. The second issue concerns the liability associated with their use and the link of this liability to the way the data is provided to the ship.

Safety of navigation has significantly improved with time as a result of better situational awareness obtained through the use of new instrumentation, better training for navigators, safety management approaches, traffic separation schemes and shore control centres. Additional navigational information, can, if properly utilised, further improve the situational awareness of the navigator.

There are two main scenarios for the provision of the information to the ship. In the first scenario, the provision of information is undertaken by national or international authorities. This scenario corresponds to a sea traffic control system putting the burden for accurate and useful information on a traffic control centre and leaving to the master the task of decision-making, without much consideration of the quality of information provided. The other scenario involves the voluntary sharing of information between ship operators and navigators. The first scenario will face the problem of differential capabilities coastal States have in setting up and maintaining such a system. It will also pass on the cost of its development and maintenance to taxpayers. The second scenario avoids the two aforementioned problems, but involves a risk of having unstandardised and therefore mixed-quality information.

Both methods of displaying additional electronic information promote standardised solutions over competition for continuously improving products and efficiency. This slow prescriptive regulatory regime, a characteristic of shipping and the IMO, removes the competitive aspect of investment in technological development within the shipping industry. It follows that, if information technology developments in shipping are to be encouraged, it is essential to establish a less prescriptive and more performance-based approach for new systems, which would facilitate the quick adoption of information technology and encourage service providers and shipowners to invest in it.

One argument against the introduction of new data streams on the bridge suggests that the additional information would confuse navigators and distract them from the use of traditional means, thus increasing accidents. This makes it necessary to look at the role of training and at the rules on safety of navigation. Perhaps a wealth of additional information may require an additional dedicated bridge officer in order to ensure that the safety advantages materialise. If increased navigational safety can be achieved in this way only, then the applicable norm suggests that such a solution should be adopted. On the other hand, shipowners would raise a counterargument about the financial costs. It is, however, arguable that taking bureaucratic tasks away from the bridge officers and performing them ashore could create the necessary financial room to support the increases in safety. As regards the alleged risks concerning the transitional period, despite being real, they cannot be sufficient to delay the use of information for safer and more efficient navigation.
Finally, the confusion with the terminology on “navigational aids” and “aids to navigation”, an important legal issue for the characterisation of STM, could be resolved. It has been suggested that the focus of the definition should be on the method of provision of information instead of on the location of the device that assists navigation. For the operation of the CLC Article III (2)(c) exception the question should be on whether the cause of the pollution damage was exclusively a failure of maintenance by a government. Whether it concerns charts, beacons or electronic signals, to the extent that these were deficient and the exclusive cause of the pollution damage, the shipowner was intended, under the CLC, to be free of liability. When navigational information is generated onboard by direct observation, for example by a magnetic compass or a radar, then any malfunction should fall on the shipowner and such failure cannot lead to his exemption from liability. However, with other systems, the answer is more complicated and depends on whose failure has caused the accident. Where, for example, the location of the ship, obtained through (Global Navigation Satellite System) GNSS, is transmitted from the ship to other ships under a compulsory requirement of AIS operation, the failure of the AIS transmission of one ship cannot be argued as being a failure of a system of the receiving ship. In such a case the liability under the CLC would not, however, be exempted, unless the failure of transmission is a failure by a government or authority in the maintenance of such a system. This requirement could perhaps be satisfied where the AIS signals are redistributed by a sea traffic centre operated by an authority.

The business model and STM

The main focus on this validation stage was to examine the effect that STM would have on the obligations arising out of a voyage charterparty. To this end, several standard-form charterparties have been examined, in order to see the way the optimisation introduced by STM would affect the underlying obligations. Of course this is only the first step, as there is a knock-on effect, because vessels are commonly sub-chartered, which could be via a time charter or another voyage charter. It has to be borne in mind that the knock-on effect extends to the obligations of the underlying contract for the sale of goods, as well as its finance, through letters of credit. The commercial and legal arrangements of international trade are in the background of any shipping scenario. In fact, shipping as we know it would not exist if it were not possible to enforce performance of sale contracts. The link between shipping and trade is so close that it is in fact almost invariably the case that any problem, accident or delay arising in relation to the ship and its voyage will have a knock-on effect on the underlying sale transaction. In order to understand fully the consequences of any given shipping scenario, it is crucial to understand the sale contract behind it. As was mentioned in the introduction, it was agreed that the work on business models would focus only on voyage charterparties, leaving that knock-on effect for a future stage of the project.

39 ibid
40 This effect is to be achieved through the exception under CLC Art. III.2(c) or through the recourse preserved under Art. III.5 but, we argue here, it serves better the spirit of the 1992 CLC if it operates through Art. III.2(c). In such a case it will also exclude liability for pollution damage following such fault of any government whether party or not to the CLC.
The main areas of a voyage charterparty that were identified by examining GENCON 1974, GASVOY 2005, BIMCHEMVOY 2005 and TANKERVOY 87 were the following:

- Deviation (GENCON 94 cl 3, GASVOY 2005 cl 21, BIMCHEMVOY 2008 cl 31, TANKERVOY 87 cl 21)

- Due despatch (GENCON 94 cl 2, GASVOY 2005 cl 2, BIMCHEMVOY 2008 cl 3, TANKERVOY 87 cl 3)

- Laytime and Demurrage (GENCON 94 cl 6-7, GASVOY 2005 cl 7-11, BIMCHEMVOY 2008 cl 11-12, TANKERVOY 87 cl 9-10)

- Notice of Readiness (NOR) (GENCON 94 cl 6, GASVOY 2005 cl.2, BIMCHEMVOY 2008 cl 3, TANKERVOY 87 cl 3)

- Safe Ports (GENCON 94 cl 1, GASVOY 2005 cl 2, BIMCHEMVOY 2008 cl 3, TANKERVOY 87 cl 3)

- Ice (GENCON 94 cl 18, GASVOY 2005 cl 22, BIMCHEMVOY 2008 cl 43, TANKERVOY 87 cl 3)

- War Risks (GENCON 94 cl 13, GASVOY 2005 cl 26(d), BIMCHEMVOY 2008 cl 34(d), TANKERVOY 87 cl 30)

The detailed analysis for the GENCON charterparty is annexed, but the key findings from examining the clauses in these charterparties will be reported in this section.

The first obligation that comes to mind, when examining a voyage charterparty and a system that amongst others provides route optimisation, is the obligation not to deviate. GENCON 94 has the older version of deviation clauses, where deviation is allowed for the purpose of saving life and/or property and to provide assistance to other vessels, while giving the liberty to call at any ports. BIMCO’s new Liberty and Deviation Clause is significantly longer and provides for deviation for any other reasonable purpose. The examination of the various charterparty clauses along with English case law on the matter strongly suggests that the route optimisation introduced by STM could not amount to deviation. The reason is that it will provide for routes that will circumvent navigational hurdles along the way, like meteorological conditions, traffic or adverse currents, which could not amount to deviation, as Cooke suggests that vessels can travel in different ways from point A to point B,41 and they are not confined to a specific route. If however there is an exceptional circumstance where the charterparty provides for a particular route to be followed, the master should disregard any alteration of the contractual route, if it is provided by STM.

As regards safe ports and notice of readiness (NOR), the examination of the clauses, along with the general principles of English law, bearing in mind the operation of STM, concludes that these two obligations could be observed better by the operation of STM. As far as safe ports are concerned, the operation of STM is only going to make them safer, as the navigator will know well in advance about any potential issues, and due to Port Call Synchronisation, his movements in the port will be monitored by more people that have interests in his port call, such as the terminal, linesmen, pilots etc.

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Similarly, the validity of the NOR, a key issue in Laytime and Demurrage disputes, will be benefited by the introduction of STM, as not only can a new standardised form be introduced, but also the accuracy in the determination of the position for obtaining the status of an “arrived ship” is expected to increase.

It is apparent to anyone even remotely familiar with the shipping world that a project that has as a main objective the constant communication of the stakeholders, in order to impose a regime of optimum speed (either by slow steaming or speeding up), in cases where there are known and inevitable delays or sudden openings in the port of destination, will affect the Laytime and Demurrage as well as the cancellation provisions of a voyage charterparty. This issue is discussed in more detail in the suggested solutions section, as the legal team of the STM has been collaborating with BIMCO and an STM Clause has been developed, in order to address the legal issues pertaining to optimisation and port calling. The STM Clause is created in order to be used in voyage charterparties, addressing some of the issues that might be created by the use of STM. The Virtual Arrival Clause, which has been analysed in detail in the GENCON report, has been the starting point in that clause, but there were some issues that are introduced by the new, innovative clause.

**Suggested changes to the business model**

The current business model of shipping as it stands is not embracing optimisation. Many aspects of shipping cannot encompass the changes introduced as the industry is currently focused on generating profit by strictness and inefficiency, with the examples of the shipment window and the laytime and demurrage both under the carriage and the sale contract being indicative of the commercial status quo.

Voyage optimisation relies on the availability and sharing of information. This is central to the workability of the provision with parties required to use “best endeavours” to obtain and exchange information about a vessel’s arrival time. The clause is binding only between the contracting owners and charterers. However, the obligation means that information which either party may have under STM arrangements or other relevant facts that might impact on the vessel’s arrival should be exchanged. This might, for example, include owners’ knowledge of weather conditions en route, pilotage delays or a tug strike and matters known to charterers including local cargo handling delays and labour shortages as well as matters beyond the port confines such as known problems with road transport.

In order to make progress in this field, BIMCO was invited to develop a functional contractual clause for use with voyage charter party forms. BIMCO provisions are normally drafted to allocate obligations, liabilities, risks, costs and expenses in relation to defined commercial needs or regulatory requirements. However, in order to encourage parties to take part in the STM validation project, the clause has been developed to provide interested parties with a balanced contractual regime for use with STM arrangements. Current transport arrangements and procedures mean that waiting time cannot be eliminated. However, slowing a vessel down or speeding up to arrive at a given time can enhance voyage efficiency leading to improved logistics management. Shorter waiting periods may also lead to lower emissions.

The content departs from the traditional BIMCO approach as it identifies STM as a named system rather than setting out procedures in conceptual terms. This was a policy decision due to the increasing use and understanding of STM as a shipping industry term and the possible future use of the clause with other similar systems.
The clause addresses only issues of speed. Requests from charterers for re-routeing or a change of port rotation must be dealt with under the appropriate provisions of the underlying charterparty. In the absence of covering charterparty provisions, requests should be dealt with on a case-by-case basis taking P&I Club or other legal advice as necessary.

**BIMCO Sea Traffic Management (STM) Clause for Voyage Charter Parties**

(a) The Owners and Charterers shall use their best endeavours to obtain and share information regarding the Vessel's Arrival Time, this shall include, but not be limited to, information from, or required by, an applicable STM system. For the purpose of this Clause, “Arrival Time” means the time of arrival at the place advised by the STM system.

(b) Notwithstanding any other clause in this Charter Party, the Charterers shall be entitled to request the Owners in writing to adjust the Vessel's speed to meet the Arrival Time, always subject to the Owners’ consent which shall not be unreasonably withheld and, in the case of an approach voyage, subject to agreeing an amended cancelling date. The Charterers shall not be entitled to request an adjustment of speed that exceeds the Vessel’s speed as set out in the Charter Party.

(c) Any extra time used on a sea voyage as a direct consequence of the Vessel adjusting speed pursuant to the Charterers’ request shall be compensated by the Charterers to the Owners at a rate equal to ___ % of the demurrage rate (if left blank then fifty per cent (50%) shall apply).

(d) The amount of extra time used shall be agreed by the parties, and compensation under Subclause (c) above shall be payable by the Charterers to the Owners, prior to completion of final discharge. Failing such agreement, the amount of extra time used shall be determined by ______________ (“the Expert”), who shall act as an expert and not as an arbitrator and whose decision shall be final and binding upon the parties. Such Expert shall reach a determination, using such data and evidence as deemed appropriate, and which the parties are required to provide, within 30 days of completion of discharge. Payment shall be made by the Charterers immediately on receipt of the Expert’s determination. The costs of such Expert shall be shared equally by the parties.

(e) Where the Vessel proceeds at a speed adjusted in accordance with Sub-clause (b), this shall constitute compliance with, and there shall be no breach of, any obligation as to despatch and shall not constitute a deviation.

(f) The Charterers shall ensure that the terms of the bills of lading, waybills or other documents evidencing contracts of carriage issued by or on behalf of the Owners provide that compliance by Owners with this Clause does not constitute a breach of the contract of carriage. The Charterers shall indemnify the Owners against all consequences and liabilities that may arise from bills of lading, waybills or other documents evidencing contracts of carriage being issued as presented to the extent that the terms of such bills of lading, waybills or other documents evidencing contracts of carriage impose or result in the imposition of more onerous liabilities upon the Owners than those assumed by the Owners under this Clause.

(g) The Owners and Charterers shall give due consideration to environmental factors, including emission reductions, when determining the reasonableness of any orders given under this Clause.
Purpose of the clause

The STM clause is distinct from, and does not supersede or replace, the BIMCO Virtual Arrival Clause. It has been developed with its own features to meet the needs of STM arrangements.

It sets out a self-standing regime for voyage optimisation. The content is without prejudice to other provisions in the underlying charter party which must be read in accordance with the contractual terms. In particular, the STM clause does not affect, or eliminate, the requirement for a notice of readiness to be tendered in accordance with laytime provisions applicable under the charter party.

Voyage optimisation relies on the availability and sharing of information. This is central to the workability of the provision with parties required to use “best endeavours” to obtain and exchange information about a vessel’s arrival time. The clause is binding only between the contracting owners and charterers. However, the obligation means that information which either party may have under STM arrangements or other relevant facts that might impact on the vessel’s arrival should be exchanged. This might, for example, include owners’ knowledge of weather conditions en route, pilotage delays or a tug strike and matters known to charterers including local cargo handling delays and labour shortages as well as matters beyond the port confines such as problems with road transport.

The clause addresses only issues of speed. Requests from charterers for re-routeing or a change of port rotation must be dealt with under the appropriate provisions of the underlying charter party. In the absence of covering charter party provisions, requests should be dealt with on a case-by-case basis taking P&I Club or other legal advice as necessary.

Key features

- Charterers may request owners to adjust a vessel’s speed (up or down) to meet their required arrival time. However, a request for an increase must not be in excess of the agreed charterparty speed;
- “Arrival time” means the time when the vessel reaches the place advised by the STM system which, according to the contract and determined by the parties as part of their information-sharing commitments, may be at the berth, the pilot boarding place, anchorage or waiting place;
- Additional voyage time resulting from an adjustment in speed is compensated by charterers at an agreed percentage of the demurrage rate. If there is no agreement, a default figure of 50% applies;
- Benefits to charterers arise from the potential savings they can achieve by carefully managing arrivals to reduce waiting time and their liability for demurrage;
- At the time of agreeing the clause, owners and charterers must nominate a single named Expert (as opposed to an arbitrator) to determine the quantum of voyage savings made if an amicable settlement cannot be reached by the parties. The Expert must be provided with all necessary data and evidence and is required to reach a determination within 30 days of completion of discharge;
- Owners will not be in breach of their obligations for despatch resulting from any speed adjustment and are protected against claims from bill of lading holders or other third parties by an indemnity to be given by charterers; and
- it is expressly provided that the parties must take account of environmental factors and reductions in emissions when giving orders under the clause.

**Detailed provisions**

Subclause (a) requires owners and charterers to use “best endeavours” to obtain and share information from all sources to establish the vessel’s arrival time at the place agreed by the STM system;

Subclause (b) entitles charterers to request an adjustment to the vessel's speed with owners’ approval not to be unreasonably withheld, subject to agreeing an amended cancelling date on an approach voyage. A request to increase speed must not exceed the agreed charterparty provisions;

Subclause (c) provides for charterers to compensate owners at a stated percentage (or 50% if left blank) of the demurrage rate for any extra voyage time resulting from their orders to adjust speed;

Subclause (d) sets out the mechanism for determining the quantum of compensation either amicably between owners and charterers or by the Expert to be nominated by the parties when agreeing to incorporate the clause in their contract;

Subclause (e) provides that an adjustment in speed will not be a contractual deviation in breach of owners’ obligations as to despatch;

Subclause (f) requires charterers to ensure that all third-party documentation complies with the clause and to indemnify owners against any liabilities beyond those set out; and

Subclause (g) states the parties’ obligations to take account of environmental factors in relation to orders given under the clause.

**New and additional risks linked with cyber security**

The cybersecurity report provides an initial mapping of the Sea System Wide Information Management (SeaSWIM) components and STM actors to the legal definitions of the actors on whom security obligations are imposed by the EU legislation. Given that the STM validation project is still in progress, which entails that certain functions or technical details are not yet clearly defined, it should be noted that the assessment conducted is merely a preliminary assessment subject to review. In this regard, the report contains a questionnaire provided in Annex I that can serve as guidance for the developers of the project in order to appraise, from a technical perspective, whether the components and actors at stake could fall within the legal definitions of the actors on whom security obligations are imposed by the EU legislation.
The table below examines the various definitions of legal actors, who are subject to security obligations under EU Law, and whether such actors operate within the STM context.

<table>
<thead>
<tr>
<th>Definitions of legal actors subject to security obligations under EU law</th>
<th>Within the context of STM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronic communications service (Directive 2002/21/EC; Directive 2002/58/EC; COM/2016/0590 final; COM/2017/010 final)</td>
<td>N/A</td>
</tr>
<tr>
<td>Operators of essential facilities (NIS Directive)</td>
<td>STM operators of VTS, ships, ports and port facilities could be caught by the legal definition on the following grounds: i) the number of users relying on these STM services is estimated to be quite large considering not only the directly affected stakeholders but also the total number of users relying on STM services, which might also affect the geographical spread of an incident; ii) the impact of a potential incident, in terms of degree and duration, is likely to affect many activities depending on the services provided by STM actors since the discontinuity of services might entail severe consequences (e.g. reliance on falsified data may lead to a close-quarters situation or even a collision); iii) given that the STM is one of the largest e-Navigation projects in the world at the moment, the market share of STM actors would be arguably considerable.</td>
</tr>
<tr>
<td>Digital Service Providers (NIS Directive)</td>
<td>Application Service Providers (ASPs), which remotely host and manage software applications, could be characterised as digital services according to the definition provided in the NIS Directive and, more specifically, they may qualify as cloud computing services. STM services that either deliver virtualised computing resources across a network communication so that the users build their own IT platforms (IaaS), or provide environments for building applications (PaaS), also qualify as digital service providers, and thus fall within the scope of application of the NIS Directive.</td>
</tr>
<tr>
<td>Data controllers (GDPR)</td>
<td>The component of the SeaSwim architecture that validates user identities in order to enable them to provide and consume data and services within STM, that is, the Identity</td>
</tr>
</tbody>
</table>
Registry, stores and processes information relating to the users for identity management and authentication purposes. The crucial factor in assessing whether the data protection legislation is triggered in terms of the Registry’s processing activities lies in distinguishing between human and machine users. In case of a human user, the details processed by the authentication mechanisms include information that can either identify or be used to identify a particular individual, such as the username and password that are usually used for login purposes. Besides the login details that are processed for authentication purposes, the Registry also stores information of authorised stakeholders to ensure confidentiality in information transfer processes, such as the full name or email of the user, which also qualify as personal data and are subject to stronger protection mechanisms. In addition to storing and processing personal information, the Registry also meets the third identification requirement of the regulatory term ‘data controller’ as it appears to determine the purposes and means of the processing of personal data. More generally, each time a stakeholder is processing personal data they will be subject to data protection law.
Policies EU and Global for STM support

The research for policies under the EU framework was not in the contractual undertakings, however it was a request that emerged during project meetings, as the project partners were interested in whether there is some EU legislation that could be useful to STM, and whether the EU has competence to legislate on shipping or navigational matters.

To this end, a report has been produced, mapping the competence of the European Union to legislate on shipping or navigational matters, including the reference on some directives that could potentially be of interest to STM.

A directive that presents an interesting overlap with the STM concept is 2002/59 on ship monitoring.

EU Directive 2002/59/EC aims to establish a Community vessel traffic monitoring and information system. It shares some common goals with STM, namely the prevention of accidents and pollution at sea, as well as the improvement of efficiency and the optimisation of port calls. This Directive however has a much narrower ambit than the STM concept. Besides the exclusion of several types of ships that are commonly excluded in most international conventions, like naval ships and fishing vessels, this directive also excludes bunkering vessels below 5000 tons and ships with a length of less than 45 metres. It also provides for an exemption for liner services, as the Member States can exclude them from the notification requirement regarding HNS cargoes.42 The pursued range of information exchange is also limited, as it covers the exchange of information between the national services in the various Member States and only to the extent these are relevant for the purposes of the Directive.

Furthermore, this Directive attempts to regulate VTS areas and article 8 includes a potentially controversial provision. Paragraph (b) requires vessels flying the flag of a Member State or ships bound for a port of a Member State, entering a VTS area outside the territorial sea of a Member State, to comply with the rules of that VTS. Paragraph (c) may become even more controversial, as it requires that vessels flagged to a third state and not bound for a port of a Member State entering a VTS area outside the territorial sea should follow the VTS rules wherever possible, and any apparent serious breaches of such rules should be reported by the Member States to the flag state. Conferring a power on authorities for the operation of a VTS system outside the territorial sea is contrary to SOLAS43 and to the guideline IMO Resolution about VTS.44 According to Article 16 1 (a) of this Directive, a vessel not complying with the rules of a VTS outside the territory of the coastal state could be considered as a potential hazard to maritime safety.

Perhaps the most problematic provision with this Directive is the fact that it expressly provides in Article 24 for the confidentiality of information shared pursuant to this Directive. STM’s key feature is information sharing, and this rule on confidentiality could exclude, in accordance with national legislation, the information exchanged under this Directive.

42 See articles 15 and 13 of EU Directive 2002/59/EC
43 SOLAS Regulation V/12.3 mentions that the use of VTS may only be made mandatory within the territorial sea of a coastal State.
44 Resolution A.857(20) Guidelines for Vessel Traffic Services, guideline 2.2.2
This confidentiality issue would apply for example in the exchange of telematics data as envisaged by Article 23, which is both consistent with the STM concept, and STM could also assist in the systemisation of the exchange of information.

This Directive might be seen as an opportunity to develop a business case for the STM, by providing this standardisation, however there are some impediments, which are not strictly legal, that preclude such a scenario. The main issues barring such a standardisation are the voluntary character of the STM, the fact that it is rather unlikely that it would be carried by all types of ships (warships, for example, would not wish to share their intentions) and the aforementioned restrictions posed by the Directive. As far as the Directive is concerned, it could be generalised so as to include more types of vessels, amend the confidentiality requirement so as to include the legal entity managing STM in the authorised actors and amend the reporting requirement regarding the VTS in order to make it consistent with international maritime law. However, with the EU not being party to SOLAS, this inconsistency is unlikely to affect its validity, as was stated above, following the Intertanko case where a challenge to an earlier directive as contrary to MARPOL was rejected on admissibility grounds, the EU not being party to the MARPOL Convention.

As far as STM is concerned, the current strategy is that it is joined on a voluntary basis. It has to be always borne in mind that maintaining the navigational safety of each sea area is the responsibility of the coastal state, and this burden cannot be delegated to a freely available navigational system, even if its use becomes a public policy. That does not prevent the EU from making it mandatory, though it would be likely to do so only if it is sufficiently proven that it increases navigational safety and has some positive impact on the environment.

EU Directive 2010/65 on reporting formalities for ships arriving in and/or departing from ports of the Member States, as amended by Directive (EU) 2017/2109, also has some overlap with STM. There are already requirements in place for information exchange between governments and authorities, e-certificates, certificates of insurance in electronic format, issues predominantly regulated by the FAL Convention after its Single Window amendments. These types of exchange can all be included within an STM system. To the extent that STM is a provision of services and information, it must comply with the national legislation that applies to information and services.

A fruitful way forward would be a potential application on a regional level and a potential link with GHG emission reductions. Arguably the next step forward would be a code of conduct for ports and port stakeholders, which would support and prioritise the stakeholders using the STM concept. Shipping interests, chartering interests (including insurers) and port authorities should be under a code of conduct which will make them disclose information and operate in a way that benefits STM. An ambitious way would be an EU STM, so that at the moment ships enter EU waters they waive the freedom of navigation and are under the control of traffic centres. It has to be noted that there are already ports that endorse behaviours by affecting the port charges such as the port of Los Angeles and the Port of Rotterdam.45

Annex 1: The Conventions Examined for the Legal Feasibility
1.1 UNCLOS

The operation of STM within the UNCLOS framework

General context

This document is written in the framework of Activity 5, which includes the analysis of the compatibility of the STM concept and services with the current legal framework. This report will be completed with other specific reports and all of them integrated in the Milestone 23 Deliverable.

The 1982 United Nations Convention on the Law of the Sea (UNCLOS) is the general governance framework for the oceans and prescribes rights and obligations for States. These in turn are supplemented in a number of international conventions, including those adopted through the International Maritime Organization (IMO) with respect to shipping. This report will first explain the jurisdictional concepts of UNCLOS, and then will analyse the rights and obligations of coastal and flag States that affect navigational rights and are relevant to STM. Notably UNCLOS does not provide for rights and obligations enforceable by private entities or ships against States, despite a small number of drafting infelicities that may mislead readers into thinking otherwise. Rather, the rights and obligations of private parties are determined by the way each State, through its national legislation, discharges its obligations under UNCLOS. The unification of such national legal frameworks is what required the creation and the development of the legal framework developed through the IMO.

Objective

This first version of the report presents a summary of the analysis of the UN Convention on the Law of the Sea and identifies the State obligations which could be affected by the adoption of the STM concept.

Restrictions

The report will be finalised for the deliverable.

Introduction

The legal framework of the UN Convention on the Law of the Sea\textsuperscript{46} [UNCLOS] (1982) provides the framework for the jurisdictional structure of maritime space. UNCLOS promotes the peaceful use of the seas, their resources and the marine environment\textsuperscript{47} by laying down the structure and demarcation of maritime zones and the rights States have within them.

UNCLOS defines a number of jurisdictional zones. Some of them may be proclaimed by coastal States. The eight jurisdictional zones are:

- Territorial sea (TS): The breadth of the territorial sea can be established up to a limit not exceeding 12 nautical miles measured from baselines,\textsuperscript{48} which can be either normal or straight. The normal baseline is the low-water line along the coast, while


\textsuperscript{47} UNCLOS preamble

\textsuperscript{48} UNCLOS Article 3
straight baselines are used when the morphology of the coastline is such that it is heavily indented and cut into, or fringed by offshore islands, to simplify what would be a very complex outer limit if constructed from normal baselines.49

- Internal waters (IW): Waters on the landward side of the baseline of the territorial sea form part of the internal waters of the State.50 It includes waterways such as rivers and canals, as well as ports, and sometimes the water within small bays.

- Archipelagic Waters (AW): Waters enclosed by archipelagic baselines, which may be used only by archipelagic States.51 These are States constituted wholly by one or more groups of islands, which form an intrinsic geographical economic and political entity.52

- Contiguous zone (CZ): This is a zone contiguous to the territorial sea of a coastal State, which may not extend beyond 24 nautical miles from the baselines from which the breadth of the territorial sea is measured.53

- Continental shelf (CS): The continental shelf of a coastal State comprises the seabed and subsoil of the submarine areas that extend beyond its territorial sea throughout the natural prolongation of its land territory to the outer edge of the continental margin (the shelf, slope and rise), or to a distance of 200 nautical miles from the baselines from which the breadth of the territorial sea is measured, where the outer edge of the continental margin does not extend up to that distance.

- Exclusive economic zone (EEZ): The exclusive economic zone is an area beyond and adjacent to the territorial sea, which shall not extend beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured.54

- High seas: All parts of the sea that are not included in the EEZ, the territorial sea or the internal waters of a State, or in the archipelagic waters of an archipelagic State.55

- The Area: the seabed and subsoil beyond the continental shelf and thus not subject to State jurisdiction (Figure 1).

49 UNCLOS Article 7 describes the use of straight baselines and when they may be employed.
50 UNCLOS Article 8
51 UNCLOS Article 49. See also Article 47 for more details on archipelagic baselines.
52 UNCLOS Article 47
53 UNCLOS Article 33
54 UNCLOS Articles 55 and 57
55 UNCLOS Article 86
Specific issues within the UNCLOS framework that are related to the STM concept

UNCLOS prescribes a number of rules for the way coastal States exercise their sovereign rights and jurisdiction in each maritime zone. Depending on where (i.e. in which zone) sea activities are taking place, UNCLOS provides varying but certain rights and obligations to coastal States and flag States.

In general, the research indicates that the STM concept is not contradictory to the specific rules and requirements of UNCLOS, although it is potentially vulnerable under one scenario to the effects of different coastal States legislating in mutually inconsistent ways. The rights coastal and flag States have in each of the jurisdictional zones as well as the powers States have concerning the STM system are outlined in Table 1.
<table>
<thead>
<tr>
<th>Jurisdictional zone</th>
<th>Rights and duties of the coastal States with reference to ships</th>
<th>Navigational rights of other States</th>
<th>STM Relevance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal waters</td>
<td>Sovereignty of the coastal State over the area, similar to its land territory, which in exceptional circumstances is subject to a right of innocent passage as described in the next column.</td>
<td>No rights of innocent passage in general. However, a right of innocent passage for foreign ships exists, where the UNCLOS-based straight baselines have resulted in waters becoming internal waters that before the publication of the baselines were not considered as such.</td>
<td>The implementation of the STM is exclusively within the powers of the coastal State. Ports are considered as internal waters.</td>
</tr>
<tr>
<td>Territorial sea (up to 12NM from baselines)</td>
<td><strong>Rights</strong>: The coastal State may make laws and regulations relating to innocent passage, as prescribed by Article 21, but such laws Right of innocent passage for foreign ships without prejudicing the peace, good order or security of the coastal State. A broader non-suspendable right of transit passage in straits used for international navigation, whereby the usual obligation for submarines to surface and show their flag does not apply.</td>
<td>Rights of coastal States depend on whether the STM falls within the CDEM exception. If it does, the coastal State can only legislate so as to implement what is required by international standards (IMO adopted regulations) If STM is not CDEM The coastal State can impose requirements for the use or the prohibition of STM while the vessel is sailing in its waters even if it is not intending to enter one of its ports, to the extent that it justifies its position under one of the heads in Article 21. However, it cannot intercept a vessel on innocent passage and enforcement on violations will need to be done when the vessel enters a port of the coastal State or the passage ceases to be innocent.</td>
<td></td>
</tr>
</tbody>
</table>
shall not apply to CDEM, unless such laws are implementing international standards.

**Obligations:** The coastal State shall not hamper the innocent passage of foreign ships through the territorial sea, either by imposing requirements on foreign ships which have the practical effect of denying or impairing the right of innocent passage; or discriminating in form or in fact against the ships or against cargoes carried by ships to, from or on behalf of any State.

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**Archipelagic Waters**

**Rights:** The archipelagic State has similar rights in implementing legislation on innocent passage (Art. 54) to those of the coastal State in the territorial sea.

Right to designate archipelagic sea lanes passage

**Obligations:** Not to hamper innocent passage, as above with the coastal State in its territorial sea.

Right of innocent passage for foreign ships without prejudicing the peace, good order or security of the archipelagic State. Archipelagic sea lanes passage in those lanes, paralleling transit passage in certain straits (see Territorial Sea above)

The archipelagic State can impose requirements for the use or the prohibition of STM while the vessel is sailing in its waters even if it is not intending to enter one of its ports. But it cannot intercept a vessel on innocent passage and enforcement on violations will need to be done when the vessel enters a port of the archipelagic State or the passage ceases to be innocent.

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56 Construction, Design, Equipment and Manning of foreign ships.

57 To the extent that it justifies the position under one of the heads in Article 21, but the State Law can generally apply in the TS anyway subject to the CDEM exception.
<table>
<thead>
<tr>
<th>Zone</th>
<th>Description</th>
<th>Rights and Jurisdiction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contiguous zone (CZ)*</td>
<td>(up to 24 NM from baseline)</td>
<td>The coastal State may take customs, fiscal, immigration or quarantine measures. However, this zone is not relevant to the STM.</td>
</tr>
<tr>
<td>EEZ*</td>
<td>(up to 200 NM from baseline)</td>
<td>In the EEZ and the continental shelf, the coastal State has sovereign rights over the natural resources, both living and non-living (minerals) and rights with respect to the protection of the marine environment and marine scientific research.</td>
</tr>
<tr>
<td>High seas</td>
<td>Ships on the High Seas are subject to the exclusive jurisdiction of the flag State except in restricted situations not relevant to the STM. Flag States are obliged to exercise jurisdiction and control in administrative, technical and social matters over ships flying their flag and ensure that they are seaworthy and properly manned.</td>
<td></td>
</tr>
<tr>
<td>AW, CZ and EEZ</td>
<td>have to be claimed</td>
<td>The high seas freedom of navigation is applicable as this zone falls within the EEZ, with due regard to the rights of the coastal State. Not relevant to STM.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>STM can be implemented compulsorily by the flag State in this zone but the coastal State will not have such powers.</td>
</tr>
</tbody>
</table>

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59 The coastal state has sovereign rights on activities like fishing and drilling, and has jurisdiction on marine scientific research, protection of the marine environment and on the establishment of artificial islands.
Figure 2: A schematic description of the links between state rights under UNCLOS, IMO-adopted instruments for the purpose of discharging such obligations and national legislation which is enforced against national and foreign ships.
1. The Role of Coastal States

1.2 The Sovereignty/Jurisdiction of Coastal States

The powers of the coastal State vary according to the maritime zone in which the foreign-flagged ship finds itself. (see Table 1).

In internal waters, the coastal State enjoys sovereignty. However, UNCLOS Article 8 states that a right of innocent passage exists in areas designated as internal waters under the rules of UNCLOS on baselines which did not have that status before this designation.

UNCLOS Article 2 states that the sovereignty of a coastal State extends, beyond its land territory and internal waters, to the territorial sea. The sovereignty of the coastal State is subject to this Convention and to other rules of international law (Article 2(3)). Such a limitation arising from the Convention is the right of innocent passage through the territorial sea provided to ships of all States (Article 17). Nevertheless, coastal States have the right to adopt laws relating to innocent passage.

As a general summary about the sovereignty of coastal States in the various UNCLOS zones, States may exercise their full jurisdiction and sovereignty over their internal waters, except for waters that used to have another status, where a right of innocent passage has to be preserved; a coastal State can exercise its sovereignty in the territorial sea, subject to the right of innocent passage of foreign ships, while it can only take measures in its contiguous zone to prevent or punish infringements in or landward of its territorial sea of its customs, fiscal, immigration or quarantine laws. Otherwise the same freedom of navigation exists as in the EEZ if one is declared, or as on the high seas otherwise. In the EEZ, the coastal States’ sovereign rights are restricted to natural resources, and they have jurisdiction on marine scientific research, protection of the marine environment and the establishment of artificial islands. In every other way, the navigational regime of the EEZ is similar to the freedoms of the high seas. For the purposes of STM, the contiguous zone and the EEZ are not relevant, as the STM concept does not have any special operation within these zones, and thus will not be analysed further.
1.3 The Rights of Coastal States

1.3.1 Laws and regulations relating to innocent passage through the territorial sea

The coastal State shall not hamper the innocent passage of foreign ships through the territorial sea, either by imposing requirements on foreign ships which have the practical effect of denying or impairing the right of innocent passage; or discriminating in form or in fact against the ships or against cargoes carried by ships to, from or on behalf of any State.  

Article 2161 gives the right to the coastal State to adopt laws and regulations relating to innocent passage through the territorial sea in respect of the safety of navigation and the regulation of maritime traffic (paragraph 1a) or the protection of navigational aids and facilities (paragraph 1b). Such regulations must not only respect the right of innocent passage, but also be duly publicised and non-discriminatory.

The implementation of the STM could perhaps be affected by legislation relating to the safety of navigation, and the regulation of maritime traffic (paragraph 1a). Navigational aids (paragraph 1b) however, are not relevant for the purposes of STM, as this term refers to the protection of facilities and installations in the territorial sea, like artificial islands, installations and structures and does not concern shipborne navigational aids.

Whether the coastal State has powers concerning the operation of STM on any foreign vessels depends on whether the STM can be considered as part of the CDEM (design, construction, manning or equipment) of ships. If it is, then the coastal State cannot make laws in this respect, either positively or negatively, affecting the use of STM, except to implement rules that have become established under IMO-adopted guidelines or regulations.

If the STM is not considered as part of the CDEM exception, a coastal State can in principle enact legislation that requires foreign vessels either to carry and use or to abstain from using the STM while exercising innocent passage through its waters. Breach of such laws will not entitle the coastal State to interrupt the innocent passage of the foreign ship. Instead it will have to enforce any penalties later when the ship enters its port or internal waters or by serving any fines on the shipowner. For deciding whether STM concerns CDEM, a brief analysis of each term is needed. ‘Design’ and ‘construction’ refer to the design and construction of the ship and its hull and could not relate to issues affecting STM.

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60 UNCLOS Article 24.1 (b)
61 Article 42 provides lesser rights to regulate transit passage through straits used for international navigation, mirrored in Article 54 for archipelagic States and archipelagic sea lanes passage.
63 ibid
64 The analysis of UNCLOS by the IMO Secretariat (infra), mentions that SOLAS 1974 and the SOLAS Protocol of 1988 regulate minimum standards for the construction, equipment and operation of ships, concerning aspects such as subdivision and stability, machinery and ejusdem generis issues. The terms ‘construction’ and ‘design’ were always commented on together, and this report follows that pattern.
“Equipment” can be interpreted through another provision in the UNCLOS that it also appears in, Article 94. Article 94(3)(a) of UNCLOS imposes upon flag States the obligation to ensure safety at sea on the high seas with regard to the construction, equipment and seaworthiness of ships. A further specification in relation to this obligation is provided in paragraph 4(a) of the same Article, which indicates that measures to be taken by flag States must include those necessary to ensure "that each ship, [...] has on board [...] navigational equipment and instruments as are appropriate for the safe navigation of the ship". The generally accepted international regulations, procedures and practices referred to in Article 94(5), to which the aforementioned paragraphs of Article 94 are required to conform, are connected to the ones in Article 21(2), as they are both contained in SOLAS and the Load Lines Convention.

In addition, the interpretation of UNCLOS by IMO’s Secretariat clarifies that the standards for equipment are the ones prescribed by SOLAS. Regulation V/19 of SOLAS provides a list of shipborne navigational systems and equipment that ships must have, which does not include STM. Consequently, STM is not currently part of the SOLAS-prescribed equipment, yet it does not necessarily follow from this that STM would not currently be considered as ‘equipment’ for the purposes of UNCLOS. This would be confirmed, however, if STM-modified devices are accepted as equipment by the IMO, either by accepting that an STM-modified ECDIS is ECDIS for SOLAS purposes, or by recognising STM devices as standalone equipment.

UNCLOS provides for ‘manning’ under Article 94(3)(b) that every State must take the necessary measures to ensure safety at sea with regard to "the manning of ships, labour conditions and the training of crews, taking into account the applicable international instruments". The same IMO document then mentions that the main legal instrument in this regard is STCW, a convention which is analysed in a separate report for the purposes of the STM Validation. STCW contains no training requirements for the STM, and until STM is standardised in it, there are no STM-relevant ‘manning’ standards for the purposes of UNCLOS which could affect a ship’s innocent passage. In other words, there is no special training or manning requirement prescribed by IMO for STM which could affect a ship’s innocent passage. Consequently, it remains unclear whether coastal State regulation mandating or prohibiting the use of STM for vessels in innocent passage through its territorial sea is or is not a CDEM measure for the purposes of this Convention. If STM becomes adopted in an internationally accepted platform, through an international convention, and carrying it on board is required for certain vessels, like ECDIS for example, then this could bring it within the scope of CDEM, and the coastal State’s rights would be restricted. Coastal States are allowed to adopt more stringent requirements for

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68 ibid
69 Ibid page 27
discharge violations, but not for CDEM infractions. Flag States and coastal States may well take different views on this question, centring on whether regulation of new navigational technology as equipment under SOLAS is merely a sufficient condition for it to qualify as equipment under UNCLOS. This view is likely to be favoured by flag States, as in that case new types of technology that could be objectively described as equipment activate the CDEM exception of Article 21(2) automatically without the need for the IMO to act. The alternative interpretation would consider such regulation as a necessary condition, which would suit coastal States wishing to prohibit or make mandatory the use of a given new technology, as in this case they would remain free to do so until such time as the IMO acts.

Thus, the position in this grey area of the law can be summarised as follows:

1) If STM is considered to be part of the design, construction, manning or equipment (CDEM) of a ship, then the coastal State may not interfere with the innocent passage of such foreign ship, by reason only of not carrying the console on board, unless the law mandating the carriage of STM gives effect to ‘generally accepted international rules or standards’.

2) The same applies in the event that the coastal State may wish to interfere with the innocent passage of a foreign ship, by reason of carrying the STM console on board contrary to its prohibition. Again, this would only be permissible if the legislation forbidding the carriage of STM in the territorial sea was giving effect to ‘generally accepted international rules or standards’.

3) If STM is not a CDEM matter, a coastal State can enact legislation affecting it, without the restrictions of Article 21.2. This would mean that the coastal State could mandate or forbid the use of STM in its territorial sea. This right is not entirely unrestricted, though, as it has to be in conformity both with the provisions of UNCLOS and with other rules of international law relating to innocent passage. There seems to be nothing in SOLAS precluding an administration from adopting provisions with a broader scope than the one envisaged in its provisions, provided they are not detrimental to navigational safety. By virtue of Article 24.1(a) of UNCLOS, the coastal State must not impose requirements on foreign ships which have the practical effect of denying or impairing the right of innocent passage, except in accordance with UNCLOS. Consequently, the relevant legislation mandating the use of STM should not deny or impair the innocent passage of a foreign vessel, except in accordance with UNCLOS, as this could result in a violation of Article 24.1(a) by the coastal State.

In brief a coastal State would only be entitled to interfere with the innocent passage of a foreign ship if the STM can be argued as affecting one of the sub-provisions of Article 21, as under Article 25 the coastal State has a right to prevent passage in its territorial sea which is not innocent. Failing this there would not be any right of interference.

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71 Richard Barnes, Article 21, in Alexander Proelss (ed), The United Nations Convention on the Law of the Sea, A commentary, CH Beck, Hart, 2017 p 203-204: The regulation of operational conduct of vessels in the territorial sea tends to be done in accordance with international conventions, even when not concerned with CDEM.
It has to be noted that the port State may provide for sanctions such as fines and penalties for non-compliance with CDEM national laws, but measures such as detention, arrest and seizure, in case of national requirements are more controversial and have to be exercised with caution.\textsuperscript{72} Notably as regards ships proceeding to internal waters or a call at a port facility, if the coastal State clearly requires the STM device as a mandatory condition for the admission of ships to internal waters or ports, the coastal State is entitled to take the necessary steps to prevent the passage and entry of the ship, notwithstanding any protection that Article 21 may afford to it in the territorial sea.

1.3.2 Sea lanes and traffic separation schemes

The coastal State may require foreign ships exercising the right of innocent passage to use sea lanes and/or traffic separation schemes, having regard to the safety of navigation (Article 22).

This right of the coastal State could be relevant to STM, depending on the final form of Flow Management. From the information that is currently exchanged, Flow Management will attempt to regulate the vessel flow in areas with congested traffic, from a shore-based controller. Such areas are those likely to have a traffic separation scheme in place.

Where no TSS exists, the STM can develop a system of regulation of traffic, ensuring always the compliance with Colregs; but where a TSS does exist, the STM can only support the coastal State’s regulation of traffic and the vessels using them must ensure their strict compliance with the TSS and the Colregs-prescribed conduct.

2. The Obligations of the Flag State

Every State shall effectively exercise its jurisdiction and control in administrative, technical and social matters over ships flying its flag. What is a technical matter is particularly relevant to the STM concept. The flag State is the party to set up the standard of seaworthiness of ship in terms of the equipment and construction, the qualified manning of the ship and the methods of communication, and ensure the ships flying its flag satisfy these requirements. According to Article 94 the flag State shall take such measures for ships as are necessary to ensure safety at sea with regard, inter alia, to:

(a) the construction, equipment and seaworthiness of ships;
(b) the manning of ships, labour conditions and the training of crews, taking into account the applicable international instruments;
(c) the use of signals, the maintenance of communications and the prevention of collisions.

A way to divide the responsibilities of the flag State is the one suggested in figure 2, which creates 3 sets of responsibilities. Safety of Navigation, which is defined and analysed through the treaties regulating navigational safety, maritime security and search and rescue; Manning and Training, which is defined and analysed through the treaties dealing with employment, training and certification; and finally Marine

\textsuperscript{72} Sophia Kopela, \textit{Port-State Jurisdiction, Extraterritoriality, and the Protection of the Global Commons}, (2016) 47 2 Ocean Development & International Law 89, 95-96
Environment, which is analysed through treaties relating to the prevention of marine pollution.

The list of treaties is provided in the Appendix to this report, and whether or not a standalone report on the treaty concerned is appended, every treaty has been dealt with and analysed individually during the course of this project, in order to assess its relevance and compatibility with the STM. The conclusions drawn from these reports and the compliance or otherwise of the STM concept with them will be an expression of the compliance with the general duties assigned by UNCLOS to flag States.

UNCLOS imposes some duties on flag States, which have to require ships of their flag to follow certain conduct. The following duties are the ones that have an STM relevance:

### 2.1 Duty to render assistance

This duty is envisaged in Article 98, and it is part of the search and rescue obligations of the flag State, which are included in the Safety of Navigation section of the reports for the STM Validation project:

“Every State shall require the master of a ship flying its flag, in so far as he can do so without serious danger to the ship, the crew or the passengers:

(a) to render assistance to any person found at sea in danger of being lost;
(b) to proceed with all possible speed to the rescue of persons in distress, *if informed of their need of assistance*, in so far as such action may reasonably be expected of him;
(c) after a collision, to render assistance to the other ship, its crew and its passengers and, where possible, to inform the other ship of the name of his own ship, its port of registry and the nearest port at which it will call.”

Every coastal State shall promote the establishment, operation and maintenance of an adequate and effective search and rescue (SAR) service regarding safety on and over the sea and, where circumstances so require, by way of mutual regional arrangements cooperate with neighbouring States for this purpose. The operation of search and rescue is obviously based upon the efficiency of communication; the STM system might assist in the facilitation of the performance of the duty to render assistance in the sea.

The observation of this duty is regulated mainly by the Salvage Convention and the 2 SAR treaties listed in the Annex, along with the analysis of the compliance of STM with their requirements.
2.2 Duty to cooperate in the repression of piracy

Article 100 requires that all States shall cooperate to the fullest possible extent in the repression of piracy on the high seas or in any other place outside the jurisdiction of any State.

The STM system contains information shared in the network, such as the locations of the ships and other navigational data, and the issue of information security will be further investigated for the purposes of cybersecurity. The issue of maritime security, either in the form of piracy or otherwise, will be analysed in the report on SUA 2005, as this is a relevant treaty to Article 100.73

2.3 Unauthorised broadcasting from the high seas

Article 109 mentions that all States shall cooperate in the suppression of unauthorised broadcasting from the high seas. For the purposes of this Convention, “unauthorized broadcasting” means the transmission of sound radio or television broadcasts from a ship or installation on the high seas intended for reception by the general public contrary to international regulations, but excluding the transmission of distress calls.

Due to the technology adopted in the STM device, the use of the STM device should not be categorised as ‘unauthorized broadcasting’ under UNCLOS. The reason for this conclusion is that the Article refers to “sound radio” and “television”, and STM does not involve either of the two in its operation. Thus, despite its prima facie relevance, Article 109 is not in fact relevant to STM.

2.4 Protection of the marine environment

UNCLOS lays down the basic framework of preventing and reducing incidents of marine pollution. It is a general obligation for all States to protect and preserve the marine environment, and to take measures to prevent, reduce and control pollution of the marine environment. These duties can be found in Articles 192 to 222.

UNCLOS encourages the exchange of information among the relevant parties in the case of accidents. When a State becomes aware of cases in which the marine environment is in imminent danger of being damaged or has been damaged by pollution, it shall immediately notify other States it deems likely to be affected by such damage, as well as the competent international organisations.74 Furthermore, States shall cooperate, for the purpose of promoting studies, undertaking programmes of scientific research and encouraging the exchange of information and data acquired about pollution of the marine environment. The international conventions have been designed and States have become party to them for this purpose, and they will be reviewed in detail for the STM validation in their legal aspects. For the sake of conciseness of the current text, they can be found in the Appendix of this report.75

Conclusions

The STM concept is not contrary to the general framework of UNCLOS. The right of a coastal State to regulate whether a foreign vessel is obliged to use or prohibited from using STM on board during innocent passage is the only difficulty that was identified.


74 UNCLOS Article 198

75 Appendix, Marine Environment
Appendix

Safety of Navigation

- Convention on the International Regulations for Preventing Collisions at Sea, 1972, as amended (COLREGs 1972)
- Convention on the International Maritime Satellite Organization
- Convention on Facilitation of International Maritime Traffic, 1965 (FAL)
- Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation (SUA); (SUA Prot 2005)
- International Convention for the Safety of Life at Sea, 1974, as amended (SOLAS 1974); (SOLAS Prot 1978); (SOLAS Prot 1988)
- International Convention on Maritime Search and Rescue, 1979 (SAR 1979)
- International COSPAS-SARSAT Programme Agreement (COS-SAR 1988)

Manning and Training

- ILO Maritime Labour Convention 2006

Marine Environment

- International Convention for the Prevention of Pollution from Ships (MARPOL), 73/78
- International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties, 1969 (INTERVENTION 1969); (INTERVENTION PROT 1973)
- International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990, as amended (OPRC 1990)
- Protocol on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances, 2000 (OPRC-HNS 2000)

b) Biological diversity
• Convention on Biological Diversity, 1992

c) Air Pollution
• MARPOL Annex VI, Prevention of Air Pollution from Ships
• 1992 UN Framework Convention for Climate Change and its Kyoto Protocol
• The Paris Agreement under the United Nations Framework Convention on Climate Change

d) Liability and compensation
• 1910 Convention for the Unification of Certain Rules of Law with respect to Collisions between Vessels (The Brussels Collision Convention)
• International Convention on Civil Liability for Bunker Oil Pollution Damage, 2001 (BUNKERS 2001)
• Convention relating to Civil Liability in the Field of Maritime Carriage of Nuclear Material 1971 (NUCLEAR 1971)
• Athens Convention relating to the Carriage of Passengers and their Luggage by Sea, (PAL PROT 2002)
• Convention on Limitation of Liability for Maritime Claims, 1976 (LLMC 1976); (LLMC PROT 1996)
1.1.1 Safety of Navigation

1.1.1.1 SOLAS


General context

This document is written in the framework of Activity 5, which is concerned with the compatibility of STM concept and services with the current legal framework. This report is a part of a series of specific reports, the results of which will be summarised in Milestone 23 as a final formal deliverable.

Objective

The compatibility of the STM concept with the International Convention for the Safety of Life at Sea 1974 (SOLAS)\(^\text{76}\) is the central point of this report.

Restrictions

The compatibility analysis is legal in nature. Any policy and perception issues introduced are not the central point of this report. This report is written before the STM concept has crystallised so modifications might be needed. Any reference made to the common law regards issues extending beyond international maritime law, and English law is very widely used for this purpose.

Introduction

The main objective of the SOLAS Convention is to specify minimum standards for the construction, compulsory equipment and operation of ships, compatible with their safety. Flag States are responsible for ensuring that ships under their flag comply with its requirements, using certificates as proof of compliance. Control provisions also allow Contracting Governments to inspect ships of other Contracting States, if there are clear grounds for believing that the ship and its equipment do not substantially comply with the requirements of the Convention - this procedure is known as Port State Control.\(^\text{77}\) Therefore, every new information system must be compliant with these requirements, which are normally embedded in the far more detailed

\(^{76}\) The International Convention for the Safety of Life at Sea 1974 (SOLAS), (adopted on 1 November 1974, entered into force 25 May 1980) 32 UST 47; 1184 UNTS 278

\(^{77}\) For more general information on SOLAS, see IMO’s website
requirements of IEC\textsuperscript{78} and ISO\textsuperscript{79}. However, if the new information (e.g. real-time meteorological data) is overlaid on an existing screen, which is part of standardised equipment, for example ECDIS, the additional functionality is likely to render the equipment non-standardised and non-approved. This would then require further testing of the equipment to confirm two things: First, that the new data stream does not affect the performance of the already standardised functions of the equipment. Second, that a failure of one of the functions will not result in the loss or malfunction of the other functions.

The current SOLAS Convention includes articles setting out general obligations, amendment procedure and other formalities, followed by an Annex divided into 14 Chapters. The main focal area for STM is Chapter V, which regards the safety of navigation, as well as Chapter XI-2 regarding the ISPS Code.

Chapters II-1 on Structure, II-2 on Construction, III on Life-saving appliances; IV on Radiocommunication, VI on Carriage of cargoes and oil fuels; VII on Carriage of Dangerous Goods, VIII on Nuclear Ships, IX on Management for the safe operation of ships, X on Safety measures for high-speed craft; and finally XII on additional safety measures for bulk carriers, are not directly relevant to STM. As regards the new chapters, Chapter XIII on auditing is not relevant to STM, but Chapter XIV on the implementation of the Polar Code has some relevance to the STM. The legal research undertaken concludes that the SOLAS Convention should be approached with caution, as, although there are no clear impediments, the introduction of STM has to be done with particular care to its requirements, in order to ensure compliance. The regulations that are analysed are the ones that are or seem to be relevant to STM, while the omitted ones do not have even a \textit{prima facie} relevance to STM.

\textbf{Regulations V/4 and V/5}

Regulation V/4, concerning navigational warnings, mentions that:

\begin{quote}
Each Contracting Government shall take all steps necessary to ensure that, when intelligence of any dangers is received from whatever reliable source, it
\end{quote}

\textsuperscript{78} International Electrotechnical Commission
\textsuperscript{79} International Organization for Standardization
shall be promptly brought to the knowledge of those concerned and communicated to other interested Governments.

This obligation concerns Contracting Governments, not shipowners or ships directly, thus it cannot affect the implementation of STM. The same applies to Regulation V/5, as it relates to the obligation of Contracting Governments to disseminate meteorological data.

As a general comment, although not legal, the requirements of this regulation will be promoted and observed better if STM is coupled in this process, and the obligation to bring the information “promptly” to the knowledge of the interested parties is observed. Furthermore, Route Optimisation takes into account the parameters described in Regulations V/4 and V/5 when optimising the route.

**Regulations V/10, V/11 and V/12**

Regulation V/10, regarding ships’ routeing mentions ‘ships’ routeing system’, referring not to an electronic system like the STM, but to systems like traffic separation schemes and two-way tracks.80 This Regulation lays down certain criteria that have to be abided by for the establishment of such a system; however, none of these criteria is relevant to STM or poses any impediment. Such routeing systems may be used by Route Cross-check and Enhanced Monitoring, as the shore-based operator could use the STM platform to reschedule a vessel’s route, in case a lane is closed.81

As regards regulation V/11, ship reporting systems are established by states, in order to increase safety and efficiency of navigation. Wherever they operate, ships shall use them in accordance with the provisions of each system. These systems are fundamentally different from STM, and they are not voluntary. However, STM could potentially couple with them, wherever they operate, so that it assists in the facilitation of the reporting process.

Regulation V/12 lays out the requirements for the establishment of Vessel Traffic Services, which could affect STM and perhaps STM could assist and be assisted by their operation, if VTS and STM operate in an interoperable way in the future. From a legal point of view, there is no relevance to STM, as this rule enshrines obligations only for Contracting Governments.

80 IMO Resolution A.572(14), *General Provisions in Ships’ Routeing*
81 MonaLisa 2.0 D2.3.1-4.3, *Flow Management Description*, p 5
Regulation V/15
Regulation 15 stipulates the principles relating to bridge design and arrangement of navigational systems and equipment and bridge procedures. Although not directly applicable to STM, as it refers to the shipborne navigational equipment of regulations 19, 22, 24, 25, 27 and 28, these requirements have to be scrutinized. It seems highly likely that the STM device (either as a standalone device or as an STM-modified ECDIS) will in due course become standardised under SOLAS, so these requirements can become extremely relevant.

Sub-regulation 3 requires that the bridge team has continuous access to essential information, “which is presented in a clear and unambiguous manner, using standardized symbols and coding systems for controls and displays”. Ship to Ship Route Exchange aims to enhance situational awareness by providing ships with surrounding ships’ route intentions and displaying them on ECDIS. Such route intentions should be displayed in accordance with the requirements of this regulation, and all STM data that are displayed either autonomously or in connection with other platforms should follow the unambiguous and standardised display requirement.

The second point relates to a requirement to prevent or minimise distractions on the bridge, which may interfere with the vigilance of the bridge team and the pilot. This requirement by sub-regulation 6 is important as it has to be borne in mind, when installing the STM on board the bridge of a vessel, to install it in such a way as to be as non-distracting as possible, which is in line with the Colregs requirement for a proper lookout and constant vigilance.

Regulation V/16
Regulation 16 regards the maintenance of equipment, which could become increasingly important. In sub-regulation 2 it is mentioned that:

 Except as provided in regulations I/7(b)(ii)\textsuperscript{83}, I/8\textsuperscript{84} and I/9\textsuperscript{85}, while all reasonable steps shall be taken to maintain the equipment required by this chapter in efficient working order, malfunctions of that equipment shall not be considered as making the ship unseaworthy or as a reason for delaying the ship in ports where repair facilities are not readily available, provided suitable

\textsuperscript{82} MonaLisa 2.0 D2.3.1-4.2, Dynamic Voyage Management Description, p 6
\textsuperscript{83} Regulation relating to the surveys of passenger ships
\textsuperscript{84} Regulation relating to the surveys of life-saving appliances and other equipment of cargo ships
\textsuperscript{85} Regulation relating to the surveys of radio installations of cargo ships
arrangements are made by the master to take the inoperative equipment or unavailable information into account in planning and executing a safe voyage to a port where repairs can take place.

This provision is subject to sub-regulation 1, which requires that adequate arrangements are in place that ensure that the performance of the equipment conforms to the requirements of Chapter V of SOLAS. Regulation V/16 includes the STM-relevant equipment (i.e. ECDIS and AIS), however it is not clear if a malfunction of STM would be considered a malfunction of ECDIS or of AIS or of any SOLAS equipment. In other words the question is, in the event that the STM has a fault, whether it is also considered a fault of the navigational aid it uses, or an independent fault that cannot be considered as rendering the hosting equipment inoperative.

If an STM malfunction is considered a SOLAS equipment malfunction, given that with the current project information, it is going to be using ECDIS and AIS, then regulation V/16 is relevant to STM. It could also be relevant if STM develops its own equipment and such equipment is included in SOLAS Chapter V. In each of these two occasions, the following apply:

a) STM malfunctions as SOLAS malfunction or STM equipment as SOLAS equipment

This Regulation addresses an aspect of unseaworthiness, which relates to the malfunctions of the equipment, and suggests that the vessel shall not be considered seaworthy, subject to four exceptions. The first exception is by Regulation 7 of Chapter I, sub-regulation b (ii), which requires that the renewal survey of passenger ships shall be such as to ensure that the ship, as regards its shipborne navigational equipment, is in satisfactory condition and fit for the service for which it is intended; that it complies with the requirements of the present regulations and of the laws, decrees, orders and regulations, promulgated as a result thereof by the Administration. Sub-regulation c clarifies that the aforementioned laws, decrees, orders and regulations shall ensure that from the point of view of safety of life, the ship is fit for the service for which it is intended.

The second exception by Regulation 8 of Chapter I regards cargo ships and it is quite similar, as it requires, on the initial survey, compliance with the regulations, satisfactory condition and fitness for the service for which the ship is intended.
The renewal and periodical surveys add a further requirement, namely that of compliance with SOLAS and Colregs, besides the satisfactory condition and fitness for service, which remain intact. Finally the annual survey is required to ensure that the maintenance of the equipment conforms with regulation 11(a), which stipulates that the equipment of ships shall be maintained in fitness so that the ship is fit to proceed to sea without danger to the ship or persons on board.

There is a serious underlying issue in these first two exceptions, namely what qualifies as a passenger ship and what as a cargo ship. According to SOLAS a ‘passenger ship’ is any vessel carrying more than 12 passengers, while a ‘cargo ship’ is any vessel over 500 GT that is not a passenger ship. Thus a vessel under 500 GT carrying less than 12 passengers falls under neither, and is outside the scope of SOLAS, even if it is a cargo vessel. This problem emerged in a case before the Samoan Court of Appeal, where such a vessel was prevented from departing, as it was carrying more than 12 passengers and had no ‘passenger ship safety certificate’. Instead, it was provided with a ‘vessel safety certificate’, which was a hybrid innovation of the flag state, however one cannot “get creative with the Convention”. Thus, on this occasion, a passenger ship safety certificate would be required, and to the extent that STM is affected by it, it is advised that vessels must carry an appropriate SOLAS certificate according to their type.

The third exception is not relevant to STM, as it refers to radio installations, and from the information available from MonaLisa 2.0 and from the current developments on the projects, there is no such function in the platform.

The fourth exception is concerned with the conduct of the master after a malfunction in equipment is acknowledged. He is required to make suitable arrangements to take the inoperative equipment or unavailable information into account in planning and executing a safe voyage to a port where repairs can take place. This obligation is two-fold, as he not only has to arrange a voyage to a port for repairs, but also he has to take into account the consequences of the malfunction of the equipment. This requirement would be more appropriately described as a condition precedent to the vessel’s seaworthiness in case there is a malfunctioning equipment, rather than as an

86 SOLAS Regulations: I/2(f) I/2(g) and I/3 (a) (iii)
exception. The reason for that conclusion is that the wording of the regulation considers the repair arrangements as a prerequisite ("provided that") to the ship’s seaworthiness.

As a conclusion, if the STM device is in a satisfactory condition and fit for the ship’s service during the surveys and the master makes suitable repair arrangements, a vessel carrying a malfunctioning STM device shall not be deemed unseaworthy for that purpose. It has to be noted that this rule does not cover other reasons of unseaworthiness (e.g. an untrained/uncertified crew), and that it relates to the equipment aspects of formal seaworthiness. The reason for the first conclusion is that the regulation explicitly mentions the reason covered, by stating: “malfunctions of that equipment shall not render the vessel unseaworthy”. As regards the second conclusion, the wording of the article is such as to address the requirements of UNCLOS Article 219 for the detention of unseaworthy vessels, particularly by making the repair plans a condition precedent to seaworthiness.

b) STM malfunctions NOT as SOLAS malfunction or STM equipment as non-SOLAS equipment

In the alternative scenario, where a malfunction of STM is not considered a malfunction of the SOLAS Chapter V equipment, Regulation V/16 does not apply. This is also the case in the event that STM has its own standalone equipment, which is not standardised in SOLAS.

This means that the common law rule applies regarding the effect of malfunctioning equipment on the seaworthiness of the vessel. Under common law, the obligation to provide a seaworthy vessel attaches at the commencement of the voyage, as far as voyage charterparties and bills of lading are concerned. If unseaworthiness arises in the course of the voyage and the shipowner has an opportunity to remedy it, he is bound to do so before proceeding on the voyage, but such an obligation does not arise from the obligation to provide a seaworthy vessel, but rather from a duty of care.

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88 Chitty on Contracts, 31st Edition, Sweet & Maxwell, para 2-152
90 However, he cannot require the charterer to wait, if such delay would go to the root of the contract: Scrutton on Charterparties and Bills of Lading, 23rd Edition, Sweet & Maxwell, para 7-030
In time charterparties, the vessel is chartered for a period of time and the carrier has to exercise his duty only at the commencement of the time stated in the charterparty, if there was an express term, or in the absence of such term, at the time of delivery. The shipowner will not be responsible for any unseaworthy condition of the vessel that arises after that.

Consequently, even in a situation where regulation V/16 is not applicable, a malfunction arising during the course of the voyage will not render the ship unseaworthy. V/16 refers to malfunctions during the course of the voyage, and not to any before sailing, as it mentions that “while all reasonable steps shall be taken to maintain the equipment [...] in efficient working order”, which implies a point in time after sailing.

As a general conclusion to Regulation V/16, the answer to the question whether STM malfunctions could be considered as a malfunction of the SOLAS equipment that it uses, is a technical matter, as it will depend on how independent the operation is going to be. Malfunctions of the STM in the course of the voyage, if Regulation V/16 is applicable and its requirements are satisfied, or if it is inapplicable, will not render the ship unseaworthy.

**Regulations V/18, V/19**

Regulation 18.2 on the performance standards of navigational systems and equipment mentions that in order to meet the functional requirements of regulations 19 and 20, they shall conform to appropriate performance standards not inferior to those adopted by the Organization. These standards are set by a series of IMO resolutions.91

These regulations refer to navigational systems and equipment, and there is a definition neither of what is a navigational system nor of what (navigational) equipment is, nor what this composite term means. However, SOLAS refers to a number of devices by the above term, and lays out the minimum standards for their operation, which leads to the conclusion that it refers to the ones that have to be compulsorily carried on board the ship.

Although these standards refer to the Chapter V equipment, there is some STM relevance, to the extent that STM uses them in order to operate. Resolution 232(82), containing the revised standards for ECDIS in paragraph 15.1 provides that: ‘ECDIS

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91 Resolutions: 343 (IX), 468 (XII), 818(19), 819(19), 823(19), 824(19), A.224 (VII), A.384(X), A.861(20), A.575(14), A 424, A.526(13), MSC.192(79), MSC.53(66), MSC 95(72), MSC 128(75), MSC 74(69), MSC 73(21), 232(82), 817(19), 64(67)
should not degrade the performance of any equipment providing sensor inputs. Nor should the connection of optional equipment degrade the performance of ECDIS below this standard.’ This is important, as the connection of STM with ECDIS should take into account this standard in order to be compliant. An identical provision on AIS can be found in Resolution 823(19), Paragraph 3.9.1.92

A provision of regulation 19 has to be taken into account when installing the STM on board a ship, as sub-regulation 4 mentions that ‘the navigational equipment and systems referred to in this regulation (shipborne navigational equipment) shall be so installed, tested and maintained as to minimize malfunction.’ This provision is of limited relevance with the current project status, as it refers to the navigational equipment of Regulations 19 and 20, and it is consequently regarding the installation of ECDIS, AIS etc. Its relevance might increase in the event that STM becomes standardised in SOLAS or if STM develops a standalone platform and as such, it becomes part of SOLAS currently, however, STM is not within the navigational equipment of Regulations 19 and 20.

**Regulation V/28**

This regulation refers to the logbook and the fact that important incidents have to be recorded in it. There is an issue whether an STM incident, which could be considered important, would need to be included in such reports. Furthermore, there is also the possibility that the flag State might allow the use of STM, as a means of recording incidents that are relevant under this regulation, and e-logbook was one of the potential functionalities that was discussed in project meetings.

**Regulation V/34**

A regulation that has to be taken into account and will potentially be affected by the operation of STM is Regulation 34. This regulation is relevant for the purposes of Route Cross-Check, as it mentions that the master should adopt a voyage plan that takes into account the routeing systems, ensures sufficient sea room for the safe passage of the ship throughout the voyage, anticipates all known navigational hazards, and takes into account the protection of the marine environment.

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92 The ARPA should not degrade the performance of any equipment providing sensor inputs, and the connection of the ARPA to any other equipment should not degrade the performance of that equipment. This requirement should be met whether the ARPA is operating or not. Additionally, the ARPA should be designed to comply with this requirement under fault conditions as far as is practicable
If Voyage Management suggests a route in its Voyage Plan to the master, it should take into account these parameters, as the master will have to observe this regulation of Chapter V.

**Regulation XI-1/4**

Regulation XI-1/4 mentions that ships of Contracting Governments shall be subject to Port State Control of other Contracting Governments, to make sure that the master or crew are familiar with essential shipboard procedures relating to the safety of ships. This provision is linked with Regulation I/19 on Port State Control, which is concerned with the verification of certificates as part of formal seaworthiness. Consequently, Regulation XI-1/4 is concerned with the exercise of Port State Control on the grounds of familiarisation of the crew with essential shipboard procedures, which can be verified through the presentation of STCW certificates. It follows that it poses no impediment to STM, as formally there are no training requirements yet in place for STM.

**Regulation XI-2/4**

Chapter XI-2 is concerned with measures enhancing maritime security. Regulation 4 of this Chapter makes a reference to the necessary compliance of shipping companies with the ISPS Code. The Code comprises a series of legally binding obligations on the part of owners and operators of the ship, on one hand and, on the other hand, a series of interlocking legal obligations on contracting states to SOLAS 1974, in particular on their port facilities and administration. The following parts of the ISPS Code are relevant to STM and they set some potential requirements for its operation without prohibiting its introduction directly.

First of all, the primary objective of the ISPS is to establish an international framework for detecting security threats and to take preventive measures against security incidents affecting ships or port facilities used in international trade. It has to be mentioned that there is nothing to confine the “security threats” to the merely physical, which means that it could extend to cyber-security threats.

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93 See for example Table A-II/1 of the STCW Code, containing the essential shipboard safety skills, or Table A-V/1-1-1 containing the essential shipboard anti-pollution procedures


95 ISPS Code Part A, paragraph 1.2.1; for more information on Cyber Security threats, please refer to STM’s Cyber Security report. There is a reference to the ISPS Code at page 9.
Paragraph 9 of Part A provides that each ship shall carry on board an administration-approved security plan, while subparagraph 9.4.4 mentions that it should take into account ‘procedures for responding to security threats or breaches of security, including provisions for maintaining critical operations of the ship or ship/port interface.’ With the introduction of STM, it is only reasonable to assume that such a plan may include the STM-related security threats, including but not limited to risks arising from the information shared through the STM platform. The same provision can be located in subparagraph 16.3.3, but it concerns the port facility security plan, which is also relevant as ports will be also stakeholders in STM.

Another part of the ISPS Code with STM relevance is that regarding the SSA (Ship Security Assessment), which is the process of developing and updating the ship security plan. Paragraph 8.2 mentions that the company security officer shall ensure that the SSA is performed in accordance with this section taking into account the guidance of Part B of the ISPS Code. Paragraph 8.3.5 of Part B of the ISPS Code mentions that during a ship security assessment the company security officer should address the radio and telecommunications systems, including computer systems and networks, and should be able to draw upon expert assistance in relation to them. As BIMCO notes in its cybersecurity guidelines, referring to ISPS 8.3: “This calls for controlling and monitoring “the ship to shore” path of the internet connection, which is important owing to the fast adoption of sophisticated and digitalised onboard OT systems that in many cases have not been designed to be cyber resilient.” Furthermore, paragraph 8.4.3 requires the identification of possible threats to shipboard operations, which, as was mentioned above, is not just confined to physical threats. Consequently, depending on the final form of the STM, the ships carrying STM are expected to include in their Ship Security Plan preventive measures against the threats that are related to its operation, including cyber threats.

As a conclusion for the ISPS, it could be argued that although there is no conflict as such, the STM should be accompanied by the appropriate security measures both for the ships and for the port facilities, so as to ensure the compliance by the ISPS and subsequently by Chapter XI-2 of SOLAS.

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96 ISPS Code Part B, paragraph 8.4.11
Regulation XIV/2
Regulation 2 of the new Chapter XIV, which came into force on 1 January 2017, mentions that this chapter applies to ships operating in polar waters, certified in accordance with Chapter I. Paragraph 2 requires that ships constructed before 1 January 2017 shall meet the relevant requirements of the Polar Code by the first intermediate or renewal survey, whichever occurs first, after 1 January 2018.

As regards the provisions of the Polar Code that could be relevant to STM, there are two points that have to be analysed. Chapter 9 on Safety of Navigation contains a provision which could be relevant if STM develops its ICE functionality as part of its Winter Navigation. Paragraph 9.2.1 mentions that ships shall have the ability to receive up-to-date information including ice information for safe navigation. The development of the ICE functionality aims to provide information on the safe routes that icebreakers have followed, and display them on the ECDIS of STM ships, which could promote the requirement of this paragraph.

Chapter 11 on Voyage Planning has as a primary goal that the navigating team are provided with sufficient information that ensures navigational safety and environmental protection. Paragraph 11.2 mentions that the voyage plan needs to take into account potential hazards listed in paragraph 11.3 and include the following: Procedures required by the PWOM (Polar Water Operational Manual), any known limitations from hydrographic information and aids to navigation, current information on ice and icebergs, statistical information on ice and temperature, places of refuge, measures on encounter of marine mammals, information on ship’s routeing systems and VTS, national and international protected areas on the route, and operation in areas remote from SAR capabilities. These parameters have to be taken into account by STM, both in the pre-voyage stage (Route Cross-Check) and in any change suggested for reasons of optimisation (Route Optimisation, Enhanced Monitoring, Winter Navigation). This Regulation has to be read together with Regulation V/34, which provides for the general requirements that Voyage Planning has to take into account in order to ensure a safe sea passage and protection of the marine environment.

98 Polar Code, Chapter 11, Paragraph 11.1
The requirement for Polar Voyage Planning that correctly identifies the polar regulatory regimes and the relevant areas will be also a requirement of the STCW, when the latest amendments to it come into force.\textsuperscript{99}

\textsuperscript{99} The amendments of STCW entered into force on 1 July 2018. This requirement can be found in IMO, Consideration and adoption of amendments to mandatory instruments MSC/97/3/2 15 August 2016, p 29, Table A-V/4-2 Column 4
1.1.1.2 COLREGS

International Regulations for Preventing Collisions at Sea 1972, as amended (COLREGS 1972) and STM

General context

This document is written in the framework of Activity 5, which is concerned with the compatibility of the STM concept and services with the current legal framework. This report is a part of a series of specific reports, the results of which will be summarised in Milestone 23 as a final formal deliverable.

Objective

The compatibility of the STM concept with the International Regulations for Preventing Collisions at Sea 1972, as amended, is the central point of this report.

Restrictions

The compatibility analysis is legal in nature. Any policy and perception issues introduced are not the central point of this report. This report is written before the STM concept has crystallised so modifications might be needed. Any reference made to the common law regards issues extending beyond international maritime law, and English law is very widely used for this purpose.

Introduction

Safety of navigation and protection of the marine environment are the two major international aims in shipping policy. There is a duty on every State to ensure that ships flagged to or registered with it operate within international standards and that the marine environment is protected. For the fulfilment of these international obligations, each State imposes the international standards as a minimum, through its national laws and regulations and demands that the operation of ships is done in a safe and careful way, which takes into account the other users of the sea. Practice of good seamanship is the standard of performance for all vessels.

This is recognised in the international agreement prescribing the rules of conduct for vessels the International Regulations for Preventing Collisions at Sea 1972\textsuperscript{100}, as amended, commonly abbreviated as COLREGS.

The COLREGS are a set of compulsory safety rules aimed at avoiding collisions at sea.

\textsuperscript{100} Convention on the International Regulations for Preventing Collisions at Sea, as amended (COLREG 1972) (adopted: 20 October 1972, entered into force: 15 July 1977) 1050 UNTS 16
The research undertaken indicates that the STM concept, as presently described, is not formally in conflict with the COLREGS and can assist in achieving safer navigation by enabling navigators to avoid close quarters situations.

A concern raised refers to a misuse and the potential overreliance on the STM concept, in particular, in relation to Ship-to-ship Route Exchange. This concern must be addressed through appropriate training and navigational systems integration. However, it is not a legal inconsistency with existing navigational rules but rather an issue concerning the shipowners’ obligation and duty to make the navigation of their ships safe.

The COLREGS underpin safe navigation and the courts, both in English and foreign cases, require conduct which is in conformity with the good seamanship standard. Each time a new technology is introduced in navigation, the court’s message has been clear: alteration of navigational behaviour cannot be justified unless it is consistent with COLREGS and the practice of good seamanship. An agreement via VHF or the use of new navigational aids cannot reduce the duty to maintain a proper look-out and keep safe speed. In some cases, the court did point out the positive effects that could come out of the correct use of additional navigational aids in collision avoidance, but only if they are used in conjunction with the traditional means of look-out. Thus, the use of the STM console will need to be done in an appropriate way in order support officers, but not distract them from what is necessary for compliance with underlying obligations.

The COLREGS apply to all vessels. Part B – Steering and Sailing Rules, Section I (Rules 4-10) regulates the conduct of vessels in any condition of visibility, Section II (Rules 11-18) regulates the conduct of vessels in sight of one another and Section III (Rule 19) regulates the conduct of vessels in restricted visibility. Criminal liability may also be invoked where failure to observe the Rules is made an offence.101

In the following paragraphs, there is a specific explanation of those COLREGS rules to which the STM concept is relevant or with which it is compatible.

**Rule 2 - Responsibility**

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Nothing in these Rules shall exonerate any vessel, or the owner, master or crew thereof, from the consequences of any neglect to comply with these Rules or of the neglect of any precaution which may be required by the ordinary practice of seamen, or by the special circumstances of the case.

In construing and complying with these Rules due regard shall be had to all dangers of navigation and collision and to any special circumstances, including the limitations of the vessels involved, which may make a departure from these Rules necessary to avoid immediate danger.
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The first paragraph is a reminder to seamen that the failure to comply with the rules or with the practice of good seamanship has adverse consequences, with *the Queen*

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101 For the UK the relevant provision is section 6 of The Merchant Shipping (Distress Signals and Prevention of Collisions) Regulations 1996, UK SI 96/75
Mary\textsuperscript{102} adding that “compliance does not terminate the ever present duty of using reasonable skill and care”.

The second paragraph aims to address the situation where a literal observance of the regulation is invoked as a defence, where the collision might have been avoided by ordinary care. A series of decisions, most of which predate the COLREGS, suggest that departure from a rule is necessary if it is perfectly clear, almost amounting to a certainty, that adherence to the rule will result in a collision, while the violation of the rule will avoid it.\textsuperscript{103}

Consequently, rule 2 extends the rule that the ordinary standard is good seamanship and stresses that the prevailing circumstances must be always borne in mind.

**Rule 5 - Look-out**

> Every vessel shall at all times maintain a proper look-out by sight and hearing as well as by all available means appropriate in the prevailing circumstances and conditions so as to make a full appraisal of the situation and of the risk of collision.

This requirement must be discharged irrespective of whether the vessel is participating in the STM Validation Project or not. However, maintaining a good look-out can be affected by the STM concept in two ways: first, Rule 5 requires good look-out to be maintained by all available means. The envisaged STM features, Voyage Planning, Ship-to-ship Route Exchange, Flow Management and Port CDM, could significantly raise the situational awareness, and in conjunction with other means, improve the observance of a proper look-out and good seamanship.

Therefore, to the extent that the STM console provides additional information, it can contribute in enhancing the keeping of a good look-out.

In fact, the use of the STM console could be considered as necessary if it can help in a particular case to make navigation safer.

\textsuperscript{102} The Queen Mary (1949) 82 Lloyds Rep 303, 341; Simon Gault, Marsden on Collisions at Sea, 14\textsuperscript{th} Edition, Sweet & Maxwell, 2016 para 5-104

\textsuperscript{103} The Boanerges and Anglo-Indian (1865) 2 Mar L Cas (OS) 239; The Ida and Wasa (1866) 2 Mar L Cas (OS) 414; Handaysyde v Wilson (1828) 3 Car&P 528; The Lady Belle [1933] P 275; Simon Gault, Marsden on Collisions at Sea, 14\textsuperscript{th} Edition, Sweet & Maxwell, 2016 para 5-113
In a United States case, it was stated: "The Court holds that Noordam [the vessel] should have kept a better look-out both visually and with the highly sophisticated equipment onboard."104

However, navigational decision-making should not be made solely on STM information. This would breach the look-out rule and breach the COLREGS. The possibility of this happening, that is, reducing the “sight and hearing” aspects of the look-out and reliance on electronic information, in particular, ship-to-ship route exchange which may be outdated or inaccurate is the major concern expressed by the International Chamber of Shipping (ICS). Legally, the words “as well as” in rule 5 are critical. Although there is no definition of proper look-out in COLREGS, a Hong Kong judge considered proper look-out to extend beyond mere observation, and took into account the reaction time [to avoid a collision or a close quarters situation], as an element defining proper look-out.105

It is clear that the STM console does not by its presence constitute a breach of Rule 5 nor that its absence would contribute to the observance of a proper look out. The STM concept should be clearly expressed as an additional assistance to navigation but not a replacement for the need of a good look-out by sight or hearing.

**Rule 6 - Safe speed**

*Every vessel shall at all times proceed at a safe speed so that she can take proper and effective action to avoid collision and be stopped within a distance appropriate to the prevailing circumstances and conditions.*

The Rule goes on to add the parameters which determine the safe speed,106 but nowhere in this or any other rule in the COLREGS is a minimum or maximum speed

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104 Hal Antillen N.V. V. Mount Ymitos MS 147 F.3d 447 (5th Cir. 1998); p 451
105 Kulemesin and Another v HKSAR, [2013] 2 Lloyds Rep 367, 402
106 In determining a safe speed the following factors shall be among those taken in to account: (a) By all vessels. (i) the state of visibility; (ii) the traffic density including concentrations of fishing vessels or any other vessels; (iii) the manoeuvrability of the vessel with special reference to stopping distance and turning ability in the prevailing conditions; (iv) at night the presence of background light such as from shore lights or from back scatter of her own lights; (v) the state of wind, sea and current, and the proximity of navigational hazards; (vi) the draught in relation to the available depth of water. (b) Additionally, by vessels with operational radar: (i) the characteristics, efficiency and limitations of the radar equipment; (ii) any constraints imposed by the radar range scale in use; (iii) the effect on radar detection of the sea state, weather and other sources of interference; (iv) the possibility that small vessels, ice and other large floating objects may not be detected by radar at an adequate range; (v) the number, location and movements of vessels detected by radar; (vi) the more exact
limit specified. In fact, even where compulsory speed limits are imposed, it can be argued that obeying them does not of itself make the speed of the vessel safe. Moreover, it can be argued that, if a collision can be avoided by a safe speed in excess of the imposed limits, then good seamanship dictates speeding up.  

One key aspect of the STM is the potential for recommending an adjustment of the speed of the vessel. Route Planning and potentially all the other features (Ship-to-ship Route Exchange, Route Optimisation, Route Cross-Check, Enhanced Monitoring, Port Call Optimisation) could suggest an optimum speed with which the vessel should be proceeding. Such recommendation would need to be followed or ignored by the master depending on whether it is consistent with the safe speed requirement. *The Maloja II* suggests that “a master should positively discourage any reluctance to reduce speed or, if necessary, stop the ship.” In other words, no matter what the suggested speed by the STM is, the master would be obliged to maintain a safe speed, which is a matter of “prudent seamanship”. The same would apply in any condition of visibility, although only rule 19 refers expressly to the safe speed in restricted visibility situations, perhaps in order to emphasise its importance. This should not be problematic for any master as there are requirements for the ship’s performance under various contractual arrangements, but these are disregarded where there is a risk of collision or bad weather or other risks. A “safe speed” should reflect at all times the prevailing circumstances.

In conclusion, Rule 6 does not prohibit the use of STM, but it is the observance of good seamanship that will determine the safe speed for the purposes of collision avoidance.

**Rule 7 - Risk of collision**

*(a) Every vessel shall use all available means appropriate to the prevailing circumstances and conditions to determine if risk of collision exists. If there is any doubt such risk shall be deemed to exist.*

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[1991] 2 Lloyds Rep 591, 596

(b) Proper use shall be made of radar equipment if fitted and operational, including long-range scanning to obtain early warning of risk of collision and radar plotting or equivalent systematic observation of detected objects.

(c) Assumptions shall not be made on the basis of scanty information, especially scanty radar information.

(d) In determining if risk of collision exists the following considerations shall be among those taken into account:

(i) such risk shall be deemed to exist if the compass bearing of an approaching vessel does not appreciably change;

(ii) such risk may sometimes exist even when an appreciable bearing change is evident, particularly when approaching a very large vessel or a tow or when approaching a vessel at close range.

The provision by STM of ship-to-ship route exchange can be used to confirm other information obtained and inform about the potential conduct of other vessels. In that sense, the STM console could be used in conjunction with other navigational aids to avoid collision risks by adjustments of routeing and/or speed well in time. Again, there is no impediment to using the STM information although concerns exist among stakeholders on whether inaccurate information on ship routeing could put the master in a situation of guessing which information should be relied upon. Legally there is no question, as rule 7 is very clear and should be abided by.

Assumptions on scanty information

Rule 7(c) prohibits making assumptions on the basis of scanty information.\textsuperscript{112} In \textit{The Oden and the Pulkovo},\textsuperscript{113} \textit{Oden} was at fault because it made assumptions based on scanty radar information, regarding the speed and the course of \textit{Pulkovo}, the vessel that it collided with. As regards the definition of scanty information, the authorities suggest that it is the simple observation of the radar without making a plot.\textsuperscript{114}

\textsuperscript{112} COLREGS Rule 7(c): Assumptions shall not be made on the basis of scanty information, especially scanty radar information.

\textsuperscript{113} \[1989\] 1 Lloyds Rep 280; 287

Compliance with Rule 7 will always require continuous monitoring of the compass bearing of an approaching vessel. There is an important distinction between using radar-based information and the STM information. The radar signal, the estimation of the compass bearing, the plotting of any information and the good lookout rely exclusively on the skills and operational capabilities of the vessel following the COLREGS.

The STM information provided by other vessels may be delayed in time and may not be followed by the approaching vessel for various reasons.\textsuperscript{115} Thus, the use of the STM for vessels in sight of each other for estimation of the risk of collision should be discouraged and it may fall within the definition of scanty information unless the information is confirmed by other means. The above argument is supported by examining the way the IMO-adopted Revised Guidelines for the operational use of shipborne Automatic Identification System (AIS)\textsuperscript{116} in collision avoidance are written. Paragraph 3 of the revised guidelines says in the last sentence:

The guidance in this document on the inherent limitations of AIS and their use in collision avoidance situations (see paragraphs 40 to 44) should therefore be observed.

These revised guidelines, published by the IMO,\textsuperscript{117} read as follows:

\begin{quote}
\begin{itemize}
\item \textbf{40. The potential of AIS as an assistance for anti-collision device is recognised and AIS may be recommended as such a device in due time.}
\item \textbf{41. Nevertheless, AIS information \textit{may merely be used to assist} in collision avoidance decision-making. When using the AIS in the ship-to-ship mode for anti-collision purposes, the following cautionary points should be borne in mind:}
\end{itemize}
\end{quote}

\textsuperscript{115} Assuming that both vessels in sight of each other are using STM
\textsuperscript{116} IMO Secretariat, \textit{Policy on Use of AIS Aids to Navigation}, MSC.1/Circ.1473, 23 May 2014, para 3: An AIS AtoN is a digital aid to navigation (AtoN) promulgated by an authorized service provider using AIS Message 21 “Aids to navigation report” that is portrayed on devices or systems (e.g. Electronic Chart Display and Information System (ECDIS), radar or Integrated Navigation System (INS)). An AIS AtoN can be implemented in two ways: .1 Physical AIS AtoN: a Physical AIS AtoN is an AIS Message 21 representing an AtoN that physically exists; and .2 Virtual AIS AtoN: a Virtual AIS AtoN is transmitted as a Message 21 representing an AtoN that does not physically exist.
\textsuperscript{117} IMO Resolution A.1106(29)
1 AIS is an additional source of navigational information. It does not replace, but supports, navigational systems such as radar target-tracking and VTS;

2 the use of AIS does not negate the responsibility of the OOW to comply at all times with the Collision Regulations, particularly rule 7 when determining whether risk of collisions exists.

42. The user should not rely on AIS as the sole information system, but should make use of all safety-relevant information available.

43 The use of AIS on board ship is not intended to have any special impact on the composition of the navigational watch, which should continue to be determined in accordance with the STCW Convention.

Note: the STM concept uses AIS for the exchange of route information, so this paragraph is relevant. It confirms to the shipowner that using STM would not entail extra manning costs, only extra specialised training.

44 Once a ship has been detected, AIS can assist in tracking it as a target. By monitoring the information broadcast by that target, its actions can also be monitored. Many of the problems common to tracking targets by radar, namely clutter, target swap as ships pass close by and target loss following a fast manoeuvre, do not affect AIS. AIS can also assist in the identification of targets, by name or call sign and by ship type and navigational status.”

The AIS is an automated system, which reports actual position and can be used to estimate average speed and direction between successive positions. In that sense, it is an accurate depiction of the instantaneous navigational situation but it says very little on the future behaviour of the approaching ship. The STM, by contrast, concerns intended route, which would require input by an operator, an act which may be delayed if there is an emergency leading to a change in the ship’s heading. With the current project information, Route Exchange information will be facilitated by AIS, and AIS’s guidelines could assist in the safe and successful introduction of the STM features.
Furthermore, paragraph 43 seems to suggest that there will be no additional manning costs for the shipowner, as AIS does not change the composition of the navigational watch. However, some extra training costs might be entailed.

The court in *The "Western Neptune" & The "St Louis Express"*\textsuperscript{118} cited these guidelines,\textsuperscript{119} while pointing out problems that could arise if AIS was used on its own. Mr Justice Steel then added: “As regards to the need for caution this court has repeatedly warned about the risks involved in using VHF to assist in collision avoidance[...]. Of course, the problem of misidentification has been much alleviated by the arrival of AIS”\textsuperscript{120}. It would be safe to say that this authority, although recognising the positive effect that new technologies can have on the prevention of collisions, does underline the need to use them with caution and always in conjunction with good seamanship and other aids to navigation.

**Rule 8 - Action to avoid collision et seq**
The STM might also affect the collision avoidance rules when vessels are in sight of each other (Rule 8). Again legally there is no impediment to using the additional information, however such information cannot be used as the basis of avoiding compliance with the specific COLREGS Rule. While the master can get an idea of where the approaching vessel is heading, the judgement on whether a risk of collision exists or not is, under the COLREGS, a process undertaken on the basis of objective observation of the behaviour of the approaching vessel and not on information of planned behaviour.

The STM is not constrained by any of Rules 11-19, which refer to specific actions that need to be taken when vessels are in sight of one another or in restricted visibility. The overlap of STM with COLREGS has been addressed in the general part, which deals with any state of visibility. The same general rule applies here, namely that the STM information cannot affect the compliance with COLREGS, and the master should always abide by COLREGS irrespective of whether the STM information suggests that the collision risk will not materialise because the approaching vessel may change its

\textsuperscript{118} [2010] 1 Lloyds Rep 158
\textsuperscript{119} *Ibid* para 46-49 (It made reference to the older version of the guidelines, but the idea behind them, and the new ones, cited above, is similar)
\textsuperscript{120} *Ibid* para 83
planned route or speed. Rules 20-37 are not relevant at all to STM, as they deal with lights and signals, Rule 38 deals with the exemptions from COLREGS, none of which are relevant to the STM.

Rules 39, 40 and 41 constitute the new Part F of COLREGS and entered into force on 1 January 2014. These rules are not relevant to the purpose of this report as they deal with the establishment of Audit schemes, to verify IMO Member States’ compliance with the Convention.

**The effect of communication and agreements between vessels in the course of navigation on compliance with COLREGS**

As explained above, there is no direct legal impediment to using STM information for increasing the ship navigator’s situational awareness. However, it is clear that risks arising from misuse and from human error or misunderstanding are of concern. While there is little doubt that if the information provided under the ship-to-ship exchange is false or outdated there would be some liability for the vessel that failed to update it in time, it is also clear that reliance on such information will never be an excuse for failing to comply with the COLREGS.

To support this argument, it suffices to look at cases where oral agreements through VHF or other communication means were made between approaching vessels with the intention that the vessels will not comply with COLREGS but will follow alternative manoeuvres to avoid collision. Where such agreements have led to a collision, the courts were very clear on what they thought about such conduct.

In *The Jute Express*, Mr Justice Sheen stated that “A ship on the high seas is not entitled to use VHF communication for the purpose of asserting a right of way which is not conferred by the Regulations. Such conduct would nullify the benefits of clear rules.” The judge went even further to characterise such navigation as “deplorable” when used to justify a departure from COLREGS. That view was also followed in *The Samco Europe and MSC Prestige* where the judge stated: “Whilst VHF must not be used to agree on a course of navigation which would conflict

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121 [1991] 2 Lloyds Rep 55; 58
122 Ibid: “The fact, if it be a fact, that Pacific Confidence II attempted to use VHF communication to justify a departure from rr. 15 and 16 demonstrates the deplorable navigation of that ship.”
123 [2011] 2 Lloyds Rep 579
with the Collision Regulations there may be circumstances where VHF conversations can be useful as an exchange of information."\(^{124}\) A similar statement can be found also in *The Aleksandr Marinesko and Quint Star*,\(^{125}\) where it is mentioned that "It cannot be too strongly emphasised that vessels should be navigated in accordance with the Collision Regulations and not by agreement on the VHF."\(^{126}\)

In *The Antares II and Victory*,\(^{127}\) a case of a collision between two vessels, there is a noteworthy passage regarding the importance of communication:

“Both sides alleged the other should have used VHF radio as a means of communication. The obvious channels to use were channels 16 and 14 if VHF radio was to be used at all. However I do not find the failure to the vessels to use VHF radio as a fault on the facts of this case where both vessels were in sight of each other in a narrow channel and no such communication was necessary if a good look-out was kept and each vessel kept to its starboard side: see also the caution recommended in Merchant Shipping Notice No. M.845. All that they had to do was to comply with the Collision Regulations to ensure a safe passing and safety was assured.”\(^{128}\)

The consistency of these authorities shows the predominant role of the observance of COLREGS in navigation and the secondary role of non-standard or agreed behaviour.

*The Mineral Dampier*\(^{129}\) is another case which shows the paramount importance of abiding by the COLREGS and by the standard of good seamanship over anything else. In that case, there was an agreement (although the agreement was overturned by the Court of Appeal) by communication through VHF, which arranged a certain set of actions for both vessels, though inconsistent with the requirements set by COLREGS. Regardless of the existence or not of an agreement, a passage from this case on the effect of such agreement is useful for the STM application: "The effect of the agreement was that Mineral Dampier was to maintain her course and speed, while she expected Hanjin Madras to turn to starboard imminently. This would have meant that Mineral Dampier was inhibiting herself from acting in accordance with r. 17(a)(ii) or (b) or good seamanship and so altering course or reducing her speed in circumstances that were fast amounting to a "close quarters situation". Blame must attach to Mineral Dampier for letting herself be put in this position."\(^{130}\)

\(^{124}\) [2011] 2 Lloyds Rep 579; 585  
\(^{125}\) [1998] 1 Lloyds Rep 265  
\(^{126}\) [1998] 1 Lloyds Rep 265; 278  
\(^{127}\) [1996] 2 Lloyds Rep 482  
\(^{128}\) [1996] 2 Lloyds Rep 482; 498. Merchant Shipping Notice No M.845 is no longer valid, but it is quoted as it was part of the judgment.  
\(^{129}\) [2001] 2 Lloyds Rep 419  
\(^{130}\) [2001] 2 Lloyds Rep 419; 426
In a case after *The Mineral Dampier*, where an agreement was reached via VHF, there is an enlightening passage stating: “The pilot of Nordlake reached an agreement by VHF with a warship [...] which was contrary to Rule 9 of the Collision Regulations. [...] There can be no doubt that whilst VHF may be used to exchange information it cannot be used to agree on a course of navigation which would conflict with the Collision Regulations. The use of VHF made by the pilot of Nordlake was, therefore, improper.”

It is unambiguous that the courts are unwilling to accept any alternative in lieu of compliance with the COLREGS and good seamanship and they expect that collision avoidance will be based on the seamanship skills of each master. The exchange of information and intended routes could be considered as falling within the ambit of these authorities if the vessels are in sight of each other. However, the ship-to-ship route exchange through STM can be used before that time in order to reduce the occurrence of close quarters situations.

The importance of the faults and their contribution to the damage caused determines the contribution to civil liability. It was obvious to the judges of the aforementioned AIS case that there could be wrong input of data, or that some vessels might not be equipped with AIS and that good seamanship required awareness and use of the information with these potential problems in mind. In another collision case involving the use of ARPA, the court apportioned the blame to the Contship Success, at fault for “wrongly interpreting the information from (or which ought by proper operation of the ARPA to be available on) radar”. The legal expectation is that the master or the Officer Of the Watch (OOW) will use all available information to assess the situation but will always comply with the COLREGS and practise good seamanship.

**General Conclusion**

The regulatory framework of the International Regulations for Preventing Collisions At Sea 1972, as amended does not forbid the use of the STM in any way. The introduction of other technologies provides robust guidance for the proper use of the STM. The use of new technologies cannot supersede the Collision Regulations. This

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131 The “Nordlake” and The “Seaeagle” [2015] EWHC 3605 (Admlty); para 76
132 The guide North of England P&I provides, for the use of new technologies in maintaining a proper lookout, could be useful in connection with the proper use of STM (http://www.nepia.com/media/73229/Colregs-Rule-05-Look-Out.PDF)
133 [2010] 1 Lloyds Rep 158; paras 46-48
134 Automatic Radar Plotting Aid
135 The “Selat Arjuna” and “Contship Success”, [1998] 2 Lloyds Rep 489; 509
has been confirmed many times in the cases mentioned above and the COLREGS have withstood the test of time.

There is no substitute for proper watchkeeping\textsuperscript{136} and STM should be used as an additional aid to navigation in order to achieve a more complete and safer assessment of the risk of collision and to avoid getting into a close quarters situation. The concerns identified relate exclusively to behavioural aspects of overreliance on scanty information and they must be dealt with through an appropriate training programme and thorough familiarisation in the use of STM-compliant equipment.

1.1.1.3 FAL

Convention on the Facilitation of International Maritime Traffic 1965

General context
This document is written in the framework of Activity 5, which is concerned with the compatibility of the STM concept and services with the current legal framework. This report is a part of a series of specific reports whose results will be summarised in Milestone 23 as a final formal deliverable.

Objective
The compatibility of the STM concept with the Convention on the Facilitation of International Maritime Traffic 1965 is the central point of this report.

Restrictions
The compatibility analysis is legal in nature. Any policy and perception issues introduced are not the central point of this report. This report is written before the STM concept is crystallised so modifications may be needed. This report takes into account the amendments unanimously adopted by resolution FAL.12 (40), which entered into force on 1 January 2018.

Introduction
This Convention was concluded in London, in 1965, in order to facilitate maritime traffic by simplifying and minimizing formalities and documentary requirements on ships engaged in international voyages. The Convention is comprised of 16 Articles and an Annex. The research undertaken indicates that STM is compatible with this convention.

The FAL Convention creates standardised examples for information to be requested by Port Authorities and it also considers the electronic exchange of information and its use for conducting trade. The exchange of information in the STM is going to be between the ship and private parties in port, which is distinguishable from the exchange between the ship and the port authorities, which is the regulatory field of this convention. In other words, STM is concerned with the exchange of information relating to the arrival and the commercial operation of the ship with ports and shore centres, where FAL is concerned with the formalities exchanged with the public authorities managing the port. This difference is the reason that the FAL Convention does not pose any impediments to the STM.

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138 IMO, Report of the Facilitation Committee on its fortieth session, FAL 40/19, 20 April 2016 Paragraphs 4.9- 4.10
FAL 1965 also contains some stipulations that illustrate an alignment of goals between FAL and STM such as: “Port authorities should [...] take measures to the end that traffic flow arrangements [...] can be cleared rapidly.” \(^{139}\); “Contracting governments should adopt all practicable measures to [...] avoid unnecessary delay of ships and [...] reduce formalities to a minimum.” \(^{140}\)

**Compliance of the STM with FAL 1965 and its Annex**

Article V states that the Convention shall not prevent a state from granting any wider facilities in respect of international maritime traffic under its national laws. \(^{141}\) In essence, this means that this Convention lays out some minimum standards, in an attempt to simplify international maritime traffic, but this does leave room for further development and regulatory intervention. Subject to the right of the coastal state to regulate its own traffic separation schemes and sea lanes, this provision could be relevant to Enhanced Monitoring, as this feature relates to monitoring of the route and suggests route modifications due to traffic or other impeding conditions. However, such an operation cannot interfere with the rights of the coastal state and the operation of a traffic separation scheme, as the vessel must be strictly compliant with the rules of conduct of such scheme.

Paragraph 3.11 of the measures to facilitate clearance of cargo, passengers, crew and baggage, provides the following recommended practice:

“Public authorities should, with the cooperation of shipowners and port authorities, and/or port administration, take appropriate measures to the end that satisfactory port traffic flow arrangements may be provided so that passengers, crew and baggage can be cleared rapidly, should provide adequate personnel, and should ensure that adequate installations are provided, particular attention being paid to baggage loading, unloading and conveyance arrangements (including the use of mechanized systems) and to points where passenger delays are frequently found to occur. Arrangements should be made, when necessary, for passage under shelter between the ship and the point where the passenger and crew check is to be made. Such arrangements and installations should be flexible and capable of expansion to meet increased security measures during higher security levels.” \(^{142}\)

This provision is relevant for the STM and in particular for the Port Call Synchronisation and the Port Call Optimisation features. One of the key targets of STM is the minimisation of waiting time in ports, by exchanging information and potentially applying changes in speed. Port Call Optimisation through its collaborative decision-making and common awareness aims to improve port traffic flow arrangements and reduce the time spent in port. This provision however, refers to port authorities, and from the information that is currently available, STM will deal with the communications

\(^{139}\) Paragraph 3.11  
\(^{140}\) Paragraph 7.3  
\(^{141}\) FAL Article V para 1  
\(^{142}\) FAL Annex, 3.11
between the vessel and the commercial port and as aforementioned this is the reason that the convention poses no impediments.

The standard set in paragraph 7.3 is a proviso, which involves a positive stipulation, relevant to Port Call Synchronisation and Port Call Optimisation.

“Contracting Governments should adopt all practicable measures to organize the normal services of public authorities at ports in order to avoid unnecessary delay of ships after their arrival or when ready to depart and reduce the time for completion of formalities to a minimum, provided that sufficient notice of estimated time of arrival or departure shall be given to the public authorities.”

Again this provision aims to minimise the time spent in port, by avoiding unnecessary delays, and reducing the amount of formalities to a minimum. A question that arises out of this provision is whether FAL can be used as a means of ensuring the fair treatment of vessels using STM both as between themselves and between STM and non-STM vessels. A valid concern arising out of the use of STM is that a vessel using the platform and following a suggestion by the STM to slow down might be overtaken by another vessel that was supposed to arrive after the former vessel, and hence taking its turn in the queue. This scenario could occur either with the involvement of both vessels participating in STM or with an STM and a non-STM vessel. This provision could be used in ensuring that the queues in port are organised in accordance with the order of the notices of ETAs, taking into account the STM information. Slot Management is a feature that has been discussed during the project meetings, as a priority that has to be developed, due to the need to tackle this concern.

The Single Window Concept and its relationship with STM

The 40th Session of the Facilitation Committee of the IMO, dealt, amongst other things, with the comprehensive review of the FAL Convention, and the application of the Maritime Single Window concept. The Single Window is a facility that allows submission of standardized information covered by the Convention to a single entry point. Resolution FAL 12(40) laid down some amendments to the Annex of the FAL Convention, some of which are important for the STM and came into force on the 1st of January 2018.

Paragraph 1.3bis mentions that: Public authorities shall take all necessary measures for the establishment of systems for the electronic exchange of information by 8 April 2019. According to paragraph 1.3ter there must be a transition period before making these systems mandatory and this period cannot be shorter than 12 months, from the date of introduction of such systems. 1.3quart adds that during a transitional period, public authorities should accept both electronic and paper forms for clearance purposes. In the next FAL meeting there was a discussion on whether there should be

143 IMO, Report of the Facilitation Committee on its fortieth session, FAL 40/19, 20 April 2016, sections 4 and 5
144 Resolution FAL. 12(40), Section 1, Definitions
145 Resolution FAL. 12(40) is located in Annex 1 of the aforementioned report of the 40th session of the FAL committee.
146 IMO, Report of the Facilitation Committee on its fortieth session, FAL 41/17, 24 January 2017 p 4
a prototype MSW\textsuperscript{147} platform that will be developed from the existing systems, an entirely new prototype MSW platform, or finally if a prototype should not be developed at all.\textsuperscript{148}

These provisions are relevant to the STM, as the STM idea is heavily focused on the electronic exchange of information and on its standardisation. These provisions not only give the green light to the electronic exchange of information, but also mandate it. This provision entails a regulatory requirement, which could prove relevant in the future for STM. The establishment of electronic information exchange systems requires a transitional period longer than 12 months before turning mandatory. Any information exchanged through STM that is included in the ones covered by this convention must be in the format required by the provisions of the Single Window. The importance of standardisation has been stressed during the 41\textsuperscript{st} Session of the Committee, as it was pointed out that the standardisation of FAL forms would have a positive impact on interoperability, MSW, implementation of electronic certificates and e-navigation.\textsuperscript{149}

Paragraph 1.3quin mentions that ‘Contracting Governments should encourage public authorities to introduce arrangements to enable the submission of all the information required by public authorities in connection with the arrival, stay and departure of ships, persons and cargo, avoiding duplication, to a “Single Window”.’ Consideration should also be given to such a Single Window serving as the mechanism through which the public authorities communicate decisions and other information covered by this Convention.

One of the main objectives of Port Call Optimisation is to avoid unnecessary duplicated communications between stakeholders during port calls. The idea of a main platform through which all the interested parties receive the updates from their counterparties is consistent with the Single Window concept. The STM concept, by having the same goals and being projected to operate in a similar manner, is thus positively supported by the requirements of this provision.

During the 41\textsuperscript{st} Session, the Republic of Korea provided information\textsuperscript{150} on the progress on the technical standardisation of maritime digital communication technology and on the future standardisation plan to digitise ship-to-shore information exchange to facilitate the ships’ port clearance process.\textsuperscript{151} The STM features of ship-to-shore route exchange, as well as some of the features of Port Call Optimisation, could potentially be coupled with this process, in order to avoid any potential duplication, which is a common target of STM and the FAL Convention.

**General Conclusion**

\textsuperscript{147}Maritime Single Window
\textsuperscript{148}IMO, Report of the Facilitation Committee on its fortieth session, FAL 41/5, 24 January 2017
\textsuperscript{149}IMO, Report of the Facilitation Committee on its forty-first session, FAL 41/17, 7 April 2017 para 5.31
\textsuperscript{150}FAL 41/INF.2
\textsuperscript{151}IMO, Report of the Facilitation Committee on its forty-first session, FAL 41/17, 7 April 2017 para 5.32
As a conclusion, this Convention does not pose any impediment to the application of STM. Its focus is on establishing documentary requirements for vessels, passengers and cargo, and on creating standardised examples for information exchange between the ship and the port authorities. These exchanges are distinguishable from the ones of the STM and this is the reason that the FAL Convention does not pose any impediments to the STM. Some of its provisions seem to endorse projects like the STM, and there seems to be an alignment of objectives and in fact FAL could even be utilised in solving some of the practical issues that the STM might encounter. Consequently this convention can be characterised as a Low Risk Convention.
1.1.1.4 Salvage 1989

International Convention on Salvage 1989 and STM

General context

This document is written in the framework of Activity 5, which is concerned with the compatibility of the STM concept and services with the current legal framework. This report is a part of a series of specific reports, the results of which will be summarised in Milestone 23 as a final formal deliverable.

Objective

The compatibility of the STM concept with the International Convention on Salvage 1989, as amended is the central point of this report.

Restrictions

The compatibility analysis is legal in nature. Any policy and perception issues are introduced but are not the central point of this report. This report is written before the STM concept has crystallised so modifications might be needed. This report is written before the STM concept has been fully implemented and it cannot be excluded that some issues might arise that the analysis below has not anticipated.

Analysis

The obligations to render assistance and to proceed to the rescue of persons and vessels in distress are contained in the Salvage Convention 1989 and there is also a provision in SOLAS Regulation V/33, which however is without prejudice to the Salvage Convention.

The research undertaken indicates that the International Convention on Salvage 1989 does not pose any legal impediments to the implementation of the STM. The scope, the objectives of the convention, as well as its provisions, are not in contradiction with the STM.

The Salvage Convention aims to provide incentives to persons undertaking salvage operations, and is comprised of 5 chapters. The first (Articles 1-7) includes some general provisions and provides the definitions and the scope of applicability of the

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Constitution, while the second chapter (Articles 8-11) lays down the rights and obligations relating to the performance of the salvage operations. The third chapter (Articles 12-19) sets out the rights of salvors, and lays out the compensation requirements relating to claims and actions, and provide that this convention does not affect the salvor’s maritime lien under any international convention or national law. The final chapter (Articles 28-34) deals with the formalities of the convention namely the signature, ratification and entry into force.

STM might have an effect only as far as Article 8 is concerned, which regards the duties relating to the environment.

**Article 8 - Duties of the salvor and of the owner and master**

1. The salvor shall owe a duty to the owner of the vessel or other property in danger:
   (a) to carry out the salvage operations with due care;
   (b) in performing the duty specified in subparagraph (a), to exercise due care to prevent or minimize damage to the environment;
   (c) whenever circumstances reasonably require, to seek assistance from other salvors; and
   (d) to accept the intervention of other salvors when reasonably requested to do so by the owner or master of the vessel or other property in danger; provided however that the amount of his reward shall not be prejudiced should it be found that such a request was unreasonable.

2. The owner and master of the vessel or the owner of other property in danger shall owe a duty to the salvor:
   (a) to co-operate fully with him during the course of the salvage operations;
   (b) in so doing, to exercise due care to prevent or minimize damage to the environment; and
   (c) when the vessel or other property has been brought to a place of safety, to accept delivery when reasonably requested by the salvor to do so.

The duties are owed under Article 8 only as between the salvor on the one hand, and the owner of the vessel, or other property in danger, on the other, with Article 8.2 imposing a duty on the master as well. STM could assist in the more effective fulfilment of the duties of these articles.

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The combined effect of 8.1.c and 8.1.d is that the salvors should accept the intervention of other services which are present and available, and if such services are not present and available, they should seek assistance.\textsuperscript{155} Article 8.2.a requires the cooperation of the shipowner and the master with the salver. It has to be noted that such obligation does not exist for the salver, as he is not necessarily obliged to cooperate.\textsuperscript{156} He is however obliged to accept the intervention of other salvors, if he is reasonably requested to do so.\textsuperscript{157} Seeking and providing assistance, as well as the cooperation between salvors and salvees, could be assisted by the enhanced situational awareness that will be provided by STM.

Consequently, due to its very limited relevance and the lack of any conflict with the STM, the Salvage Convention should be characterised as a Low Risk Convention.

\textsuperscript{155} F Rose, \textit{Kennedy and Rose on the Law of Salvage}, 8\textsuperscript{th} Edition, Sweet & Maxwell, 2013, pp 462-463

\textsuperscript{156} Cf R Shaw, \textit{The 1989 Salvage Convention and English Law}, (1996) 2 LMCLQ 202, 213, who suggested that such an obligation has to be implied for the salver to make the contract workable.

\textsuperscript{157} F Rose, \textit{Kennedy and Rose on the Law of Salvage}, 8\textsuperscript{th} Edition, Sweet & Maxwell, 2013, p 467
1.1.1.5 SAR Conventions

SAR Conventions and STM

General context
This document is written in the framework of Activity 5, which is concerned with the compatibility of the STM concept and services with the current legal framework. This report is a part of a series of specific reports, the results of which will be summarised in Milestone 23 as a final formal deliverable.

Objective
The compatibility of the STM concept with the 1979 International Convention on Maritime Search and Rescue (1979 SAR Convention)\textsuperscript{158}, the COSPAS-SARSAT Programme Agreement\textsuperscript{159}, the Convention on the International Maritime Satellite Organization\textsuperscript{160} (INMARSAT) are the central points of this joint report.

Restrictions
The compatibility analysis is legal in nature. Any policy and perception issues introduced are not the central point of this report. This report is written before the STM concept has crystallised so modifications might be needed.

Analysis
Safety of navigation and protection of the marine environment are the two major international aims in shipping policy. There is a duty on every State to ensure that ships flagged or registered with it operate within international standards and that the marine environment is protected. For the fulfilment of these international obligations, each State imposes the international standards as a minimum, through its national laws and regulations, and demands that the operation of ships is done in a safe and careful way, which takes into account the other users of the sea. An aspect of these obligations is the obligation to render assistance and proceed to the rescue of persons in distress, which is provided for in article 98 of UNCLOS.

The 1979 SAR Convention
The 1979 International Convention on Maritime Search and Rescue (1979 SAR Convention)\textsuperscript{161} is the main legal instrument, regulating the matters of Search and Rescue (SAR). The COSPAS-SARSAT Programme Agreement\textsuperscript{162} was implemented in order to establish a Global Maritime Distress and Safety System (GMDSS).

As regards the 1979 SAR Convention, the research undertaken indicates that there is no impediment or conflict with the STM, as the treaty deals with the organisation and coordination of SAR operations. The obligations envisaged by its provisions are imposed on Parties, which are States, consequently there could be no liability for STM or its users. There is no provision precluding projects like STM or the use of additional

\textsuperscript{158} 1979 International Convention on Maritime Search and Rescue, adopted in Hamburg on 27 April 1979, entered into force on 22 June 1985, 1405 UNTS 97. Its latest amendments were issued on 20 May 2004 through MSC. 155(78).

\textsuperscript{159}The International COSPAS-SARSAT Programme Agreement, adopted in Paris on 1 July 1988 and entered into force on 30 August 1988 document C/S P.001

\textsuperscript{160}Convention on the International Maritime Satellite Organization (INMARSAT), (adopted in 3\textsuperscript{rd} September 1976 and entered into force in 16\textsuperscript{th} July 1979) 1143 UNTS 105

\textsuperscript{161} 1979 International Convention on Maritime Search and Rescue, adopted in Hamburg on 27 April 1979, entered into force on 22 June 1985, 1405 UNTS 97. Its latest amendments were issued on 20 May 2004 through MSC. 155(78).

\textsuperscript{162}The International COSPAS-SARSAT Programme Agreement, adopted in Paris on 1 July 1988 and entered into force on 30 August 1988 document C/S P.001
devices, and on the contrary, there are stipulations promoting constant communication and cooperation between the SAR actors and requesting information that will be provided more efficiently by STM. Paragraph 4.1.2 of the Annex mentions that

‘Each rescue co-ordination centre and rescue sub-centre should have ready access to information regarding the position, course, and speed of vessels within its area which may be able to provide assistance to persons, vessels or other craft in distress at sea, and regarding how to contact them. This information should either be kept in the rescue co-ordination centre, or be readily obtainable when necessary.’

This provision is very likely to be affected positively by STM, as such navigational data will be available through its platform, and will be easier to obtain, which might improve the SAR operations. A number of provisions demand the coordination of SAR activities, which is an STM objective, tested on the SAREX drill. The main provision which is relevant to the STM is paragraph 5.1.2 of the Annex, which reads as follows:

*Parties contemplating the institution of a ship reporting system should take account of the relevant recommendations of the Organization (IMO). Parties should also consider whether existing reporting systems or *other sources of ship position data* can provide adequate information for the region, and seek to minimize unnecessary additional reports by ships, or the need for rescue co-ordination centres to check with multiple reporting systems to determine availability of ships to assist with search and rescue operations.*

This provision invites the creation of ship reporting systems, or “other sources of ship data”, in order to minimise unnecessary additional reports by ships, which is one of the main objectives of STM. The continuous exchange of STM data, and the elimination of unnecessary communications, which is one of STM’s goals, fit in the goal of this provision. STM’s SAR tool, with the display on STM ECDISes, of the IAMSAR route that each ship follows, also addresses the minimisation of the need “to check with multiple reporting systems”. Consequently STM could be an additional means that could supplement the operation of ship reporting systems.

The STM SAR tool intends to divide the rescue area, and inform the other participants of the IAMSAR-nominated route the vessel is following, by updating their respective ECDISes. This will ensure that there is no overlap between the SAR routes, and that a certain area is covered sufficiently and more quickly.

Consequently the 1979 SAR Convention would be characterised as a Low Risk Convention, due to the fact that not only there is no conflict, but also the STM concept fits into its main objectives, and its implementation can assist in more effective SAR operations.

**The COSPAS-SARSAT Agreement**

The COSPAS-SARSAT Agreement, is not affecting the STM system as there is no point of potential overlap. This agreement is concerned with the long-term operation.

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163 4.2.2, 4.7.1

164 International Aeronautical and Maritime Search and Rescue Manual

165 This is also in conformity with the latest developments in SAR discussions: See IMO, *Report of the twenty-third session of the ICAO/IMO joint working group on harmonization of aeronautical and maritime Search And Rescue, NCSR 4/21 4* November 2016, p 18

166 Article 2(a) of the COSPAS-SARSAT Agreement
of the COSPAS-SARSAT System, which is comprised by a Space and a Ground Segment, as well as by Radiobeacons.\textsuperscript{167}

There seems to be no room for concern as far as COSPAS-SARSAT is concerned, thus it should be characterised as a Low Risk Convention.

**The INMARSAT Convention**

Similarly, the Convention on the International Maritime Satellite Organization\textsuperscript{168} (INMARSAT) has a limited overlap with the STM. INMARSAT is a convention, whose primary purpose is the provision of maritime mobile satellite communications services for the GMDSS (Global Maritime Distress and Safety System).\textsuperscript{169} STM has very limited interrelation with GMDSS, as it is one of the systems that might operate during a SAR operation, and STM’s operation in SAR is mainly about sharing the IAMSAR rescue route with the other participants. STM does not use or affect the use of GMDSS, consequently no liability could ever arise for STM from this convention. Thus, due to the absence of any conflict, the INMARSAT Convention should be categorised as a Low Risk Convention.

\textsuperscript{167} Articles 1 and 3 of the COSPAS-SARSAT Agreement

\textsuperscript{168} Convention on the International Maritime Satellite Organization (INMARSAT), (adopted in 3\textsuperscript{rd} September 1976 and entered into force in 16\textsuperscript{th} July 1979) 1143 UNTS 105

\textsuperscript{169} Its successful operation has been recently affirmed by IMO. See Report to the Maritime Safety Committee NCSR 3/29 22 March 2016, p33
1.1.1.6 SUA 2005

The 2005 SUA Convention and STM

General context
This document is written in the framework of Activity 5, which is concerned with the compatibility of the STM concept and services with the current legal framework. This report is a part of a series of specific reports whose results will be summarised in Milestone 23 as a final formal deliverable.

Objective
The compatibility of the STM concept with the 2005 SUA Convention is the central point of this report.

Restrictions
The compatibility analysis is legal in nature. Any policy and perception issues are introduced but are not the central point of this report. This report is written before the STM concept has crystallised so modifications might be needed. This report is written before the STM concept has been fully implemented and it cannot be excluded that some issues might arise that the analysis below has not anticipated.

Introduction
Although the Convention is named as the 2005 Convention, in fact it is composed by the 1988 Convention on the Suppression of Unlawful Acts against the Safety of Maritime Navigation and an additional Protocol of 2005 to it. The reason it is known as the 2005 SUA Convention is Article 15 of the 2005 Protocol, which states that “Articles 1 to 16 of the Convention, as revised by this Protocol, together with Articles 17 to 24 of the Protocol and the annex, shall constitute and be called the 2005 SUA Convention”. The research undertaken concludes that the 2005 SUA Convention does not prohibit in any way the application of STM and that it poses no impediment to its implementation.

Scope and area of application
This convention deals with the suppression of unlawful acts at sea, and it focuses on acts of violence or potential terrorism. Articles 3, 3bis, 3ter and 3quater, lay out a series of criminally punishable offences, relating to acts of violence against people on board a vessel or with damage to property, or more seriously to the carriage and/or discharge of biological and nuclear weapons. A significant part of the Convention is dedicated to the facilitation of the prosecution or extradition of the person committing the offences, as well as the resolution of some potential problems in the process.

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171 IMO, Adoption of the final act and any Instruments, Recommendations and Resolutions resulting from the work of the conference Protocol of 2005 to the Convention for the Suppression of Unlawful Acts against the safety of maritime navigation, LEG/CONF.15/21, 1 November 2005, p. 17
It applies to persons, with one limited exception, and the offences are drafted very widely, with a view to including everyone from the shipowner to all crew members. It has to be noted that the company managing STM, as an entity, can be held liable as a consequence of SUA, but under a very limited scope, as liability for legal entities is provided for only in one circumstance. Article 5bis requires that each party shall take the necessary measures to enable the liability of legal entities, in accordance with its national law, when a person responsible for the management or control of that legal entity has, in that capacity, committed an offence set forth in this Convention. This liability is without prejudice to the criminal liability of the individual and may be criminal, civil or administrative. Consequently, STM could be liable only if a person responsible for its management and control committed a SUA offence, in his capacity as a manager.

Its spatial scope in analysed in article 4, which reads as follows:

Article 4:

1. This Convention applies if the ship is navigating or is scheduled to navigate into, through or from waters beyond the outer limit of the territorial sea of a single State, or the lateral limits of its territorial sea with adjacent States.

2. In cases where the Convention does not apply pursuant to paragraph 1, it nevertheless applies when the offender or the alleged offender is found in the territory of a State Party other than the State referred to in paragraph 1.

This rather complicated articulation includes voyages to and from the area beyond 12 nm from the baseline. In simpler terms, it includes any vessel coming from or going to the area outside the territorial sea. The drafters attempted to phrase this article so as to make the spatial scope of the Convention as wide as possible. The voyages to which it does not apply are voyages starting within the territorial sea, and ending and/or planning to end within the territorial sea. This is when paragraph 2 becomes relevant, which provides to a domestic voyage “an international element vis-a-vis the flag State of the ship having been the target of the unlawful act”. If the (alleged) offender is found on the territory of another state party, the convention still applies. A practical example of this, would be a scheduled voyage of a vessel from Piraeus to Mykonos, which is the target of a terrorist who is later found in Oslo. (Both Greece and Norway are signatories)

This convention is not directly connected to the STM, but there are a couple of points which could be of a potential interest to the STM.

**Points of potential relevance**

Before analysing the provisions of potential relevance, a mental element that they share in common, has to be satisfied. Articles 3(1)(d), 3(1)(f) and 3bis(1)(iii), like most

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172 ICFTU, Review of the Convention for the Suppression of unlawful acts against the safety of maritime navigation 1988 and its protocol of 1988 relating to fixed platforms located on the continental shelf (SUA convention and protocol) LEG 87/5/2 11 September 2003 para 8

173 SUA Convention Article 5bis paras 1 and 2


175 This need was underlined in the Explanatory Note presented to the IMO by Austria, Egypt and Italy in introducing the first draft of the Convention (IMO document C/57/25, p 4).
of the offences of the 2005 Protocol, require that the person committing the offence does so “unlawfully” and “intentionally”. These two requirements, although present in almost every offence in the Protocol, are not expressly clarified in the convention.

“Unlawfully”

As far as “unlawfully” is concerned, a reasonable construction would be “not conforming with law or without authority”, with the UK in its implementing legislation of the SUA construing “unlawfully” as being contrary to UK laws. While the contravention of law is a point that is relatively clear, what is not clear, and thus prone to interpretation, is the nature of the law has to be violated, in order for this to have occurred “unlawfully” for the purposes of the protocol.

One way to approach this provision would be by construing “unlawfully” so as to include the breach of any law. The alternative construction would restrict the breaches to those of criminal law, as the purpose of the convention is to penalise criminal and terrorist acts.

The first construction provides for a wide interpretation of the term. It has been supported that “unlawfully and intentionally” is wide enough to include both politically motivated acts and those committed for private ends and may facilitate prosecution in a broader range of offences; “unlawfully” [...] means [...] any offence under the law of England; “unlawfully and intentionally” does not provide seafarers and shipowners with adequate protection [...] as it is unlawful to export/import any prohibited weapon without the proper permits.

The second construction is supported by the general targets of the convention, and by some indirect statements. Such statements are: ‘The mental test should be high- as is the case with [...] the “unlawfully and intentionally” requirement; In response to a proposal to replace the expression ‘unlawfully’ with ‘knowingly’ it was noted that the unlawful element should be included since it reflected the essence of the terrorist act to be criminalized. The fact that the Convention imposes criminal liability, could mean that the ‘unlawful’ conduct should be in breach of criminal law.

176 Carlos Esposito, James Kraska et al, Ocean Law and Policy: Twenty Years of Development Under the UNCLOS Regime, Brill Nijhoff, 2016 p 192
177 UK Aviation and Maritime Security Act 1990 Article 11(7): In this section “unlawfully”- (a) in relation to the commission of an act in the United Kingdom, means so as (apart from this Act) to constitute an offence under the law of the part of the United Kingdom in which the act is committed, and (b) in relation to the commission of an act outside the United Kingdom, means so that the commission of the act would (apart from this Act) have been an offence under the law of England and Wales if it had been committed in England and Wales or of Scotland if it had been committed in Scotland.
178 IMO Legal Committee, Piracy: Uniform and consistent application of the provisions of international conventions relating to piracy, LEG 98/8, 18 February 2011, para 15
179 UK Aviation and Maritime Security Act 1990 Article 11(7):
181 ICFTU, Review of the Convention for the Suppression of unlawful acts against the safety of maritime navigation 1988 and its protocol of 1988 relating to fixed platforms located on the continental shelf (SUA convention and protocol) LEG 87/5/2 11 September 2003, para 10
182 IMO, Report of the Legal Committee on the work of its eighty-eighth session, LEG 88/13 18 May 2004 para 48
183 See SUA Article 5bis para 2
The importance of the difference is that with the first interpretation, a master contravening the Colregs for example, could be held liable, whereas he would not with the second, as it is not a criminal law.\textsuperscript{184}

As regards the issue of under which country’s law the conduct has to be unlawful, article 6 establishes the jurisdiction of the State Parties over the offences, thus the conduct has to be unlawful under the law of the State Parties that have jurisdiction. According to Article 6 these are a) the flag State of the ship that the offence is committed against or on board of, b) the State in the territory of which the offence is committed, including its territorial sea, c) the State of nationality of the offender. Jurisdiction is also established, with the addition of a requirement to notify the Secretary-General of the IMO upon its establishment for: a) the State of the habitual residence of a stateless offender b) the State of the nationality of a person that is seized, threatened, injured or killed during an offense and finally c) the State that an offence intends to compel to do or abstain from doing any act.\textsuperscript{185} Consequently, the conduct has to be contrary to the laws of the State that establishes jurisdiction under Article 6.

As a conclusion, there is no conclusive authority on the two interpretations of “unlawfully”, however the wider one, which includes the breach of any law, seems to be well supported, while it has to be unlawful under the law of the State that has jurisdiction under Article 6.

“Intentionally”

Although the actual meaning of the word is not too debatable, as it means “deliberately or purposefully”\textsuperscript{186}, the object of the intention is a matter of contention. The object of the intention could either refer to the actus reus (i.e. placing the device or communicating information), or to the further result (i.e. endangering navigation). The difference is that the mental test is higher if it refers to the result as well, as in order to affirm the criminal liability, it would have to be proven that not only did the offender perform the unlawful act intentionally, but also with an additional intent to endanger navigation. Intentions should be taken into account, otherwise unwitting and innocent seafarers may be liable for the proposed offences.\textsuperscript{187} The Legal Committee of IMO stated the following during its 88\textsuperscript{th} Session, which dealt with the revision of SUA: \textit{In response to a proposal to replace the expression ‘unlawfully’ with ‘knowingly’ it was noted that the unlawful element should be included since it reflected the essence of the terrorist act to be criminalized.}\textsuperscript{188} This passage underlines the general aim of the convention, which is the suppression and condemnation of unlawful and terrorist acts on maritime transportation,\textsuperscript{189} and this could be indicative that the second interpretation, requiring the dual intention of the offender is more correct.

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\footnotesize
\textsuperscript{184} Provided of course that Colregs are not codified in the criminal law of the flag State.
\textsuperscript{185} SUA Article 6 para 2
\textsuperscript{186} Carlos Esposito, James Kraska et al, \textit{Ocean Law and Policy: Twenty Years of Development Under the UNCLOS Regime}, Brill Nijhoff, 2016 p 192
\textsuperscript{187}International Chamber of Shipping (ICS), the International Shipping Federation (ISF) and the International Confederation of Free Trade Unions (ICFTU) \textit{Review of the convention for the Suppression of Unlawful Acts against the safety of maritime navigation, 1988, and its protocol of 1988 relating to the Suppression of Unlawful Acts against the safety of fixed platforms located on the continental shelf (SUA Convention and Protocol)} LEG 88/3/2, paras 14-15
\textsuperscript{188} IMO, Report of the Legal Committee on the work of its eighty-eighth session, LEG 88/13 18 May 2004 para 48
\textsuperscript{189} See the preamble of the convention
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Another element, which points to the correctness of the double intent requirement can be derived from the 2005 Council of Europe Convention on the Prevention of Terrorism, which includes the SUA 2005 offences in its ambit. Article 5 (1) of this convention reads as follows:

Article 5 – Public provocation to commit a terrorist offence

For the purposes of this Convention, "public provocation to commit a terrorist offence" means the distribution, or otherwise making available, of a message to the public, with the intent to incite the commission of a terrorist offence, where such conduct, whether or not directly advocating terrorist offences, causes a danger that one or more such offences may be committed.

This wording is similar to the one observed in SUA 2005, and its interpretation could assist in resolving the proper construction of “intentionally”. Both the Secretary-General's guidelines and the European instruments require intent to bring about the commission of a terrorist act or offence as a condition for prohibiting the speech.\(^\text{190}\) Thus, a requirement of intent on the part of the inciter to bring about the commission of a terrorist act may mean that the inciter must have a double intent, both that the incitee carry out the actus reus of the terrorist act and that the act intimidate the population or compel a government.\(^\text{191}\) The double intent requirement is present in the Genocide Convention\(^\text{192}\), which again requires not only intent in the act of genocide, but also intent to wipe out the population group in question.\(^\text{193}\)

Consequently, there are two possible interpretations of “intentionally”, a wider one that requires intent only for the actus reus, and a narrow one, which requires a dual intent, for both the action and the further purpose, with the second being the one that can be supported more easily.

Article 3 (1)(d)

“Any person commits an offence if that person unlawfully and intentionally;

(d) places or causes to be placed on a ship, by any means whatsoever, a device or substance which is likely to destroy that ship, or cause damage to that ship or its cargo which endangers or is likely to endanger the safe navigation of that ship;

This provision could be relevant if someone was installing a falsified/altered version of STM, which would be likely to endanger navigation. Although the provision, given the nature of the convention, is aimed at penalising the placement of explosive devices on board a ship,\(^\text{194}\) it could have application to the installation of a device which


\(^{193}\) Otto Triffterer, ‘Genocide it’s Particular Intent to destroy in Whole or in Part the Group as Such’ 14 Leiden Journal of International Law 399, 403 (2001).

\(^{194}\) Malirsch M, Prill F, The Proliferation Security Initiative and the 2005 Protocol to the SUA Convention, Heidelberg Journal of International Law ( HJIL ) 67 (2007), 229-240, at 236, see also footnote 30 of this article
endangers navigation. However, the acknowledgement of the mental element is crucial. Thus, the person installing such a device has to do that a) unlawfully and b) intentionally, which means that the installation must be unlawful and the person must have an intention to install such a device, and potentially an additional intention to endanger the safe navigation of that ship.

Article 3(1)(f)

“Any person commits an offence if that person unlawfully and intentionally:
(f) communicates information which that person knows to be false, thereby endangering the safe navigation of a ship”

This could have application to the STM only if someone was using the STM platform, in order to communicate false information deliberately. This automatically excludes the accidental wrong input of information, as the article requires wilful misconduct by stating that the person needs to know that the information is false.

This is critical for examining the liability of someone using STM as a platform for spreading the information, as the communication of the false information per se does not suffice to affirm liability.

Even on an individual level, an employee of STM transmitting false information would have been liable, if he/she knew that the information transmitted was false, but still transmitted it. However, this scenario has to be precluded, as STM will transmit standardised, user-controlled information. Any potential liability arising from this convention, would concern the person knowingly communicating false information, and this cannot be anyone else than the information owner, which is the creator.

However the interpretation of “unlawfully” and “intentionally” are crucial in assessing the liability under this clause.

If the wider interpretation of both “unlawfully” and “intentionally” is adopted, then, for example, during a head-on situation a master setting a course on STM that he does not intend to follow, wanting to make the other vessel turn, could be liable under Article 3.1.f.

With the narrow interpretation of “unlawfully” he would not be liable, as Colregs is not a criminal law provision.

With the narrow interpretation of “intentionally”, it would have to be additionally proven that he acted so, with an intent to endanger navigation.

Article 3bis(1)(iii)

Another provision that could be relevant is Article 3bis(1)(iii), which reads as follows:
‘1. Any person commits an offence within the meaning of this Convention if that person unlawfully and intentionally: (iii) uses a ship in a manner that causes death or serious injury or damage’

This provision relates to the use of the ship as a weapon, and was “inspired” by the tragedy of the 9/11 attacks on the World Trade Center, where civil aircraft were used...
as such.\textsuperscript{196} The potential applicability of this provision is quite similar to the one mentioned above, as it could be relevant if someone was using or hacking the STM platform, in order to essentially render the vessel a weapon for criminal or terrorist purposes. However, with the current functionality of STM, it seems impossible for a hacker/terrorist to have complete control of the vessel through the STM platform, as STM does take actions, it provides information to the navigator.

**General Conclusion**

The SUA Convention and its protocol are not preventative treaties in the sense that they do not regulate measures to avoid the commission of terrorist acts, but rather focus on ensuring prosecution and punishment of perpetrators of such acts.\textsuperscript{197} ‘Although entitled "Convention for the Suppression of Unlawful Acts Against the Safety of Maritime Navigation," the SUA's operative provisions deal primarily with events after illegal acts have taken place; that is the apprehension, conviction and punishment of those who commit such acts, as opposed to the prevention or suppression of those acts.’\textsuperscript{198}

Hence, the research concludes that this convention does not pose any impediments, and the potential room for application relates to cyber-attacks, or the intentionally wrongful use of its features by users. If there were any preventative measures, or any requirements as to ship safety, then it could be more relevant, as there would have been an issue of potential compliance of STM with them. Since no such requirements are in place, the operation of STM as a device assisting navigation does not face any impediments by the 2005 SUA Convention, and should be categorised as a Low Risk convention.

\textsuperscript{196} IMO Secretariat, Review of the Convention for the Suppression of Unlawful acts against the safety of maritime navigation 1988, and its protocol of 1988 relating to fixed platforms located on the continental shelf (SUA Convention and Protocol) LEG 84/6 13 March 2002, para 10

\textsuperscript{197} ibid, para 7

1.1.1.7 STPS Agreement

The Special Trade Passenger Ships Agreement, 1971, its 1973 Protocol on Space Requirements and STM

General context
This document is written in the framework of Activity 5, which is concerned with the compatibility of the STM concept and services with the current legal framework. This report is a part of a series of specific reports whose results will be summarised in Milestone 23 as a final formal deliverable.

Objective
The compatibility of the STM concept with the Special Trade Passenger Ships Agreement, 1971\(^{199}\) and the Protocol of 1973\(^{200}\) is the central point of this report.

Restrictions
The compatibility analysis is legal in nature. Any policy and perception issues are introduced but are not the central point of this report. This report is written before the STM concept has crystallised so modifications might be needed. This report is written before the STM concept has been fully implemented and it cannot be excluded that some issues might arise that the analysis below has not anticipated.


The STPS Agreement

The scope of application of this Agreement is very limited, as both the type of passengers and the spatial area it applies to are very narrow. As the map below indicates, which is part of Appendix 1 of the treaty, the Special Trade Area, to which the treaty applies, as defined in article 2 (6), covers an area bounded by the African and Asian continents and a series of lines joining then to Madagascar and encompassing part of the Philippine archipelago and the whole of Indonesia. Special Trade is defined by the Agreement as the conveyance of large numbers of special trade passengers by sea on international voyages within the aforementioned area.\(^{201}\)

The persons to which it applies, are also limited as it regards Special Trade Passengers, who are defined as the passengers that are carried in special trades in spaces on the weather deck, upper deck and/or between decks, on ships which accommodate more than eight passengers.\(^{202}\)

The rules apply to new and existing special trade passenger ships,\(^{203}\) which are mechanically propelled passenger ships carrying large numbers of Special Trade Passengers.\(^{204}\) It is notable that this agreement along with the 1973 Protocol on Space Requirements for Special Trade Passenger Ships, are exceptions to the requirements set out by SOLAS. The following provision can be located in 3 different provisions in SOLAS:\(^{206}\)

\[\text{In the case of passenger ships which are employed in special trades for the carriage of large numbers of special trade passengers, such as the pilgrim trade, the Administration of the State whose flag such ships are entitled to fly, if satisfied that it is impracticable to enforce compliance with the requirements of this chapter, may exempt such ships from those requirements, provided that they comply fully with the provisions of:}\]

1. the rules annexed to the Special Trade Passenger Ships Agreement, 1971;

and


\(^{201}\) STPS Agreement, Rule 2 paragraph 6
\(^{202}\) STPS Agreement, Rule 2 paragraph 12
\(^{203}\) STPS Agreement, Rule 3
\(^{204}\) Some websites refer to more than 30 such passengers, but this does not derive from the text of the Agreement
\(^{205}\) STPS Agreement, Rule 2 paragraph 13
\(^{206}\) Chapter II-1 Reg 1 para 5, Chapter II-2 Reg 4, Chapter III Reg 2
The special nature of these voyages affords them an exemption from the SOLAS requirements, as long as they carry safety and space certificates issued under STP 1971 and SSTP 1973, as required by section 2 of Annex 1.

After a careful examination of the text of the Agreement and of its Protocol, it is concluded that this Agreement cannot affect the implementation of the STM project. It regulates the living conditions of Special Trade Passengers on the vessel, as well as the requirements the vessel must have in order to accommodate them. There seems to be no point of potential overlap or conflict that would require further analysis. This agreement should be categorised in the Low Risk category, as it poses no impediments to the application of the STM.
1.1.2 Manning and Training

1.1.2.1 STCW

Compatibility of STM with the STCW Convention and Code

General context

This document is written in the framework of Activity 5, which includes the analysis of the compatibility of the STM concept and services with the current legal framework. This report is a part of a series of specific reports which results will be summarised in Milestone 23 as a final formal deliverable.

Objective

This first version of the report presents a summary of the initial analysis of the compatibility of STM with the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, in order to ensure that STM is compatible with the legal framework. This report examines the STM concept interaction with the STCW Convention and the associated STCW code in particular.

Restrictions

The analysis concerns legal compatibility between the STM and the STCW. Safety concerns not giving rise to legal obstacles will be referred to but not analysed in detail. Any reference made to the common law regards issues extending beyond international maritime law, and English law is very widely used for this purpose.

Introduction

Training standards and obligations affect shipping in two ways. First, in their regulatory role, training standards must be complied with so that ships are allowed to trade freely.

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207 International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (adopted 7 July 1978) 1361 U.N.T.S. 2, amended many times, with 2 major amendments, one in 1995 and the latest being in 2010, also known as the Manila Amendments. Accessible through IMO’s website
The international Standards of Training, Certification and Watchkeeping for Seafarers are laid out in both the STCW Convention and the STCW Code. The Code contains the technical details associated with the provisions of the Convention.

There is no legal incompatibility between the STCW standards and the STM concept. To the extent that the STM concept is voluntary in nature, there would not be a regulatory requirement for training in relation to the STM console.

However, as a matter of good management and ensuring the safe operation of ships equipped with STM hardware, it is expected that appropriate training will be provided to seafarers who will use it and that familiarisation exercises for new personnel onboard will also be provided.
Overview of the STCW Convention and Code

The main purpose of the STCW Convention is to promote safety of life and property at sea and the protection of the marine environment by establishing international standards of training, certification and watchkeeping for seafarers.208

This is achieved by imposing on flag States the obligation of training seafarers in specific tasks, according to the skill set or responsibilities required by their ranks. This leads to international certification accepted and respected by the Administrations of the contracting States. The STCW Convention’s scope of training covers all aspects of the practice of seafarers, from navigational systems and techniques, life-saving drills and first aid, treatment of electrical equipment, cargo-specific guidelines for cargo handling to environmental awareness. The regulations contained in the Convention are supported by sections in the STCW Code. Generally speaking, the Convention contains basic requirements which are then enlarged upon and explained in the Code. Part A of the Code is mandatory.209 The flag State must ensure that seagoing personnel on ships of its flag demonstrate the minimum standards of competence, which are given in detail in a series of tables. The STCW Code provides for different standards of training according to the tonnage or the type of the vessel and the role of the seafarer on the ship. The IMO Implementation Code210 provides for a continuing training culture on issues of environmental protection and safety.211

The STCW Code is organised according to 7 functions and 3 levels of responsibility. The levels of responsibility on board are212:

.1 Management Level: Master, Chief Mate, Chief/Second Engineer officer
.2 Operational Level: Officer in charge of Navigational or Engineering watch
.3 Support Level: Operating under directions of Management or Operational Level

The table below shows the STM relevance of the different functions per responsibility level:

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210 IMO Instruments Implementation Code (III Code), Resolution A.1070(28)
211 Resolution A.1070(28) Art 12
212 STCW/CONF.2/34, Resolution 2, Annex Part A, Section A-I/1
There is also some STM relevance on the security officer and the officer performing security duties, as it is mentioned that their training should enable them to demonstrate competence in handling sensitive security-related information and security-related communications.\textsuperscript{216}

The STCW Code tables define the competence, the training objective, the methods of demonstrating that competence and finally the criteria for evaluating it, in separate columns, according to the level of responsibility. These vary depending on the tonnage of the ship. Accompanying sections analyse what is required in the tables and clarify the requirements.\textsuperscript{217}

\begin{tabular}{|l|c|c|c|}
\hline
FUNCTIONS & \textbf{RESPONSIBILITY LEVEL} & \textbf{Responsibility (Master/Chiefs)} & \textbf{Operational (OOW)} & \textbf{Support} \\
\hline
\hline
Navigation & & & & \\
\hline
Cargo Handling and Stowage & NO & NO & NO \\
\hline
Controlling the operation of the ship and care for persons on board & NO\textsuperscript{213} & NO & NO \\
\hline
Marine Engineering & NO & NO & NO \\
\hline
Electrical, electronic and control engineering & N/A\textsuperscript{214} & & NO \\
\hline
Maintenance and repair & N/A\textsuperscript{215} & & NO \\
\hline
Radiocommunications & NO & & NO \\
\hline
\end{tabular}

\textsuperscript{213} This refers to training on: 1) Control trim, stability and stress 2) Knowledge of international maritime law 3) Knowledge of emergency response handling situation 4) Use of leadership and managerial skills 5) organisation and managing the provision of medical care

\textsuperscript{214} The highest responsibility level in Electrical, Electronic and Control Engineering is that of the OOW. There is no responsibility on the management level.

\textsuperscript{215} The highest responsibility level in Maintenance and Repair is that of the OOW. There is no responsibility on the management level.

\textsuperscript{216} STCW Code, Table A- VI/5, A-VI/6-2

The role of training is legally important in two main aspects. First, the need for compliance arises in relation to formal certification of the ship according to the STCW Convention and its implementation by the flag State. Failure to do so leads to the potential detention of the vessel and inability to trade in ports of contracting States to the STCW Convention and also exercise innocent passage rights in waters of such States. The onus for compliance is on the master and shipowner and the onus of enforcement on the flag States and port state control arrangements. An unseaworthy vessel may be detained by public authorities,\textsuperscript{218} who are concerned with the certificates proving that the crew is abiding by the training requirements set out by the STCW Convention.\textsuperscript{219} In other words, a vessel may be detained if there are no STCW certificates for the crew. It follows that to the extent that the STM Concept is used on a voluntary basis and is not prescribed in the STCW Convention there is no legal obstacle raised by the STCW Convention.

The second aspect of training is broader in scope and concerns the legal requirement that a ship must be seaworthy. This requirement is expressed differently in the various commercial contexts. Thus in addition to formal compliance which includes, with respect to manning, the STCW Convention and other related instruments there are: 1) in ordinary tort, a duty of care owed to other users of the sea that the ship is seaworthy; 2) in contracts of carriage of goods by sea an implied or express obligation that the ship is seaworthy, which requires appropriate manning (in respect of training as well as number of crew members) judged against a standard of what a reasonable shipowner would do, and a similar requirement in marine insurance voyage policies. Failure to provide a seaworthy ship may, in the case of an accident, lead to the liability of the shipowner and result in paying out of damages. For example, if the crew of an STM compliant ship is not trained in the use of the STM hardware or software and this leads to accidents or damage, it would render the vessel unseaworthy for the purposes of the carriage contract. The disabling knowledge must relate to something that would eventually make the seafarer, and consequently the vessel, unfit to withstand the voyage. In cases where unseaworthiness was affirmed and related to the unawareness of the crew in relation to specific aspects of the vessel, these aspects

\textsuperscript{218} See Directive 09/16/EC, article 2.15 and UNCLOS article 219.

\textsuperscript{219} Oya Ozcan, \textit{Port State Control}, 2\textsuperscript{nd} Edition, LLP, 2004 p 145
were integral for the adventure in question. In extreme circumstances where the shipowner acts in a way to enable the vessel to be navigated in a reckless way that will cause some probable type of damage, the shipowner’s right to limit liability may also be affected. Similar requirements apply within the Marine Insurance context of seaworthiness.

While the operation of the STM is planned to be supplementary to navigational equipment and thus, as explained, the STCW Convention would not impose any obligations on ships to provide evidence for formal qualifications in this respect, the commercial consequences of unseaworthiness dictate otherwise. Providing appropriate training as well as familiarisation of new crew members with the use and rules of operation of the STM is necessary to avoid shipowner’s liability from arising in this respect and to preserve the right to limit liability. Note that the shipowner may still be vicariously liable if there is negligence in the use of the STM equipment by a crew member. However in that case the limitation of liability or the insurance cover cannot be affected and would probably also be protected under the terms of the contract of carriage. From a systems safety point of view, training in use of the STM concept would contribute to its appropriate use, to avoiding overreliance on its information and maximise the potential benefits, by using the STM information for safe and efficient navigation. This is something that normally classification societies will look at as a part of their contract with the shipowner to ensure that the vessel is seaworthy with respect to the standards of its class and can be insured accordingly.

The issue of participation in trials
There is no express requirement in the STCW Convention which affects the implementation of the STM concept. Nor will the STM use affect any of the training requirements as long as the STM use is on a voluntary basis. A provision of the STCW Convention needs to be discussed because it may be used as a transitional route to the implementation of the STM concept within the context of the STCW Convention requirements. This refers to the option granted to contracting States to enable experimental trials for ships flying their flag. Trials are defined as "an experiment or

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220 In *The Clan Gordon*, the crew was unaware of a requirement to trim homogeneous cargoes, causing her to capsize; in *The Star Sea*, the master was ignorant of the proper method of using CO₂ in firefighting operations; in *The HongKong Fir*, the chief engineer was a drunkard and could not perform any of his duties.
series of experiments, conducted over a limited period, which may involve the use of automated or integrated systems in order to evaluate alternative methods of performing specific duties or satisfying particular arrangements prescribed by the Convention, which would provide at least the same degree of safety and pollution prevention as provided by these Regulations.”

The questions that need to be answered are a) whether the article refers to training programs, or to actual trials at sea, and if so, b) whether STM could fall under the definition of trials, and if so, c) what are the requirements for conducting them.

a) As regards the first question, the article must refer to actual trials at sea, and not to training programs conducted ashore. First of all, Regulation I/13 in paragraph 1 refers to the authorisation of ships participating in trials. Furthermore, 2 IMO circulars refer to the Watchkeeping duties during the conduct of trials, which can only mean that such trials are conducted on board a vessel, at sea. Finally, the requirement for the same level of safety and pollution prevention also points to the fact that they must be conducted at sea, otherwise such a requirement would have been redundant.

b) The second question is slightly more complicated, as it is not clear whether STM would be considered a trial. The word “alternative” is crucial. If construed as meaning that these methods under trial are supposed to replace the existing methods, then it would not be applicable to STM, because the STM does not intend to operate as a substitute method of performing a navigational duty so as to replace the existing ones.

If this interpretation is incorrect and the inclusion of the STM is such an alternative way of performing specific duties then STM would be considered a trial and would be subject to the requirements of this Regulation. It is possible that maritime administrations may take alternative views on the topic. However the provision itself is designed to be permissive in order to encourage the testing of alternative systems for the purpose of discharging specific obligations, under the STCW Convention. From this point of view it would arguably be wrong to read it as restrictive in the introduction of every single innovation or simple improvement of navigational systems. However

221 STCW Convention Annex Regulation I/13 para 2
222 MSC/Circ.566, Provisional Guidelines on the conduct of trials in which the officer of the navigational watch acts as the sole look-out in periods of darkness, and MSC/Circ.867, Officer of the navigational watch acting as the sole look-out in periods of darkness
from the point of view of safety, requiring trials for every substantive alteration of the navigational systems is arguable and by no means irrational.

c) If STM is considered to be a “trial” for the purposes of the STCW, then it should comply with the requirements of Regulation I/13. The main consequence arising out of this is that if a coastal state objects to a vessel engaging in trials while navigating in its waters, and has communicated its objection to the IMO, the flag State is bound to respect such objection. Consequently if STM is considered a “trial”, a coastal State may object to the conduct of STM trials in its waters, and this could affect the test beds. To forestall this risk, it would be prudent to seek the consent of any State in whose territorial sea test beds are to be located.

Some other important consequences arise out of this, like the necessary authorisation of the trials by the flag state, the duty to report the details of such trials to the IMO up to 6 months prior to their commencement and the duty to report their results. Finally, if the flag State concludes on the basis of a trial that the system which was under trial provides the same degree of safety, security and pollution prevention as provided by these regulations, it may authorise the ships entitled to fly its flag to continue to operate with such a system subject to 4 requirements. These requirements are: 1) the flag State must communicate the details of the authorisation to the IMO, 2) any operations must be conducted in accordance with the guidelines that were observed during the trials, 3) such operations shall respect the aforementioned objections of the coastal States, 4) such an operation shall only be permitted pending a determination by the MSC on whether an amendment to the Convention would be appropriate and if so whether this will affect the status of the operation before the amendment goes into force.

Consequently, the need to comply with STCW cannot be used as an obstacle to test beds for the STM by the administration provided that the trials are as safe as the other means used. The IMO must be notified if there is an authorisation for the use of STM by a maritime authority, while respecting any potential objection of the coastal state. If another state objects to a ship conducting trials whilst sailing in its waters, then the

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223 STCW Convention Annex Regulation I/13 para 7 and 6 respectively
224 STCW Convention Annex Regulation I/13 para 1
225 STCW Convention Annex Regulation I/13 para 4
226 STCW Convention Annex Regulation I/13 para 5
227 STCW Convention Annex Regulation I/13 para 8
trials must stop. **However this presupposes that STM is characterised as a “trial”**. If STM is not a “trial”, then it is not subject to the requirements of this regulation.

3. **Voyage Planning**

Thanks to the entry into force of the new amendments of the STCW, which implement the training requirements for the Polar Code, there is a point of STM interest.\(^{228}\) There is requirement for a Polar Voyage Planning that correctly identifies the polar regulatory regimes and the relevant areas and the need for ice-pilotage and/or icebreaker assistance.\(^{229}\) In the same column, it is also required that the reasons for the planned route are supported by facts obtained from relevant sources and publications, statistical data and limitations of communication and navigational systems. This is a requirement that STM will have to observe if it modifies the Voyage Plan, as it would have to take into account the polar regulatory regimes and have the necessary sources to justify the route. The development of Winter Navigation, and the ICE functionality, where the routes of the icebreakers are to be displayed on ECDIS, could assist in the observation of the requirement of taking into account “ice-pilotage and/or icebreaker assistance”, as well as in the “development of safe routeing and passage planning to avoid ice where possible”.\(^{230}\)

**Conclusion**

The STCW Convention and Code set the compulsory standards for Training, Certification and Watchkeeping for seafarers, and the STCW parties have to make sure that seafarers serving on ships flying their flag are trained and certified in accordance with the STCW’s requirements. As the STCW Convention currently stands it does not express any requirement which could affect the implementation of the STM concept. Nor will the STM use affect any of the training requirements as long as that use is on a voluntary basis. The training requirements would be affected, though, if the STCW Convention were amended, so as to include STM, which would have been the

\(^{228}\) The amendments to STCW entered into force on 1 July 2018. See IMO, *Consideration and adoption of amendments to mandatory instruments* MSC/97/3/2 15 August 2016 p 3

\(^{229}\) This requirement can be found in IMO, *Consideration and adoption of amendments to mandatory instruments* MSC/97/3/2 15 August 2016, p 29, Table A-V/4-2 Column 4

\(^{230}\) IMO, *Consideration and adoption of amendments to mandatory instruments* MSC/97/3/2 15 August 2016, p 29, Table A-V/4-2 Column 2
case if STM were made obligatory or if it were to be considered as an alternative way of discharging STCW Convention duties.

It has to be noted that the answer as to compliance with the STCW will largely depend on the final form of the console. Thus the answer will vary depending on whether it is an independent console, or if it provides the data to ECDIS (current form) and if so, how different it will be, compared to the current ECDIS.\textsuperscript{231} This is because, if the impact of STM on ECDIS is such as to materially change the information obtained by training, the answer might change. With its current form, however, there seems to be no conflict, especially given the voluntary nature of STM.

\textsuperscript{231} Gard: ECDIS - charting the future of navigation, Gard News 200, November 2010/ January 2011: Even though the additional information available may be useful to navigation, it may clutter the display or result in information overload that may serve to distract the navigator or lull the navigator into a false sense of security. Non-chart data should be used judiciously, and the operator should be aware of how to activate the function that will instantly disable all non-chart data.
Appendix: INPUT FROM OTHER TECHNOLOGIES

The following appendix addresses the ways other navigational technology innovations were introduced in shipping in the context of the STCW Convention. The STCW Code takes for granted that malfunctions of equipment as well as wrong data and inappropriate use of the equipment may occur, and provides that the responsibility for avoiding the consequences of such events lies with the seafarer using the equipment.

Non-participating vessels
Training and assessment in both ARPA\textsuperscript{232} and ECDIS are not required for those who serve exclusively on ships not fitted with them. Those limitations shall be reflected with an endorsement issued to the seafarer in question.\textsuperscript{233} As explained, the STM is not intended to be at this stage a compulsory part of the ship’s equipment. However, even if it does become part of the STCW Code training requirements, these would only be relevant to participating ships. In such a case appropriate training courses for trainers would need to be first designed and then training of seafarers by the qualified trainers will have to follow. The easiest way would be by modifying slightly the training program for each ranking. In such a case having a similar exclusion to reduce the need to confine seafarers’ training to only STM-compliant ships could be important.

The overlap of STM with other platforms
Paragraph 62 of Section B-I/12 of the STCW Code mentions that the trainee should be able to demonstrate knowledge on how to connect ARPA to ECDIS,\textsuperscript{234} while paragraph 63 requires knowledge on the interface of ECDIS with AIS\textsuperscript{235} and interpretation of its data.\textsuperscript{236} If STM is introduced in the STCW Code, seafarers would most likely need to be trained in how to deal with the overlap between technologies. This overlap could significantly boost situational awareness, as the interrelation between the available means should provide a coherence of information. For training this would in turn mean that the STM-related training should be integrated with that of the other navigational aids.

Also relevant to the STM is the requirement for masters and chief mates on ships of 500 GT or more to be trained and certified in order to make voyage planning and

\textsuperscript{232} Automatic Radar Plotting Aid
\textsuperscript{233} STCW Code Table A-II/1, Navigation at Operational Level, Column 1, Side notes
\textsuperscript{234} STCW Code Section B-I/12 paragraph 62
\textsuperscript{235} Automatic Identification System
\textsuperscript{236} STCW Code Section B-I/12 paragraph 63
navigation for all conditions by acceptable methods that take into account a series of factors, like restricted waters, meteorological conditions, TSS, VTS etc.\textsuperscript{237} The use of STM information in this sense would be relevant for Voyage Management and ship-to-ship route exchange, as the exchange of information facilitated by SeaSwim could provide input on the factors affecting the voyage planning. The issue of prioritising sources of information, if conflicting, and ensuring that voyage planning is based on the most accurate information, can be problematic if the information differs. However in such a case there is clearly more time to assess the reliability of information and smaller chances of an accident.

The dangers of overreliance and wrong input of data
The STCW Code underlines the dangers of overreliance on the use of ARPA.\textsuperscript{238} The same danger is highlighted for the ECDIS as well.\textsuperscript{239} While the new technology has an overall positive effect in safety of navigation, it has accompanying risks that need to be mitigated, primarily by appropriate training and the development of awareness. The risk of introducing any new technology is that it could potentially affect the duty of a proper look-out\textsuperscript{240}. This may also hold true for the STM concept. A requirement imposed on ECDIS does point out a concern that would apply equally for Voyage Management, namely the one for situational awareness while using the system, including safe water, the proximity of hazards etc.\textsuperscript{241}

Position determination can be conducted, according to the Code, by …“3. using modern electronic navigational aids, with specific knowledge of their operating principles, limitations, sources of error, detection of misrepresentation of information and methods of correction to obtain accurate position fixing.”\textsuperscript{242} This passage envisages the use of modern electronic navigational aids, relevant to the STM. More importantly, though, it points out one of the major concerns of the stakeholders, namely, what happens if there is a wrong input of data or a mistake in the system. The

\textsuperscript{237} STCW Code Table A-II/2, Navigation at the management level, Column 2
\textsuperscript{238} STCW Code Table A-II/1, Navigation at Operational Level, Column 2, Radar Navigation
\textsuperscript{239} STCW Code Table A-II/1, Navigation at Operational Level, Column 2, Navigation using ECDIS, the danger pointed out as number 2, after the thorough understanding of ENC and other chart data
\textsuperscript{240} STCW Code Section B-I/12 paragraph 20
\textsuperscript{241} STCW Code Table A-II/1, Navigation at Operational Level, Column 2, Navigation using ECDIS, Proficiency in operation interpretation and analysis of information obtained from ECDIS including, req. 6
\textsuperscript{242} STCW Code Table A-II/2, Navigation at the management level, Column 2
STCW Convention at numerous points and for different reasons or systems mentions that the training and certification of the seafarer must enable them to detect such malfunctions or wrong input of data and for the flag administration and the shipowner to ensure that training to that effect has been obtained.

There are several examples, which include:

- “detection of misrepresentation of information, false echoes, sea return, etc., racons and SARTs”\(^{243}\)
- “A knowledge should be attained of factors which might lead to faulty interpretation”\(^{244}\)
- “A knowledge should be attained of 2. The effects of errors on the accuracy of information displayed; effects of transmitting log errors on a true-motion display; and the effects of inaccurate manual speed settings on a true-motion display”\(^{245}\)
- “Knowledge of 1. methods of testing for malfunctions of ARPA systems, including functional self-testing”\(^{246}\)
- “The following factors should be emphasised during training: 9. Potential errors in the display of 9.1 the own ship’s position; 9.2 radar data and ARPA and AIS information”\(^{247}\)

A guide for the STM is the analysis of the goals of an ECDIS training program, as well as on the risks of overreliance on ECDIS information. On the goals of training, malfunctions and errors play a predominant role as it is mentioned that:

“The ECDIS trainee should be able to: .1 operate the ECDIS equipment, use the navigational functions of ECDIS, select and assess all relevant information and take proper action in the case of a malfunction; .2 state the potential errors of displayed data and the usual errors of interpretation; and .3 explain why ECDIS should not be relied upon as the sole reliable aid to navigation.”\(^{248}\)

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\(^{243}\) STCW Code Table A-II/1, Navigation at Operational Level, Column 2, Radar Navigation

\(^{244}\) STCW Code Section B-I/12 paragraph 6

\(^{245}\) STCW Code Section B-I/12 paragraph 8 subparagraph 2

\(^{246}\) STCW Code Section B-I/12 paragraph 28

\(^{247}\) STCW Code Section B-I/12 paragraph 50

\(^{248}\) STCW Code Section B-I/12 paragraph 40
The potential errors in displayed data are stated again in paragraph 41, while paragraph 49 addresses the risks of overreliance, as follows:

“Risks of over-reliance on ECDIS

49 The training in ECDIS operational use should address:

1. The limitations of ECDIS as a navigational tool;
2. potential risk of improper functioning of the system;
3. system limitations, including those of its sensors;
4. hydrographic data inaccuracy; limitations of vector and raster electronic charts (ECDIS vs RCDS and ENC vs RNC); and
5. potential risk of human errors.

Emphasis should be placed on the need to keep a proper look-out and to perform periodical checking, especially of the ship’s position, by ECDIS-independent methods.”

The above would need to be integrated with the STM training requirements. In addition, if the STM data are to be displayed on the ECDIS screen, then the ECDIS training program should be modified to reflect this.

The training provided should always lead249 to the promotion of the cautious use of devices assisting navigation, which is a basic requirement in COLREGS, as an expression of the observation of good seamanship and proper look-out.

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249 Table A-II/1 Col.2, Table A-II/2 Col.2, Table A-II/3 Col.2, Section A-VIII/2 Part 4.1 paras 23 and 26, Section B-1/12 paras 17, 35
1.1.2.2 MLC

Maritime Labour Convention 2006 and STM

General context
This document is written in the framework of Activity 5, which is concerned with the compatibility of STM concept and services with the current legal framework. This report is a part of a series of specific reports which results will be summarised in the Milestone 23 as a final formal deliverable.

Objective
The compatibility of the STM concept with the Maritime Labour Convention 2006\textsuperscript{250} is the central point of this report.

Restrictions
The compatibility analysis is legal in nature. Any policy and perception issues are introduced but are not the central point of this report. This report is written before the STM concept has crystallised so modifications might be needed. This report is written before the STM concept has been fully implemented and it cannot be excluded that some issues might arise that the analysis below has not anticipated.

Introduction
The ILO Maritime Labour Convention 2006 is the leading convention on the regulation of maritime labour, codifying and revising more than 35 treaties that comprised the pre-existing framework.\textsuperscript{251} The Regulations and the Code are organised into general areas under five titles: \textsuperscript{252}

- Title 1: Minimum requirements for seafarers to work on a ship
- Title 2: Conditions of employment
- Title 3: Accommodation, recreational facilities, food and catering
- Title 4: Health protection, medical care, welfare and social security protection
- Title 5: Compliance and enforcement

The Regulations and the provisions of Part A of the Code are mandatory. The provisions of Part B of the Code are not mandatory.\textsuperscript{253}

\textsuperscript{251} The list of revised treaties can be found in article X of the MLC.
\textsuperscript{252} Explanatory note to the regulations and code of the Maritime Labour Convention, para 5
\textsuperscript{253} MLC Article VI
STM is intended to operate as a device assisting navigation, and although there is some relevance to this convention, the overlap between the STM and the convention is rather limited. Indicative of the scope of this convention is Standard A2.1, which requires, amongst other things, that the seafarers shall have a signed seafarers’ agreement, providing them with decent working and living conditions on board the ship.\textsuperscript{254}

It is important to point out that STM cannot increase the workload beyond the statutory maximum of the standard set by the Member and in any event the hours of work and rest are limited by regulation 2.3. According to Regulation 2.3.5: The limits on hours of work or rest shall be as follows:

(a) maximum hours of work shall not exceed: (i) 14 hours in any 24-hour period; and(ii) 72 hours in any seven-day period; or

(b) minimum hours of rest shall not be less than: (i) ten hours in any 24-hour period; and (ii) 77 hours in any seven-day period.

Regulation 2.3.6 adds that hours of rest may be divided into no more than two periods, one of which shall be at least six hours in length, and the interval between consecutive periods of rest shall not exceed 14 hours. A device assisting navigation cannot possibly affect the decency of the working conditions on board a vessel.

An interesting point arises in Article IV, which requires that: ‘Every seafarer has the right to a safe and secure workplace that complies with safety standards.’ This provision relates to the outcome of the legal compliance of STM with the international maritime law framework, which was the object of the legal validation of STM. This means that if carrying STM on board a ship is breaching the conventions that regulate the safety standards, it would extend the breach to this convention as well. In other words, if a ship carrying STM is considered unsafe, the provisions of this Convention would be breached as well. The only effect that this provision has to STM, is the potential effect of a general lack of compliance. This conclusion is supported by the ILO’s Guidelines on the OSH provisions of the MLC 2006\textsuperscript{255}, which mention on paragraph 63 that the shipowners ensure the design of the workplace conforms to relevant international and national laws, regulations, standards or codes of practice.

\textsuperscript{254} MLC Regulation 2.1, Standard A2.1 (a), article IV para 3

\textsuperscript{255} ILO, Guidelines for implementing the occupational safety and health provisions of the Maritime Labour Convention 2006, 1\textsuperscript{st} Edition, 2015,
Consequently, this provision on its own does not cause any concern, and it is part of the co-operative approach that the MLC is intended to have with the various IMO instruments.\textsuperscript{256}

Regulation 1.3 on training and qualifications requires that seafarers shall not work on a ship, unless they are trained or certified as competent or otherwise qualified to perform their duties. Paragraph 4 of this regulation clarifies that meeting the IMO requirements for training and certification is considered as meeting the requirements of regulation 1.3. For STM purposes, there are currently no formal requirements for training, so this paragraph is not affecting STM's implementation. If STM's equipment is standardised, and accordingly training requirements are incorporated in the STCW Code, then the seafarers using it to perform their duties, have to be trained and certified accordingly in order to work on board a ship.

The MLC 2006 is a very important piece of legislation, as amongst others, it extends the doctrine of seaworthiness, both in terms of standards (as it is now tested against the requirements of the MLC as well) and in terms of duration, as the shipowner shall maintain continuous compliance with the requirements of this convention.\textsuperscript{257} From the current project information, the STM will not affect the working arrangements onboard a ship, nor will it require additional personnel. It is anticipated that it will be an addition to the existing devices on the bridge, without the need for additional personnel, thus it does not engage the MLC aspect of seaworthiness.

Thus, apart from the question of safety, which is germane to most issues of seaworthiness regarding STM, there seems to be no overlap. The reason for this conclusion is that the compliance or not of the working conditions on a vessel equipped with STM, will be a question that will be answered independently from the fact that the vessel carries STM, as there seems to be no reason that the STM would affect such conditions.

Consequently, the MLC 2006 should be characterised as an Intermediate Risk convention, until there is a definite answer on the general safety and compliance of

\textsuperscript{256} Pengfei Zhang, Edward Phillips, \textit{Safety first: Reconstructing the concept of seaworthiness under the maritime labour convention 2006}, MP 67 (2016) 54-59, 56

\textsuperscript{257} MLC Regulation 5.1.3, Standard A5.3 para 16; Pengfei Zhang, Edward Phillips, \textit{Safety first: Reconstructing the concept of seaworthiness under the maritime labour convention 2006}, MP 67 (2016) 54-59, 57
STM with it. If STM is considered as a technology not making the vessel unsafe, then this convention will be a Low Risk, as there is no impediment to STM’s implementation.
1.1.3 Protection of the Marine Environment

1.1.3.1 MARPOL

MARPOL 73/78 and STM

General context

This document is written in the framework of Activity 5, which includes the analysis of the compatibility of the STM concept and services with the current legal framework. This report is a part of a series of specific reports whose results will be summarised in Milestone 23 as a final formal deliverable.

Objective

This first version of the report presents the initial analysis of the compliance of STM with the International Convention for the Prevention of Pollution from Ships 1973 in order to evaluate the compatibility of STM with the legal framework.

Restrictions

The compatibility analysis is legal in nature. Any policy and perception issues introduced are not the central point of this report. This report is written before the STM concept has crystallised so modifications might be needed. Any reference made to the common law regards issues extending beyond international maritime law, and English law is very widely used for this purpose. The suggested Voyage Plan suggested by STM, and the operation of Port CDM, must take into account the disposal process of garbage and sewage as provided by annexes IV and V to the Convention.

Introduction

The protection of the marine environment is one of the two major international aims in shipping policy along with the safety of navigation. There is a duty on every State to ensure that ships flagged to or registered with it operate within international standards and that the marine environment is protected. Every discussion on environmental protection has as a legal starting point the International Convention for the Prevention of Pollution from Ships, 1973, more widely known as MARPOL.

MARPOL is a set of internationally agreed rules aiming to minimise the likelihood of pollution by establishing standards and operational procedures for ships. It provides a

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258 The International Convention for the Prevention of Pollution from Ships, 1973 (adopted on 2 November 1973, entered into force 2 October 1983) 1340 UNTS 184. The 1973 agreement did not enter into force until after the provisions of the 1978 Protocol were adopted, and the agreement and its 1978 protocol are normally referred to jointly as “MARPOL 73/78.”
framework for the elimination of intentional pollution of the marine environment by oil and other harmful substances and the minimisation of accidental discharge of such substances. As regards its structure, it is comprised by i) the MARPOL 73 text, ii) the MARPOL 78 protocols, iii) the protocol of 1997 which added a 6th annex. Despite being a convention aiming to reduce marine pollution, MARPOL does not define marine pollution, but defines “harmful substance” in Article 2(2) in a similar way to UNCLOS.259

Article 4 of MARPOL mentions that any violation of the requirements of this Convention shall be prohibited and sanctions shall be established under the law of the flag State. Article 5 envisages the issue of certificates, which will be subject to Port State Control, in order to verify compliance and avoid the operation of sub-standard ships.260 Port State Control is present in all annexes (Regulations I/11, II/16.9, III/8, IV/13, V/8, VI/10), with an identical provision, linked with the Article 5 procedure.261

The damaged equipment exception

Annex I analyses the regulations for the prevention of pollution by oil, and deals mainly with the requirements in terms of certificates, cargo area and machinery requirements, as well as with special requirements for the transfer or carriage of oil in specific areas. Regulation I/4 provides an exemption for discharge violations (Regulations I/15 and I/34) in the event that they result from damage to a ship or its equipment. The objective of this provision is primarily to establish the standard of care to be met in order to avoid accidental pollution.262 This exception is subject to three concurrent conditions: a) that the damage resulted from damage to a ship or its equipment, b) that all reasonable precautions have been taken to prevent and minimise such damage, and c) that the owner or master has not acted either with intent to cause damage or recklessly and with knowledge that damage would probably result. If all these three conditions are satisfied, then there is an issue of which persons are exempted.

259 MARPOL Article 2(2); M George et al, Protecting the Malacca and Singapore Straits from Ships’ Atmospheric Emissions through the Implementation of MARPOL Annex VI, (2017) 32 IJMCL 95-137, at 105
260 Sir Anthony Clarke, Port State Control or sub-standard ships: who is to blame? What is the cure?, [1994] LMCLQ 202,207
First of all, the damage must have resulted from the damaged equipment, which means that the operation of STM must be causatively connected with the discharge. It has been held that the fact that a failure of an aid to navigation (lights in particular), that would act as a warning, did not suffice to consider this failure as legally causative of an accident.\cite{263} The same case found the same for navigational aids, as any potential failure did not have any causal connection with the master’s navigational or supervisory abilities, on the facts of that case.\cite{264} Consequently, even if an STM malfunction is considered to be “damage to a ship or its equipment”, it will be hard to prove that the damage has resulted from it, as courts tend to underline the overriding role of the master.\cite{265}

As regards the question whether a damaged STM that results in oil discharge qualifies under this exception, the answer depends on the interpretation of “equipment”. If “equipment” is interpreted in its UNCLOS context (as being part of the CDEM of a vessel), then there will be an issue as to whether STM should qualify as “equipment” under MARPOL, in its current form. The reason is that the standards for “equipment” under UNCLOS are normally considered to be the standards laid down under SOLAS for “shipborne navigational systems and equipment”, and the STM is not currently part of the list provided by SOLAS’s Regulation V/19. Flag States and coastal States may well take different views on this question, centring on whether regulation of new navigational technology as equipment under SOLAS is merely a sufficient condition for it to qualify as equipment under UNCLOS. This view is likely to be favoured by flag States, as in that case new types of technology that could be objectively described as equipment activate the CDEM rule of Article 21(2) automatically without the need for the IMO to act. The alternative interpretation would consider such regulation as a necessary condition, which would suit coastal States wishing to prohibit or make mandatory the use of a given new technology, as in this case they would remain free to do so until such time as the IMO acts. If the final form is a modified and standardised

\begin{footnotesize}
\begin{enumerate}
\item \textit{The Isla Fernandina}, [2000] 2 Lloyds Rep 15, 31-32. Langley J stated the following “the master did entrust it (navigation) to the third officer and the presence or absence of the light would not be expected to be a determinative factor in his doing so nor has either of them ever suggested it was.
\item \textit{The Isla Fernandina}, [2000] 2 Lloyds Rep 15, 32. By making a reference to charts (navigational aid according to IALA) the judge seems to extend it to navigational aids by the following statement: “Had the chart shown there was no light, the navigation of the third officer and so the grounding would in my judgment have happened just as they did.
\item On the support of the predominant and overriding role of the master, also see the report of the compliance of STM with the Collision Regulations.
\end{enumerate}
\end{footnotesize}
ECDIS, and this device with the STM functionality is already standardised under SOLAS, then STM would fall under CDEM.

If the “damage to equipment” is construed as SOLAS “malfunction of equipment”, then it could qualify as “damage to equipment” under MARPOL. This issue again will depend on the final form of STM, and the location of the malfunction. If the modified ECDIS is standardised, then there is no question, as it would qualify as a SOLAS malfunction. If however, a different approach is adopted, and there is just an input that fails in isolation, and this does not render the entire ECDIS inoperative, then it should not qualify as a malfunction of equipment. It has to be noted that such installation, in the event that the STM device is not regulated, would have to ensure that its installation does not interfere with the normal operation of other shipborne navigational equipment.

The Intertanko case before the ECJ dealt with the effect of this exception: Namely, does it exempt any person, or could other persons be liable if the owner or master are exempt from liability? According to the industry coalition’s preferred interpretation, this exception disappplies the entire MARPOL regime for any person, and there cannot be any liability as there is no breach of Annex I. The interpretation put forward by the Advocate-General supports that other responsible persons can be made liable even where the owner or master has not acted recklessly or with an intention to cause damage. If it can be shown that other persons such as the charterer or the classification society acted in such a way, then there seems no reason for them not to be liable. The wording of the Regulation is open to both interpretations, and it neither

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266 See SOLAS Regulation V/16
267 For more details see the analysis of Regulation V/16 of the SOLAS compliance report
268 By STM device we mean the installation of any device/input or modification of existing navigational aids, in a way that they operate differently from the way they did prior to the installation/modification that ensures STM operability.
269 SOLAS Regulation V/19 combined with Resolution 232(82), analysing the revised standards for ECDIS. In paragraph 15.1 of this resolution it is mentioned that: ‘ECDIS should not degrade the performance of any equipment providing sensor inputs. Nor should the connection of optional equipment degrade the performance of ECDIS below this standard.’
271 See the opinion of Advocate General Kokott in the Intertanko Case before the ECJ. https://publications.europa.eu/en/publication-detail/-/publication/59f533d0-2518-4090-a4d4-25ea0330840b
imposes nor exempts expressly any other class of actors from liability. This issue was left unresolved by the Intertanko case, however, as the case was decided on jurisdictional grounds and thus never examined on its merits.\footnote{Case C-308/06 The Queen on the application of: International Association of Independent Tanker Owners (Intertanko) and Others v Secretary of State for Transport ECR [2008] I-04057; Baris Soyer & Andrew Tettenborn, Pollution at Sea, Informa, 2012, Chapter 14: Marc Huybrechts, Whatever happened to European Directive 2005/35/EC? Europe’s ambivalent approach to the fight against marine pollution and its consequences for seafarers} Due to the nature of STM, this exception seems of limited relevance, and its applicability to STM depends on a number of factors. The issues of interpretation of “equipment” or “damage to equipment” are important and even if they are satisfied, then there is also the requirement of causation, which cannot be easily satisfied.

**The disposal process**

Annexes IV and V differ from the previous annexes, as they deal with sewage and garbage pollution prevention, by providing the process and the proper equipment for waste disposal. STM will need to observe the processes envisaged by Regulation 11.1 of Annex IV and by Regulations 7.1, 9.2 and 9.3 of Annex V, regarding the disposal process of garbage and sewage. The reason there is some overlap is that any change in the vessel’s schedule dictated by the berth-to-berth synchronisation must take into account the time and the availability of the respective facilities to accommodate the vessel. Thus, although there is no conflict with these provisions, they should be taken into account as parameters affecting the adjustment of the vessel’s schedule and are relevant for the purposes of Voyage Management.

**The obligations of Annex VI**

The adoption of MARPOL Annex VI is considered a major advance over early international environmental law, which was generally regarded as “soft law”.\footnote{M George et all, Protecting the Malacca and Singapore Straits from Ships’ Atmospheric Emissions through the Implementation of MARPOL Annex VI, IJMCL 32 (2017) 95-137, at 137} Annex VI is concerned with the prevention of air pollution from ships, by gradually reducing the sulphur oxide limits on vessel fuel,\footnote{See MARPOL Annex VI, Regulation 14} and by establishing standards that either forbid the installation of harmful substances on newly built ships or require stricter standards on conversions of engines.\footnote{MARPOL Annex VI, Regulation 14} STM is mainly concerned about reducing GHG emissions, and such emissions are not currently included in Annex VI. The
purpose of Annex VI is essentially to improve the quality of fuel that ships use, and does not have any overlap with STM.

STM, in general, could assist in the successful implementation of the goals of Annex VI, as just-in-time operations can reduce the consumption of bunkers, which will lead to a reduction of emissions. This ties in with the outcome of MEPC 72, which included optimisation as a short-term measure in the Initial Strategy to reduce GHG emissions from ships.

Consequently, Annexes I to III are of very limited relevance to the STM, Annexes IV and V are relevant in so far as the voyage planning of the STM takes into account waste disposal and finally Annex VI, which is not relevant, is nonetheless likely to be benefited by the operation of STM.

As a conclusion, the implementation of STM does not face any legal impediments from MARPOL, whose goals could be achieved better by the introduction of STM. The only concern relates to a non-legal issue, which is that the STM arrangements on a port call, by Voyage Planning or Port CDM, should take into account the requirements of Annexes IV and V, regarding the sewage and waste disposal arrangements. Consequently, MARPOL should be characterised as a Medium Risk Convention, due to the necessary adjustment that has to be made for the disposal process.
1.1.3.2 CBD

The 1992 Convention on Biological Diversity and STM

General context
This document is written in the framework of Activity 5, which is concerned with the compatibility of the STM concept and services with the current legal framework. This report is a part of a series of specific reports whose results will be summarised in Milestone 23 as a final formal deliverable.

Objective
The compatibility of the STM concept with the 1992 Convention on Biological Diversity\textsuperscript{277}, is the central point of this report.

Restrictions
The compatibility analysis is legal in nature. Any policy and perception issues are introduced but are not the central point of this report. This report is written before the STM concept has crystallised so modifications might be needed. This report is written before the STM concept has been fully implemented and it cannot be excluded that some issues might arise that the analysis below has not anticipated.

Analysis
The 1992 Convention on Biological Diversity (CBD) provides the framework for conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources\textsuperscript{278}. The convention is comprised of 42 articles, with articles 1-21 laying out the general obligations and articles 22-42 forming the procedural part of the convention; and of 2 annexes, with the first defining identification and monitoring and the second dealing with arbitration and conciliation.

The CBD imposes some general obligations on states, such as cooperation\textsuperscript{279}, general measures for sustainability\textsuperscript{280}, monitoring\textsuperscript{281} and conservation in and ex situ\textsuperscript{282} while observing their sovereign right to exploit their own resources pursuant to their own environmental policies under the restriction of not causing transboundary damage\textsuperscript{283}. The convention requires that contracting States establish incentive measures for the preservation of biological diversity\textsuperscript{284}, that they increase awareness\textsuperscript{285} and that they

\begin{itemize}
\item \textsuperscript{277} 1992 Convention on Biological Diversity (adopted 5 June 1992, entered into force 29 December 1993) 1760 UNTS 79
\item \textsuperscript{278} CBD Article 1
\item \textsuperscript{279} CBD Article 5
\item \textsuperscript{280} CBD Article 6
\item \textsuperscript{281} CBD Article 7
\item \textsuperscript{282} CBD Articles 8 and 9: According to article 2, in situ conservation is the conservation of components of biological diversity in their natural surroundings, while ex situ is outside their natural habitats.
\item \textsuperscript{283} CBD Article 3
\item \textsuperscript{284} CBD Article 11
\item \textsuperscript{285} CBD Article 13
\end{itemize}
establish research and training for this purpose. The operation of the CBD concerns primarily the areas where States have jurisdiction. The areas beyond national jurisdiction are subject to general legal principles and currently subject to international negotiation.

The research undertaken indicates that there is no conflict of the 1992 CBD with the STM. First of all, the obligations it imposes are obligations on states to legislate, thus any potential conflict would not arise between this Convention and STM, but potentially between any implementing legislation and STM. Moreover, there is no point of overlap between the STM or in general with the use of devices assisting navigation, and the obligations to preserve biological diversity.

The only point, which is remotely relevant, regards in-situ conservation, as Article 8(a) mentions that each contracting party shall establish a system of protected areas where special measures need to be taken to conserve biological diversity. In that line the Polar Code for example, requires voyage planning to take into account national and international designated protected areas. Where such areas are established, Route Optimisation along with Enhanced Monitoring and the Navigational Warning feature can transmit and inform the stakeholders in the STM ecosystem about the boundaries of such areas and the activities restricted. This can assist in the more effective protection of these areas and in the more efficient implementation of the convention’s requirements.

Consequently, due to the absence of conflict and the limited relevance, this convention should be characterised as a Low Risk Convention.

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286CBD Article 12
287International Code for ships operating in Polar waters (Polar Code) MEPC 68/21/Add.1 Annex 10, 11.3.8
1.1.3.3 INTERVENTION


General context

This document is written in the framework of Activity 5, which is concerned with the compatibility of the STM concept and services with the current legal framework. This report is a part of a series of specific reports, the results of which will be summarised in Milestone 23 as a final formal deliverable.

Objective

The compatibility of the STM concept with the International Regulations for Preventing Collisions at Sea 1972, as amended, is the central point of this report.

Restrictions

The compatibility analysis is legal in nature. Any policy and perception issues introduced are not the central point of this report. This report is written before the STM concept has crystallised so modifications might be needed. Any reference made to the common law regards issues extending beyond international maritime law, and English law is very widely used for this purpose.

Intervention Convention and STM

The 1969 International Convention relating to Intervention on the High Seas in cases of Oil Pollution Casualties is a convention that regulates the measures that need to be taken on the high seas, in case an environmentally hazardous incident takes place. This Convention is not relevant to STM as the obligations that it enshrines relate to states and not to vessels.

Article I refers to the fundamental obligation of this convention which requires the parties, following a maritime casualty, to take such measures on the high seas as may be necessary to prevent, mitigate or eliminate grave and imminent danger to their coastline or related interests from pollution or threat of pollution by sea by oil. This right derives from customary international law and is preserved in UNCLOS Article 221. "Maritime casualty" is defined for the purposes of this convention as "a collision of ships, stranding or other incident of navigation, or other occurrence on board a ship or external to it, resulting in material damage or imminent threat of material damage to a ship or cargo."

No indication is given to explain the meaning of necessary in relation to the measures that are to be taken, but the right of intervention is subject to 3 conditions: i) it arises in the event of a maritime incident ii) such incident must give

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290 INTERVENTION 1969 Art II (1) and this definition has been followed in UNCLOS Article 221 para 2 (replacing ships with vessels), Unclos commentary (infra), p 313
rise to a threat of major or imminent damage to the intervening state and iii) any remedial measures must be necessary and proportionate. Article III requires consultation of other affected states before taking an action, especially of the flag states, allowing however actions to be taken in cases of extreme urgency without consultation and article VI provides for the right to compensation in case the measures taken exceed those that were reasonably necessary. The convention features an annex dealing with the dispute resolution issues by regulating the process of conciliation (arts 1-12) and arbitration (arts 13-19).

The 1973 protocol was added to greatly broaden the scope of polluting substances that with which state parties might take action following a maritime casualty. The provisions of the protocol are identical to the ones of the 1969 Convention, as the purpose of the protocol is to afford the same right of intervention from pollution arising from additional substances. Finally, the 1973 protocol has an Annex containing the list with these substances that allow the intervention of the affected states in the High Seas.

Consequently, neither the 1969 Convention nor its 1973 Protocol pose any impediments to STM as they are not relevant, due to the fact that their object is the right of the coastal State to intervene in the High Seas in case of an environmental hazard. As a result, this Convention and its Protocol should be characterised as a Low Risk Convention.

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292 Ibid p 307, these requirements derive from a combined interpretation of articles I and V. The requirement that the damage or threat of damage has to be in relation to oil, has been deliberately omitted, due to the broadened range of substances provided by the 1973 protocol.

293 Protocol relating to intervention on the high seas in cases of pollution by substances other than oil, 1973 (adopted on 2 November 1973, entered into force 30 March 1983) 1313 UNTS 4

1.1.3.4 OPRC 1990

OPRC 1990 with its HNS 2000 Protocol and STM

General context
This document is written in the framework of Activity 5, which is concerned with the compatibility of the STM concept and services with the current legal framework. This report is a part of a series of specific reports, the results of which will be summarised in Milestone 23 as a final formal deliverable.

Objective
The compatibility of the STM concept with The International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990 (OPRC 1990) and its Protocol on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances 2000 (HNS 2000 Protocol) is the central point of this report.

Restrictions
The compatibility analysis is legal in nature. Any policy and perception issues are introduced but are not the central point of this report. This report is written before the STM concept has crystallised so modifications might be needed. This report is written before the STM concept has been fully implemented and it cannot be excluded that some issues might arise that the analysis below has not anticipated.

Analysis
OPRC 1990 is a framework which provides for international co-operation for combating major oil pollution incidents. The Convention recognises the importance of mutual assistance and exchange of information between the parties, in order to combat oil pollution incidents. The exchange of information along with the development of research initiatives to improve preparedness are the only points of potential relevance to the STM. The research undertaken indicates that there is nothing in the OPRC 1990 which could impede the implementation of the STM. Similarly to the Intervention Convention, the initial Convention against oil pollution

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297 Edgar Gold, Gard handbook on Marine Pollution, Gard 1998 p 70
298 See OPRC 1990 Article 8
299 1969 International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties (adopted on 29 November 1969, entered into force 6 May 1975) 970 UNTS 211 was followed by the Protocol relating to Intervention on
was followed by a protocol providing for an identical framework for any substance other than oil.

One of the most important features of this Convention is article 3, mandating that the parties should require the vessels flying their flag to have on board a shipboard oil pollution emergency plan, in accordance with articles 5 and 7 of MARPOL 73/78. This article however, is of no relevance to the STM and there is no conflict.

Article 7 is of some relevance to the STM, as it mentions that parties agree that they will cooperate and provide technical support and equipment for the purpose of responding to an oil pollution incident. Although this article imposes an obligation on States, its implementation can be assisted by STM. The aforementioned cooperation could be facilitated more efficiently through the STM, as vessels operating within the polluted area, according to their oil pollution emergency plan, could potentially mitigate the pollution more efficiently if they use Ship-to-Ship Route Exchange, so that the other actors are aware of the situation in the area and thus increase the operation’s spatial efficiency. The IMO recently published a model course on OPRC, which organises the response plan in 3 levels: Strategic, Tactical and Operational. STM could be helpful both at a strategic and at an operational level, because of the route planning of the response plan and the enhanced situational awareness provided by STM.

Finally, the Annex refers to the allocation of costs in mitigation of oil pollution. In the absence of an agreement, if action is taken by one party at the express request of another party, the latter is obliged to reimburse the first party, while if action was taken by a party on its own initiative then it shall bear the costs on its own.

The HNS 2000 Protocol follows the same structure, and has an almost identical wording, with the only difference being that it refers to Hazardous and Noxious Substances (HNS), at the points where the OPRC is referring to oil. The term HNS might be confusing, due to the 1996 HNS Convention, which preceded the protocol, but the protocol has an entirely different objective from the HNS Convention. Similarly to the OPRC, the HNS 2000 Protocol deals with the preparedness and response measures for dealing with HNS spills, while the HNS convention deals with the compensation from for such spills.

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300 International Convention for the Prevention of Pollution from Ships (adopted on 2 November 1973, entered into force 2 February 1983), 12 ILM 1319 (1973); OPRC Article 3 refers to “provisions adopted by the Organization for this purpose”, but Conference Resolution 1 clarifies that this refers to Articles 5 and 7 of MARPOL.

301 IMO, Updated OPRC Model Training Courses PPR 4/14/1-4/14/4 (4/14/1 for the introduction, 4/14/2 for the Operational Level, 4/14/3 for the Tactical and 4/14/4 for the Strategic Level), 14th October 2016


Article 3 of the HNS Protocol merges articles 3 and 4 of the OPRC, providing for the requirement for a pollution incident emergency plan, and reporting procedures. The key differences the OPRC are that offshore units are expressly excluded from the application of this article and that the notification requirement has been simplified. HNS 2000 article 3(3) states: “When the appropriate authorities of a Party learn of a pollution incident they shall notify other States whose interests are likely to be affected by such incident”. Articles 5 and 6 of the HNS Protocol are identical to articles 7 and 8 of the OPRC 1990, so there is nothing to be added in terms of commenting on the compliance of STM with them.

As a conclusion, the OPRC 1990 Convention and its HNS 2000 Protocol, due to their limited relevance, if any, and the absence of conflicts, should be categorised as a Low Risk Convention.
1.1.3.5 *UNEP Nairobi*


**General context**
This document is written in the framework of Activity 5, which is concerned with the compatibility of STM concept and services with the current legal framework. This report is a part of a series of specific reports, the results of which will be summarised in the Milestone 23 as a final formal deliverable.

**Objective**
The compatibility of the STM concept with UNEP Nairobi Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region is the central point of this report.

**Restrictions**
The compatibility analysis is legal in nature. Any policy and perception issues introduced are not the central point of this report. This report is written before the STM concept has been fully implemented and it cannot be excluded that some issues might arise that the analysis below has not anticipated.

**Analysis**
The protection of the marine environment is one of the two major international aims in shipping policy along with the safety of navigation. There is a duty on every State to ensure that ships flagged to or registered with it operate within international standards and that the marine environment is protected. The UNEP Nairobi Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region has an established framework of goals and principles that guide UNEP’s actions towards protecting, conserving and managing the Western Indian Ocean coastal and marine environment. The principles of the Nairobi Convention are specified and implemented through the Articles in the Convention and Specific Protocols, which address a series of issues, and the inclusion of all the principles within the Convention corresponds with the development of frameworks for addressing environmental issues on the global scale.

Its spatial application is confined to the “Convention area”, which is the Eastern African region of the Indian Ocean falling within the jurisdiction of the contracting states.

**Figure 1: Map showing the area of Application of the Convention**

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305 Pollution from ships; Pollution caused by dumping; Pollution from Land-Based Sources and Activities; Pollution from Sea Bed activities; Pollution resulting from Transboundary Movement of Hazardous Wastes; Airborne Pollution Biological Diversity; Co-operation in combating pollution; Environmental damage from engineering activities; Environmental Impact Assessment Scientific and technical co-operation; Pollution resulting from Transboundary Movement of Hazardous Wastes and Biological Diversity.

306 [UNEP Nairobi Convention Article 2](https://www.unep.org/nairobi-convention)
The map attached below, shows in a darker colour, the geographical coverage of this Convention.

In terms of compliance of the STM with the Convention, *prima facie* there seems to be no impediment. Article 5 is concerned with the pollution from ships, and reads as follows: *The Contracting Parties shall take all appropriate measures to prevent, reduce and combat pollution of the Convention area caused by discharges from ships and, for this purpose, to ensure the effective implementation of the applicable international rules and standards established by, or within the framework of, the competent international organization.*

The wording of this article sets the standard for the member States, by requiring the adoption of anti-pollution policies on shipping and the effective implementation of the international standards. There seems to be no relevance to the operation of an STM vessel. As far as the effective implementation of international standards is concerned, this refers to the standards set by conventions like MARPOL, SOLAS and the HNS Convention.\(^{307}\)

Article 9 reads as follows: *The Contracting Parties shall take all appropriate measures to prevent, reduce and combat pollution of the Convention area resulting from discharges into the atmosphere from activities under their jurisdiction.* This could have STM relevance to the extent that vessels are flying the flag of one of the contracting States and to vessels that are navigating within maritime zones that are within the jurisdiction of a contracting State. This is not relevant to STM as it refers to the obligations of a contracting State in adopting measures, and does not stipulate any particular conduct or remedy which could potentially create liability for STM. As with Article 5, any potential conflict would arise from the internal implementing legislation, not from this Convention.

Article 11, which refers to cooperation in combatting pollution in cases of emergency, is also of potential relevance to the STM. This article requires that States cooperate in order to create emergency anti-pollution measures. Any such measure or planning could potentially benefit from the operation of STM. Route optimisation will take into account no-go areas and other parameters, like maritime accidents, groundings,

\(^{307}\) Third Meeting of the Contracting Parties to the Convention for the protection, management and development of the Marine and Coastal Environment in Eastern and Southern Africa region (COP 3) 5-7 December 2001, p 30
environmentally hazardous areas, so that there is awareness of their existence and any potential plan for their elimination can be facilitated quicker. Paragraph 2 adds a notification requirement of the danger of pollution and of any potential actions for its mitigation, which is something that could potentially be observed better if STM was in place.

This Convention does not impede the implementation of the STM with any of its provisions, because it imposes obligations on States to take anti-pollution measures. As such, a potential breach of the Convention affects the States, not STM or its stakeholders. Consequently, due to its limited relevance, and its limited spatial application, the UNEP Nairobi Convention should be characterised as a Low Risk Convention.
1.1.3.6 UNFCCC 1992 Kyoto and Paris Agreement

The 1992 UN Framework Convention for Climate Change, its Kyoto Protocol the Paris Agreement and STM

General context
This document is written in the framework of Activity 5, which is concerned with the compatibility of the STM concept and services with the current legal framework. This report is a part of a series of specific reports whose results will be summarised in Milestone 23 as a final formal deliverable.

Objective
The compatibility of the STM concept with the 1992 United Nations Framework Convention on Climate Change, its Kyoto Protocol and the Paris Agreement is the central point of this joint report.

Restrictions
The compatibility analysis is legal in nature. Any policy and perception issues are introduced but are not the central point of this report. This report is written before the STM concept has crystallised so modifications might be needed. This report is written before the STM concept has been fully implemented and it cannot be excluded that some issues might arise that the analysis below has not anticipated.

Analysis
The protection of the marine environment is one of the two major international aims in shipping policy along with the safety of navigation. There is a duty on every State to ensure that ships flagged or registered with operate within international standards and that the marine environment is protected.

The research undertaken indicates that the 1992 United Nations Framework Convention on Climate Change, its Kyoto Protocol and the Paris Agreement do not pose any legal impediments to the implementation of the STM. Their scope, the

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310 The Paris Agreement (adopted on 12 December 2015, entered into force 4 November 2016)
objectives of the Convention and of its Protocol and Agreement, as well as their provisions are not in contradiction with the STM.

In particular, the 1992 United Nations Framework Convention on Climate Change has as an ultimate objective to stabilise the greenhouse gas (GHG) concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.\(^{311}\) Two of the Key Performance Objectives of the STM are the reduction of fuel consumption and the reduction of GHG emissions.\(^ {312}\) The use of Port Call Synchronisation, Ship-Port Synchronisation, Sharing of Voyage Plan & Identity Registry will enable optimal speed, which is expected to reduce fuel consumption and emitted GHG. Thus in terms of objectives there is an alignment between the UNFCC and STM.

In terms of obligations, there can be no impediment to STM as the UNFCC, its Kyoto Protocol and the Paris Agreement impose obligations on Parties, which are States, and no obligation arises for physical or legal persons. The commitments of UNFCCC Article 4 that are imposed on States, include one (4.1.c) which is a positive stipulation for STM:

> All Parties [...] shall promote and cooperate in the development, application and diffusion, including transfer of technologies, practices and processes that control, reduce or prevent anthropogenic emissions of greenhouse gases [...] including the [...] transport [...] sector(s).

Despite this being a commitment concerning States, even so, the STM falls within the ambit of such a commitment and is positively reinforced.

As regards the Kyoto Protocol, it sets some assigned GHG aggregate emission amounts to each State party, which they shall ensure not to exceed, providing a more specific framework for the UNFCCC. However such restrictions, even though they would apply to States and would not concern STM, do not apply to GHG emissions from marine bunkers. Article 2.2 transfers the obligation to pursue limitation or reduction of emissions of GHG from marine bunker fuel from States to the IMO, as it mentions that the Parties have to work through IMO. The effectiveness of this provision has been heavily criticised as IMO has failed to set a target for emissions reductions measured against an agreed baseline and a framework in which emission reduction measures could be undertaken\(^ {313}\). Even if such baselines are set, these will be an issue directly concerning States not physical persons or legal entities, and would

\(^{311}\) UNFCC Article 2  
\(^{312}\) STM Deliverable 5.1.1, STM Validation Hypotheses, 23/9/16 p 24  
\(^{313}\) Bill Hemmings Bunker fuels and the Kyoto Protocol: How ICAO and the IMO failed the climate change test, European Federation for Transport and Environment (T&E) 2009, p 17
require further regulation from these States, in order to set limits related to physical persons or legal entities.

The Paris Agreement is the most recent attempt to tackle climate change and address some of the inefficiencies of the Kyoto Protocol. The key objective of this Agreement is to hold the increase in the global average temperature to well below 2°C and adapt to a low greenhouse gas emissions development in a way that reflects equity and the principle of common. As far as STM is concerned, there is no relevance, as it also concerns States and it is an Agreement, which aims to enhance the implementation of the UNFCCC. IMO, through its Marine Environment Protection Committee (MEPC), diagnosed the need for a meaningful process and discussion of shipping's "fair share" that should be initiated in parallel to a three-step approach. MEPC stated that data collection was the first step in a three-step approach, the second step being data analysis and the third step being decision making on what further measures, if any, are required.\textsuperscript{314} The key challenges in this process are not to restrict international trade or to permit carbon leakage, and it is important to consider social, economic, technical and environmental impacts to ensure that developing countries have access to financial resources and technology.\textsuperscript{315}

As a conclusion, the 1992 UNFCCC, its 1997 Kyoto Protocol and the Paris Agreement are not contradicting the implementation of STM and their key objective, which is the reduction of GHG emissions, is one of the core objectives of STM. Thus, they should be characterised as a Low Risk Convention.

**Appendix: IMO recent developments with GHG Emissions and STM**

On 12 April 2018 IMO’s Marine Environment Protection Committee, during its 72\textsuperscript{nd} session discussed the reduction of GHG (Greenhouse Gas) emissions from ships. The working group concluded on an Initial Strategy, which aims at enhancing IMO’s contribution to global efforts by addressing GHG emissions from international shipping, identifying the appropriate actions for the international shipping sector being mindful of the impact on States and at identifying measures appropriate to achieve these objective including incentives for research and development.

The level of ambition was rather high. Besides the reduction of carbon intensity of the ship with further implementation of the energy efficiency index (EEDI), a CO2 reduction target per transport work was set as a minimum of 40% by 2030 and towards 70% by 2050 compared to the 2008 emissions, while reducing the total annual emissions by at least 50% by 2050. This strategy suggested some measures by

\textsuperscript{314} Report of the Marine Environment Protection Committee on its sixty-ninth session, MEPC 69/21 16/5/16, paras 6.8 and 7.21

\textsuperscript{315} Report of the Marine Environment Protection Committee on its sixty-ninth session, MEPC 69/21 16/5/16 Para 7.5.4
dividing them according to their implementation timeframe to short, mid and long-term measures.

One of the short-term measures suggested is to “consider and analyse the use of speed optimization and speed reduction as a measure, taking into account safety issues, distance travelled, distortion of the market or trade and that such measure does not impact on shipping's capability to serve remote geographic areas”. This measure can be achieved by the implementation of optimisation projects like STM.

STM can lead to the reduction of bunker consumption, which can subsequently lead to the reduction of emissions. Route cross-check and Route optimisation ensure that a vessel is following the optimal route, which means that it will take less time and fuel to perform a voyage. In addition to the fuel and emissions saved by the optimisation of the route, the synchronisation of port calling and just-in-time arrivals means that a vessel will no longer rush to a port and wait in anchorage, burning more fuel to get there faster, and burning fuel while waiting. Besides the benefits it could bring to port logistics, the potential reduction in emissions can be very significant. STM is not only about slowing steaming, as if there is an opening that the vessel can make by speeding up, the vessel would still save fuel by avoiding the waiting time.

An important point highlighted by IMO’s strategy is that optimisation should take into account safety issues; that it should ensure that market is not distorted and that shipping can still serve remote geographic areas. As regards safety, STM is designed to boost the situational awareness of the navigator, by providing real-time data, including information about the other ships’ intended routes. This can assist in avoiding close encounters and in establishing common awareness, as it is common in other means of transport (e.g using indicators while driving). On the avoidance of any market distortion, STM is working closely with BIMCO on the development of an STM clause, which will address the main charterparty issues that could arise by the optimisation of shipping. On the last point, STM is not going to change or restrict the capability to serve remote areas. If anything, it is going to improve it, as one of the features currently tested (Winter Navigation) can assist in navigation in icy areas. It is providing information, which is important on icebreaking services such as best route, waiting positions, preparations for assistance, position in convoy and time for departures from port.

Consequently, it could be argued that the MEPC 72 and the IMO GHG Emissions Strategy is endorsing projects like STM. The optimisation of the vessel’s route and port calls can lead to financial gains for shipowners and to the reduction in emissions from their ships. STM is creating a new paradigm for maritime information sharing offering tomorrow’s digital infrastructure for shipping. Understandably, the targets set by the IMO can be more achievable if the optimisation of STM is combined with the
rest of the measures suggested, such as the improvement of the energy efficiency framework, the development of low carbon fuels and the provision of incentives for first movers in new technology. Even without these measures, STM can be very helpful in improving the efficiency of shipping and reducing its carbon footprint, while improving safety and creating room for monetary gains.
1.1.4 The liability issues of the STM

1.1.4.1 CLC FUND and BOPC

CLC FUND and BOPC Conventions and STM

General context
This document is written in the framework of Activity 5, which is concerned with the compatibility of the STM concept and services with the current legal framework. This report is a part of a series of specific reports whose results will be summarised in Milestone 23 as a final formal deliverable.

Objective
The compatibility of the STM concept with the CLC 1969\(^\text{316}\), as amended by the 1992 protocol\(^\text{317}\), the 1992 FUND Convention\(^\text{318}\), its 2003 optional supplementary FUND Protocol\(^\text{319}\) and BOPC\(^\text{320}\) is the central point of this joint report.

Restrictions
The compatibility analysis is legal in nature. Any policy and perception issues are introduced but are not the central point of this report. This report is written before the STM concept has crystallised, so modifications might be needed. This report is written before the STM concept has been fully implemented and it cannot be excluded that some issues might arise that the analysis below has not anticipated.

Analysis
The set of conventions analysed in this report addresses the civil liability arising from oil pollution. They are very similar to each other in terms of content and structure.


CLC 1992 provides a strict liability regime for compensation of pollution damage by contamination caused by oil\(^{321}\) in the territory, including the territorial sea, of a Contracting State and its EEZ and any preventative measures taken anywhere to prevent or minimise such damage.\(^{322}\) The liability attaches to the registered shipowner of a tanker carrying persistent oil as cargo and includes pollution damage caused by the bunkers of the ship. The shipowner’s liability is limited to an amount which depends on the size of the ship. The shipowner has to be insured to the limitation amount and claimants have the option to sue the insurer directly for compensation.

The 1992 FUND Convention was established to provide compensation for pollution damage to the extent that CLC 1992 is inadequate.\(^{323}\) The 2003 FUND Protocol introduced a Supplementary Fund, which shall pay compensation to persons suffering pollution damage if such persons were unable to obtain adequate compensation under the 1992 Fund Convention.\(^{324}\)

The BOPC Convention applies to pollution caused by discharge or escape of bunker oil from ships not covered by the CLC Convention.\(^{325}\) Thus all cargo ships, passenger ships, tugs etc as well as tankers not carrying persistent oil as cargo are subject to the BOPC for damages caused by the spillage of bunker oil. The liability is strict as with the CLC 1992. Any limitation of liability rights available under national law are respected. Insurance is compulsory and direct action against the insurer is also available. The liability of the insurer is always limited to the corresponding amount of the 1976 LLMC as amended by the 1996 and 2012 Protocols. The liability under the BOPC does not attach only to the registered shipowner but also to the manager, bareboat charterer and operator of the ship.

The provision relevant to STM regards an exclusion of liability for navigational aids and appears in the CLC and the BOPC.

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\(^{321}\) Art.1.5 Defines oil as “any persistent hydrocarbon mineral oil such as crude oil, fuel oil, heavy diesel oil and lubricating oil, whether carried on board a ship as cargo or in the bunkers of such a ship

\(^{322}\) CLC Article II

\(^{323}\) FUND Convention Article 2

\(^{324}\) (2003) Fund Article 5

\(^{325}\) BOPC Articles 1.9 and 4.1

Figure 1: How full and adequate compensation from Oil Pollution damage can be pursued
Article III 2.c of CLC\textsuperscript{326} excludes the shipowner’s liability if the incident took place due to a failure of the authority responsible for the “maintenance of lights or other navigational aids in the exercise of that function.” This provision is copied verbatim\textsuperscript{327} in Article 3.3.c of BOPC.\textsuperscript{328}

CLC Article III 2.c is susceptible to different interpretations, as to what falls under its scope. The phrase the “maintenance of lights or other navigational aids in the exercise of that function” is not clear, as it could be interpreted as embracing only \textit{ejusdem generis} navigational aids (i.e. buoys and lighthouses), or it could be interpreted as involving any navigational aid. This difference is very important, as it could mean that the flag State could be held liable for failure to ensure adequate maintenance of a navigational aid carried by a ship flying its flag.

The travaux preparatoires of the Fund Convention 1971 seem to suggest that the meaning assigned to “navigational aids” is external to the operation of the ship.\textsuperscript{329} Most statements during this Fund Convention drafting session, referred to the government that is responsible for the maintenance of navigational aids, and this implies that they are not onboard the ship, because the maintenance of onboard devices is the responsibility of the shipowner.\textsuperscript{330}

However a controversial Swedish case called the \textit{Tsesis} suggests otherwise. The case regarded a ship’s grounding that led to oil pollution. The grounding was attributable to a failure of Sweden to update the charting of the area in which the accident took place.\textsuperscript{331} The court in this case examined whether charts should be considered a navigational aid, the maintenance of which lies with the State. The Swedish Supreme Court held that the exception of CLC Article III 2.c was applicable, as according to the Court, such maintenance included hydrographical surveying for the purpose of producing new charts. This aspect of the judgment was highly debated, as 3 judges dissented on the character of charts as a “navigational aid”.\textsuperscript{332} Besides what is a “navigational aid”, the question turned on which navigational aids can be subject to “maintenance”, and whether charts were such. It has been suggested that if the fault alleged is a failure to establish or improve navigational aids, that is distinct from a failure to maintain them.\textsuperscript{333}

This controversy leaves two questions open to interpretation: what qualifies as a “navigational aid” under this provision and what qualifies as “maintenance”. In relation to STM the question would only arise if the information fed to the STM device is provided by a coastal authority, rather than being shared with other ships and


\textsuperscript{327} See the submission by Mr Massey (USA) on the travaux preparatoires of the 1971 FUND Convention, LEG/CONF.2/C.1/SR.7: [This provision] “had been taken verbatim from Article III, paragraph 3, of the 1969 Convention so as to ensure uniform interpretation.”


\textsuperscript{329} LEG/CONF.2/C.1/SR.7, 13 April 1973: See the submission by Mr Bentein (Belgium): “First, navigational aids and signalling lights were placed in position voluntarily.”, Mr Sjidiman (Indonesia) referred to “adequacy of navigational aids”, which is usually referring to external devices, such as buoys and beacons.

\textsuperscript{330} SOLAS Regulation V/16.1

\textsuperscript{331} This case has been repeatedly characterised as controversial, see Gotthard Gauci, \textit{Oil Pollution at Sea}, Wiley, 1997, Tiberg infra note 17, Dan Malika Gunasekera, \textit{Civil Liability for Bunker Oil Pollution Damage}, Lang, 2010, p 218

\textsuperscript{332} To avoid confusion the original term of the convention is used instead of “aid of navigation”, which is what was used in the case. This is the accurate translation in English, of the Swedish translation of \textit{navigational aids}, according to Hugo Tiberg. See Tiberg, \textit{Oil Pollution of the Sea and the Swedish “Tsesis” decision}, (1984) LMC LQ 218

stakeholders. If the information is provided by the coastal authorities, then failure to provide or update information may trigger the application of the exception as suggested in the *Tesis*. However, the exception will not be relevant when the STM system is obtaining/sharing information without governmental standardisation or transmittance.

The rest of the provisions in these conventions do not have any relevance to STM nor do they affect its implementation.

Consequently, despite the controversial provision that can be found in the CLC 1992 and the BOPC, these should be categorised as Low Risk Conventions, due to the fact that they could not have an impact on STM except where the STM information is provided by a coastal authority. The 1992 FUND Convention and its 2003 supplemental Fund Protocol pose no risks, and should also be categorised as Low Risk conventions.
1.1.4.2 HNS Convention

HNS Convention 2010 and STM

General context
This document is written in the framework of Activity 5, which is concerned with the compatibility of the STM concept and services with the current legal framework. This report is a part of a series of specific reports, the results of which will be summarised in Milestone 23 as a final formal deliverable.

Objective
The compatibility of the STM concept with the International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea (HNS Convention 2010) is the central point of this report.

Restrictions
The compatibility analysis is legal in nature. Any policy and perception issues are introduced but are not the central point of this report. This report is written before the STM concept has crystallised so modifications might be needed. This report is written before the STM concept has been fully implemented and it cannot be excluded that some issues might arise that the analysis below has not anticipated.

Analysis
The HNS Convention aims to ensure adequate compensation is available for damage occurring as a result of the maritime transport of hazardous and noxious substances (HNS), by establishing a regime for the liability and compensation for damage in connection with the carriage of HNS by sea. The legal research undertaken indicates that there is no conflict between the STM and this convention.

It has to be mentioned that the convention is not in force, as it needs 12 ratifications or accessions and so far only 8 states done so, but it is not unlikely that it will be, given the increasing effort of the IMO. However, the damage arising from the carriage of HNS is currently dealt with by national law, and in English law, for example, is based on tort, with the limitation of liability being dealt with under the 1996 LLMC. The Convention will supersede the EU Environmental Liability Directive (ELD) once in force, but meanwhile the Directive supplies the national law for EU Member States. Thus, the ELD takes full effect in incidents falling under the HNS Convention until it comes in force, provided that its requirements are fulfilled. It has to be noted

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335 IOPC Fund, The 2010 HNS Convention (brochure), September 2014, p 2.
336 Denmark, Canada, France, Germany, Greece, the Netherlands, Norway and Turkey.
337 IMO recently issued a brochure in collaboration with IOPC and ITOPF, “The HNS Convention, Why is it needed” in an attempt to persuade states to become party to the convention.
338 See Article 4 (2) and Annex IV of the Directive
that the Directive provides for an administrative action against environmental damage, departing from the civil law concept, which required private initiative. This could lead to the polluter being financially burdened under two separate legal grounds (Public and Private Law) for the same event, as the Directive does not preclude the exercise of more stringent national law.

The regime established by the 2010 HNS Convention is largely modelled on the existing regime for oil pollution from tankers set up under the International Convention on Civil Liability for Oil Pollution Damage, 1992 (CLC) and the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1992 (Fund Convention), which covers pollution damage caused by spills of persistent oil from tankers. Under the 2010 HNS Convention, a two-tier system for compensation is established. The shipowner is liable for the loss or damage up to a certain amount, which is covered by insurance (1st tier). A compensation fund (the HNS Fund) will provide additional compensation when the victims do not obtain full compensation from the shipowner or its insurer (2nd tier). The HNS Fund will be funded by those companies and other entities which receive HNS after sea transport in a Member State in excess of the thresholds laid down in the Convention.

As an overview, the HNS Convention covers cargoes of oils, noxious liquids, dangerous liquid substances, liquefied gases, residues from previous carriage in bulk, solid bulk materials that are chemically hazardous, liquid substances with a flashpoint below 60 degrees Celsius and packaged hazardous goods covered by the IMDG Code. The damage covered is similar to the CLC conventions, with the HNS being wider, by adding loss of life and personal injury on board and outside the ship (excluding passengers) and property damage outside the ship. The overlap of the oil pollution damage being covered by both the CLC and HNS, is avoided by HNS Article 4.3, which provides that oil pollution damage compensated under the CLC is excluded from the scope of the HNS Convention. As far as its spatial application is concerned, the HNS 2010 applies in the territory, the territorial sea and the EEZ of a contracting state.

The point of liability in this convention is the only part of the convention, which is relevant for examining the compliance of the STM. Article 7, after referring to the owner’s strict liability regime, which is a concept used in the CLC conventions, establishes the exceptions to the owner’s strict liability. Under 7.2.(c) it is provided that: “No liability shall attach to the owner if the owner proves that; (c) the damage was wholly caused by the negligence or other wrongful act of any Government or other authority responsible for the maintenance of lights and other navigational aids in the exercise of that function” . This article mirrors CLC Article III 2(c), and has been

340 Articles 11 and 12 1 (c) of the Directive
342 Article 16 of the Directive
344 See Annex I of Marpol 73/78.
345 HNS Article 3. “if a State Party has not established such a zone, in an area beyond and adjacent to the territorial sea of that State determined by that State in accordance with international law and extending not more than 200 nautical miles from the baselines from which the breadth of its territorial sea is measured.”
analysed on the joint report for CLC, FUND and BOPC Conventions, as well as in the article cited in the main body of the report.\textsuperscript{347}

The Convention then goes on to mention how liability is limited (Articles 9-10), lays out the compulsory insurance regime (Article 12), then deals with the establishment of the HNS Fund (Articles 13-36) and the claims procedure (Articles 37-41), followed by the transitional and final clauses (Articles 43-48) none of which will affect STM. As a conclusion, only the issue of the exclusion of liability is relevant which is analysed in the CLC, FUND and BOPC report, consequently this convention can be characterised as a Low Risk Convention.

\textsuperscript{347} See fn 2 in the main body of the report.
1.1.4.3 LLMC 1976

Convention on Limitation of Liability for Maritime Claims, 1976 (LLMC 1976) and STM

General context

This document is written in the framework of Activity 5, which is concerned with the compatibility of STM concept and services with the current legal framework. This report is a part of a series of specific reports, the results of which will be summarised in the Milestone 23 as a final formal deliverable.

Objective

The compatibility of the STM concept with the Convention on Limitation of Liability for Maritime Claims, 1976 (LLMC 1976) and its Protocol of 1996 is the central point of this report.

Restrictions

The compatibility analysis is legal in nature. Any policy and perception issues are introduced but are not the central point of this report. This report is written before the STM concept has crystallised so modifications might be needed. Any reference made to the common law regards issues extending beyond international maritime law, and English law is very widely used for this purpose. This report is written before the STM concept has been fully implemented and it cannot be excluded that some issues might arise that the analysis below has not anticipated.

Analysis

The object and purpose of the 1976 LLMC is to encourage the provision of international trade by way of sea carriage, by limiting the liabilities which might arise after an incident. The legal research concluded that the STM do not in general affect the application of the LLMC 1976 as amended. As a consequence, the use of STM would not in general affect the right of the shipowner and charterers to limit liability.

However the use of the STM services for navigational purposes and in particular the use of ship-to-ship route exchange, even if it is not in itself, when properly used,

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349 CMA CGM SA v Classica Shipping Co Ltd [2004] 1 Lloyd’s Rep 460, 464
illegal or negligent, may under certain circumstances lead in case of an accident to an argument for the removal of the shipowner’s or demise charterer’s right to limit liability.

In particular, Article 4, which provides for the conditions under which the right to limit liability can be removed, reads as follows:

A person liable shall not be entitled to limit his liability if it is proved that the loss resulted from his personal act or omission, committed with the intent to cause such loss, or recklessly and with knowledge that such loss would probably result.

The prerequisites for the application of Article 4 are the following:

a) The damage must arise because of wrongdoing of the person entitled to limit liability and not his servants’ or agents’ and either
   b1) the shipowner/salvor must be acting either intentionally, or
   b2) the shipowner/salvor must be acting recklessly and at the time he acts recklessly he must be aware of:
      the kind of damage that would probably be caused by his action and that such damage is not a mere possibility but a realistic and probable outcome of his actions.

a) As regards the first prerequisite, there is no general guide as to what constitutes the alter ego of the shipowner, and this needs to be resolved on a case-by-case basis depending on the structure of each company and on the distribution of responsibilities within each company.

Acts of a member of the board of directors would normally be attributed to the company, however there could be circumstances under which the director may not be representing the company. In the same vein, even where there is one person that has ultimate control of a company, this does not necessarily mean that only this person’s acts would count as acts of the company.

The Privy Council decision in Meridian Global Funds Management Asia Ltd. v. Securities Commission confirms the general position that the primary rules of attribution found in the company’s constitution and implied by company law together with the secondary rules of attribution, would determine which acts of natural

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350 See Mustill LJ’s judgment in the Court of Appeal decision Societe Anonyme des Minerais v. Grant Trading Inc. (The Ert Stefanie) [1989] 1 Lloyd’s Rer 349.
351 ibid.
353 The rules of agency, vicarious liability etc.
persons were to be attributed to the company. However, in exceptional cases, even where the particular person cannot be properly described as the ‘directing mind and will’ of the company, it may be necessary to devise special rules of attribution, where the acts of a duly authorised agent or servant of the company will represent the company. Such exceptional cases are distinguishable by reference to the legal substantive provisions imposing obligations on the company. This leads to the conclusion that the relevant person may be any person statutorily required to act for the company, such as the Chief Security Officer (CSO) under the ISPS Code.

In the absence of these exceptional circumstances there is still a need of search for the “directing mind and will of the company”.\(^\text{354}\) Thus, a master without any other involvement in the running of the company would not be the directing mind of the company. Similarly the fault of a marine superintendent cannot be considered as the fault of the company.\(^\text{355}\) Also the acts of the Chief Navigator and his staff, in a large state-owned shipping company, are not the acts of the company,\(^\text{356}\) while the acts of his superior, the director of technical and investment affairs would have, in that particular case, represented the company. Fault may also be found in the way the constitution of the company attributes duties. However, such fault would arguably be relevant only where the company directors are in fact aware of the fault and they do not perform the necessary duties.\(^\text{357}\) From the practical point of view the above would mean that, provided that appropriate procedures are established by the company’s management and constitution, faults by officers operating or supervising the operation of the vessel would not normally be considered as faults by the company.

b) The generally accepted strictness of the test which only slightly lowers the requirement from one of an intentional act has led to the statement that, as for as collisions are concerned, Article 4 cannot, in general, be satisfied and consequently the liability of the shipowner will in all but the most exceptional cases be limited\(^\text{358}\) and a limitation decree would be available to the shipowner.

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354 Lennard’s Carrying Co Ltd v Asiatic Petroleum Co Ltd [1915] AC 705.
357 See for example The Garden City [1982] 2 Lloyd’s Rep 382 at p 389.
The right to limit liability was removed in *The Atlantik Confidence*\(^\text{359}\) where the cargo claimant successfully proved that the test under Article 4 of the 1976 LLMC, as amended, was satisfied. The court applied the same approach that is followed to determine the liability for scuttling of a vessel on the balance of probabilities with a criminal standard of proof. The link of the shipowner with the scuttling was based on the absence of any allegation that the master and the chief engineer acted for their own reasons, a number of navigational and other actions taken and the use of the insurance money for paying off debts of other companies in the same group. The shipowner was the one to benefit from the scuttling. Thus, in this case, there was a deliberate act or omission with knowledge of the probable damage, but the act was by itself inadequate to cause the intentional damage. The interpretation of Article 4 in *The Atlantik Confidence* indicates that it is the intention and the recklessness of the shipowner (with knowledge) that lead to the loss of right to limit and not the actual causation of the loss by such actions.

As a conclusion, it is very hard to prove that an act is conducted by the shipowner himself or of his *alter ego*, and even if this is successful,\(^\text{360}\) it would have to be proven that either he acted intentionally or recklessly while being aware the kind of damage that his action could probably cause and that such damage is a realistic outcome of his actions.\(^\text{361}\) Consequently, if a collision takes place because of the STM being installed on board, or because the crew was untrained in the use of STM, it is very unlikely, if not impossible, that this will affect the right to limit, as the standard of proof is very high.

Article 4 cannot generally be satisfied in collisions and consequently the liability of the shipowner will be limited in almost all cases. The argument that can be put forward in relation to the use of STM in navigation, and in particular in relation to ship-to-ship route exchange, arises from the view expressed on behalf of shipowners that such an exchange poses risks to navigation. While posing a risk is not necessarily a “*reckless act with knowledge that such damage would probably result*”, it certainly permits, in case of accident, an argument that a shipowner who adopted a system characterised


\(^{361}\) On this point a Canadian Supreme Court case allowed a fisherman to limit his liability, due to the fact that he did not intend to cause the specific loss (i.e. cutting a cable). *Telus Communications v Peracomo Inc and Réal Vallée* [2011] FC 494, *Peracomo Inc. v. Société Telus Communications Co.*, 2014 SCC 29
by their own umbrella organisation as posing a risk has acted recklessly. It will then be an issue of demonstrating that the damage that occurred was within the knowledge of the shipowner at the time he permitted the use of STM in navigation. This argument is not however necessarily conclusive for the right to limit liability, because it would not cover failures of the system or negligence of the crew but would have to be shown as a failure of the specific highlighted feature. In other words, the view under discussion will need to be documented and linked with the facts of the specific accident and the damages caused. Of course, acceptance by national administrations and/or classification societies of the relevant services and the ship-to-ship route exchange for navigational purposes, with respect to the way they are displayed on the bridge and the training received by the officers and crew, will effectively remove this risk, which exists only to the extent that the use of the STM services is voluntary and untested.

The rest of the provisions of the LLMC, including the limits of the liability in Chapter II, the limitation fund in Chapter III, the scope of application in Chapter IV and the final clauses in Chapter V, are not relevant for the purposes of STM, as they are not affected by its operation, nor do they have any effect on STM specifically.
As a conclusion STM does not in general affect the right of the shipowner or the demise charterer to limit liability. There is room for an argument that a shipowner might not be able to limit his liability, based on the characterisation of ship-to-ship route exchange as posing potential risks to navigation. However, this is just a potential argument, which is not conclusive, as it also dependent on the views of national administrations or classification societies on the matter. In such a case other charterers and managers are protected, as they are not involved with the navigational aspect of the ship.
1.1.4.4 1910 Collision Convention

1910 International Convention for the Unification of Certain Rules of Law Related to Collision between Vessels and Protocol of Signature and STM

General context
This document is written in the framework of Activity 5, which is concerned with the compatibility of the STM concept and services with the current legal framework. This report is a part of a series of specific reports whose results will be summarised in Milestone 23 as a final formal deliverable.

Objective
The compatibility of the STM concept with the 1910 International Convention for the Unification of Certain Rules of Law Related to Collision between Vessels and Protocol of Signature is the central point of this report.

Restrictions
The compatibility analysis is legal in nature. Any policy and perception issues are introduced but are not the central point of this report. This report is written before the STM concept has crystallised so modifications might be needed. This report is written before the STM concept has been fully implemented and it cannot be excluded that some issues might arise that the analysis below has not anticipated.

Analysis
The 1910 Convention harmonised the international rules for legal liability after a collision has taken place. Liability is proportioned according to the degree of culpability and causative potency. The research undertaken indicates that the 1910 Collision Convention does not pose any impediment to the implementation of STM. However, the 1910 Convention will be applicable as the method under which liability will be determined by the courts of the State party to it, in case of a collision or any accident caused by the navigation of a ship, even if no collision actually occurs. This is because Art. 13 extends the effect of the 1910 Convention to “the making good of damages which a vessel has caused to another vessel, or to goods or persons on board either vessel, either by the execution or non-execution of a manoeuvre or by the non-observance of the regulations, even if no collision had actually taken place.”

These rules apply regardless of the waters that the collision took place (Article 1) and provide for the obligation to make good the damage that was caused by a fault of one vessel to another (Article 3). However, if the collision is accidental, or caused by force...
*majeure*, or if the cause of the collision is left in doubt, the damages are borne by those who have suffered them (Article 2). As a conclusion, the 1910 Collision Convention does not pose any impediments to the implementation of the STM and should be characterised as a Low Risk Convention.
1.1.4.5 Athens Convention

Athens Convention relating to the Carriage of Passengers and their Luggage by Sea and STM

General context
This document is written in the framework of Activity 5, which is concerned with the compatibility of the STM concept and services with the current legal framework. This report is a part of a series of specific reports whose results will be summarised in Milestone 23 as a final formal deliverable.

Objective
The compatibility of the STM concept with the Athens Convention relating to the Carriage of Passengers and their Luggage by Sea[^365] is the central point of this report.

Restrictions
The compatibility analysis is legal in nature. Any policy and perception issues are introduced but are not the central point of this report. This report is written before the STM concept has crystallised, so modifications might be needed. This report is written before the STM concept has been fully implemented and it cannot be excluded that some issues might arise that the analysis below has not anticipated.

Analysis
The Athens Convention is a set of rules relating to the carriage of passengers and their luggage by Sea. It serves two purposes. First, it stops carriers from inserting exclusion and limitation of liability clauses in their standard contractual terms for carriage. Second, it provides for minimum liability standards to be available to claimants. The damages covered are restricted to loss of life, personal injury and loss or damage to cars and luggage.

The original 1974 Athens Convention provides for fault-based liability for both the contractual and the performing carrier[^366]. However, the fault of the carrier was presumed for loss of life and personal injury arising from shipping incidents. The carrier could, however, avoid liability by demonstrating that neither it nor its servants had been negligent. The 1974 Athens Convention was particularly weak, because the liability for the carrier was limited to 46,666 Standard Drawing Rights per passenger for loss of life or personal injury. This corresponds to 56826 Euros[^367].

The 2002 Protocol to the Athens Convention considerably increases the ship’s limits of liability for loss of life and personal injury to 400,000 SDR per passenger, of which, 250,000 SDR is subject to strict liability for shipping incidents, in other words, are available to the claimant without the need to prove fault of any carrier or its servants. It also increases the limits of liability for loss of or damage to luggage. In addition it

[^366]: Art.3 and Art. 1(1).
[^367]: According to SDR/Euro rate on the 3rd December2018
provides for the compulsory insurance of the carrier and direct action rights against the insurer. The 2002 Athens Convention is part of the EU legal order and is implemented as Regulation (EC) No 392/2009 of the European Parliament and of the Council of 23 April 2009 on the liability of carriers of passengers by sea in the event of accidents. The Athens Regulation covers all international voyages calling into an EU port and, in addition, is extended to cover internal, to a Member State, voyages for all ships of certain Classes under Article 4 of Directive 98/18/EC. The flag of the ship does not affect the application of the Athens Regulation.

**STM malfunction as a potential “shipping incident”**

Three aspects of the Athens Regulation may be related to the STM usage.

1) The first issue relates to the characterisation of an accident contributed to by an STM malfunction of any kind, including misuse by the crew. In this respect it must be noted that the strict liability of the Regulation applies to “shipping incidents” which are defined as: “shipwreck, capsizing, collision or stranding of the ship, explosion or fire in the ship or defect in the ship”\(^{369}\). To the extent that the STM failure leads to one of these incidents the liability of the carrier will be strict.\(^{370}\)

2) The second aspect where the STM may be relevant to the operation of the Athens Regulation concerns the exception of liability for damages “wholly caused” by intentional actions of third parties under Art. 3(1)(b). Hacking or misleading information intentionally provided by a third party and leading to the loss of life or the personal injury of passengers may not fall within for the liability of the carrier. This is an issue that has created significant worries to the insurers as well and has been modified from the original version of the Convention, in the Athens Regulation through the IMO guidelines in order to reduce the exposure of the insurers. In particular, in the 2003 Institute Cyber Attack Exclusion Clause (Cl. 380) was created, in order to exclude from insurance cover losses caused directly or indirectly or contributed to by cyber-attacks. In response to these exclusions, and the problem they created, as carriers were unable to obtain the Certificate of Financial Security (CFS), the IMO issued a Resolution advising States to ratify the Athens protocol with a reservation that they reserve the right to issue and accept certificates with such exceptions.\(^{371}\) IMO’s Legal Committee later issued Guidelines for the implementation of the Athens Convention, which were annexed in the Athens Regulation.\(^{372}\) Thus, after these reservations, policies could exclude cyber-attacks from their cover, and this would not affect the ability of the carriers to obtain the CFS.

To summarise the legal position concerning cyber-attacks, in principle, if a cyber-attack results in a shipping incident, which is possible since there is no restriction on the cause of an accident, the shipowner can be held strictly liable. However, it is very likely that he will fall under the exception of Article 3.1.b, as if an accident is wholly

\(^{368}\) Art. 2 of the Athens Regulation. The Classes under Directive 98/18/EC are A and B.

\(^{369}\) Athens Convention Art 3.5.a

\(^{370}\) Athens Convention Art 3.2

\(^{371}\) IMO Resolution A.988 (24), 9 February 2006.

\(^{372}\) IMO Circular Letter No 2758, 20 November 2006, also annexed in Annex II of Regulation (EC) 392/2009
caused by an intentional act by a third party, the carrier is not liable. It is also possible to be exempted from liability if the cyber-attack is part of warfare (Article 3.1.a). Moving on from strict liability, the fault-based rule could apply (Article 3.2), as the carrier might be held to be negligent, if he failed to protect the ship sufficiently against cyber-attacks. Arguably the satisfaction of the requirements under the ISPS Code, which are the minimum standards of due diligence for the carrier, should be sufficient to prove that the carrier has performed his duty to protect the ship. However, it is possible that the responsible party under the ISPS might not be the carrier under the Athens Regulation, which means that each incident must be assessed individually.

3) The third aspect of potential interaction of the STM with the Athens Regulation concerns the complete removal of limitation rights if the usage of the STM system is the cause of the damage and it is inherently unsafe making it possible to argue that the carrier intended to cause such an accident by the installation and usage of the STM or that the installation of STM and its usage was reckless and with knowledge that the particular damage would take place. To the extent that the STM is to be used in conjunction with other navigational information and there is training and manuals onboard explaining the risks of overreliance on the system, this third aspect is rather unlikely to be an issue. Article 13 states that the carrier shall not be entitled to the benefit of the limits of liability if it is proved that the loss resulted from the personal act or omission of the carrier, committed with the intent to cause such loss, or recklessly and with knowledge that such loss would probably result. This is relevant to STM, in the event that an owner sends an STM vessel on a voyage with a crew untrained in the use of STM.

This issue has been analysed in the LLMC report and there is no reason to reiterate it here. In brief, the circumstances under which the right to limit is not granted are very limited, and an occurrence of the type classified above would very unlikely affect the right to limit liability.

**Conclusion**

The 2002 Athens Convention as enacted in the EU, but also in its original form, does not forbid the operation of STM in any way. The liability of the carrier will remain unaltered and any additional risks are only related to the potential of cyber-attacks that can lead to damages covered by the Regulation. Due to the fact that cyber-attacks targeting STM could create liabilities, and an adequate cyber-security plan is required in order to prove due diligence, the Athens Convention should be characterised as a Medium Risk Convention.
1.1.4.6 NUCLEAR

Convention relating to Civil Liability in the Field of Maritime Carriage of Nuclear Material 1971 (NUCLEAR 1971) and STM

General context
This document is written in the framework of Activity 5, which is concerned with the compatibility of the STM concept and services with the current legal framework. This report is a part of a series of specific reports, the results of which will be summarised in Milestone 23 as a final formal deliverable.

Objective
The compatibility of the STM concept with the Convention Relating to Civil Liability in the Field of Maritime Carriage of Nuclear Material (NUCLEAR 1971),\textsuperscript{373} is the central point of this report.

Restrictions
The compatibility analysis is legal in nature. Any policy and perception issues are introduced but are not the central point of this report. This report is written before the STM concept has crystallised so modifications might be needed. This report is written before the STM concept has been fully implemented and it cannot be excluded that some issues might arise that the analysis below has not anticipated.

Analysis
The protection of the marine environment is one of the two major international aims in shipping policy along with the safety of navigation. The protection of the environment is ensured not only by preventative measures, but also by establishing a liability regime to apportion liability in case pollution takes place. NUCLEAR 1971 intends to ensure that the operator of a nuclear installation will be exclusively liable for damage caused by a nuclear incident occurring during maritime carriage of nuclear material.\textsuperscript{374} The operator of a nuclear installation is defined in the Vienna Convention on Civil Liability for Nuclear damage\textsuperscript{375} as the person designated or recognized by the Installation State as the operator of that installation.\textsuperscript{376} The Installation State, in relation to a nuclear installation, means the Contracting Party within whose territory that installation is situated or, if it is not situated within the territory of any State, the

\textsuperscript{373} Convention Relating to Civil Liability in the Field of Maritime Carriage of Nuclear Material (adopted 17 December 1971, entered into force: 15 July 1975), 974 UNTS. 177
\textsuperscript{374} Last sentence of the Preamble of NUCLEAR 1971
\textsuperscript{375} The Vienna Convention of 21 May 1963 on Civil Liability for Nuclear Damage (Adopted on 21 May 1963, entered into force 12 November 1977) 266 UNTS 1977
\textsuperscript{376} The Vienna Convention Article 1(c)
Contracting Party by which or under the authority of which the nuclear installation is operated.\textsuperscript{377}

The research undertaken indicates that the NUCLEAR 1971 does not pose any legal impediments to the implementation of the STM. The scope and the objectives of the convention as well as its provisions are not in contradiction with the STM.

In the first two articles, the Convention addresses the potential overlap with the existing framework on liability from nuclear activities, by exonerating the carrier if there is a liable operator of nuclear installations under the Paris or Vienna conventions\textsuperscript{378}. Article 3 mentions that besides the general target to exonerate the carrier, such intention does not cover damage caused by a nuclear incident involving the nuclear fuel or waste produced on board the ship.\textsuperscript{379} Articles 4-12 concern the formalities of the Convention and are not thus relevant to STM.

As a conclusion, NUCLEAR 1971 due to its scope and its objectives, has a very limited overlap with STM, and poses no impediment to it. Thus, it should be categorised as a Low Risk Convention.

\textsuperscript{377} The Vienna Convention Article 1(d)
\textsuperscript{378} The Paris Convention on Third Party Liability in the Field of Nuclear Energy and its Additional Protocol of 28 January 1964 (Adopted on 29 July 1960, entered into force 1 April 1968) 956 UNTS 251
\textsuperscript{379} NUCLEAR 1971 Article 3
1.1.4.7 Nairobi Wreck Removal Convention
2007 Nairobi International Convention on the Removal of Wrecks and STM

General context
This document is written in the framework of Activity 5, which is concerned with the compatibility of the STM concept and services with the current legal framework. This report is a part of a series of specific reports, the results of which will be summarised in Milestone 23 as a final formal deliverable.

Objective
The compatibility of the STM concept with the 2007 Nairobi International Convention on the Removal of Wrecks, is the central point of this report.

Restrictions
The compatibility analysis is legal in nature. Any policy and perception issues are introduced but are not the central point of this report. This report is written before the STM concept has crystallised so modifications might be needed. This report is written before the STM concept has been fully implemented and it cannot be excluded that some issues might arise that the analysis below has not anticipated.

Analysis
The protection of the marine environment is one of the two major international aims in shipping policy along with the safety of navigation. There is a duty on every State to ensure that ships flagged or registered with operate within international standards and that the marine environment is protected.

The research undertaken indicates that the 2007 Nairobi International Convention on the Removal of Wrecks does not pose any legal impediments to the implementation of the STM. The scope, the objectives of the convention as well as its provisions are not in contradiction with the STM.

In particular, the 2007 Nairobi International Convention on the Removal of Wrecks applies only to wrecks in the Exclusive Economic Zone (EEZ) of a State Party (Articles 1.1 and 3.1), however a State Party may extend its application within its territory, including the territorial sea, subject to certain restrictions. This Convention does not

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381 The restrictions are: a) The requirement for notification to of the Secretary-General, b) The limitations of 4.4
apply to measures in relation to the Intervention Convention\textsuperscript{382} and its Protocol\textsuperscript{383}, and the owner is not liable for the costs of the wreck removal if and to the extent that such liability would conflict the CLC Convention\textsuperscript{384}, The HNS Convention\textsuperscript{385}, The Nuclear Conventions\textsuperscript{386} and the BOPOC\textsuperscript{387}.

STM could have an interesting overlap with Article 5, which requires the reporting of wrecks. This article imposes the obligation on a State Party to require from the master and the operator of a ship flying its flag to report to the Affected State without delay when that ship has been involved in a maritime casualty resulting in a wreck. This obligation could be observed better if STM developed a post-accident function, which would not only notify the STM users that such vessel has been involved in an accident, but also provide in a standardised and automated way, all the necessary information required by paragraph 2. Such information is the precise location of the wreck, its type, size and construction, the nature of the damage and its condition, cargo-related information and the information regarding the oil onboard. This obligation does not create any problems to STM, as it is an obligation on the State Parties, and not directly on the shipowners, and from a legal point of view, there is no issue of compliance.

Furthermore, Route Cross-Check can exclude from the ship’s route an area, where a wreck constitutes a hazard, even before such wreck is marked by the affected State\textsuperscript{388} in accordance with Article 8. After the marking, when this area is a no-go area, the relevant feature is Route Optimisation, as Area Management deals with temporary exclusions.

Finally, Article 10 excludes the owner’s liability for the costs of locating marking and removing the wreck, if the casualty leading to the wreck was wholly caused by the

\textsuperscript{382} 1969 International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties (adopted on 29 November 1969, entered into force 6 May 1975) 970 UNTS 211
\textsuperscript{383} Protocol relating to Intervention on the High Seas in Cases of pollution by substances other than oil, 1973 (adopted on 2 November 1973, entered into force 30 March 1983) 1313 UNTS 4
\textsuperscript{388} This is according to Article 1.10 the State in whose EEZ the wreck is located.
negligence or other wrongful act of any Government or other authority responsible for the maintenance of lights or other navigational aids in the exercise of that function. The interpretation of this exclusion is analysed in the joint report for CLC, BOPC and FUND Conventions, as this provision copies verbatim article III(2)(c) of the CLC Convention.

As a conclusion, the Nairobi Wreck Removal Convention, due to its scope and its objectives, has a very limited overlap with STM, and poses no impediment to it. Thus, it should be categorised as a Low Risk Convention.
2.2.1 The commercial background of shipping
by Filippo Lorenzon and Mikis Tsimplis

Introduction
The commercial and legal arrangements of international trade are in the background of any shipping scenario. In fact ships and shipping how we know it would not exist if not for making performance of sale contracts possible. The link between shipping and trade is so close that it is in fact almost invariably the case that any problem, accident or delay arising in relation to the ship and its voyage will have a knock-on effect on the underlying sale transaction. In order to understand fully the consequences of any given shipping scenario, it is crucial to understand the sale contract behind it.

The types of international sale contracts requiring sea carriage
Contracts for the international sale of goods may be divided into three main groups depending on the mode and place of delivery of the consignment sold: E terms (or ex works contracts), D terms (destination/arrival or delivered contracts) and shipment terms. Broadly speaking, the delivery of the goods is made at the seller’s premises in E terms, at the buyer’s premises in D terms and generally on board a vessel at the loading port in shipment terms.

The two most common types of sale arrangements on shipment terms are the so-called c.i.f. and f.o.b. contracts. First of all, it must be made clear that both c.i.f. and f.o.b. sales are shipment contracts where the duty of the seller as to the delivery of the cargo is fulfilled by shipping goods on board a vessel (or procuring goods shipped on board a vessel) rather than by handing them over to the buyer at the port of discharge. But whereas the duty to procure the cargo always rests with the seller, the duty to fix a vessel suitable to carry the cargo from the port of loading to the port of discharge does not always follow. Generally speaking, in c.i.f. (or c.&f.) agreements it is the seller who is under the obligation to fix the vessel whereas in bare (or straight) f.o.b. sales such duty falls on the buyer. Particular care, however, should be taken with regard to f.o.b. contracts where – in practice – such default position is often amended by way of contractual variations the most common of which is often referred to as “f.o.b. of the classic type”. In its “classic” form the f.o.b. contract provides for the seller to conclude a contract of carriage as an agent for the buyer, at all material stages the original party to the contract of carriage with the carrier; the commodity will be still invoiced by the seller at f.o.b. rate but a commission for the fixture is usually added as a separate item. Another common alternative may be referred to as “f.o.b. with additional carriage services” where the seller fixes the contract of carriage with the carrier in his own name and then transfers its contractual position by endorsing the bill of lading. In this case again the commodity is invoiced at f.o.b. rate and freight and commission are charged separately or specifically itemised. Distinguishing between c.i.f. sales and the various sub-types of f.o.b. terms is crucial for the apportionment of the risk in the goods shipped.
Risks in transit and STM

The parties to every sale contract have an interest in the quality and condition of the goods they trade in but – when the sale at stake is an international one – there is a further cause for concern: to reach their buyers the goods sold have to be carried across international, political and geographical boundaries. Although designed for the purpose of efficiency, sea traffic management may also be a source of commercial losses (e.g. a vessel ordered to delay its arrival for a long time outside port with some perishable cargo on board). Furthermore, a distinction may be made between losses which would arise from a well-functioning STM, and losses which would result from its malfunction.

What happens if the goods are damaged or lost in transit? Although both the carrier (or its liability insurer) and the cargo insurer will provide compensation for transit losses, the identity of the party which will have suffered the loss depends on the answer to a rather different question: who bears the risk of loss of or damage to the goods while in transit? According to the maxim *res perit domino* only the owner of the cargo can suffer an actual loss as a result of its cargo being lost or damaged. However, when goods are sold on shipment terms the situation is more elaborate and risk and property are very seldom transferred at the same time. It follows that it has to be examined how the specific risk allocation models of international trade would operate in an STM scenario.

Given the key importance of risk in international trade transactions it may happen that the parties expressly clarify the allocation of transit risks in their contracts with ad hoc clauses saying e.g. that “risk . . . shall pass to Buyers at the loading port or terminal as the oil passes the loading vessel’s permanent hose connection”. In such cases, it is clear that risk of transit loss will pass to the buyer at that very precise moment in time. On the other hand, if the parties have not given special consideration to the issue of risk, risk will pass according to the type of contract stipulated by the parties.

In ex works contracts the duty of the seller is to place the goods at the disposal of the buyer before shipping at the agreed point. It thus bears all risks of loss of or damage to the goods from the time they have been so delivered. On the other hand, in contracts concluded on D terms the seller undertakes to arrange the carriage of the goods to the agreed point and the buyer has to take delivery only if the goods it receives at destination are as agreed in the contract. An example of the related questions: What happens if delivery at the agreed destination is not possible or particularly inconvenient due to STM instructions?

There are additional considerations that need to be taken into account.

**Date of shipment**

Credit is provided to buyers under specific terms and they in turn undertake to pay sellers through banks under documentary credits involving, amongst other things, specific shipment dates for shipment. The date of shipment in turn is documented by a statement in the bill of lading, normally issued, after the completion of loading. While STM can be considered as ensuring that shipment takes place within the agreed
period by ensuring just in time arrivals and suitable port operations it is also clear that, especially against a volatile market, the parties to such arrangements may be particularly vulnerable to delays related to STM in the operational voyage aspect or the port operations part. Thus, an efficient and attractive STM should take into account such arrangements. However such considerations are normally considered confidential and would not be disclosed to third parties easily.

**The voyage approach**

The STM validation project has adopted the voyage approach to improving efficiency. What is ignored by such approach is the need for the shipowner, demise-charterer or charterer (for time-charterparties) to ensure continuing employment of the ship. Charterparties normally have a specific time period for presenting the ship to the charterers in the appropriate place and condition as described in the contract. STM arrangements should take into consideration such needs if they are to become attractive to the entity carrying the risk of delays and the loss of the future contract. This is not a matter that can be dealt with in an STM context that is solely based on the voyage approach. Nor can it be dealt with by modification of the voyage charterparty related to the voyage concerned. It will require a much broader agreement with future charterers and sellers—whose interests will be significantly changing according to the market and the availability of cheaper options for carriage or higher prices for the sale of the goods.

Both the above problems are primarily related to tramp trade while the STM project looks more suitable for liner trade.

**The need for documents**

Shipping goods as agreed in the sale contract only fulfils part of the seller’s duties, in order to get paid for its goods the seller will also have to tender to the buyer the documents it has promised. The question arises what consequences would follow if the seller cannot tender a so-called ‘clean bill of lading’ due to STM instructions, even though they have performed their physical duties of delivering the goods but late, or in worsened condition, or on a different ship. The banks’ duties to make or to refuse payment under letters of credit in such situations is a closely related concern.
2.2.2 GENCON 1994

Analysis of Gencon 1994

Technological advances and innovations are always welcomed with enthusiasm and excitement, and the average person always thinks of the potential benefits, as well as how things could change through their introduction. When the technology in question is a coffee maker, or a new TV, perhaps it is that simple. However, when innovations like the STM are introduced, that deal with shipping then the question is more complicated, as its operation affect a multibillion industry and the underlying commercial relationships. STM can interfere with the traditional voyage in a number of ways, by using features like Voyage Management and Port CDM as well as with the introduction of slow steaming.

The operation of STM, through its features and the actions of its users, will affect many aspects of shipping, one of which are charterparties. GENCON 1994 is a standard form voyage charterparty, which is divided in two parts. The first part, which is filled in by the parties, and includes the basic information of the contractual voyage, like the name of the vessel, the contractual route, expected readiness to load etc; and the second part, which contains the clauses that impose the obligations to the parties. This paper focuses on the second part of GENCON, which is composed by 19 clauses that set out the contractual requirements on the major issues that could arise on a voyage charterparty. The paper will examine the main obligations arising from express clauses, as well as the implied ones that overlap with them, and will conclude with the common law obligations.

The question of seaworthiness

Clause 2 of GENCON lays out the Owners’ Responsibility clause, which, as the title indicates, lays out the events for which the shipowner is liable for. Essentially it is a clause stipulating the obligation of the shipowner to provide a seaworthy vessel. Clause 2 is as follows:

*The Owners are to be responsible for loss of or damage to the goods or for delay in delivery of the goods only in case the loss, damage or delay has been caused by personal want of due diligence on the part of the Owners or their Manager to make the Vessel in all respects seaworthy and to secure that she is properly manned, equipped and supplied, or by the personal act or default of the Owners or their Manager.*

*And the Owners are not responsible for loss, damage or delay arising from any other cause whatsoever, even from the neglect or default of the Master or crew or some other person employed by the Owners on board or ashore for whose acts they would, but for this Clause, be responsible, or from unseaworthiness of the Vessel on loading or commencement of the voyage or at any time whatsoever.*

In order to evaluate the effect STM could have on this clause there are 2 issues to be dealt with: First, we have to examine the exact nature of the obligation to provide a seaworthy vessel and then to see how STM can interfere with the seaworthiness of the vessel. Seaworthiness is an implied duty, which can be modified by the insertion of an express clause, and this is the case with the GENCON charterparty.

Seaworthiness is an implied common law obligation to provide a vessel which is reasonably fit to withstand the foreseeable voyage perils and to keep the cargo reasonably safe from them. That obligation is absolute, and without clause 2, it

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389 The Kriti Rex [1996]2 Lloyds Rep 171, 184
would not merely be a due diligence obligation, with the nature of the obligation being important mainly for the application of the exclusion clauses. 390 Seaworthiness has many aspects, which need not to be analysed for the purposes of the STM, and extends to the structure and the hull 391 and the cleanliness of the holds. 392 What needs to be analysed though, for the purposes of STM, is equipment and manning.

The fitness of equipment is also an aspect of seaworthiness which is relevant to the STM. In **The Marion** 393 it was held that ‘It is the duty of the owners to provide a ship with those navigational aids which are appropriate for the voyage on which she is engaged’ 394. In the **Aconcagua** 395 it was held that ‘A vessel may be unseaworthy if there is no system in operation to deal with the ordinary incidents of a voyage including the need for the cargo to be stowed in a way that does not endanger the ship’ 396. The reference of this passages refers on the former case to the existence of updated charts and radar equipment, while on the latter of a stowage system which does not endanger the vessel. ‘The standard of seaworthiness is not condemned to inertia or rigidity, but changes with advancing knowledge, experience and the changed appliances of navigation’. 397 The question that is raised by the requirement of the fitness of equipment, is whether the fact that a vessel is carrying the STM platform, might render that vessel unseaworthy. This could be the case if STM is considered to be an unsafe technology, which is an attribute of the ship, as in **The Apostolis** it was mentioned that “For a ship to be unseaworthy [...] there must be some attribute of the ship itself which threatens the safety of the cargo”. 398 In order to establish that STM is an unsafe technology, it would have to be proven that the STM either on its own or in combination with other systems, results in rendering navigation unsafe. Reversing this process though, STM would have to make sure that the platform satisfies the requirements set by the IMO, and to address the concerns of key stakeholders, in order to secure a successful introduction.

The competence of the crew, could be crucial for the safety determination of the STM. It has been held that an otherwise perfectly qualified crew that lacked certain specific knowledge as to the characteristics of the ship or cargo, may render a vessel unseaworthy. In **The Star Sea** 399, the master was not aware of the proper method of using Carbon Dioxide, in order to extinguish fires, and this fact rendered the vessel unseaworthy. Similarly, in an older case, the master was oblivious of the special nature of the vessel 400, which made it unstable in certain states of handling homogenous cargo. The judge located the inefficiency of the master on his ignorance as to how the ship may behave in circumstances likely to be met during an ordinary voyage. 401 That requirement is relevant to STM, because a potential lack of awareness in relation to the operation and the features of the STM equipment, might render the vessel unseaworthy.

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390 Voyage Charters para 11.17
391 See for example **The Toledo** [1995] 1 Lloyds Rep 40
392 See **The Good Friend** [1984] 2 Lloyds Rep 586
393 [1982] 2 Lloyds Rep 52
394 [1982] 2 Lloyds Rep 52,58
396 **The Aconcagua** [2010] 1 Lloyd’s Rep. 1, 53
397 **The Portland Trader** [1963] 2 Lloyds Rep 278,282 citing **The Titania** (D.C) (19F) 101,106; **The Southwark** 191 US 1, 24 S Ct 1, 48 L Ed 65
399 [1997] 1 Lloyds Rep 360
400 See also **Burges v Wickham** (1863) 3 B. & S. 669
401 As per Lord Atkinson in **The Clan Gordon** [1924] AC 100
unseaworthy. This is why emphasis must be given to proper training and adequate certification on the STM platform, as besides the obvious reasons of navigational safety and increased situational awareness, liabilities from unseaworthiness might arise.

**Matters relating to deviation**

**GENCON 94** has a simple and brief clause on deviation:

_The Vessel has liberty to call at any port or ports in any order, for any purpose, to sail without pilots, to tow and/or assist Vessels in all situations, and also to deviate for the purpose of saving life and/or property._

A quite common amendment to the GENCON 94 clause, is the BIMCO Liberty and Deviation Clause for the contracts of carriage.

**BIMCO Liberty and Deviation Clause for Contracts of Carriage:**

(a) The Vessel shall have liberty to sail with or without pilots, to tow or go to the assistance of vessels in distress, to deviate for the purposes of saving life or property, and for any other reasonable purpose, which term shall include but not be limited to calling at any port or place for _bunkers_; taking on board _spares_, stores or _supplies_; _repairs_ to the vessel necessary for the safe continuation of the voyage; _crew changes_; _landing of stowaways_; _medical emergencies_ and _ballast water exchange_. (b) If the Charterer requests any deviation for the Charterer’s purposes and the Owners consent, such consent to be at the absolute discretion of the Owners, the Charterer shall indemnify the Owners against any and all claims whatsoever brought by the owners of the cargo and/or the holders of Bills of Lading against the Owners by reason of such deviation. (c) Prior to giving any such consent the Owners may, at their option, require to be satisfied amongst other things that the Charterer has sufficient and appropriate P&I Club cover and/or if necessary, other additional insurance cover, in respect of such a requested deviation, (d) This Clause shall be incorporated into any sub-charter and any bill of lading issued pursuant hereto.

There are a number of issues that could potentially arise with STM and deviation. One of its features, DVM (Dynamic Voyage Management) will be monitoring the movement of other vessels, and also suggest different routes in order to optimize the voyage, by utilising navigational data, provided by other users of STM that had previously passed through the same route. The question that arises automatically is whether such change in route amounts to deviation under GENCON’s clause. There is a series of authorities pointing to the conclusion that departure from the route for navigational reasons is permitted, and go as far as to support that even an unintentional setting of an entirely mistaken route is not deviation. For the sake of clarity, route optimisation is a valid navigational reason, as Lord Esher pointed out in the historic case of _Leduc v Ward_ that “the ordinary sea track of such a voyage according to a reasonable construction of that term.” In simpler terms, vessels can travel in

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402 *Reardon Smith v Black Sea Insurance* [1939] AC 562, 574 *Leduc v Ward* (1888) 20 QBD 475, 481; *Morrison v Shaw Savill* [1916] 2 KB 783, 797
404 (1888) 20 Q.B.D. 475
405 Ibid at 481
different ways for point A to point B, as Cooke suggests\textsuperscript{406}, and this could be due to various reasons, including but not limited to weather. The courts have gone even further to acknowledge bunkering\textsuperscript{407}, which is permitted expressly by BIMCO’s Clause, or loading/discharging cargo\textsuperscript{408}, if it is usual for the route in question.

Another question which could arise in the application of STM, is with relation to the operation of Voyage Planning. a) If VP creates a route that is not in compliance with the contractual route, in such an extent that it could amount to deviation, what are the consequences then? b) Would the shipowner be entitled to sue the charterer, upon indication on the system of the VP planned route, or should he wait for the actual route? c) In an alternative scenario, what if the charterer deviates, and the deviation is transmitted to the shipowner through the STM but would not be known otherwise?

There are two possible answers for the first question: The one that seems more correct, and in compliance with the current legal regime, which would suggest that the master is the one responsible to deal with the navigation vessel, and all navigational aids have a consultative role and not a decision-making one. Thus, if there was a route that could amount to deviation, the master should disregard it or the charterer would be held liable. The second answer, would entail a potential addition to the charterparty, so as to make the decisions of the STM through its features, final, as to the determination of the contractual route, with the owners thus waiving any potential right to claim deviation on that ground. Both scenarios though, refer to an occasion that a route suggested by STM would consist a deviation, which is very hard to occur, since it would be a navigational interference, which is not considered a deviation.

The answer to the second question would be negative, as deviation is a question of fact, not a question of intention. Thus, if the deviation never manifests, despite being suggested by the system, there would be no grounds to sue on deviation. Deviation is constituted by unjustifiable departure from the contract route, and that refers to the adopted route\textsuperscript{409}. It has to be pointed out once again, that the STM will be a navigational aid, so it is up to the master or the OOW to make the decision whether to adopt the suggestion of the STM or not. This part is important in this context as it affects any potential ground that the charterer may have had, to sue the STM for suggesting a deviating route.

The last question focuses mainly on the use of STM as a means of information. In the event that the shipowner could not have found out otherwise about the deviation, it would mean that there would be no delay or no damage incurred, otherwise he would have noticed either the delay, or a grounding. This leads us to the conclusion that even if the innocent party rescinds from the contract, it will be very difficult to prove any damage, as there would be no delay or physical damage to the vessel.

Finally, there is the question whether slow steaming could constitute deviation. Delay in the voyage could amount to deviation, if it is unreasonable, and it prolongs the voyage so much “as to substitute an entirely different voyage for that contemplated by the bill of lading”, as it was stated in the landmark case of \textit{Brandt v Liverpool}\textsuperscript{410}. A delay which is agreed between the parties is highly unlikely to qualify as an unreasonable one, let alone as one that entirely differentiates the contemplation by

\textsuperscript{406} Cooke, \textit{Voyage Charters}, 4\textsuperscript{th} Edition, Informa,2014 para 12.4
\textsuperscript{407} The Hill Harmony [2001] 1 AC 638; Reardon Smith v Black Sea Insurance [1939] AC 562
\textsuperscript{408} Frenkel v MacAndrews [1929] AC 545; Evans v Cunnard (1902) 18 TLR 374
\textsuperscript{410} [1924] 1 KB 575, at 661
the bill of lading, since, if a virtual arrival clause is implemented, the bill of lading requirements are amended accordingly. Of course, delay could have an impact on the common law obligation of due dispatch, but this will be dealt with after the contractual requirements are analysed.

The effect on Laytime and Demurrage and cancellation

The matters around laytime and demurrage are perhaps the spiciest ones, from a legal point of view, and the ones that come first to mind, when someone hears about STM. Clause 6 of GENCON deals with the regulation of laytime, providing in subclause (a) and (b) the option for a separate and a total laytime respectively.

Subclause (c) mentions at line 109 onwards: **If the loading/discharging berth is not available on the Vessel's arrival at or off the port of loading/discharging, the Vessel shall be entitled to give notice of readiness within ordinary office hours on arrival there, whether in free pratique or not, whether customs cleared or not. Laytime or time on demurrage shall then count as if she were in berth and in all respects ready for loading/ discharging provided that the Master warrants that she is in fact ready in all respects. Time used in moving from the place of waiting to the loading/ discharging berth shall not count as laytime.**

It is apparent to anyone, even remotely familiar with the shipping world, that a project that has as a main objective the constant communication of the stakeholders, in order to impose a regime of slow steaming, in cases where there are known and inevitable delays in the port of destination. Slow Steaming though, is not the only feature that could affect laytime issues, as the operation of Port CDM, is very likely to affect the operations in port, including, but not limited to, loading and unloading operations, so that port calling is optimized.

The all-important issue of the Notice of Readiness (NOR) is also going to be affected by the operation of STM. The validity of the NOR is perhaps the most crucial part in every demurrage case, as this is the point of time, at which the laytime begins to count. In a nutshell, the validity of the NOR depends upon the place it is given and the ability of the vessel to load or discharge the cargo. The STM will have an important effect on the first limb, which is the place that the notice is given. Constant communication and ship reporting is one of the main characteristics of the STM, and combined with Port CDM it could be argued that the determination of the exact position of the vessel in port, will be more accurate than ever. The readiness to load the cargo though, is dependent upon other factors, like a need for fumigation, lack of loading equipment, and is not relevant to STM. STM could have an effect on cases, where an invalid NOR can be held to be valid. Laytime can commerce under a voyage charterparty, requiring a valid NOR, when an invalid one is given which is : a) valid in form and is tendered prior to arrival and b) thereafter the vessel arrives ready to discharge and c) discharge thereafter commences without rejection regarding the notice of readiness. If these 3 occur concurrently, the charterers are deemed to have waived the invalidity. The STM could have an effect in the validity in form, as the STM platform could be used

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412 See The Tres Flores,[1974] QB 274

413 Glencore Grain Ltd v Flacker Shipping Ltd. (The Happy Day) [2002] 2 Lloyds Rep 487
for exchanging information like NORs, with increased accuracy and perhaps some ship data proving the vessel’s readiness to load/discharge.

BIMCO has developed a virtual arrival clause to provide a useful tool in specific circumstances where owners and charterers have agreed to implement a virtual arrival scheme.\textsuperscript{414} This clause can be a very useful tool for the STM, as the concept of virtual arrival will serve the purposes of the project and resolve most, if not all of the problems relating to laytime and demurrage.

**BIMCO Virtual Arrival Clause for Voyage Charter Parties**\textsuperscript{415}

(a) Notwithstanding any other clause in this Charter party entitling the Owners to slow steam, the Charterers shall be entitled to request the Owners in writing to instruct the Master to adjust the Vessel’s speed to meet a specified time of arrival at a particular destination, always subject to the Owners’ consent which shall not be unreasonably withheld and, in the case of an approach voyage, subject to agreeing an amended cancelling date. The Charterers shall not be entitled to request an adjustment of speed that exceeds the Vessel’s warranted speed. Any extra time used on a sea voyage as a direct consequence of the Vessel adjusting speed pursuant to the Charterers’ request shall be compensated by the Charterers to the Owners at a rate equal to ___ % of the demurrage rate (if left blank then fifty per cent (50%) shall apply). Such compensation shall be payable by the Charterers to the Owners prior to completion of final discharge. The extra time used shall be agreed by the parties, failing which an independent third party (an “Expert”) shall be appointed by mutual agreement. The Expert shall act as an expert and not as an arbitrator and his decision shall be final and binding upon the parties. The costs of such Expert shall be shared equally by the parties. In the absence of mutual agreement as to the identity of the Expert, each party shall appoint an independent Expert at their own expense to calculate the extra time; the average of the results of such calculations shall be binding.

(b) Such extra time shall be calculated on the basis of all relevant information including but not limited to weather data, wave and speed projections and other relevant technical or meteorological data.

(c) Where the Vessel proceeds at a reduced speed pursuant to Sub-clause (a), then provided that the Master has exercised due diligence to comply with such instructions, this shall constitute compliance with, and there shall be no breach of, any obligation requiring the Vessel to proceed with utmost and/or due despatch (or any other such similar/equivalent expression).

(d) The Charterers shall ensure that the terms of the bills of lading, waybills or other documents evidencing contracts of carriage issued by or on behalf of the Owners provide that compliance by Owners with this Clause does not constitute a breach of the contract of carriage. The Charterers shall indemnify the Owners against all consequences and liabilities that may arise from bills of lading, waybills or other documents evidencing contracts of carriage issued by or on behalf of the Owners with this Clause.

\textsuperscript{414} BIMCO’s explanatory notes to virtual arrival clause for voyage charterparties, available at: http://apps.bimco.org/Chartering/Clauses_and_Documents/Clauses/Virtual_Arrival_Clause_for_Voyage_Charter_Parties/Explanatory_notes.aspx

\textsuperscript{415} The virtual arrival clause can be found at: http://apps.bimco.org/Chartering/Clauses_and_Documents/Clauses/Virtual_Arrival_Clause_for_Voyage_Charter_Parties.aspx
documents evidencing contracts of carriage being issued as presented to the extent that the terms of such bills of lading, waybills or other documents evidencing contracts of carriage impose or result in the imposition of more onerous liabilities upon the Owners than those assumed by the Owners pursuant to this Clause.

This clause by BIMCO also addresses another potential issue that arises with the normal GENCON wording and slow steaming, which is the triggering of the cancellation clause. Under the GENCON form, if the vessel is not ready to load by the specified cancelling date, the charterers have the option to cancel. If the parties choose to include the Virtual Arrival Clause, which was cited above, then this issue is regulated. In its first paragraph it mentions that the owners are entitled to adjust the vessel’s speed in an approach voyage, as long as they agree with the charterers for an amended cancelling date.

As with cancellation, the Virtual Arrival Clause resolves any potential liability that could arise from an inconsistency of the bill of lading or of similar documents with the requirements of the clause. Consequently that innovative clause by BIMCO addresses some very important concerns that could arise from the use of STM. There are some however, that the adoption of this clause either does not address or resolve.

The concept of STM aims to establish a constant communication between the stakeholders, with multiple benefits in various circumstances. One of the key features is that, when the destination port will not be available for a certain period of time for some reason (ie. Congestion), the parties could then agree to slow steam. Something not addressed by the aforementioned clause, is what happens, if the event causing the delay stops occurring, making thus the port available, after concluding the slow steam agreement. Would then the charterer (or the owner in an approach voyage), be entitled to take advantage of the slow steam date, when they can proceed with a normal speed?

Another issue not addressed by the clause is the apportionment of the benefits. The key argument in support of slow steering, in general, is that it saves bunkers and money. Taking into account that the economic benefits from both the bunkers costs and the potential demurrage liability could be significant, it would be unfair not to apportion them to all the affiliated parties. Thus there should be a formula, similar to the one under sub-clause a of the Virtual Arrival Clause, in order to apportion the benefits between the charterers, the shipowners and the cargo interests. This task is more challenging that it seems, the following must take place: A calculation of potential bunkers and demurrage savings, considering as an arrival time the time that the vessel would have arrived and estimating also the bunkers that would have been consumed, while waiting in port. After ascertaining the amount of money to be distributed, then the complicated, and certainly not conflict-free, apportionment of the benefits comes into the equation, which is more a commercial rather than a legal question. Given that the standard form laytime clause in the GENCON is a WIBON clause, which results in the fact that the risk of ordinary port congestion is to fall on the charterer.

416 GENCON 94 cl 9
417 If the loading/discharging berth is not available on the Vessel's arrival at or off the port of loading/discharging, the Vessel shall be entitled to give notice of readiness
General Strikes, Port Safety and War Risks

Another part of the Gencon form, which poses an interesting question, is the General Strikes clause, and in particular its interrelation with slow steaming. Before examining this though, it needs to be said that it seems highly likely that the operation of Port CDM, a feature aiming to boost common awareness and minimise port-calling times, will have a positive effect on the cargo operations during and after the strike. The reason for this statement lies on the fact that common awareness will enable the parties to utilise the time on strike to lay out a plan to optimise the process, when the strike is over; it should also be borne in mind, that the minimisation of port-calling times, which is the main objective of Port CDM, will have an auspicious effect on post-strike cargo operations.

Moving on to the question of slow steaming, in order to examine, whether such an agreement could take place, the clause of the form must be examined. Clause 16 reads as follows:

16. General Strike Clause

(a) If there is a strike or lock-out affecting or preventing the actual loading of the cargo, when the Vessel is ready to proceed from her last port or at any time during the voyage to the port or ports of loading or after her arrival there, the Owners may ask the Charterers to declare, that they agree to reckon the lay days as if there were no strike or lock-out. Unless the Charterers have given such declaration writing (by telegram, if necessary) within 24 hours, the Owners shall have the option of cancelling this Charterparty. If part cargo has already been loaded, the Owners must proceed with same, (freight payable on loaded quantity only) having liberty to complete with other cargo on the way for their own account.

(b) If there is a strike or lock-out affecting or preventing the actual discharging of the cargo on or after the Vessel's arrival at or off port of discharge and same has not been settled within 48 hours, the Charterers shall have the option of keeping the Vessel waiting until such strike or lock-out is at an end against paying half demurrage after expiration of the time provided for discharging until the strike or lock-out terminates and thereafter full demurrage shall be payable until the completion of discharging, or of ordering the Vessel to a safe port where she can safely discharge without risk of being detained by strike or lock-out. Such orders to be given within 48 hours after the Master or the Owners have given notice to the Charterers of the strike or lock-out affecting the discharge.

(c) Except for the obligations described above, neither the Charterers nor the Owners shall be responsible for the consequences of any strikes or lock-outs preventing or affecting the actual loading or discharging of the cargo.

A question germane to the applicability of a slow steaming regime, is whether the port under a strike can be avoided as a whole. As a general principle, although the safety of the port is extended to political safety, the danger in question or the risk of its occurrence, has to be a normal characteristic of the port, so that it can be considered as prospectively unsafe. Thus, unless strikes are considered a normal characteristic of the port, it cannot be avoided on the grounds of being a prospectively unsafe port. Moving on to the contractual options, as far as the loading port is concerned, there

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seems to be no such option, while keeping the charterparty in force, as there is only a reference to cancellation under certain requirements (see 16(a) above), and no right to avoid the port is provided by the clause. The situation on discharge is entirely different, as there is an express right to order the vessel to a port that she can safely discharge, however the question of whether the port can be avoided as a whole is not answered, as this right is provided ‘on or after the vessel’s arrival at the port of discharge’. Consequently, although the discharge port provides a right to substitute the port, it cannot be argued that the port can be avoided, since the exercise of the right is contingent upon the vessel’s arrival at the port in question.

Slow steaming could have some room of application in this context, as it is an event, like congestion, that is preventing the normal occurrence of cargo operations. There seems to be no reason why the parties could not agree on slow steaming. However, the problem that was mentioned above, namely, what happens if they agree on slow steaming and the port becomes available, is even more important in the strike context. Workers go on strike, in order to pursue a goal, or to have a demand satisfied, and it is not uncommon that a strike stops before it was supposed to.

As regards the safety of the port, which is not related to strikes, but in a more general context, the requirement by GENCON is to ‘always lie safely afloat’. These words were held to be concerned in The Evaggelos Th exclusively with the marine characteristics of the place of discharge, and require that the vessel shall be able to remain there without risk of loss or damage. The STM, could hardly have an effect to such a requirement, but if it had any, it would definitely be positive. Voyage Management and Port CDM, would provide a master of a vessel with better awareness of some potential navigational hazards.

Turning to the issue of War Risks (cl. 16 of GENCON 94), it has to be noted that the clause deals with the consequences of War Risks, which briefly provide a right: of cancellation to the owner before loading (sub-clause 2); of refusal to load/continue with the adventure to the master (subclauses 3 and 4); of abiding by directions/recommendations of authorised bodies to the vessel (subclause 5). A question that arises in relation to the STM is, what would happen if Voyage Management created a route which directs the vessel through a War Risks Area? The answer is potentially the same with what was discussed on deviation, namely that the master is the one who will decide the route of the vessel by taking into account all available means. Taking into account the cases dealing with the liability arising on/from the use of other modern navigational aids, there seems to be a consensus that it is a duty of the master or the OOW, to navigate the vessel in accordance with good seamanship. In order to create a liability shield, as a safeguard, the STM could have a disclaimer that it is not supposed to operate in a War Risk Area, and that it is the duty of the master to avoid such areas. The operation of the system in a War Risk area, could create different problems as well, especially if a war vessel is using STM, as it could compromise its position or other data to an enemy. It would be wise, in terms of liability, to have a disclaimer, so that any potential liability could not affect STM.

The General Ice Clause has a quite similar wording with the War Risks Clause, and the concerns are quite similar. However, here the answer is slightly different. If the

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421 See 16(b) above, lines 234-5
422 Cl 1 lines 7-14
STM provides data that induce the master that there is ice in a port that there is not or vice versa, there is a potential liability. On the former it brings the owners in repudiatory breach, as the grounds upon which the charterparty is considered to be null and void, are simply inexistent, thus if the captain leaves without cargo, it is an act of rescission. On the latter, if the vessel proceeds in a port, due to STM data, and eventually freezes there, it is highly likely that the STM might be held liable for any damages caused to the vessel and for the deprival of its use. The same would apply if STM directed a certain conduct (ie slow-steaming), which affected the master’s decision leading to a frozen vessel. As with War Risks, there needs to be either a disclaimer, or there needs to be an express addition to the charter that the STM should not be used to assess factual conditions, or impose a certain behaviour relating to clause 17.

The Common Law Obligations

Besides the express obligations, and their implied overlapping counterparts, there are some obligations arising exclusively from implied terms which are inserted into the contract, in order to give business efficacy. A couple of common law obligations, namely the absolute obligation to provide a seaworthy vessel and the obligation to proceed without unreasonable deviation have been dealt above, when analysing the owners responsibility and the deviation clauses. In this part, the obligation of due dispatch and its interrelation with the abidance by international regulations, will be examined.

The undertaking to proceed with all reasonable dispatch, is categorised as an innominate term, which means that the available remedies will depend on the seriousness of the breach. If the delay is such as to deprive ‘the charterer of the whole benefit of the contract, or entirely frustrates the object of the charterer in chartering the ship’ the charterer may not perform his end of the contractual obligations. This implied undertaking is relevant to the STM, to the extent that it affects the vessel’s schedule and its speed. Although Voyage Management is created in order to achieve route optimization, thus, if anything, positively affects this obligation, there could be a number of issues with slow steaming. As far as the implied obligation is concerned, since it is an innominate term, a delay which is agreed upon by both parties, is highly unlikely to be considered a breach (especially if the Virtual Arrival Clause is implemented), let alone one that would go to root of the contract. Consequently it seems highly unlikely that this implied obligation will be adversely affected by STM.

Another common law obligation, which interrelates with the aforementioned obligation, is the abidance by international regulations. According to United Nations Convention on the Law of the Sea (UNCLOS), ships of all States, whether coastal or land-locked, enjoy the right of innocent passage through the territorial sea. Article 18 clarifies that

Passage shall be continuous and expeditious. However, passage includes stopping and anchoring, but only in so far as the same are incidental to ordinary navigation or are rendered necessary by force majeure or distress or for the

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424 Liverpool CC v Irwin [1977] A.C. 239 HL
425 See Hongkong Fir Shipping Co v Kawasaki Kisen Kaisha [1962] 2 Q.B. 26 CA
426 MacAndrew v Chapple (1866) LR. 1 CP 643, 648, cited by Scrutton 23rd para 7-044.
428 UNCLOS Article 17
purpose of rendering assistance to persons, ships or aircraft in danger or distress.

The interrelation between the contractual speed, the reasonable dispatch obligation, and the “continuous and expeditious” passage, required by UNCLOS, create a very interesting riddle, as to what the vessel’s speed should be, so that there is no breach. The conflict between the contractual speed, the reasonable dispatch obligation and slow steaming, has been resolved, as slow steaming is the new contractual speed, which (by the insertion of the Virtual Arrival Clause) sets a new schedule so the adventure is conducted with reasonable dispatch. That speed though, may be in inconformity with the requirement set by UNCLOS, so the question eventually becomes: What speed ensures that the passage is expeditious? So far, there has been no known minimum speed requirement for the innocent passage, which essentially means that there is no conflict. If, however, there is somewhere a minimum speed requirement, for the innocent passage, the vessel has to abide by it.

Conclusion

The STM project is still in its validation stage, and that fact alone renders its legal compliance task, mainly a task of assumption of facts, as to how it may operate and the potential liabilities that could arise. There are many potential issues that could arise from a standard form charterparty, that the STM needs to take seriously into account, both for this and for the next stages.

The analysis of the GENCON form leads to the conclusion that there are 2 options for the STM when it proceeds to the next stages. The first one is the minimum risk approach. This would mean that the project would have to adapt to the current legal regime and standard forms, without affecting the existing law or commercial reality. The second choice, is the route of negotiations. This would have as a result, a minimal adaptation for the project, in terms of its operation, only in order to comply with some key, and virtually non-negotiable, pieces of legislation (like the Collision Regulations). This path would entail negotiations with the key stakeholders both legislatively (IMO for example) and commercially for standard-form charterparties (BIMCO, Shell, BP, ICS etc.). The first option is safer, mainly because it does not depend upon the success of negotiations, the second one though, would allow the project to have a more significant impact, as the potential legislative/contractual conflicts, would have been expressly regulated to avoid any liabilities.
Competence of the EU in shipping matters

The research undertaken on the European Union’s competence to regulate shipping can be summarised by the diagram below. The competence of the EU can be: 1) exclusive to the Union, 2) shared with the member-states or exclusive to the member-states, 3) supporting or coordinating the actions of Member States and providing arrangements within which EU Member-States must coordinate policy.

The nature of competence in regulating navigation, shipping and ports

The nature of the competence the EU has on navigational matters varies, but it could be stated that as a matter of principle, it falls under the shared competence of the EU with the Member States, since the fields where there is exclusive competence are of rather limited application or importance for these purposes. While there is no doubt that the EU is competent to regulate shipping, the exact ground of competence varies, according to the aspect of shipping that is regulated. The EU has established exclusive competence on some issues, even in areas of core sovereignty like the national fleets or the national waters of a state.

As regards the relationship between EU law and international conventions, Article 216(2) of the Treaty on the Functioning of the European Union (TFEU)\(^\text{429}\) clarifies that the EU and its institutions are bound by agreements concluded by the EU. These agreements have primacy over secondary EU legislation and there might be an incompatibility between them, which has to be invoked before a national court. The examination of the invalidity is subject to two conditions: a) the EU must be bound by such rules and b) the nature and the broad logic of the EU legislation must not preclude such an examination of validity and the treaty’s provisions appear, as regards their content, to be unconditional and sufficiently precise.\(^\text{430}\) However, the powers of the EU must be exercised in observance of international law, including provisions of international agreements insofar as they codify customary rules of general international law.\(^\text{431}\) The latter point prevented the examination of a Directive in the light of some provisions of MARPOL, as according to the European Court of Justice (ECJ) they did not codify customary principles of general international law.\(^\text{432}\)

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\(^\text{429}\) Consolidated versions of the Treaty on European Union and the Treaty on the Functioning of the European Union - Consolidated version of the Treaty on the Functioning of the European Union OJ C 326 , 26/10/2012 P. 0001 - 0390  
\(^\text{430}\) C-308/06 - Intertanko and Others ECLI:EU:C:2008:312, paras 42-45 Case C-344/04 IATA and ELFAA [2006] ECR I-403, paragraph 39  
\(^\text{432}\) C-308/06 - Intertanko and Others ECLI:EU:C:2008:312, para 51
same result was reached in relation to UNCLOS because UNCLOS does not establish rules intended to apply directly and immediately to individuals and to confer upon them rights or freedoms capable of being relied upon against States, irrespective of the attitude of the ship’s flag State.

**National Fleets**

Article 92 of UNCLOS states that ships shall sail under the flag of one State only, and that they shall be subject to its exclusive jurisdiction on the high seas, while article 94 describes the duties of the flag State. Although the Member States have jurisdiction over the vessels flying their flag, they have a duty of cooperation with the EU, which does not depend on the nature of competence (i.e. exclusive, shared or coordinating), nor on the right to enter into agreements with third countries. Consequently, since the EU is not a flag, it cannot have exclusive jurisdiction over a vessel, and it does not have any jurisdiction on the Member State vessels, other than the one enshrined through the duty of cooperation.

**National Waters and ports**

Similarly, the default position under UNCLOS is that coastal States exercise their sovereignty on the territorial sea. The competence of the Member-State in its national waters is exclusive, but there are three circumstances, in which the EU is exclusively competent.

1) The conservation of sea fishing resources falls under the exclusive competence of the EU and it is for the community to adopt the relevant rules and regulations and to enter into undertaking with 3rd States and international organisations.

2) The EU has an exclusive competence only to the extent that provisions of UNCLOS or instruments in pursuance of its provisions, in relation to maritime transport, safety of shipping and the prevention of marine pollution, affect common rules established by the Community. If there are Community rules but are not affected then there is shared competence, as the Member States have competence without prejudice to the competence of the Community to act on

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434 Case C-433/03 **Commission v Germany**, [2005] ECR I- 7011, para 64; Case C-266/03 **Commission v Luxembourg**, ECR I-4805 paras 16-24
435 The exercise of their sovereignty is subject to UNCLOS and other rules of international law. See UNCLOS Article 2.
this field. If there are no Community rules, competence rests with the Member States.\(^{437}\)

3) Finally, the EU has competence in respect of the International Trade related provisions, of Parts X and XI of UNCLOS, by virtue of its commercial and customs policy.\(^{438}\)

Thus, although in principle the coastal State has competence on its territorial sea, which is its sovereign territory, this competence is more likely to be a shared one with the EU, as the Community’s impact in issues relating to shipping, is rather extensive, as it will be analysed below.

Furthermore, the EU appears to have competence to regulate matters within an EU member-state’s port. Regulation EU 2015/757\(^{439}\) imposes a duty to report and monitor CO\(_2\) emissions from ships arriving at or departing from EU member state ports. This regulation bases its competence on article 192 (1) TFEU, which falls under the general environmental competence (4.2e TFEU). Although this Regulation imposes the monitoring burden on the shipowners, it does relate to the regulation of a navigational conduct within the port of a member state, hence it is submitted that there is EU competence in regulating navigational matters within ports.

**Bases of Competence**

The regulatory regime of shipping in the EU is defined by article 4 of the Treaty on the Functioning of the European Union (hereinafter TFEU), which refers to the areas of joint competence between the EU and the member states. There are three main heads of competence, that make reference to sub-heads of competence, in order to specify the requirements of each item of legislation that needs to be laid down. The choice of the specific article varies, according to the effect the imposed legislation is going to have.

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\(^{437}\) Council Decision 98/392/EC, Annex I p 127

\(^{438}\) ibid

\(^{439}\) Regulation EU 2015/757 of 29 April 2015 on the monitoring, reporting and verification of carbon dioxide emissions from maritime transport, and amending Directive 2009/16/EC. OJ L 123, 19.5.2015, p. 55–76
The legal bases of EU shipping law are: Firstly, the general rules of the TFEU; secondly, the legislation adopted under this treaty; and thirdly the case-law as it is interpreted by the CJEU. As regards the TFEU, articles 2-6 deal with Categories and Areas of the EU competence. It could be argued that, if defined strictly, there is shared competence between the EU and the Member States, with the authorising provision being article 4, paragraph 2, subsection g. The main basis for that proposition is that this subsection refers to ‘transport’, and shipping, which is a means of transport, falls under this category, as is explained in the analysis of 4.2.g in its corresponding Title in the TFEU. Shipping, however, can also be regulated through legislation on matters relating to its environmental consequences or through legislation forming wider European policy, such as Trans-European networks.

Consequently, the main bases of competence in navigation are located in article 4.2, and according to the regulatory field of the legislation, and the aspects of shipping that are affected are:

- 4.2.g for transport
- 4.2.e for environment
- 4.2.h for Trans-European networks.

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440 Vincent Power, *EC Shipping Law*, 2nd Edition, LLP 1998 para 4.005 (text referred to EC Treaties but was adapted to the current regime by the author of this paper)

These bases have a corresponding section in the TFEU, and secondary EU legislation relies on these subsections. Thus, the legislature does not invoke the paragraphs of 4.2 as a competence basis but uses the articles in which these regulatory fields are analysed.

The subsequent bases of competence are:

- **4.2.g (transport):** Title VI: Articles 90-100. Articles used for secondary legislation: 91, 100.2 TFEU
- **4.2.e (environment):** Title XX: Articles 191-193. Article used for secondary legislation: 192 TFEU
- **4.2.h (Trans-European Networks):** Title XVI: Articles 170-172. Article used for secondary legislation: 172 TFEU

**Article 4.2.g Transport**

The aforementioned bases of competence, are the main bases, used by the legislature to justify the adopted measures, which are further analysed in their respective sections in the TFEU. Transport is addressed in articles 90-100, with articles 90-99 dealing with the internal transport competence within the CTP and article 100 dealing with the transport competence that affects third States or international organisations.

Article 91 TFEU provides the central legal basis for secondary legislative acts of the Union in the field of common transport policy (CTP). Article 100 para 2 TFEU provides the legal basis for legislative acts in the field of air and sea transport, which is seemingly an overlapping regulatory field with Article 91. The landmark AETR case mentions that Article 91 (then Article 75) “assumes that the powers of the community extend to relationships arising from international law, and hence involve the need in the sphere in question for agreements with the third countries concerned”. The same case also mentions that “the system of internal community measures may not therefore be separated from that of external relations”. The practice however, indicates that almost invariably, Article 100 (2) was the one concerned with the obligations arising from international law, and Article 91 was dealing with internal community measures. Thus, the legislative practice not only created a division in community measures between internal and external measures, but also assigned to Article 100(2) the role of the main legal base for the majority of maritime measures. Consequently, although in theory, there is no division and Article 91 was supposed to be the basis for the extension to international law

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443 Case 22/70 Commission v Council (AETR) [1971] ECR 263
444 Case 22/70 Commission v Council (AETR) [1971] ECR 263 para 27
445 Ibid para 19
446 HM Government, Review of the Balance of Competences between the United Kingdom and the European Union Transport, February 2014 para 1.16
relationships, the legislative practice of over four decades is contrary to the above AETR dicta.

**Internal Competence**

Article 91 mentions that the European Parliament and the Council, following the ordinary legislative procedure, shall lay down policies in order to achieve the objectives of the treaties, within the framework of a common transport policy (Art 90). Such policies are:

(a) common rules applicable to international transport to or from the territory of a Member State or passing across the territory of one or more Member States;
(b) the conditions under which non-resident carriers may operate transport services within a Member State;
(c) measures to improve transport safety;
(d) any other appropriate provisions.

The regulation of navigational matters seems to be more relevant to subparagraphs (a) and (c), due to the ambit of these provisions, with the latter covering safety issues regarding the transport routes and the behaviour of users. Subparagraph (d) could also be relevant to navigational matters, as long as it does not fall under one of the other subparagraphs, since its wording is one of a blanket provision, so as to cover common transport policy matters that are not regulated by (a)-(c).

The competence under Article 91 is particularly broad, as the wording of the article enables the specified institutions to impose ‘any appropriate provisions’. Measures on that basis may be introduced by all forms of actions laid down in Article 288 TFEU. According to this article, ‘the institutions shall adopt regulations, directives, decisions, recommendations and opinions’. The legislative procedure is dictated by Articles 289 and 294 TFEU, as Article 91 TFEU mentions that the ordinary legislative procedure is followed, which is defined in these two articles.

As was mentioned earlier, the legislative practice of the EU points to the conclusion that Article 91 is confined to measures that deal with internal community measures. For example, Directive 2010/35/EU on transportable pressure equipment, which relies on Article 91, excludes the application to transport exclusively between Member States and third countries and is not linked to any international convention. Similarly, Directive 2014/94/EU on alternative fuels infrastructure does not make any

reference to international conventions, and does not include any provisions regarding third States. Other examples of secondary legislation, some of which relate to other means of transport, support the aforementioned conclusion.  

**External Competence**

Article 100 para 2 TFEU provides the legal basis for legislative acts in the field of air and sea transport, which is also EU’s legal base for the majority of maritime measures. The article reads as follows:

> The European Parliament and the Council, acting in accordance with the ordinary legislative procedure, may lay down appropriate provisions for sea and air transport. They shall act after consulting the Economic and Social Committee and the Committee of the Regions.

The regulatory scope of Article 100.2 TFEU is different from that of Article 91 TFEU, as it extends to maritime and shipping matters beyond the internal Common Trasport Policy (CTP) targets, and addresses the relationship of EU law with rights and obligations arising from international law. The secondary legislation that has its competence basis in Article 100.2 TFEU has two main differences from that relying on Article 91: a) It regulates the rights and obligations of EU Member States with third States and international organisations; b) It makes reference to an international convention.

For example, Council Directive 95/21/EC, concerning the enforcement of international standards for ship safety, pollution prevention and shipboard living and working conditions (Port State Control), deals with the harmonisation of international standards by the Member States and makes reference to a plethora of conventions. Similarly, Regulation 725/2004 on enhancing ship and port facility security regulates the security of ships used in international trade and associated port facilities, and also...
makes reference to SOLAS and the ISPS Code.\textsuperscript{456} Directive 2008/106/EC\textsuperscript{457} on the minimum level of training of seafarers affects the rights of seafarers of third countries\textsuperscript{458} while it is directly linked to the changes in international conventions and codes.\textsuperscript{459} There are more examples\textsuperscript{460} affirming this rule, and it is quite clear that secondary legislation that relies on article 100.2 has the aforementioned two characteristics.

\footnote{See Articles 1.1, 2 and 3 of this Directive.}


\footnote{See the recital of the Directive, paragraph 15}

\footnote{See the recital of the Directive, paragraph 22}

Overlapping legislation

There is an example of a piece of secondary legislation that falls under the wider ambit of Article 4.2.g and relies on both Article 91 and Article 100.2. Regulation 1177/2010 concerning the rights of passengers when travelling by sea and inland waterways,\footnote{Regulation (EU) No 1177/2010 of the European Parliament and of the Council of 24 November 2010 concerning the rights of passengers when travelling by sea and inland waterways and amending Regulation (EC) No 2006/2004 Text with EEA relevance. OJ L 334, 17.12.2010, p. 1–16} relies on both these articles. This regulation aims to protect not only passengers between ports of Member States, but also passenger services between such ports and ports outside the Member States’ territory.\footnote{See the recital of Regulation 1177/2010, paragraph 1} It also makes a reference to the STCW Convention,\footnote{See the recital of Regulation 1177/2010, paragraph 9} which leads to the conclusion that the reason behind the dual competence basis was that the Regulation addresses issues which are not confined in one of the two categories above.

As a conclusion to the maritime transport competence, the main base is article 4.2.g TFEU, which is particularised in Articles 90-100. This is then divided in two main parts: 1) Article 91 TFEU, which deals mainly with the issues having an internal reference and 2) Article 100.2 TFEU, which regulates the relationship of the EU with the international framework, as well as the rights of third States and the way they are affected by the implementation of EU legislation.

Article 4.2.e Environment

Shipping is very frequently regulated through environmental legislation, due to its impact on the environment. Apart from the times that the spotlight is on, and this is usually when an environmentally disastrous accident occurs, the everyday operation of a ship affects the environment. For example, a vessel slow-steaming, which is a navigational and operational decision, may reduce by up to 15% its carbon dioxide emissions,\footnote{H. Psaraftis, C. Kontovas, Balancing the economic and environmental performance of maritime transportation, Transportation Research Part D, 15 (2010), pp. 458-462} and taking into account the volume of shipping, the regulation of navigation can be crucial to environmental protection.

both operate in pursuance of a general policy, namely Union Environmental Policy and Common Transport Policy respectively.

Indicatively, examples of legislation that relate to shipping and are regulated through the environmental provisions, are the following:

- Regulation 2015/757/EU on the monitoring, reporting and verification of carbon dioxide emissions from maritime transport, and amending Directive 2009/16/EC
- Directive 2004/35/CE on environmental liability with regard to the prevention and remediying of environmental damage
- Directive 2006/11/EC on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community modifying or repealing a series of shipping environmental directives

Consequently, Article 192 TFEU is one of the core bases of competence for the regulation of shipping, due to the significant impact that it has on the environment, and the development of environmental legislation to this effect.

**Article 4.2. h Trans-European Networks**

Although a trans-European transport network is still a strategic goal, and is under construction, there are already steps taken on a trans-European level which affect shipping matters. As with environment and transport, the normal legislative procedure is followed, and the relevant article in this context is article 172 TFEU. Its structure is similar to the one at Articles 192 and 91 TFEU, as Article 172 makes a reference to a different policy, namely the development of trans-European networks.

As far as the trans-European transport network is concerned, Regulation 1315/2013 is of increased importance. This regulation envisages the development of that network, as part of the Europe 2020 Strategy and the Commission’s *White Paper*. The
objectives of the Regulation, as set out in Article 4, are cohesion of infrastructure, efficiency of transport networks, sustainability and increased efficiency for its users. The regulation also envisages in article 21 the creation of ‘Motorways of the sea’, as the concept of the White Paper as a whole is a (maritime) transport space without borders.\textsuperscript{469} Finally, it is worth mentioning the priorities of the regulation for maritime infrastructure development, which are laid out in its Article 23: a) promoting motorways of the sea; b) interconnection of maritime ports with inland waterways; c) implementation of VTMIS and e-Maritime services; d) introduction of new technologies on fuel; e) modernisation of the capacity in ports.

As regards other pieces of trans-European legislation affecting shipping, it is noteworthy that they revolve mainly around the operation of navigational E-Systems. Thus:

- Regulation 912/2010 setting up the European GNSS Agency, repealing a regulation on the management of European satellite radio navigation programmes
- Regulation 1285/2013 on the implementation and exploitation of European satellite navigation systems
- Decision 1104/2011/EU on the rules of access to the public regulated service provided by the global navigation satellite system established under the Galileo programme.

This competence base is increasingly important for shipping, due to the fact that it relates to the development of e-navigation systems, which are increasing both in number and in the effect that they have in conducting navigation.

\textsuperscript{469} See Article 21, para 1 of Reg 1315/2013
Approximation of Laws

The research indicated other potential ground of competence, which is not however likely to be considered as the rule, but more of an exception. Such an exception is the NIS Directive, whose competence nests on Article 114 TFEU (approximation of laws). This is a Directive concerning measures on network and information system security across the Union. Although its relevance may not be apparent, it is an increasingly important piece of legislation to shipping, as vessels tend to become increasingly digitised. The evolution of technology is changing the way shipping operates and heavily affects navigation. The recent introduction of technologies like AIS and ECDIS have provided to masters new tools to navigate, and to the shore operators extensive means to track and protect their investment. On July 2016, the EU adopted the NIS Directive on Cyber Security, Commissioner Oettinger noting that it will involve investments of €1.8 billion, consequently this legislative basis might be of increasing importance.

This affects shipping as the regulation refers to an obligation relating to the duty of care of the master to prevent or mitigate a cyber-attack or its effects on the vessel.\textsuperscript{470} What remains to be seen is how mariners will adapt to the new navigational reality, which requires them to increase their digital vigilance, but at the same time keep their traditional one intact, by maintaining a conventional “proper lookout”.

As an overall conclusion on competence bases for shipping, there are three main competence bases deriving from Article 4, with the core ones being 4.2.g that regulates transport and 4.2.e that regulates the environment. A wider perception of the operation of shipping could also include the Trans-European Networks (4.2.h) and potentially also Article 114 on the approximation of laws, given the increased digitisation of shipping.

The role of STM in the EU

Connecting Europe Facility and Motorways of the Sea

The STM Validation Project is co-financed by the EU under CEF/Motorways of the Sea, which is under the Trans-European Transport Networks (TEN-T). STM is an expression of EU’s competence in regulating navigation, as it is funded, along with other projects, in an attempt to create safer and greener navigation.

Motorways of the Sea (MoS), a horizontal priority of the Connecting Europe Facility (CEF), aims to promote green, viable, attractive and efficient sea-based transport links integrated in the entire transport chain. Their implementation should help to rebalance the EU transport system. MoS are considered the maritime pillar of the Trans-European Transport Network. They consist of short-sea routes, ports, associated maritime infrastructure and equipment, facilities as well as simplified administrative formalities enabling short sea shipping or sea-river services between at least two maritime ports, including hinterland connections. The MoS concept builds on the EU’s goal of achieving a clean, safe and efficient transport system by transforming shipping into a genuine alternative to overcrowded land transport. MoS aim at introducing new inter-modal maritime-based logistics chains to bring about a structural change to transport organisation: door-to-door integrated transport chains. MoS aim to positively contribute to greenhouse gas (CO₂) reductions which is of paramount importance in the context of climate change. Based upon successful shipping routes, MoS are designed to remove bottlenecks in the EU’s transport system, which was a target of the White Paper, expressed also through the TEN-T regulation. This will be achieved through the establishment of more efficient, and frequent, high-quality maritime-based logistics services between Member States.

STM could assist in achieving the regulatory goals of the EU, as envisaged under the MoS, in a number of ways.

MoS intend to remove bottlenecks in the EU’s transport system by relying on successful shipping routes. The STM can be integral to this effort, as one of its key features is Voyage Management. Voyage Management will provide the optimal route when the ship is about to sail, and it will be updated en route by providing optimal alternatives, in the event that incidents arise. This feature, along with ship-to-ship route

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472 Article 3 (q) of EU Regulation 1315/2013 defines bottleneck as “a physical, technical or functional barrier which leads to a system break affecting the continuity of long-distance or cross-border flows”. Regulation EU 1315/2013, Union Guidelines for the development of the trans-European transport network and repealing Decision No 661/2010/EU, OJ L 348, 20.12.2013, p. 1–128

473 Regulation EU 1315/2013, preamble para 3
exchange, could provide the most accurate and efficient routes that would further assist the implementation of MoS goals.

Furthermore, MoS’s primary goal is to create a viable alternative to road transport by introducing a new intermodal logistics chain and reducing administrative burden. STM could assist this goal as well, as PortCDM intends to create optimised port calls and to minimise the time spent in port. The exchange of standardised messages through a common platform could potentially also reduce the administrative inefficiencies.

Finally STM could contribute to the goal of reducing greenhouse gas emissions. STM through all its features intends to create a common awareness for its users, optimising their voyages. Common awareness will ensure that the stakeholders will save valuable time and bunker fuel either by speeding up to secure an opening in the berth queue, or by slow steaming to a late one. This optimisation will assist in reducing carbon emissions from the unnecessary waiting time in port, caused by inefficiencies and lack of common awareness.

**STM's role under general policy**

As was shown in the diagram above, the EU has a rather wide range of potential legislative intervention, and STM could also have a role in this general regulatory policy.

**EU Directive 2002/59/EC**

EU Directive 2002/59/EC aims to establish a Community vessel traffic monitoring and information system. It shares some common goals with STM, namely the prevention of accidents and pollution at sea, as well as the improvement of efficiency and the optimisation of port calls. This Directive however has a much narrower ambit than the STM concept. Besides the exclusion of several type of ships, that are commonly excluded from most international conventions, like naval ships and fishing vessels, this directive also excludes bunkering vessels below 5000 tons and ships with a length of less than 45 metres. It also provides for an exemption for liner services, as the Member States can exclude them from the notification requirement regarding HNS cargoes.\(^474\)

The pursued range of information exchange is also limited, as it covers the exchange of information between the national services in the various Member States and only to the extent these are relevant for the purposes of the Directive.

Furthermore, this Directive attempts to regulate VTS areas and article 8 includes a rather controversial provision. Paragraph (b) requires vessels flying the flag of a Member State or ships bound for a port of a Member State, entering a VTS area outside the territorial sea of a Member State, to comply with the rules of that VTS. Paragraph (c) is even more controversial, as it requires that vessels flagged to third

\(^{474}\) See articles 15 and 13 of EU Directive 2002/59/EC
States and **not bound for a port** of a Member State entering a VTS area **outside the territorial sea** should **follow the VTS rules wherever possible**, and any apparent serious breaches of such rules should be reported by the Member States to the flag state. Conferring a power on authorities for the operation of a VTS system outside the territorial sea is contrary to SOLAS\(^{475}\) and to the guidelines IMO Resolution about VTS.\(^{476}\) According to Article 16 1 (a) of this Directive, a vessel not complying with the rules of a VTS outside the territorial sea of the coastal state, could be considered as a potential hazard to maritime safety.

Perhaps the most problematic provision with this Directive is the fact that it expressly provides in Article 24 for the confidentiality of information shared pursuant to this Directive. STM’s key feature is information sharing and this rule on confidentiality could exclude, in accordance with national legislation, the information exchanged under this Directive. This confidentiality issue would apply for example in the exchange of telematics data as envisaged by Article 23, which is both consistent with the STM concept, and STM could also assist in the systemisation of the exchange of information.

This Directive might seem to be an opportunity to develop a business case for the STM, by providing this standardisation, however there are some impediments, which are not strictly legal, that preclude such a scenario. The main issues barring such a standardisation are the voluntary character of the STM, the fact that it is rather unlikely that it would be carried by all types of ships (warships for example would not wish to share their intentions) and the aforementioned restrictions posed by the Directive. As far as the Directive is concerned, it could be generalised so as to include more types of vessels, amend the confidentiality requirement so as to include STM (the legal entity managing it) in the authorised actors and amend the reporting requirement regarding the VTS in order to make it consistent with international maritime law. However, this inconsistency is unlikely to affect its validity, as was stated above, to the extent that any court challenge to it would fail for the same reason as the *Intertanko* case.

As far as STM is concerned, the current strategy is that it is joined on a voluntary basis. It has to be always borne in mind that maintaining the navigational safety of each sea area is the responsibility of the coastal state, and this burden cannot be discharged to a freely available navigational system, unless its use becomes a public policy. The EU is likely make it mandatory only if it is sufficiently proven that it increases navigational safety and that it has some positive impact on the environment.

\(^{475}\) SOLAS Regulation V/12.3 provides that the use of VTS may only be made mandatory in the sea areas within the territorial sea of a coastal State.

\(^{476}\) Resolution A.857(20) Guidelines for Vessel Traffic Services, guideline 2.2.2
Although there is not an inconsistency as such, barring the application of STM, there are a number of provisions, especially confidentiality that would interfere with the proper function of the system.

**EU Directive 2009/18/EC**

EU Directive 2009/18/EC deals with the investigation of accidents in the maritime sector, and STM could potentially assist in its implementation. This Directive imposes an obligation in Article 5 to investigate very serious maritime casualties (a) involving a ship flying its flag irrespective of the location of the ship (b) occurring within its territorial sea irrespective of the flag of the vessel; and (c) involving a substantial interest of the Member State.

STM could assist in achieving the goal set by Article 10, namely that of establishing a permanent cooperation framework enabling the investigative bodies to cooperate amongst themselves for the purposes of the Directive. This view is enhanced by subparagraph 3(a), which mentions that the investigative bodies should be able to share installations facilities and equipment for the technical investigation of wreckage. STM, with its SAR tool and Area Management, could assist in carrying out the investigations. Finally, the requirement for confidentiality of paragraph 3(f) relates only to sharing witness evidence and sensitive information, which should not be a problem for STM communications.

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Regulation EU 2015/757

This regulation was referred to above, in order to demonstrate the competence of the EU in regulating matters that affect ports. Article 1, which describes its scope, mentions that the Regulation aims to promote the reduction of CO₂ emissions from maritime transport, by monitoring these emissions from ships arriving at, within or departing from ports under the jurisdiction of a Member State. Although it is not relevant to refer to every detail on reporting, for the purposes of STM, there are some issues of potential relevance.

First of all, this regulation has some common targets with STM, as the preamble of the regulation suggests. Paragraph 11 mentions the lack of reliable information, one of the fundamental reasons behind the creation of MonaLisa and subsequently STM; paragraph 19 stresses the need for the minimisation of administrative burden for shipowners and operators, and this is one of the key targets of Port CDM, extended to port authorities as well. Finally, the object of the regulation, which was mentioned above, is the reduction of CO₂ emissions, which is one of the core objectives of STM.

Moreover, article 12 requires that the emissions report shall be submitted using automated systems and data exchange formats, including electronic templates. In addition to that, it is mentioned in article 9 that some of the parameters are a) the port of departure and port of arrival including the date and time of these events; b) the amount and emission factor for each type of fuel consumed in total; c) the CO₂ emitted; d) the distance travelled; e) the time spent at sea; f) the cargo carried; g) the transport work and information relating to ice navigation.

This is a potential market for the STM, as the STM could be used as a platform to exchange these information, as especially the information relating to the port, the distance, the time spent are information that will be exchanged for the purposes of Voyage Management and Port CDM; also The Winter Navigation tool will provide the STM users with the route followed by the icebreaker. If it is possible to include information about the emissions, the cargo and the transport work, there is a potential business case for the STM. STM’s data exchange fits with article 12, as the exchange of information is projected to take place through an automated system (SeaSwim) through standardised data exchange formats, which sometimes will include electronic templates.

Conclusion

The results of the research on the European Union’s competence to regulate navigation, can be summarised by the diagram in the beginning of this document, which was analysed throughout this report. The competence base for regulatory interrelation on shipping in the EU is defined by Article 4 of the Treaty on the Functioning of the European Union, which refers to the areas of joint competence
between the EU and the Member States. There are 3 main heads of competence, that make reference to sub-heads of competence, in order to specify the requirements of each legislation that needs to be laid down. The choice of the specific article varies, according to the effect the imposed legislation is going to have.

The nature of the competence the EU has on shipping matters varies, but it could be stated that the rule is that there is a shared competence, as the fields, where there is exclusive competence, are of rather limited application or importance. While there is no doubt that the EU is currently competent to regulate shipping and navigational matters, there is a considerable debate on whether it should regulate such matters. Voices focus both on the key principles of subsidiarity and proportionality, as well as the lack of expertise of the Commission to regulate such matters. As was shown at the beginning of the paper, even in areas of core sovereignty like the territorial waters of a state, EU has established exclusive competence on some issues.

\[478 \text{ See the Appendix}\]
Appendix

Proportionality and Subsidiarity: The boundaries of the EU legislative powers

Article 3 of the first Protocol of TFEU provides that:

National Parliaments may send to the Presidents of the European Parliament, the Council and the Commission a reasoned opinion on whether a draft legislative act complies with the principle of subsidiarity, in accordance with the procedure laid down in the Protocol on the application of the principles of subsidiarity and proportionality.

The principle of subsidiarity is defined in article 5 paragraph 3 of the TEU, as follows:

Under the principle of subsidiarity, in areas which do not fall within its exclusive competence, the Union shall act only if and in so far as the objectives of the proposed action cannot be sufficiently achieved by the Member States, either at central level or at regional and local level, but can rather, by reason of the scale or effects of the proposed action, be better achieved at Union level.

Paragraph 4 of the same article also defines the principle of proportionality: ‘Under the principle of proportionality, the content and form of Union action shall not exceed what is necessary to achieve the objectives of the Treaties.’

Some room for concern and criticism has been provided from the responses of the stakeholders on the Review of the Balance of Competences between the United Kingdom and the European Union. Particularly interesting was the response of Lloyds Register, when asked about the proportionality of EU’s exercise of its competence in the field of transport. An abstract of their response is the following:

The Commission should not impose their decision just because they hold competency. This is critical in respect of technical aspects of the maritime safety, where the Commission officials do not have the required knowledge or experience to legislate without causing disruption to the shipping industry.479

This is a very important point and it leaves significant room for concern. As was mentioned above, EU legislation is subject to the principles of subsidiarity and proportionality and the point Lloyd’s Register made is actually doubting the observation of the latter principle. Their criticism was not isolated, as all stakeholders

noted the fact that the EU overstepped its boundaries and the infringement of proportionality has been even characterised as a “competence creep”. The Balance of Competences (BOC) Maritime Workshop noted that the EU transferred an international convention into EU law, which was originally limited to international transport for a reason, but the EU chose to extend it to coastal transport as well. The UK Chamber of Shipping noted that the EU attempted to extend regulation 725/2004 applying the IMO Code on International Shipping and Port Facility Security to non-SOLAS vessels, which was, according to them, a clear example of “both creep and disproportionate measures”.

Another problem, deriving from the alleged “competence creep”, has been pointed out by Lloyd’s Register:

The EU is not a flag; The Commission does not have international treaty obligations to treaty parties in the maritime world. The UK is and does. Therefore the performance of its fleet and the relationships with the States involved in agreeing the international regime within which UK Ships operate, depends on the ability of the UK to maintain direct relationships with these States. The EU Commission may take decisions for the good of the Union but the practical consequences will fall on the shoulders of the flag states.

The last point is increasingly important, if it is combined with the concerns voiced above with the EU allegedly overstepping its boundaries. There is a danger that the EU might be too eager to undertake obligations, which it will never be summoned to observe. This paradox is magnified if it is juxtaposed with the principle of subsidiarity, which requires from the EU to execute only tasks that the Member States could not effectively perform by themselves. So, the EU essentially undertakes some commitments, which could have very easily been undertaken by the Member States individually, and extends them according to its own will, while it is never summoned to perform them. The concerns of the stakeholders in the consultation response to the UK Department of Transport, are valid and point out some important deficiencies in

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EU policy making. The application of the principles of proportionality and subsidiarity are ‘one of the most debated, analysed, criticised and despised areas of EU Law’, and the difficulty in achieving an objective approach, due to their political nature, is perhaps the reason for their limited judicial application. The courts have been very reluctant to approach the principle of subsidiarity and were merely accepting its observation without any specific comments. This paper tends to agree with the view of the EU Committee of the House of Lords, which pointed out the fact that the Court must adopt a more critical approach to subsidiarity, in order to ensure the justification for action at a Union level is adequate. That scrutiny was also endorsed by the French National Assembly, while there was a general consensus on the need to augment the national parliaments’ role in the observation of the subsidiarity principle. Currently, there is a strong debate on whether the principle of subsidiarity is being eroded, however, as long as it is still standing, it remains a valid ground of criticism of the policymaking.

The principle of proportionality is less important in the context in question as the three step test that was introduced in the Afton Chemical case, has limited applicability, as far as navigational legislation is concerned. The three steps were as follows: a) ‘the principle of proportionality requires that measures adopted by EU institutions do not exceed the limits of what is appropriate and necessary in order to attain the objectives legitimately pursued by the legislation in question.’ b) ‘when there is a choice between several appropriate measures recourse must be had to the least onerous’ and c) ‘the disadvantages caused must not be disproportionate to the aims pursued’. Consequently the main room for application lies under the first limb of the rule, as the question of whether EU’s competence on navigation is appropriate and necessary, is hard to answer, and increasingly overlapping with the question of subsidiarity.

484 Andrea Biondi, EU Law After Lisbon, OUP 2012 p 213
486 Netherlands v European Parliament and Council (Case C-377/98) [2001] ECR I-7079 para 33; Commission v Germany (Case C-518/07) [2010] ECR I-1885; Vodafone Ltd, Telefonica 02 Europe plc, T-Mobile International AG, Orange Personal Communications Services Ltd v Secretary of State for Business, Enterprise and Regulatory Reform (Case C-58/08), particularly interesting is the opinion of the Advocate-General in para 30 onwards.
487 House of Lords EU Committee, ‘Strengthening national parliamentary scrutiny of the EU—the Constitution subsidiarity early warning mechanism’ Report with Evidence, 14th Report of Session 2004–05, para 244
488 Ibid para 255
489 See the views of the Dutch, Danish, Finland and Lithuanian parliaments in paras 261 onward in the aforementioned report of the EU Committee of the House of Lords.
490 Afton Chemical (Case C-343/09) [2010] ECR I-2925 para 45

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February 2018
Executive Summary

The primary role that technology plays in the STM context indicates the significance of analysing the legal issues relating to the cyber security aspects of the STM project in order to ensure that legal considerations will be embedded in the development of the STM infrastructure. The report aims to contribute to Activity 5 (Analysis and Evaluation) and, more specifically, Activity 5.4 (Legal and Liability Issues of STM) by depicting the legal framework surrounding the relevant security obligations at the EU and UK level and outlining the kinds of organisations that may be subject to these requirements. To that end, the nature of the data exchanged by the STM services is examined to check whether certain actors ought to abide by the stricter laws regulating the processing of personal data, while a framework is provided containing parameters that need to be taken into account when assessing the security measures to be implemented. The aim of the report is twofold – to outline the security requirements laid down in the context of network and information security regulation, and analyse the relevant legal definitions and criteria to be met in order to provide a legal framework for testing whether current or future stakeholders and activities fall within it.
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(ii) Internet access services, that is, “publicly available electronic communications services that provide access to the internet, and thereby connectivity to virtually all end points of the internet, irrespective of the network technology and terminal equipment use.” 214

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Appendix 1.- Contractual undertakings
Introduction

Maritime cyber risk is established when a technology asset is threatened by a potential circumstance or event resulting in information or systems being corrupted, lost or compromised, which, in turn, leads to shipping-related operational, safety or security failures.\(^{491}\) Risk management is fundamental to safe and secure shipping operations and hence it is significant that risk management procedures identify emerging threats and vulnerabilities related to digitisation, integration and automation of processes and systems in shipping.

The term *threat* is defined as “a potential cause of an incident or hazardous situation that may result in harm to an asset, person, system or organisation”.\(^{492}\) In the cyberspace context, threats are presented by malicious actions (e.g. hacking or introduction of malware) or the unintended consequences of benign actions (e.g. software maintenance or user permissions). In general, these actions expose vulnerabilities (e.g. outdated software or ineffective firewalls) or exploit vulnerabilities in operational or information technology. Effective cyber risk management should consider both kinds of threat. *Vulnerabilities*, that is, weaknesses (technical, physical, systematic or procedural) of an asset, or group of assets, that can be exploited by one or more threats, can result from inadequacies in design, integration or maintenance of systems, as well as lapses in cyber discipline.\(^{493}\) In general, where vulnerabilities in operational and information technology are exposed or exploited, either directly (e.g. weak passwords leading to unauthorised access) or indirectly (e.g. the absence of network segregation), there can be implications for system security when critical systems (e.g. bridge navigation or main propulsion systems) are compromised, or for the confidentiality, integrity and availability of information in the case of inappropriate connection to operational technology systems or procedural lapses by operational personnel or third parties (e.g. inappropriate use of removable media such as a memory stick).\(^{494}\)

Although there is no common understanding of the term *cyber security* and, therefore, no general consensus on a common definition, since different definitions have been suggested by different actors, the essence of cyber security lies in putting in place procedures and measures able to protect both the physical elements (such as physical infrastructure and buildings) and the virtual elements (such as networks and data) of the cyber environment and organisation and user’s assets.\(^{495}\) Cyber environment would be more clearly conceived as a collection of the interconnected networks of both information and cyber physical systems that use electronic, computer-based and wireless systems, while the organisation and user’s assets refer to connected computing devices, infrastructure, telecommunications

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492 Ibid.


494 IMO, “Interim Guidelines on Maritime Cyber Risk Management” (n 1)

systems, services, applications, personnel, as well as the totality of transmitted, processed and stored information in the cyber environment.\textsuperscript{496}

The Guidelines on Cyber Security On-board Ships\textsuperscript{497} suggest that a holistic response to the management of cyber risks is required that combines both \textit{defence in depth} and \textit{defence in breath} approaches. In other words, it is essential that multiple layers of protection are applied across all vulnerable and integrated systems. Applying this approach to the SeaSWIM, whose aim is to ensure interoperability of the STM services, such as Port CDM and Voyage management, by facilitating a common information environment,\textsuperscript{498} a layered approach to cyber security should be based on the way in which information is shared through SWIM.

The SWIM global interoperability framework comprises five layers encapsulating messages from other layers.\textsuperscript{499} To begin with, the ‘network connectivity’ layer consists of the interconnected network infrastructures of the different stakeholders, which are either public or private Internet Protocol (IP) networks; at this level, focus should be placed on the aspects of network system security. The scope of SWIM is mainly associated with the three middle layers, which are the following: the ‘SWIM infrastructure’ layer for sharing information, which provides the core services, such as interface management, request-reply and publish-subscribe messaging; the ‘information exchange models’ layer using subject-specific standards for sharing information for the next layer, that is, the ‘information exchange services’ layer. At this level, the elements that should be primarily protected are related to network and information security (e.g. authentication and authorisation). Finally, the layer of ‘SWIM-enabled applications’ of information providers and information consumers uses information exchange services for interaction; at this level, focus should be placed on the aspects of cyber security relating to application services security.

The fact that the use of technology is the principal feature of the STM concept, which aims at providing a common platform of information exchange between ports, Vessel Traffic Services (VTSs) and shipping companies in a cyber environment, demonstrates the significance of analysing the legal dimensions of the STM project in order to ensure cyber security in relation to STM services and hence assure consistency.

The first step towards achieving this goal lies in thoroughly understanding the key attributes of cyber security in order to identify the elements of the cyber environment that need to be protected. Therefore, the following analysis starts with describing the features that comprise the definition of cyber security, while it also examines the meaning of cyber security in the maritime context. After providing a broad framework for the identification of the necessary security measures to be implemented, the report proceeds with analysing certain high-level security principles that serve as guidance for determining the appropriate level of security required in each case.


\textsuperscript{498} M21 STM Information Environment; Document No: STM_D4.1.2-1 Title: SeaSWIM Specification Date: 2016-03-31.

These principles, which describe the mandatory security outcomes that need to be achieved according to the EU and UK legal framework, are supplemented by more detailed parameters intended to guide the relevant actors on assessing the security risk presented and the way in which they will address their compliance responsibilities. Although arguably EU pieces of legislation are sector-specific, the directives or regulations covering the topic of cyber security are governed by similar high-level principles and a uniform risk-based approach. Nevertheless, more detailed rules have been adopted in the field of personal data protection. Personal data controllers contrary to providers dealing with non-personal data or (legally) anonymised data are therefore subject to more or stricter obligations. Hence, special emphasis is placed on the security requirements relating to the processing of personal data. In this regard, the nature of the data exchanged by the STM services is examined in order to determine whether certain actors ought to abide by the laws regulating the processing of personal data.

Finally, it is essential that the actors involved comprehend their legal obligations and implement the necessary security measures to either prevent or mitigate a security incident. To that end, the report outlines the types of organisations that may be subject to these requirements by providing identification criteria that need to be met for these actors to fall within the relevant legal definitions.

The following analysis is primarily based on STM documents as well as on legal (EU Directives/Regulations, UK Act), regulatory (codes of practice, explanatory reports) and technical sources (technical guidance on security measures, technical standards).


Both ships and ports are becoming increasingly complex cyber environments and hence dependent on the extensive use of digital and communications in order to provide a range of operational services. Therefore, the lack of security measures or the implementation of inappropriate measures could lead not only to significant financial losses but also to reputational damage and penalties severely affecting the companies involved. For instance, the compromise of ship systems may cause physical harm to the system or the shipboard personnel or cargo, potentially permitting criminal activity (e.g. imposition of ransom ware), while there lies the danger of the loss of sensitive information (e.g. sensitive personal data). The loss or compromise of the assets forming a port (e.g. buildings, linear infrastructure, plant and machinery, information and communications systems) may result in a number of undesirable situations, including loss of resilience or system redundancy, failure of critical systems

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501 *Sensitive information* is defined as “information, the loss, misuse or modification of which, or unauthorised access to, could: (a) adversely affect the privacy, welfare or safety of an individual or individuals; (b) compromise intellectual property or trade secrets of an organisation; (c) cause commercial or economic harm to an organisation or country; or (d) jeopardise the security, internal and foreign affairs of a nation, depending on the level of sensitivity and nature of the information.” (IET Code of Practice Cyber Security for Ships, p.9).
or processes, accidental or inadvertent exposure of sensitive applications or data to unauthorised third parties.

It is essential that cyber security be considered as part of a holistic approach to protecting the systems and information, as it does not only involve the implementation of the necessary measures to prevent hackers from gaining access to systems and information, potentially resulting in loss of confidentiality and control. Cyber security also addresses other issues, such as the development of resilient systems or the maintenance of integrity and availability of systems and information, thus ensuring the continuing utility of digital assets and systems as well as business continuity. Given that the appropriate security measures vary depending on the complexity, ownership, use and the supply chain supporting the design, construction, operation and occupation of the ships and ports, coupled with the variety of technologies involved in the maritime environment, cyber security would be best addressed by adopting a risk-based approach. In this regard, the International Ship and Port Facility Security (ISPS) Code provides guidance on the security measures by reference to the security level, that is, "the qualification of the degree (probability and impact) of risk that a security incident will be attempted or will occur." The security levels are divided in three categories and specific examples of security measures are provided. For instance, when the threat presented is of low significance (e.g. phishing attacks on supplier to infect or gain access to supplier’s systems), minimum appropriate protective security measures are required (security level 1), whereas additional measures should be applied (security level 2) in case of a threat of moderate significance (e.g. targeted attempts to gain access to specific assets or information). Finally, a threat of high significance (e.g. highly sophisticated, well-resourced attacker seeking to gain access to specific assets or information) calls for further specific security measures, which should be maintained for a limited period of time when a security incident is probable or imminent (security level 3).

In assessing the level of the security risk presented and the appropriateness of certain security measures, a risk-based approach should take into consideration the following key attributes of cyber security:

Confidentiality - The ship and port systems and the associated processes should be designed, implemented, operated and maintained so as to prevent unauthorised access to systems and information.

Integrity - The ship and port systems and the associated processes should be designed, implemented, operated and maintained so as to prevent unauthorised alterations being made to assets, processes, system state or the configuration of the system itself.

Utility - The ship and port systems and the associated processes should be designed, implemented, operated and maintained so that the use of assets is maintained throughout their lifecycle.

Authenticity - The ship and port systems and the associated processes should be genuine and not tampered with or modified, while the authenticity of components, software and data within the systems must be verified.

Availability - The ship and port systems, information and the associated processes should be consistently accessible and usable in an appropriate and timely fashion.

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502 Boyes et al., "IET Code of Practice Cyber Security for Ships" (n 3)
Safety - The ship and port systems and the associated processes should be designed, implemented, operated and maintained so as to prevent the creation of harmful states which may lead to injury or loss of life, or unintentional physical or environmental damage.

Resilience - The ship and port systems and the associated processes should be designed, implemented, operated and maintained so as to ensure the ability of systems and information to transform, renew and recover in a timely manner in response to adverse events.

Possession - The ship and port systems and the associated processes should be designed, implemented, operated and maintained so as to prevent unauthorised control, manipulation or interference.

Given that a large proportion of security breaches is caused by poor processes and people, it is not sufficient to merely protect the physical and technical aspects of a system, but people and processes related to the technological systems, for which cyber security measures are required, should also be considered in the process of deciding upon the appropriate and proportionate mitigation measures to be implemented. When choosing mitigation measures, a balance needs to be struck on a case-by-case basis between optimum risk reduction and the overall impact on the operation of the ship or port/port facilities.

A framework for the identification of the necessary security measures should involve, as a minimum, the following parameters:

Personnel - People are often the weakest element in any secure system or operation and therefore security measures on the personnel should be implemented at the first stage of the security process. For example, personnel with privileged access to the systems (e.g. administrative, engineering or technical support) should be subject to pre-employment/pre-contract security screening and vetting checks, with appropriate ongoing monitoring.

Process – Appropriate policies and supporting processes should be in place to ensure that all access to the systems is monitored and logged, and that personnel with access credentials to sensitive systems and controlled spaces are supervised in case they were not previously subjected to screening and background controls.

Physical Security – In order to enhance the achievable level of cyber security, it is important to have in place physical security measures able to prevent unauthorised access to sensitive systems, such as systems fulfilling critical safety functions, IT equipment storing or processing sensitive information, security and control systems; prevent theft of, or damage to IT equipment, storage media, or critical data; protect network and communications infrastructure from accidental damage, deliberate/malicious damage, tampering or denial of service; protect utilities and systems required to operate the network and communications infrastructure, and maintain a safe and secure cyber environment.

Technical Security – Appropriate protection should be provided to prevent IT control and security systems getting infected with malware (e.g. software updates on USB memory sticks or diagnostic software on laptop or tablet devices); protect data whilst at rest, in use or transit (e.g. encryption technologies); ensure that critical security systems operate over a segregated infrastructure where possible.
Overview

The legal framework surrounding the security requirements in the context of the security of network and information systems and the protection of personal data, both at the EU and UK level, primarily refers to the implementation of appropriate technical and organisational measures, which should be proportionate to the level of security risk posed to the cyber environment. Based on the premise that security requirements should be proportional to the risks inherent in the organisations’ activities, the law opts for a risk-based approach to compliance allowing organisations to exercise discretion and flexibility in assessing how to address their compliance responsibilities. Given that risk varies across industries, instead of imposing a one-size-fits-all approach, the law promotes a nuanced approach, according to which organisations are free to adjust protection measures to their business model and devote more resources to the operations considered to raise the most serious threats. The notion of risk should be conceived in relation to the consequences a feared situation would entail not only in terms of the rights and freedoms of individuals but also to the organisation itself (e.g. financial, reputational, and litigation risks, or corporate opportunity risks associated with the organisation’s business and profit objectives). The actual risk level should be assessed considering the likelihood (i.e. the likelihood of a risk or its impact to materialise) and severity (i.e. the magnitude of the risk or its impact in case it materialises) of the risk presented. In other words, the question to be answered is whether there is a significant possibility that the particular threat could lead to the particular harm with a significant degree of seriousness. In determining the appropriate level of security, the assessment and analysis procedures performed need to take into account certain high level security principles as reflected in the relevant laws and regulations. These principles describe the mandatory security outcomes to be achieved and are supplemented by more detailed sector-specific guidance. The high level security principles in line with which the choice and implementation of the appropriate security measures should be made are the following:

Risk Management: Establishing and maintaining an effective governance and risk management framework requires taking the necessary steps to understand the

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relevant types of threats (e.g. online attackers, insider threats or accidental threats) as well as the potential system vulnerabilities that the identified threats might take advantage of (e.g. technical vulnerabilities, misuse of legitimate processes). Risk assessment allows an objective decision-making process as it offers a means of determining which assets are in scope and which security measures are appropriate for the risks presented, and should be regularly updated to tailor cyber security policies to the current risks and relevant threats.

**Asset Management:** Managing security risks requires a clear understanding of service dependencies, that is, physical assets, software, data, staff, supporting infrastructure, which should be identified and recorded.

**Security Policy:** Establishing and maintaining an appropriate security policy requires putting in place and documenting clear governance structures with well-defined lines of responsibility and accountability.

**Security of Supplies:** The physical and environmental security of systems and services requires establishing and maintaining policies that ensure the accessibility and, where applicable, the traceability of critical supplies supporting the provision of systems and services.

**Security of Servers & Applications:** Examples of security measures might include using vulnerability detection tools when software is being executed on servers, updating applications when critical flaws have been identified, taking precautions in the event of software installation, utilising personalised account identifiers to access databases, refraining from operating servers housing databases used for other purposes.

**Systematic Management of Network & Information Systems:** Effectively protecting network and information systems against attacks that seek to exploit software vulnerabilities involves minimising opportunities for successful attacks by actively managing software vulnerabilities, controlling connectivity and minimising services available. To this end, software and associated permissions should be limited for legitimate purposes, software should be up-to-date with security patches applied and well configured (e.g. by changing default passwords or disabling services not required). Devices and technical infrastructure should be protected from physical interference or tampering that could undermine the security of network and information systems. In addition, unauthorised devices should be prevented from accessing the network (e.g. by using device authentication or disabling network ports by default).

**Security of Communications:** Appropriate security mechanisms should be in place to guarantee the confidentiality, integrity and authenticity of communications, such as measures preventing unauthorised access to data (e.g. through unauthorised access to devices containing data or interception of data in transit) or ensuring the authentication of servers. Data at rest on a device should be protected both physically and through technical means, such as encryption, pseudonymisation or even anonymisation, while all technology components should be managed through the entire lifecycle of data. It is essential to ensure that data in transit, especially sensitive data, is protected by physically protecting the network infrastructure or preventing data from being read or interfered with by deploying cryptographic means (e.g. using an appropriate VPN for remote access), while security critical data such as passwords and private keys should not be disclosed or tampered with.

**Identity & Access Control:** Rights or access granted to specific users or functions should be understood, well managed and periodically reviewed and technically removed when no longer required. Users (or automated functions) with access to data
or services, both physical and logical access, must be appropriately verified, authenticated and authorised (e.g. using two-factor or hardware authentication).

**Incident Handling:** Well defined and tested incident management processes should be in place that minimise the impact of security incidents. Examples of such processes might include detection processes that ensure adequate awareness of anomalous events, processes on reporting security incidents and identified weaknesses and vulnerabilities, documented processes reporting the results of the measures taken, assessing the incident's severity, and collecting relevant information likely to serve as evidence.

**Business Continuity Management:** Appropriate contingency plans should be established and used in order to maintain or as appropriate restore the delivery of services at acceptable predefined levels following a disruptive incident. Resilience against cyber-attacks and system failure must be built into the design, operation, implementation and management of network and information systems in order to ensure that they are well maintained and administrated through life. Examples of security measures might include manual failover processes, critical data backup, critical system redundancy, rate-limiting access to data or service commands, DDoS protection, protected power supply.

**Monitoring, auditing and testing:** An effective monitoring strategy requires that the security status of networks and systems is regularly monitored in order to detect potential security problems and assess the effectiveness of the security measures. Besides the collection of logs, the implementation of appropriate tools able to correlate events and discover anomalous activities is necessary (e.g. inspection and verification mechanisms that check whether standards are being followed, records are accurate and efficiency targets are being met). Given that cyber threats are rapidly evolving, while systems and services change, it is essential that cyber security is conceived as a continuous activity and therefore the effectiveness of the security measures in place needs to be assured throughout the delivery and operational lifecycle of a system or a service.

### 3.2. Compliance with technical standards

Most laws, regulations and guidelines encourage organisations to comply with widely accepted technical standards adopted by European bodies, such as the European Standards Organisations, or international bodies, including the International Organisation for Standardisation (ISO), the International Telecommunication Union (ITU) or the International Electrotechnical Committee (IEC). In this context, the term 'standard' refers to a technical specification (i.e. a document describing the technical requirements to be fulfilled by a product, process, service or system), which is adopted by a recognised standardisation body for continuous or repeated application, and the compliance with this specification is voluntary. In terms of information security management, the ISO and the IEC have developed and published the ISO/IEC 27000 family of mutually supporting information security standards in order to provide a globally recognised framework for the best practices in this field. In particular, the ISO/IEC 27001 standard provides general guidance on the establishment, operation and maintenance of an information security management system (ISMS).
and encourages companies to implement a holistic approach to security management which should encompass technology, processes and people, while also setting out requirements for the assessment and treatment of information security risks. In order for the companies to select controls within the process of implementing an ISMS based on the ISO/IEC 27001, the ISO/IEC 27002 standard provides guidelines to the companies with respect to the selection, implementation and management of security controls; in particular, the guidance provided refers to, among others, the organisation of information security, human resources security, asset management, access control, physical and environmental security, operations security, communication security, information security incident management, information security aspects of business continuity management, and compliance with legal and contractual requirements. In addition to these two primary security standards, a large number of more specific standards have been developed to get organisations familiar with the most effective security techniques. For example, issues of network security are addressed by the ISO 27033 standard, application security is covered by the ISO 27034 standard, and storage security issues are covered by the ISO 27040 standard; guidance on business continuity and incident management is provided by the ISO 27031 and ISO 27035 standards, respectively; security issues relating to cloud services are addressed by the ISO 27017 and 27018 standards.

Additional obligations concerning the processing of personal data

3.3.1. Personal data in the STM context

The EU law distinguishes the security requirements depending on whether the data processed is considered to be ‘personal data’ or not as the processing of personal data triggers the application of stricter obligations. Pursuant to GDPR Art.4(1), the term ‘personal data’ encompasses “any information relating to an identified or identifiable natural person (‘data subject’),” while the term ‘identifiable’ is further explained to include any person “who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data, online identifier or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that person.” Looking at the data exchanged through STM, it seems that they are primarily associated with a vessel rather than a natural person, which means that data protection requirements are not applicable in terms of the information exchanged between data providers and data consumers for the purposes of route optimisation, port call synchronisation or enhanced monitoring. More specific, each information object exchanged relating to a voyage or port call contains a unique identifier as reference identifying the voyage or port call through its lifetime. The syntax of the identifier does not reveal specific information about the actors if the actors involved do not approve but it may provide reference to where actors can seek specific information regarding a voyage or a port call, if authorised to access such information. Examples of information exchanged for such purposes include destination port, location, port call data port-related information); waypoints, times of arrival (estimated or planned) which constitute a route (route-related information); blocks with general information about the area, information types linked with geofeature objects by

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507 Regulation (EU) 2016/679 of the European Parliament and Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC.
508 Document: Unique Identifiers in STM.
association (navigational warnings), set of points with geographical coordinates (area-related information).\footnote{Document No: STM_D4.1.2-1 Title: STM Act2 SeaSWIM Testbed Specification (including STM Standard Data Models).}

In order, however, to be able to exchange such information, the SeaSWIM architecture requires that STM users (data/service providers and data/service consumers) have first gone through the authentication process. In other words, STM users need to verify their identity to make use of its services. The authentication factors for human users are usually knowledge factors, such as username or password, whereas ownership factors, such as certificates, are used for machine users. For instance, a digital certificate certifies the ownership of a public key by the named subject of the certificate, e.g. creating a certificate for a vessel, which can serve to certify that a given document was indeed signed by someone in possession of the certificate issued to that vessel. Each authentication factor covers a range of elements used to authenticate or verify an identity prior to being granted access, approving a transaction request, signing a document or other work product, granting authority to others, and establishing a chain of authority.\footnote{Viktoria Swedish ICT, KRISO, ETRI, Frequentis, OFFIS and Danish Maritime Authority, “Identity Management and Cyber Security – Working Document”, IALA. Available at: http://maritimecloud.net/docs/Identity%20Management%20and%20Cyber%20Security.pdf.}

When an STM user uses the ID registry, which enables identity management and authentication mechanisms, the user opens up a web-based service ('Relying Party'). Once the user clicks log in with Maritime ID, the Relying Party redirects the user to an Identity Provider in which the user has registered his login information; only the Identity Provider receives the user’s login details. After the user logs in and gives his consent for transferring his information back to the Relying Party, the Identity Provider redirects the user back to the Relying Party with an authentication code. Then the Relying Party asks the Identity Provider to validate the authentication code and the latter replies with a set of tokens that contains information about the user.\footnote{Ibid.}

Examples of information sent for authentication purposes include the full name and the email of the user, the ID of the organisation is a member of, a list of permissions for this user assigned by that organisation. In case the identity to be verified belongs to a human user and the information processed results in that user being identified or identifiable (if the information falls under one of the aforementioned categories), then those in charge of processing the personal information (e.g. the ID provider in the case of the ID registry) are subject to stricter security obligations.

3.3.2. Obligations triggered by high-risk processing activities

To begin with, the Regulation imposing security requirements on the processing of personal data provides examples of processing activities that qualify as potentially risky, such as the processing of a large amount of data affecting a large number of individuals, the processing of special categories of data, the processing of the personal data of vulnerable natural persons etc.; this list of risky operations is not exhaustive and hence organisations ought to consider other possible risk elements in each case based on context. When considering the potential threats in a risk-based environment, particular attention must be placed on the use of information, which poses the greatest threat, such as the use or storage of inaccurate or outdated data. As with the risky processing activities, the assessment of potential threats should also be contextual,
which means that context needs to be recognised as an important factor in determining the level of threat and its potential to cause harm. Potentially risky processing activities might present two types of harms – material or non-material damage. The first category of damage can be conceived as any tangible, physical or economic harm to the individuals, such as financial loss, bodily harm, loss of freedom of movement, whereas the second category refers to the intangible distress caused to individuals which may entail unacceptable intrusion into private life, deprivation of control over personal data, reputational harm etc.

The Regulation organises the security requirements adopting two different approaches to the concept of risk. On the one hand, it conceives risk sequentially, which means that data controllers are obliged to adopt stronger data protection measures as their data processing poses increased possibilities of harm. On the other hand, in contrast to a threat model based on a continuum, in certain cases the Regulation divides risk into two mutually exclusive categories – risk and high risk. The significance of this distinction lies in the fact that data processing operations which involve high risk trigger additional compliance obligations513 and thus the identification of the amount of risk and the question of which category a certain operation falls into are matters of crucial importance. As far as the second approach is concerned, the extent of the threat that different processing operations raise to individuals’ rights and freedoms plays a crucial role in determining whether a certain processing activity will be regarded as involving high risk and thus will trigger additional compliance obligations, or it will be seen as raising lower risks to the fundamental rights and freedoms of individuals and, as a consequence, will result in fewer compliance obligations.

To further clarify the meaning of high-risk processing, the Regulation provides guidance on what may constitute high-risk processing by giving examples of the characteristics of potentially high-risk processing operations, which should, however, be viewed by organisations as being part, not the only features, of a risk assessment process. Hence, types of processing likely to result in high risk include processing activities where new technologies are used, activities that are of a new kind and where no data protection impact assessment has been carried out before by the controller, as well as activities that become necessary in the light of the time that has elapsed since the initial processing.514 The Regulation also establishes the following ‘default’ high-risk categories of processing operations: the systematic and extensive evaluation of personal aspects relating to natural persons which is based on automated processing, including profiling, and on which decisions are based that produce legal effects concerning the natural person or similarly significantly affect the natural person; the processing on a large scale of special categories of data and of personal data relating to criminal convictions and offences; and the systematic monitoring of a publicly accessible area on a large scale.515

The Regulation imposes specific obligations on data controllers516 that are triggered only in cases of high-risk processing. First, in the case of the aforementioned ‘default’ high-risk processing operations, the Regulation imposes an additional obligation on data controllers, which lies in carrying out an assessment of the impact of these

513 GDPR Art.34-36
514 GDPR Art.35(1)
515 GDPR Art.35(3)
516 GDPR Art.4(7) defines data controller as “the natural or legal person, public authority, agency or other body which, alone or jointly with others, determines the purposes and means of the processing of personal data”.
operations on the protection of personal data prior to the processing and after consulting the relevant data protection officer.\(^{517}\) A data protection impact assessment is also required when processing involves the use of new technologies as long as the processing activity is likely to result in a high risk to the rights and freedoms of individuals having regard to the nature, scope, context and purposes of the processing.\(^{518}\) In addition to the requirement for conducting a data protection impact assessment in cases of high risk processing, the Regulation obliges controllers to also seek formal advice from the responsible supervisory authority before processing personal data in case the impact assessment indicates that the processing would result in a high risk in the absence of measures taken by the controller to mitigate the risk.\(^{519}\) Finally, according to the data breach notification requirement, data controllers ought to notify not only the responsible supervisory authority, but also disclose the breach to the data subject without undue delay when the breach is likely to result in a high risk to the rights and freedoms of natural persons.\(^{520}\)

3.3.3. Data protection by design and by default

The Regulation requires data controllers to implement the appropriate technical and organisational measures not only at the time of the processing itself but also at the initial stage of determining the means of the processing. Data protection by design encourages organisations to prevent security risks by embedding data protection features into the systems used for processing both in the beginning of the design process and throughout the lifecycle of the process development in order to ensure that the processes put in place remain relevant as risks to data evolve.\(^{521}\) Under the principle of data protection by default, data controllers should provide data subjects with the highest level of data protection and it should be left to the data subject’s discretion to erode the level of protection by explicitly opting out of certain safeguards.\(^{522}\) In this regard, only personal data necessary for a specific purpose should be processed and by default only be kept for the amount of time necessary for the provision of the service. Moreover, data protection by default prohibits the provision of services that by default make personal information accessible to an indefinite number of people.

3.3.4. Data breach notification requirement

The notification obligation is triggered in the case of a security breach that results in personal data (stored, transmitted, or otherwise processed) being lost, altered, destroyed. In addition, a personal data breach can also occur when someone other than the data controller gets unauthorised access to the data, either accidentally or unlawfully.\(^{523}\) In such cases, the data controller is obliged to notify the personal data breach to the competent supervisory authority without undue delay and, where feasible, within 72 hours after having become aware of the breach.\(^{524}\) The notification requirement is mandatory on the condition that the breach is likely to result in “a risk to the rights and freedoms of natural persons.”\(^{525}\) In case there is possibility that the

\(^{517}\) GDPR Art.35(2)
\(^{518}\) GDPR Art.35(1)
\(^{519}\) GDPR Art.36(1)
\(^{520}\) GDPR Art.34(1)
\(^{521}\) GDPR Art.25(1)
\(^{522}\) GDPR Art.25(2)
\(^{523}\) GDPR Art.4(12)
\(^{524}\) For further details see GDPR Art.33(3-5)
\(^{525}\) GDPR Art.33(1)
breach involves a high risk to the individuals, the data controller should also communicate the breach to the data breach, as analysed at the end of Section 3.3.2.

3.3.5. Accountability obligation

According to the principle of accountability, data controllers are required to implement a range of measures that not only ensure compliance with their obligations under the Regulation but also enable them to objectively demonstrate such compliance. In the security context, it may be possible to demonstrate adherence to the data protection principles by signing up to a code of conduct or becoming certified. Accountability mechanisms such as codes of conduct and certification mechanisms clarify exactly what the general requirements of the Regulation mean; for instance, they can provide guidance on what security measures are considered appropriate in terms of a certain processing activity.\textsuperscript{526} Hence, adherence to such mechanisms enables organisations to demonstrate that they have implemented the appropriate technical and organisational measures to adequately protect the fundamental rights and freedoms of individuals. It should be noted, however, that adherence to certification schemes or codes of conduct should solely be viewed as one of the elements which demonstrate fulfilment of the security requirements and does not reduce the responsibility of the controller or the processor for compliance with the Regulation. In other words, even when controllers or processors implement widely recognised technical standards, which are used as benchmarks of the “appropriateness” and “state of the art” in the field of data security measures, it will still be necessary to check whether such security measures can sufficiently protect personal data in relation to the specific risks posed by the nature of the data concerned and the processing activity. Therefore, risks must be identified on a case-by-case basis and the effectiveness of the security measures should be constantly monitored in the specific environment.

Nonetheless, certification schemes and codes of conduct still have a significant role to play and that is why the Regulation encourages their adoption; not only do they provide a basis for organisations to build security policies upon and achieve their compliance objectives, but they also safeguard data subjects’ rights, thus providing a degree of confidence in the reliability of the systems accommodating their personal information. Some practical steps organisations could take to adhere to the accountability principle include, inter alia, the following: tracking the progress of codes of conduct and certification mechanisms,\textsuperscript{527} creating and maintaining detailed records of the processing activities and keeping them up to date; undertaking audits of all systems processing personal data;\textsuperscript{528} reviewing and updating the data protection policies; establishing a programme of ongoing monitoring of the processing carried out.\textsuperscript{529}

Criteria for Identifying the Actors In Charge of Complying with the Security Requirements

At the EU level, security requirements do not apply across the board and target specific actors, each one of which will be discussed below in order to identify the

\textsuperscript{526} GDPR Art.40-43
\textsuperscript{527} See e.g. ISO 27006 (Information technology – Security techniques – Requirements for bodies providing audit and certification of information security management systems).
\textsuperscript{528} See e.g. ISO 27007 (Information technology – Security techniques – Guidelines for information security management systems auditing), and ISO 27008 (Information technology – Security techniques – Guidelines for auditors on information security controls).
\textsuperscript{529} See e.g. ISO 27004 (Information technology - Security techniques - Information security management -Monitoring, measurement, analysis and evaluation).
criteria that need to be met for an actor to fall under the legal definition and thus be subject to the aforementioned security requirements. The relevant actors to be considered in the cyber security context are the following: providers of public electronic communications networks or publicly available electronic communications services; operators of essential services; digital service providers; and data controllers.

### 4.1. Providers of electronic communications networks and services

It is noteworthy that the security requirements laid down by the EU communications regulation mainly concern the providers of public electronic communications networks or publicly available electronic communications services, which will be discussed in the following section; on the contrary, there is no security obligation imposed upon the providers of private electronic communications and networks. At the UK level, both public and private providers of electronic communications networks and services must comply with the General Conditions drawn up and enforced by Ofcom under the Communications Act 2003, which is currently the main source of regulation for communications providers in the UK. These conditions contain a range of requirements and apply differently to different types of services depending on whether the service is available to the general public or only to a private group (e.g. bespoke services available to particular users within a company). Two conditions of relevance, which apply to both public and private communications providers, are the confidentiality obligation and the obligation to comply with certain technical standards. Condition 1 requires that information be used solely for the purpose for which it was supplied and imposes on communications providers the obligation to respect at all times the confidentiality of information, stored or transmitted. According to Condition 2, communications providers must comply with any relevant compulsory standards and specifications as are listed in the Official Journal of the European Communities for the provision of services, technical interfaces and network functions pursuant to Article 17 of the Framework Directive. In the absence of compulsory standards and specifications, communications providers should take full account of any relevant voluntary standards and specifications adopted by European or international standards organisations.

### 4.2. Providers of public electronic communications networks or publicly available electronic communications services


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4.2.1. Assessment of what constitutes an ‘electronic communications network’

Is the network a system for the conveyance of signals?

Does the system or system component constitute a fundamental precondition for the capacity to transmit signals?

An electronic communications network is any transmitter or transmission system (plus associated equipment, software and stored data) used to convey electronic signals (including sounds, images or data of any description). Pure transmission systems that translate between different kinds of identity (names, numbers or addresses) do not constitute their own electronic communications network as such, but may often be viewed as part of such a network. Other kinds of function that only simplify or improve the efficiency of the conveyance of signals normally fall outside the term ‘electronic communications network’. When assessing whether parts of the network should be included in the regulatory term ‘electronic communications network’, one should ask whether the part is essential in any way for effecting the conveyance of signals within or between networks, regardless of the part of the network involved and where it is schematically situated. One example of a part of the network that represents a fundamental precondition for the conveyance of signals is the transmission medium itself, which may also be a passive fibre network (‘dark fibre’). It may be part of the access network and/or the transmission network.\textsuperscript{531}

4.2.2. Assessment of what constitutes an ‘electronic communications service’

Is the service provided to another (external) party?

Is the service normally provided for remuneration?

Does the service consist mainly in the conveyance of messages (“signals”) by means of an electronic communications network?

An electronic communications service is a service conveying signals over an electronic communications network on the condition that the service provider has control (through ownership or agreement) over the signal, and thereby has influence over factors such as, for instance, transmission and quality. If the service has been designed so that it comprises several sub-services where one of the sub-services includes the conveyance of signals, which is a prerequisite for being able to offer the other sub-services, the entire service (that is, including all sub-services) shall be characterised as mainly comprising the conveyance of signals. Given that any service other than those consisting in the conveyance of signals is outside the scope of the legal definition, it is not unusual for any service or application to have the conveyance elements of the service or the application subject to regulation as ‘electronic communications services’, whereas the content of those service or applications is not

because the legal definition excludes content services, that is, services that involve supplying material or exercising editorial control over content.

One key precondition for enabling communication via an IP-based network is that every terminal connected to such a network is linked to an IP address. Usually, it is the stakeholder providing the communications service (e.g., the Internet service) that also provides the IP addresses for the end users' terminals and thereby enables communication. Furthermore, it is often the stakeholder providing IP addresses that also enables the transmission of IP packets through routing. Accordingly, the party providing IP addresses usually controls the conveyance of signals. The provision of IP addresses is thereby a circumstance that suggests that the provider of the service has control over the conveyance of signals and that the service provider is consequently providing an electronic communications service. Communication in an IP-based communications network can be divided into different levels in the TCP/IP model. The lower levels represent the physical infrastructure, systems, protocols, routing and addressing for the actual transmission of packets, regardless of the information contained in the packet. These packets can then be used by other services/applications that ‘fill’ the packet with information. These services/applications work in the levels above the basic communication level and use the capacity of the basic communication level to transmit the packet without having to interact with it. Consequently, as regards function, the overlying services/applications can expect the basic communication level to work. For this reason, stakeholders providing services that only use functions at the upper levels do not have to have any relationship with the stakeholders providing services that apply to the lower levels of the TCP/IP model. Stakeholders providing services that only use functions at the upper levels consequently do not usually have any control over the conveyance of signals. Therefore, those types of services which only involve communication over a pre-existing electronic communications service should not fall within the definition. 532

4.2.3. Assessment of what constitutes a ‘public electronic communications network or publicly available electronic communications service’

Is it possible for a wide range of users to connect to the network?

Is the service provided openly on the market and not just to a predetermined user group?

4.2.4. Assessment of what constitutes a ‘provider of electronic communications networks and services’

Is the party providing the network or service the stakeholder that concludes a contract with another party for use of the network or service and who at the same time controls the communications network or service through ownership or contract?

Does the party providing the network or the service sell communications services or access to communications networks at a wholesale level?

The law draws no distinctions based on ownership of the network; the provider of a network or a service may own the underlying network or facilities but may also rent some or all of them. Where more than one organisation might be considered to be involved in the provision of the network, responsibility for complying with any legal

requirements would depend on which of those organisations had control over the facilities to which the requirement relates. The provider of an electronic communications service is generally the organisation with a contractual relationship with the end user or, in the case of wholesale services, with the reseller or other intermediary for the provision of such services. The term ‘provider of an electronic communications service’ does not include telecoms equipment providers or content providers (when the service provider exercises editorial control over material or provides material for transmission), although some communications carriage providers also provide content services. To the extent a platform allows third parties to provide material for transmission, it will not be a content service and thus may be an electronic communications service. This means that service providers are not limited to network-layer infrastructure; they may include internet service providers who allow electronic messages to be sent.

4.2.5. Assessment of what constitutes an ‘electronic communications service’ under the proposed e-Privacy Regulation and the proposed Directive establishing the European Electronic Communications Code

A new definition is provided for ‘electronic communications services’ by the proposed – that is, not yet in force – e-Privacy Regulation (ePR) and Directive on the European Electronic Communications Code (EECC). More specific, the proposal for an ePR uses the definition of the term ‘electronic communications service’ set forth in the draft Directive on the EECC. According to the latter, in order for a service to fall within the scope of the legal definition, it should be “normally provided for remuneration” and belong to one of the following types of services:

- Services consisting wholly or mainly in the conveyance of signals
- Internet access services, that is, “publicly available electronic communications services that provide access to the internet, and thereby connectivity to virtually all end points of the internet, irrespective of the network technology and terminal equipment use.”
- Interpersonal communications services, which are defined as services enabling “direct interpersonal and interactive exchange of information via electronic communications

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533 Practical Law Media and Telecoms, “Telecoms: A Quick Guide”. Available at: https://uk.practicallaw.thomsonreuters.com/9-503-2464?
534 ICO, Guide to PECR: Key Concepts and Definitions (n 41)
537 Draft ePR Art.4(1)(b)
538 "In the digital economy, market participants increasingly consider information about users as having a monetary value. (...) The concept of remuneration should therefore also encompass situations where the end-user is exposed to advertisements as a condition for gaining access to the service, or situations where the service provider monetises personal data it has collected” (Recital 16 of the draft ECC).
539 Draft ECC Art.2(4)
networks”, and include all types of email and messaging services as well as group chats. A service must meet the following criteria to fall within the scope of the definition provided in Art.2(5) of the draft ECC:

The communication must be transmitted to a finite, that is to say not potentially unlimited, number of natural persons.

The number of persons between which the communication takes place must be determined by the sender of the communication.

Interactive communication entails that the service allows the recipient of the service to respond.\(^{542}\)

**Examples of services meeting the above criteria:** messaging services (e.g. WhatsApp), web-based email services (e.g. Gmail) and Voice over IP services (e.g. Skype).

**Examples of services not meeting the above criteria:** linear broadcasting, video on demand, websites, social networks, blogs, or exchange of information between machines.

Despite the adoption of a common definition of the term ‘electronic communications services’, there is one important point where the proposed ePR deviates from the draft Directive on the EECC in terms of the definition of ‘interpersonal communications services’. Whereas the ePR proposal (Recital 11) states that ‘interpersonal communications service’ shall include services which enable interpersonal and interactive communication merely as a minor ancillary feature that is intrinsically linked to another service (e.g. instant messaging features within a game, where players can directly communicate), which means that consumers using these communications channels will also be protected by the principle of confidentiality of communications (Art.5), the proposed Directive excludes from its scope the interpersonal and interactive and communication facility that is a purely ancillary feature to another service and cannot be used without that principal service (Recital 17). However, there seems to be broad support for the inclusion of ancillary services so that common minimum standards can be guaranteed when it comes to the security of networks and services, as well as the privacy of end-users. Indeed, the Article 29 Working Party\(^{543}\), the EDPS\(^{544}\), and both the EU Parliament’s Committee on Industry, Research, and Energy\(^{545}\), and the Committee on Civil Liberties, Justice and Home Affairs\(^{546}\), all


welcome the idea of ancillary services to be considered as interpersonal communications services.

4.3. Operators of essential services


Does the entity provide a service which is essential for the maintenance of critical societal and/or economic activities?

Does the provision of that service depend on network and information systems?

Would an incident have significant disruptive effects on the provision of that service?\(^{547}\)

In assessing whether a public or private entity provides a service which is essential for the maintenance of critical societal or economic activities, account should be taken of certain factors indicative of its significance in relation to the sector concerned, such as the number and the size of the entity in terms of the market share or the quantity produced or carried. The NIS Directive provides a list of examples of what types of services should be considered essential in different sectors. As far as the domain of maritime transport is concerned, operators of essential services might include harbour authorities, operators of Vessel Traffic Services (VTS) and operators of port facilities (at ports with annual passenger number greater than 10 million, for example, in the case of the UK), water transport companies (which, for example, have more than 2 million total annual passengers at UK ports).\(^{548}\) In the water transport sector, the security obligations imposed on VTS, ports, port facilities, ships and companies cover all operations, including computer networks and systems, as well as radio and telecommunication systems. Furthermore, in order to assess whether an entity meets the third identification criterion, account should be taken of the factors indicative of the impact of a potential incident\(^{549}\) on the provision of its services, such as the number of users relying on that service for private or professional reasons, the market share of that entity, the importance of the entity for maintaining a sufficient level of the service, the dependency of other operators of essential services on the services provided by that entity. For instance, a parameter to be considered when assessing that impact, in terms of its degree and duration, is the time likely to elapse before the discontinuity would start to have a negative impact.

4.4. Digital service providers


\(^{547}\) NIS Directive Art.4(4), Art.5(2), Annex II


\(^{549}\) NIS Directive Art.5(c) defines incident as any event having an actual adverse effect on the security of network and information systems.
Is the service provided an online marketplace?
Is the service provided an online search engine?
Is the service provided a cloud computing service?\textsuperscript{550}

In order to clearly identify the actors that will fall within the legal definitions, additional conditions need to be met. First, an online marketplace, that is, a platform that acts as an intermediary between sellers and buyers facilitating the sale of goods and services, is in scope as long as sales are made on the platform itself, as opposed to the cases where websites redirect users to other services to complete the final transaction or sell directly to consumers.\textsuperscript{551} For example, online stores that digitally distribute software programmes or applications from third parties are to be considered as being a type of online marketplace.\textsuperscript{552} Second, when a website offers search engine facilities - digital services that allow users to perform search of websites on the basis of a query and return links related to the requested content – but those facilities are powered by another search engine, then the underlying search engine should also meet the requirements laid down in the law.\textsuperscript{553} Third, in order for an entity to fall within the legal definition of a cloud computing service, it should offer one or more of the following types of services:\textsuperscript{554} i) *Infrastructure as a Service (IaaS)* refers to the delivery of virtualised computing resource (e.g. server space, storage space, network connections, IP addresses) as a service across a network communication to the users who are then granted access to the resource to build their own IT platforms; ii) *Platform as a Service (PaaS)* service provide developers with environments on which they can build applications that are delivered over the Internet, often through a web browser; iii) *Software as a Service (SaaS)* is a software delivery model in which applications are hosted, usually by a provider, and made available to customers over a network connection.\textsuperscript{555}

4.5. Data controllers

Regulation 2016/679 of the European Parliament and Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (GDPR)

Art.4(7) of the GDPR defines *data controller* as “the natural or legal person, public authority, agency or other body which, alone or jointly with others, determines the purposes and means of the processing of personal data.” Data controllers are usually organisations, but can also be individuals or other corporate and unincorporated

\textsuperscript{550} NIS Directive Art.4(5) & Annex III
\textsuperscript{551} UK Department for Digital, Culture, Media and Sport, “Security of Network and Information Systems - Public Consultation” (n 58)
\textsuperscript{552} NIS Directive Recital 15
\textsuperscript{553} UK Department for Digital, Culture, Media and Sport (2017) Security of Network and Information Systems - Public Consultation (n 58)
\textsuperscript{554} Ibid.
\textsuperscript{555} NIS Directive Art.4(5) & Recital 17
bodies of individuals. The key criterion for identifying the data controller is answering the question of who exerts overall (or a great degree of) control over the purpose (‘why’) and the manner (‘how’) of a data processing activity, as well as the content of the personal data. The aforementioned definition provides flexibility in the way data controllers can work together when processing personal data; for instance, one may partly control the purpose of the processing whilst being mainly responsible for controlling the manner of the processing. It is important to distinguish the notion of data controller from that of data processor, which processes the personal data on behalf of the controller (Art.4(8)), and therefore less legal obligations are imposed upon him. Even though the data processor can have some discretion about the details of implementing data processing (e.g. the technical aspects of how a particular service is delivered), overall responsibility of the processing remains with the data controller. Hence, overarching decisions that can only be taken by the controller are associated with, for example, the legal basis for collecting personal data in the first place, the content of the data to be collected, the purposes the data are to be used for, the individuals to collect data about, the retention period of the data, data disclosure etc. By contrast, the areas where data processor is allowed to exercise control are mostly related to the details of carrying out a data processing operation, such as the IT systems or methods to be used for data collection, the means used to transfer, retrieve, dispose or delete the data.

Preliminary Assessment of the SeaSwim Architecture and STM Actors

In an attempt to apply the different categories defined in the foregoing section to the STM context, this section maps, where feasible, the SeaSWIM components and STM actors to the legal definitions. Given that the STM validation project is still in progress, which entails that certain functions or technical details are not yet clearly defined, it should be noted that the assessment conducted is merely a preliminary assessment subject to review. In this regard, the questionnaire provided below in Annex I can serve as guidance for the developers of the project in order to appraise, from a technical perspective, whether the components and actors at stake could fall within the legal definitions of the actors to which security obligations are imposed by the EU legislation.

Electronic communications services

As analysed above, the current EU legal framework on the providers of publicly available electronic communications services only applies to services in charge of the actual transmission of the TCP/IP packets without covering services or applications carrying the content of the packets. In this regard, STM services conveying signals over an electronic communications network could potentially fall within the legal definition on the condition that providers of such services exercise actual control over the conveyance of the signals. There is, however, another element of the definition which renders the application of the relevant EU laws to the STM context problematic. The fact that the service provided must be ‘publicly available’ means that it should be available to anyone who is willing to both pay for the service and comply with the conditions of its provisions; in other words, the term should be interpreted to mean that there is a general opportunity to connect to the service and that the use of the service

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557 Ibid.
is not restricted to a predetermined user group. A crucial factor in assessing if a service is publicly available is whether a previous relationship between the provider and the user of the service is required for the communication service to be available. In the STM context, one of the main principles is that only authenticated users can use STM services, which implies that users should meet certain criteria set in the authentication process and, as a result, it can be argued that they fall outside the scope of the current legal definition.

Operators of essential services

The significance of the services provided by certain STM actors for the maintenance of critical societal and economic activities is demonstrated by the fact that the entities providing such services are included in the list of essential services of the NIS Directive. In fact, operators of Vessel Traffic Services (VTS), ships, ports, and port facilities are explicitly mentioned as examples of operators of essential services in the water transport domain. Moreover, the aforementioned STM actors also appear to meet the second identification criterion of the legal definition since the provision of their services depends on network and information systems, that is, systems that fall under one of the following categories: electronic communications networks (as explained in Section 4.2.1); any device or group of interconnected or related devices; or data stored, processed, retrieved or transmitted by elements covered by one of two former categories (Art.4(1)). The question that remains to be answered, so that STM actors qualify as operators of essential services according to the requirements laid down in the law, is associated with the impact on the provision of these services of an event affecting the security of network and information systems. Taking into account the various cross-sectoral factors that determine whether the disruptive effect caused by an incident is significant or not, prima facie, it seems that STM operators of VTS, ships, ports and port facilities could be caught by the legal definition on the following grounds: i) the number of users relying on these STM services is estimated to be considerably large considering not only the directly affected stakeholders but also the total amount of users relying on STM services, which might also affect the geographical spread of an incident; ii) the impact of a potential incident, in terms of degree and duration, is likely to affect many activities depending on the services provided by STM actors since the discontinuity of services might entail severe consequences (e.g. reliance on falsified data may lead to a close-quarters situation or even a collision); iii) given that the STM is one of the largest e-Navigations projects in the world at the moment, the market share of STM actors would be arguably considerable.

Digital service providers

Application Service Providers (ASPs), which remotely host and manage software applications, could be characterised as digital services according to the definition provided in the NIS Directive and, more specific, they may qualify as cloud computing services. ‘Applications as a service’ refers to the delivery of software applications via the Internet; in this way, ASPs maintain and distribute software for all users at a single point – the cloud. This service model of software delivery is also referred to as SaaS (Software as a Service) or on-demand software and constitutes one of the three main

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559 The same holds true as regards the regulatory term ‘providers of public networks’, which requires that a wide range of users should be able to connect to the network.

560 In contrast to the EU law, STM electronic communications services fall within the definition of the respective UK law which applies to both public and private providers of electronic communications networks.

561 See Section 4.3
categories of cloud computing, alongside Infrastructure as a Service (IaaS) and Platform as a Service (PaaS). STM services that either deliver virtualised computing resources across a network communication so that the users build their own IT platforms (IaaS), or provide environments for building applications (PaaS), also qualify as digital service providers, and thus fall within the scope of application of the NIS Directive.

Data controllers

As explained above, the component of the SeaSwim architecture that validates user identities in order to enable them to provide and consume data and services within STM, that is, the Identity Registry, stores and processes information relating to the users for identity management and authentication purposes. The crucial factor in assessing whether the data protection legislation is triggered in terms of the Registry’s processing activities lies in distinguishing between human and machines users. In case of a human user, the details processed by the authentication mechanisms include information that can either identify or be used to identify a particular individual, such as the username and password that are usually used for login purposes. Besides the login details that are processed for authentication purposes, the Registry also stores information of authorised stakeholders to ensure confidentiality in information transfer processes, such as the full name or email of the user, which also qualify as personal data and are subject to stronger protection mechanisms. In addition to storing and processing personal information, the Registry also meets the third identification requirement of the regulatory term ‘data controller’ as it appears to determine the purposes and means of the processing of personal data.

Conclusions and Recommendations

As the above analysis has indicated, cyber security would be better conceived as a part of a holistic approach to protecting network and information systems as it involves a variety of parameters that need to be taken into account when assessing the appropriate security level required. Therefore, it is essential that the legal considerations described above are embedded in the development of the STM infrastructure so that all critical systems are designed in a way that complies with the relevant laws. The legal framework surrounding the security requirements in the context of the security of network and information systems primarily refers to the implementation of appropriate technical and organisational measures, which should be proportionate to the level of security risk posed to the cyber environment. Based on the premise that security requirements should be proportional to the risks inherent in the organisations’ activities, the law opts for a risk-based approach to compliance allowing organisations to exercise discretion and flexibility in assessing how to address their compliance responsibilities. Moreover, organisations are encouraged to comply with widely accepted European or international standards.

Particular emphasis should be placed on identifying the cases when personal data, as defined in the law, are transmitted, stored or processed because stricter security requirements are imposed on those handling personal data, who not only ought to abide by tighter security obligations but they must also demonstrate adherence to the data protection principles by signing up to a code of conduct or becoming certified. It is noteworthy that entities handling personal data are obliged to implement technical and organisational security measures not solely at the time of processing itself but also at the initial stage of determining the means of processing. In other words, these

562 See Section 4.4
entities are advised to prevent security risks by embedding data protection features into the systems used for processing both in the beginning of the design process and throughout the lifecycle of the process development in order to ensure that the processes put in place remain relevant as risks to data evolve. In addition, they should also provide data subjects with the highest level of data protection so that it is left to the data subject’s discretion to erode the level of protection by explicitly opting out of certain safeguards. Finally, the identification criteria provided in the above analysis should serve as guidance for mapping STM stakeholders to the legal definitions in order to precisely identify the relevant actors that bear the security obligations laid down in the EU and UK legal framework.
References


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Annex I
Questionnaire - Criteria for identifying the actors in charge of complying with the security requirements imposed by the EU legislation

Providers of Public Electronic Communications Networks
Is the network a system for the conveyance of signals?
Does the system or system component constitute a fundamental precondition for the capacity to transmit signals?
Is it possible for a wide range of users to connect to the network?
Is the party providing the network the stakeholder that concludes a contract with another party for use of the network and who at the same time controls the communications network through ownership or contract?
Does the party providing the network sell access to communications networks at a wholesale level?

Providers of Publicly Available Electronic Communications Services
Is the service provided to another (external) party?
Is the service normally provided for remuneration?
Does the service consist mainly in the conveyance of messages (“signals”) by means of an electronic communications network?
Is the service provided openly on the market and not just to a predetermined user group?
Is the party providing the service the stakeholder that concludes a contract with another party for use of the service and who at the same time controls the communications service through ownership or contract?
Does the party providing the service sell communications services at a wholesale level?

Operators of Essential Services
Does the entity provide a service which is essential for the maintenance of critical societal and/or economic activities?
Does the provision of the service depend on one of the following categories of network and information systems:
transmission systems, switching or routing equipment and other resources which permit the conveyance of signals by wire, by radio, by optical or by other electromagnetic means, including satellite networks, fixed (circuit- and packet-switched, including Internet) and mobile terrestrial networks, electricity cable systems, to the extent that they are used for the purpose of transmitting signals, networks used for radio and television broadcasting, and cable television networks, irrespective of the type of information conveyed; or
device or group of interconnected or related devices, one or more of which, pursuant to a program, perform automatic processing of digital data; or
digital data stored, processed, retrieved or transmitted by elements covered under points (i) and (ii) for the purposes of their operation, use, protection and maintenance?

Would any event adversely affecting the security of network and information systems have a significant disruptive effect on the provision of the service, taking into account, amongst others, the following factors: the number of users relying on the service; the geographic spread of a security incident; the impact of the incident on public safety and the economic and social activities; the dependency of operators of essential services in other sectors on the service; the market share of the entity providing the service; and the availability of alternative means for the provision of the service in case of a security incident?

**Digital Service Providers**

Is the service provided an online marketplace?

 Does the service act as an intermediary between sellers and buyers in order to facilitate the sale of goods and services?

Are the sales made on the platform itself?

Is the service provided an online search engine?

Does the service allow the user to perform searches of all websites on the basis of a query on a subject?

Is the search function of the service not limited to the content of a specific website or the price comparison between particular products or services aiming to redirect the user to a particular trader for the completion of the purchase?

Is the service provided a cloud computing service?

Does the service allow access to computing resources, such as networks, servers or other infrastructure, storage, applications and services?

Are the computing resources flexibly allocated by the cloud service provider in order to handle fluctuations in demand?

Are the computing resources provided from the same electronic equipment to multiple users who share a common access to the service?

Are the computing resources provisioned and released according to demand in order to increase and decrease resources available depending on workload?

**Data Controllers**

Do the data at stake identify or can be used to identify, directly or indirectly, a natural person (i.e. personal data such as name, identification number, location data, online identifier, data relating to the physical, physiological, genetic, mental, economic, cultural or social identity of an individual)?
Does the entity perform any of the following operations on personal data or on sets of personal data, whether by automated or non-automated means: collection, recording, organisation, structuring, storage, adaptation or alteration, retrieval, consultation, use, disclosure by transmission, dissemination or otherwise making available, alignment or combination, restriction, erasure or destruction?

Does the entity processing personal data determine the purposes and the means of the processing activities?

Annex II
Security obligations as formulated by the relevant EU laws

Article 13a
Security and integrity
1. Member States shall ensure that undertakings providing public communications networks or publicly available electronic communications services take appropriate technical and organisational measures to appropriately manage the risks posed to security of networks and services. Having regard to the state of the art, these measures shall ensure a level of security appropriate to the risk presented. In particular, measures shall be taken to prevent and minimise the impact of security incidents on users and interconnected networks.
2. Member States shall ensure that undertakings providing public communications networks take all appropriate steps to guarantee the integrity of their networks, and thus ensure the continuity of supply of services provided over those networks.
3. Member States shall ensure that undertakings providing public communications networks or publicly available electronic communications services notify the competent national regulatory authority of a breach of security or loss of integrity that has had a significant impact on the operation of networks or services.


Article 4
Security of processing
1. The provider of a publicly available electronic communications service must take appropriate technical and organisational measures to safeguard security of its services, if necessary in conjunction with the provider of the public communications network with respect to network security. Having regard to the state of the art and the
cost of their implementation, these measures shall ensure a level of security appropriate to the risk presented.

1a. Without prejudice to Directive 95/46/EC, the measures referred to in paragraph 1 shall at least:

— ensure that personal data can be accessed only by authorised personnel for legally authorised purposes,

— protect personal data stored or transmitted against accidental or unlawful destruction, accidental loss or alteration, and unauthorised or unlawful storage, processing, access or disclosure, and,

— ensure the implementation of a security policy with respect to the processing of personal data,

Relevant national authorities shall be able to audit the measures taken by providers of publicly available electronic communication services and to issue recommendations about best practices concerning the level of security which those measures should achieve.

2. In case of a particular risk of a breach of the security of the network, the provider of a publicly available electronic communications service must inform the subscribers concerning such risk and, where the risk lies outside the scope of the measures to be taken by the service provider, of any possible remedies, including an indication of the likely costs involved.

3. In the case of a personal data breach, the provider of publicly available electronic communications services shall, without undue delay, notify the personal data breach to the competent national authority.

When the personal data breach is likely to adversely affect the personal data or privacy of a subscriber or individual, the provider shall also notify the subscriber or individual of the breach without undue delay.

Notification of a personal data breach to a subscriber or individual concerned shall not be required if the provider has demonstrated to the satisfaction of the competent authority that it has implemented appropriate technological protection measures, and that those measures were applied to the data concerned by the security breach. Such technological protection measures shall render the data unintelligible to any person who is not authorised to access it.

Without prejudice to the provider's obligation to notify subscribers and individuals concerned, if the provider has not already notified the subscriber or individual of the personal data breach, the competent national authority, having considered the likely adverse effects of the breach, may require it to do so.

The notification to the subscriber or individual shall at least describe the nature of the personal data breach and the contact points where more information can be obtained, and shall recommend measures to mitigate the possible adverse effects of the personal data breach. The notification to the competent national authority shall, in addition, describe the consequences of, and the measures proposed or taken by the provider to address, the personal data breach.

4. Subject to any technical implementing measures adopted under paragraph 5, the competent national authorities may adopt guidelines and, where necessary, issue instructions concerning the circumstances in which providers are required to notify personal data breaches, the format of such notification and the manner in which the notification is to be made. They shall also be able to audit whether providers have
complied with their notification obligations under this paragraph, and shall impose appropriate sanctions in the event of a failure to do so.

Providers shall maintain an inventory of personal data breaches comprising the facts surrounding the breach, its effects and the remedial action taken which shall be sufficient to enable the competent national authorities to verify compliance with the provisions of paragraph 3. The inventory shall only include the information necessary for this purpose.

**Article 5**

*Confidentiality of the communications*

1. Member States shall ensure the confidentiality of communications and the related traffic data by means of a public communications network and publicly available electronic communications services, through national legislation. In particular, they shall prohibit listening, tapping, storage or other kinds of interception or surveillance of communications and the related traffic data by persons other than users, without the consent of the users concerned, except when legally authorised to do so in accordance with Article 15(1). This paragraph shall not prevent technical storage which is necessary for the conveyance of a communication without prejudice to the principle of confidentiality.

2. Paragraph 1 shall not affect any legally authorised recording of communications and the related traffic data when carried out in the course of lawful business practice for the purpose of providing evidence of a commercial transaction or of any other business communication.

3. Member States shall ensure that the use of electronic communications networks to store information or to gain access to information stored in the terminal equipment of a subscriber or user is only allowed on condition that the subscriber or user concerned is provided with clear and comprehensive information in accordance with Directive 95/46/EC, inter alia about the purposes of the processing, and is offered the right to refuse such processing by the data controller. This shall not prevent any technical storage or access for the sole purpose of carrying out or facilitating the transmission of a communication over an electronic communications network, or as strictly necessary in order to provide an information society service explicitly requested by the subscriber or user.

**Regulation 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC [GDPR]**

**Article 24**

*Responsibility of the controller*

1. Taking into account the nature, scope, context and purposes of processing as well as the risks of varying likelihood and severity for the rights and freedoms of natural persons, the controller shall implement appropriate technical and organisational measures to ensure and to be able to demonstrate that processing is performed in accordance with this Regulation. Those measures shall be reviewed and updated where necessary.

2. Where proportionate in relation to processing activities, the measures referred to in paragraph 1 shall include the implementation of appropriate data protection policies by the controller.
3. Adherence to approved codes of conduct as referred to in Article 40 or approved certification mechanisms as referred to in Article 42 may be used as an element by which to demonstrate compliance with the obligations of the controller.

Article 25
Data protection by design and by default
1. Taking into account the state of the art, the cost of implementation and the nature, scope, context and purposes of processing as well as the risks of varying likelihood and severity for rights and freedoms of natural persons posed by the processing, the controller shall, both at the time of the determination of the means for processing and at the time of the processing itself, implement appropriate technical and organisational measures, such as pseudonymisation, which are designed to implement data-protection principles, such as data minimisation, in an effective manner and to integrate the necessary safeguards into the processing in order to meet the requirements of this Regulation and protect the rights of data subjects.

2. The controller shall implement appropriate technical and organisational measures for ensuring that, by default, only personal data which are necessary for each specific purpose of the processing are processed. That obligation applies to the amount of personal data collected, the extent of their processing, the period of their storage and their accessibility. In particular, such measures shall ensure that by default personal data are not made accessible without the individual's intervention to an indefinite number of natural persons.

3. An approved certification mechanism pursuant to Article 42 may be used as an element to demonstrate compliance with the requirements set out in paragraphs 1 and 2 of this Article.

Article 32
Security of processing
1. Taking into account the state of the art, the costs of implementation and the nature, scope, context and purposes of processing as well as the risk of varying likelihood and severity for the rights and freedoms of natural persons, the controller and the processor shall implement appropriate technical and organisational measures to ensure a level of security appropriate to the risk, including inter alia as appropriate:

(a) the pseudonymisation and encryption of personal data;
(b) the ability to ensure the ongoing confidentiality, integrity, availability and resilience of processing systems and services;
(c) the ability to restore the availability and access to personal data in a timely manner in the event of a physical or technical incident;
(d) a process for regularly testing, assessing and evaluating the effectiveness of technical and organisational measures for ensuring the security of the processing.

2. In assessing the appropriate level of security account shall be taken in particular of the risks that are presented by processing, in particular from accidental or unlawful destruction, loss, alteration, unauthorised disclosure of, or access to personal data transmitted, stored or otherwise processed.

3. Adherence to an approved code of conduct as referred to in Article 40 or an approved certification mechanism as referred to in Article 42 may be used as an element by which to demonstrate compliance with the requirements set out in paragraph 1 of this Article.
4. The controller and processor shall take steps to ensure that any natural person acting under the authority of the controller or the processor who has access to personal data does not process them except on instructions from the controller, unless he or she is required to do so by Union or Member State law.

**Article 33**

*Notification of a personal data breach to the supervisory authority*

1. In the case of a personal data breach, the controller shall without undue delay and, where feasible, not later than 72 hours after having become aware of it, notify the personal data breach to the supervisory authority competent in accordance with Article 55, unless the personal data breach is unlikely to result in a risk to the rights and freedoms of natural persons. Where the notification to the supervisory authority is not made within 72 hours, it shall be accompanied by reasons for the delay.

2. The processor shall notify the controller without undue delay after becoming aware of a personal data breach.

3. The notification referred to in paragraph 1 shall at least:

   (a) describe the nature of the personal data breach including where possible, the categories and approximate number of data subjects concerned and the categories and approximate number of personal data records concerned;

   (b) communicate the name and contact details of the data protection officer or other contact point where more information can be obtained;

   (c) describe the likely consequences of the personal data breach;

   (d) describe the measures taken or proposed to be taken by the controller to address the personal data breach, including, where appropriate, measures to mitigate its possible adverse effects.

4. Where, and in so far as, it is not possible to provide the information at the same time, the information may be provided in phases without undue further delay.

5. The controller shall document any personal data breaches, comprising the facts relating to the personal data breach, its effects and the remedial action taken. That documentation shall enable the supervisory authority to verify compliance with this Article.

**Article 34**

*Communication of a personal data breach to the data subject*

1. When the personal data breach is likely to result in a high risk to the rights and freedoms of natural persons, the controller shall communicate the personal data breach to the data subject without undue delay.

2. The communication to the data subject referred to in paragraph 1 of this Article shall describe in clear and plain language the nature of the personal data breach and contain at least the information and measures referred to in points (b), (c) and (d) of Article 33(3).

3. The communication to the data subject referred to in paragraph 1 shall not be required if any of the following conditions are met:

   (a) the controller has implemented appropriate technical and organisational protection measures, and those measures were applied to the personal data affected by the personal data breach, in particular those that render the personal data unintelligible to any person who is not authorised to access it, such as encryption;
(b) the controller has taken subsequent measures which ensure that the high risk to the rights and freedoms of data subjects referred to in paragraph 1 is no longer likely to materialise;

(c) it would involve disproportionate effort. In such a case, there shall instead be a public communication or similar measure whereby the data subjects are informed in an equally effective manner.

4. If the controller has not already communicated the personal data breach to the data subject, the supervisory authority, having considered the likelihood of the personal data breach resulting in a high risk, may require it to do so or may decide that any of the conditions referred to in paragraph 3 are met.

**Article 35**

*Data protection impact assessment*

1. Where a type of processing in particular using new technologies, and taking into account the nature, scope, context and purposes of the processing, is likely to result in a high risk to the rights and freedoms of natural persons, the controller shall, prior to the processing, carry out an assessment of the impact of the envisaged processing operations on the protection of personal data. A single assessment may address a set of similar processing operations that present similar high risks.

2. The controller shall seek the advice of the data protection officer, where designated, when carrying out a data protection impact assessment.

3. A data protection impact assessment referred to in paragraph 1 shall in particular be required in the case of:

   (a) a systematic and extensive evaluation of personal aspects relating to natural persons which is based on automated processing, including profiling, and on which decisions are based that produce legal effects concerning the natural person or similarly significantly affect the natural person;

   (b) processing on a large scale of special categories of data referred to in Article 9(1), or of personal data relating to criminal convictions and offences referred to in Article 10; or

   (c) a systematic monitoring of a publicly accessible area on a large scale.

4. The supervisory authority shall establish and make public a list of the kind of processing operations which are subject to the requirement for a data protection impact assessment pursuant to paragraph 1. The supervisory authority shall communicate those lists to the Board referred to in Article 68.

5. The supervisory authority may also establish and make public a list of the kind of processing operations for which no data protection impact assessment is required. The supervisory authority shall communicate those lists to the Board.

6. Prior to the adoption of the lists referred to in paragraphs 4 and 5, the competent supervisory authority shall apply the consistency mechanism referred to in Article 63 where such lists involve processing activities which are related to the offering of goods or services to data subjects or to the monitoring of their behaviour in several Member States, or may substantially affect the free movement of personal data within the Union.

7. The assessment shall contain at least:
(a) a systematic description of the envisaged processing operations and the purposes of the processing, including, where applicable, the legitimate interest pursued by the controller;

(b) an assessment of the necessity and proportionality of the processing operations in relation to the purposes;

(c) an assessment of the risks to the rights and freedoms of data subjects referred to in paragraph 1; and

(d) the measures envisaged to address the risks, including safeguards, security measures and mechanisms to ensure the protection of personal data and to demonstrate compliance with this Regulation taking into account the rights and legitimate interests of data subjects and other persons concerned.

8. Compliance with approved codes of conduct referred to in Article 40 by the relevant controllers or processors shall be taken into due account in assessing the impact of the processing operations performed by such controllers or processors, in particular for the purposes of a data protection impact assessment.

9. Where appropriate, the controller shall seek the views of data subjects or their representatives on the intended processing, without prejudice to the protection of commercial or public interests or the security of processing operations.

10. Where processing pursuant to point (c) or (e) of Article 6(1) has a legal basis in Union law or in the law of the Member State to which the controller is subject, that law regulates the specific processing operation or set of operations in question, and a data protection impact assessment has already been carried out as part of a general impact assessment in the context of the adoption of that legal basis, paragraphs 1 to 7 shall not apply unless Member States deem it to be necessary to carry out such an assessment prior to processing activities.

11. Where necessary, the controller shall carry out a review to assess if processing is performed in accordance with the data protection impact assessment at least when there is a change of the risk represented by processing operations.

Article 36

Prior consultation

1. The controller shall consult the supervisory authority prior to processing where a data protection impact assessment under Article 35 indicates that the processing would result in a high risk in the absence of measures taken by the controller to mitigate the risk.

2. Where the supervisory authority is of the opinion that the intended processing referred to in paragraph 1 would infringe this Regulation, in particular where the controller has insufficiently identified or mitigated the risk, the supervisory authority shall, within period of up to eight weeks of receipt of the request for consultation, provide written advice to the controller and, where applicable to the processor, and may use any of its powers referred to in Article 58. That period may be extended by six weeks, taking into account the complexity of the intended processing. The supervisory authority shall inform the controller and, where applicable, the processor, of any such extension within one month of receipt of the request for consultation together with the reasons for the delay. Those periods may be suspended until the supervisory authority has obtained information it has requested for the purposes of the consultation.
3. When consulting the supervisory authority pursuant to paragraph 1, the controller shall provide the supervisory authority with:

(a) where applicable, the respective responsibilities of the controller, joint controllers and processors involved in the processing, in particular for processing within a group of undertakings;

(b) the purposes and means of the intended processing;

(c) the measures and safeguards provided to protect the rights and freedoms of data subjects pursuant to this Regulation;

(d) where applicable, the contact details of the data protection officer;

(e) the data protection impact assessment provided for in Article 35; and

(f) any other information requested by the supervisory authority.

4. Member States shall consult the supervisory authority during the preparation of a proposal for a legislative measure to be adopted by a national parliament, or of a regulatory measure based on such a legislative measure, which relates to processing.

5. Notwithstanding paragraph 1, Member State law may require controllers to consult with, and obtain prior authorisation from, the supervisory authority in relation to processing by a controller for the performance of a task carried out by the controller in the public interest, including processing in relation to social protection and public health.


Article 14
Security requirements and incident notification [for operators of essential services]

1. Member States shall ensure that operators of essential services take appropriate and proportionate technical and organisational measures to manage the risks posed to the security of network and information systems which they use in their operations. Having regard to the state of the art, those measures shall ensure a level of security of network and information systems appropriate to the risk posed.

2. Member States shall ensure that operators of essential services take appropriate measures to prevent and minimise the impact of incidents affecting the security of the network and information systems used for the provision of such essential services, with a view to ensuring the continuity of those services.

3. Member States shall ensure that operators of essential services notify, without undue delay, the competent authority or the CSIRT of incidents having a significant impact on the continuity of the essential services they provide. Notifications shall include information enabling the competent authority or the CSIRT to determine any cross-border impact of the incident. Notification shall not make the notifying party subject to increased liability.

Article 16
Security requirements and incident notification [for digital service providers]

1. Member States shall ensure that digital service providers identify and take appropriate and proportionate technical and organisational measures to manage the risks posed to the security of network and information systems which they use in the context of offering services referred to in Annex III within the Union. Having regard to
the state of the art, those measures shall ensure a level of security of network and information systems appropriate to the risk posed, and shall take into account the following elements:

(a) the security of systems and facilities;
(b) incident handling;
(c) business continuity management;
(d) monitoring, auditing and testing;
(e) compliance with international standards.

2. Member States shall ensure that digital service providers take measures to prevent and minimise the impact of incidents affecting the security of their network and information systems on the services referred to in Annex III that are offered within the Union, with a view to ensuring the continuity of those services.

3. Member States shall ensure that digital service providers notify the competent authority or the CSIRT without undue delay of any incident having a substantial impact on the provision of a service as referred to in Annex III that they offer within the Union. Notifications shall include information to enable the competent authority or the CSIRT to determine the significance of any cross-border impact. Notification shall not make the notifying party subject to increased liability.

4. In order to determine whether the impact of an incident is substantial, the following parameters in particular shall be taken into account:

(a) the number of users affected by the incident, in particular users relying on the service for the provision of their own services;
(b) the duration of the incident;
(c) the geographical spread with regard to the area affected by the incident;
(d) the extent of the disruption of the functioning of the service;
(e) the extent of the impact on economic and societal activities.

The obligation to notify an incident shall only apply where the digital service provider has access to the information needed to assess the impact of an incident against the parameters referred to in the first subparagraph.

5. Where an operator of essential services relies on a third-party digital service provider for the provision of a service which is essential for the maintenance of critical societal and economic activities, any significant impact on the continuity of the essential services due to an incident affecting the digital service provider shall be notified by that operator.

6. Where appropriate, and in particular if the incident referred to in paragraph 3 concerns two or more Member States, the competent authority or the CSIRT shall inform the other affected Member States. In so doing, the competent authorities, CSIRTs and single points of contact shall, in accordance with Union law, or national legislation that complies with Union law, preserve the digital service provider's security and commercial interests as well as the confidentiality of the information provided.

7. After consulting the digital service provider concerned, the competent authority or the CSIRT and, where appropriate, the authorities or the CSIRTs of other Member States concerned may inform the public about individual incidents or require the digital service provider to do so, where public awareness is necessary in order to prevent an incident or to deal with an ongoing incident, or where disclosure of the incident is otherwise in the public interest.
8. The Commission shall adopt implementing acts in order to specify further the elements referred to in paragraph 1 and the parameters listed in paragraph 4 of this Article. Those implementing acts shall be adopted in accordance with the examination procedure referred to in Article 22(2) by 9 August 2017.

9. The Commission may adopt implementing acts laying down the formats and procedures applicable to notification requirements. Those implementing acts shall be adopted in accordance with the examination procedure referred to in Article 22(2).

10. Without prejudice to Article 1(6), Member States shall not impose any further security or notification requirements on digital service providers.

11. Chapter V shall not apply to micro- and small enterprises as defined in Commission Recommendation 2003/361/EC.


Article 5
Confidentiality of electronic communications data
Electronic communications data shall be confidential. Any interference with electronic communications data, such as by listening, tapping, storing, monitoring, scanning or other kinds of interception, surveillance or processing of electronic communications data, by persons other than the end-users, shall be prohibited, except when permitted by this Regulation.

Article 17
Information about detected security risks
In the case of a particular risk that may compromise the security of networks and electronic communications services, the provider of an electronic communications service shall inform end-users concerning such risk and, where the risk lies outside the scope of the measures to be taken by the service provider, inform end-users of any possible remedies, including an indication of the likely costs involved.


Article 40
Security and integrity of networks and services
1. Member States shall ensure that undertakings providing public communications networks or publicly available electronic communications services take appropriate technical and organisational measures to appropriately manage the risks posed to security of networks and services. Having regard to the state of the art, these measures shall ensure a level of security appropriate to the risk presented. In particular, measures shall be taken to prevent and minimise the impact of security incidents on users and interconnected on other networks and services.
2. Member States shall ensure that undertakings providing public communications networks take all appropriate steps to guarantee the integrity of their networks, and thus ensure the continuity of supply of services provided over those networks.

3. Member States shall ensure that undertakings providing public communications networks or publicly available electronic communications services notify without undue delay the competent national regulatory authority of a breach of security or loss of integrity that has had a significant impact on the operation of networks or services.

In order to determine the significance of the impact of a security incident, the following parameters shall, in particular, be taken into account: (a) the number of users affected by the breach; (b) the duration of the breach; (c) the geographical spread of the area affected by the breach; (d) the extent to which the functioning of the service is disrupted; (e) the impact on economic and societal activities.
### Appendix 1.- Contractual undertakings

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Contractual undertaking</th>
<th>Performed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specify the ships onto which the STM concept can be imposed in the various jurisdictional zones, especially in the areas of implementation</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Evaluate the consistency of the STM concept with all relevant IMO conventions as well as with the ILO’s Maritime Labour Convention and with international framework conventions</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Evaluate the effects of the STM concept on civil liability for accidents at sea through collisions</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Evaluate the present arrangements for Search and Rescue and their consistency with the STM concept</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Evaluate each part of the SMT concept against relevant legislation indicating consistency or inconsistencies in need of alteration</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Identification of the relevant Charter Parties (CP) &amp; business models.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Study and analyses of the effects of STM on the relevant CP and business models of the involved key stakeholders</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Study and analyses of the effects of STM on standard form CP which are extensively used by the shipping industry, form Charter Parties. Report</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Report on initial identification and analysis of the effects</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Conclusions: suggestions about the business models pertaining to the shipping industry (proposal) and assess the effects the required changes in the commercial arrangements will have in such models on the effects of required changes in the commercial arrangements</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Report on Cyber-Security issues</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Setting up a communication channel with leading industry partners (ICS,BIMCO)</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Produce an STM Clause addressing potential problems in commercial implementation</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Initial consultation on EU framework in shipping</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Publication of an academic paper, based on findings from STM research</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>
38 partners from 13 countries - Creating a safer more efficient and environmentally friendly maritime sector

Demonstrating the function and business value of the Sea Traffic Management concept and its services.

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Co-financed by the Connecting Europe Facility of the European Union