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**DOCUMENT STATUS**

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Abbreviations

The following abbreviations are used in this document:

AM        Aboa Mare, Turku, Finland
AIS       Automatic Identification System
Base Line Simulations without the use of STM services
CJ        Centro Jovellanos, Gijon, Spain
CML       Fraunhofer CML
CoC       Certificate of Competency
COLREG    International Regulation for Preventing Collisions at Sea
CTH       Chalmers University of Technology
DIS       Distributed Interactive Simulation
ECDIS     Electronic Chart Display and Information System
EL        Hochschule Emden-Leer
EMSN      European Maritime Simulator Network
ENC       Electronic Nautical Chart
ETA       Estimated Time of Arrival
EU        European Union
FSA       Formal Safety Assessment
FUAS      Flensburg University of Applied Sciences
HAZID     Hazard Identification Workshop
HF        Human Factors
HMI       Human Machine Interface
INS       Integrated Navigation Systems
ML2       MONALISA 2.0
MSI       Maritime Safety Information
MSP       Maritime Spatial Planning
MRCC      Maritime Rescue Coordination Centre
OS        Own Ship
PortCDM   Port Collaborative Decision Making
SAR       Search and Rescue
SHS       Ship Handling Simulator
SMA       Swedish Maritime Authority
SC        Shore Centre
SHS       Ship Handling Simulator
SSR       Sikkerhetssenteret Rørvik
STM       Sea Traffic Management
STM-ECDIS ECDIS station with STM functionalities (ECDIS, Planning SW and Chat)
SW        Software
TeamSpeak Web based application for voice communication
TG        Target Ship/Traffic Ship
VTS       Vessel Traffic Service
WMA       Warsash Maritime Academy
1 General Information

This document describes the management of the European Maritime Simulator Network (EMSN) developed during the MONALISA 2.0 and the management and coordination of simulation exercises held during the STM project to validate parts of the STM concept that are not possible to do in real life.

1.1.1 Background

The aim of the Sea Traffic Management (STM) concept is to use more of a Need-to-Share attitude instead of Need-to-Know approach, as is mostly practiced today. With greater use of System-wide Information Management at sea, we can move closer to the air traffic control concept of sharing voyage plans among parties both in tactical and executional situations. STM can provide captains with the optimal available voyage plans for their ships in terms of minimal fuel consumption, shortest route, or other criteria chosen by captains. The voyage plans will be optimized, calculating with real-time data, such as info from met-providers, ports, biodiversity areas, and MSI, etc., all to gain the optimal way to go. The routes will be shared and available among other vessels to increase the on-board situational awareness as vessels approach potential collision points.

Sea Traffic Management (STM) – a methodology like Air Traffic Management, (ATM) – can offer, suggest and monitor alternative routes that will increase overall vessel performance. Likewise, this will be achieved by the introduction of a new service facility: a Shore Center (SC), similar to Air Traffic Control Centers, providing new processes and methodologies of exchanging data between ship and shore, and ship-to-ship.

To be able to test and evaluate the STM concept a large number of SHS was required to be able to make realistic scenarios and collect sufficient amount of data.
2 European Maritime Simulator Network (EMSN)

2.1 General Description

Several simulator centers around Europe have been and are interconnected in what is called the European Maritime Simulator Network (EMSN) which gives a unique possibility in creating scenarios with a large number of participating own ships.

The EMSN network consists of the following elements:

- Simulator centers, including ship bridges and control station;
- EMSN infrastructure, including communication protocol;
- STM-ECDIS and STM services integrated at each ship bridge;
- Shore Centers (SC) and MRCCs including decision support systems; and
- Evaluation test methods and procedures.

2.2 Scope and Purpose of the EMSN

The primary purpose of the European Simulator Network (EMSN) is to gain experience with STM features and to understand how involved persons and institutions deal with its capabilities. This is done in a simulated environment, which saves large amounts of time, costs and environmental impact.

The scope and purpose of the EMSN simulations are to reflect the STM concept, to validate and evaluate the findings and to give input to various hypotheses and FSA developed by other activities within the project. The following main services are tested and evaluated:

**Ship-to-ship route exchange**

This service provides the navigator with a route segment consisting of the next 7 waypoints of the monitored route of another vessel. Route segments are broadcasted through Automatic Identification System (AIS) and give additional information to the presently available data obtained by radar/ARPA and AIS. Nothing in the S2SREX information exonerates the navigator from applying the International Regulations for Preventing Collisions at Sea (COLREG) and rather than being used in a close quarters situation, the S2SREX may be used as a tactical tool for supporting decision-making and situational awareness at a longer range.

**Rendezvous Function**

As an integral part of the S2SREX, this function allows the navigator to view where own ship will meet a target ship if both vessels continue along their monitored broadcasted route with the present speed over ground. This function provides route-based Closest Point of Arrival (CPA) and Time to Closest Point of Arrival (TCPA) based on AIS information.

**Shore-to-Ship Route Exchange (Receiving route suggestions from shore)**

This service allows the shore-centre to send a suggested route to the ship, to be reviewed by the bridge team and then either accepted or rejected. This service can be used in various situations, for example if several vessels are warned to avoid a certain
area, the shore centre can plan a route based on all available information and directly send this route to the vessel.

**Receiving Navigational Warnings**

This service provides a notification which overlays a Navigational Warning Message directly on the ECDIS. If the Navigational Warning involves a geographical area to avoid or be aware of, this will be automatically plotted onto the ECDIS, so it is visible to the bridge team.

**Chat Function**

A standalone software like other programs (e.g. Skype) which was integrated on the same station as the ECDIS. Text communications with other stations with enabled STM tools such as Shore Centres and ships.

**Enhanced Monitoring and Route Cross Check**

After having received a ship’s monitored route and schedule, shore centres will be able to detect if planned schedule is not kept or if ship deviates from monitored route. A shore centre can receive any planned route and cross check such route against any navigational dangers and if necessary send a route suggestion back to the ship.

**Assistance**

Ships can be offered special pilot assistance on different service levels in confined, complex or other areas whenever required by the captain. This could be an alternative to Open Sea pilotage in, for example, non-mandatory waters. Flow management Traffic congestion and prediction of high traffic intensity areas will easily be calculated, and appropriate information can be distributed to particular vessels to help them prepare to take precautionary actions. In the longer perspective, suggestions for safer flow management can be calculated and provided to vessels.

### 2.3 Technical Description of the EMSN

To enable a sufficient realistic evaluation of the STM and its capabilities a minimum set of services was established within the EMSN.

- Distribution of simulated exercise data which consists primarily of published entity data that represent the participating simulated ships.
- Voice communication between SHSs among each other and between them and the SC emulating real world radio communication.
- Supply of network capacity for the STM data communication.

A comprehensive technical description is provided in deliverable D3.2.1 EMSN Technical Description.
3 Work Package Descriptions (WPD) and Time Plan

3.1 Overall Work Breakdown Structure (WBS)

Activity 3 is divided into three Sub-Activities (SA):

Figure 1 Work Breakdown Structure

3.2 SA 3.1 EMSN Management and Coordination

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<thead>
<tr>
<th>Responsible</th>
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<tr>
<td>Duration</td>
<td>Start: 01/06-2015; End 31/12-2018</td>
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</table>
| Tasks       | • Prepare an EMSN organization and procedures  
              • Establish an EMSN test plan  
              • Establish test specification  
              • Coordination and overview of test scenarios  
              • Resource management within the EMSN |
| Deliverables (D) | STMVal_D3.14 EMSN Management and Coordination Plan (this document) |
| Internal Deliverables (ID) | • ID3.1.1 EMSN Test Plan and General Exercise Specification  
                                • EMSN Operational procedures and guidelines for simulation exercises (guidance documents, manuals, etc. for each simulation campaign uploaded on projectplace) |
| Milestones (M) | M14 Established test plan |
| Milestones (IM) | • 31/12-2015: MI3.1.1 Established organization  
                          • 31/06-2016: MI3.1.2 Established Test Plan and Specification |
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<td>3.1.3</td>
<td>Establish test specification</td>
<td>01/03-2016 to 30/06-2016</td>
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<tr>
<td>3.1.4</td>
<td>Establish test scenarios</td>
<td>01/03-2015 to 30/06-2016</td>
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### 3.3 SA 3.2 EMSN Technical Preparation and Development

**Objective**
To prepare the simulation test campaigns

**Responsible**
SMA

**Participants**
CML, simulator & equipment manufacturers, simulator centers

**Duration**
Start: 01/01-2016; End 22/03-2017

**Tasks**
- Develop simulator network protocol for advanced simulator tests
- Prepare and perform EMSN technical integration
- Perform installation of STM equipment at the simulator centers
- Perform simulation instructor training
- Perform EMSN integration tests

**Deliverables (D)**
STMVal_D3.15 EMSN Integration Test Report (Fraunhofer CML)

**Internal Deliverables (ID)**
- ID3.2.1 EMSN- Technical Description
- ID3.2.2 EMSN Integration and Maintenance Tests
- ID3.2.3 EMSN-DIS Interface and Allocation
- ID3.2.4 EMSN-Pilot Test Plan and Exercise Specification

**Internal Milestones (IM)**
- 22/03-2017: IM3.2.1 Performed EMSN Integration Tests
- 01/07-2017: IM3.2.2 Performed STM Equipment Integration Tests (depending on technical status)
- 01/11-2016: IM3.2.3: Tested Shore station (depending on technical status)
### EMSN Simulation Test Campaign Data Collection

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**Tasks**

- Specify data collection needs and methods
- Manage the running of simulator tests
- Perform approximately five simulation tests within the project period
- Prepare raw data initial data analysis
- Report collected data to Activity 5

**Deliverables**

- STMVal_D3.16 EMSN Summary Test Report (CML Fraunhofer)
- ID3.3.1 Centralized numerical data collection uploaded on projectplace
- ID3.3.2 EMSN-Test Person and Data Collection Management
- ID3.3.3 Test Report: Evaluation of STM Services through a Traffic Risk Assessment
- ID3.3.4 Test Report: Numerical Data Analysis: Safety Index
- ID3.3.5 Test Report: Evaluation of the STM services - Ice Scenario
- ID3.3.6 Test Report: Evaluation of STM Services: Human Factors
- ID3.3.7 Test Report: Numerical Data Analysis Southern Baltic Scenario
- ID3.3.8 Test Report: Ship to Ship Route Exchange
### Task Description Time

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<td>Specify data collection methods</td>
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<td>Manage and conduct simulation run</td>
<td>See <a href="#">Test Plan for EMSN Simulations</a></td>
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<td>Prepare raw data and perform initial analysis</td>
<td>Connected to each test</td>
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<td>Report collected data to Activity 5</td>
<td>After each test</td>
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#### 3.5 Interaction and dependencies with other activities

Activity 1: Interfaces/product to test PortCDM in simulations.

Activity 2: Prototypes and STM function standards for onboard and shore-based systems as used in the EMSN simulations.

Activity 4: Maritime Service Infrastructure prototype SeaSWIM (Product Interface – Act 2 and 3).

Activity 5: Data collection requirement regarding Analysis and Evaluation.

#### 3.6 External deliverables and milestones

Below the activities external deliverables and milestones are listed

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4 Organization and Management for Activity 3 and the STM EMSN Test Campaign

4.1 Introduction

The organization regarding STM EMSN Activity 3 is to reflect and attempt to encompass the highly complex interdependencies between the various activities in the project as stated in Interaction and dependencies with other activities. These interdependencies have a direct influence on the construction and evaluation of the planned simulation runs as depicted below.

Figure 2 Interaction and dependencies

To be able to meet the expectations from other activities within the project, especially Activity 5 which deals with analysis and FSA, the organization rests on 5 key areas:

- Overall coordination within activity 3 and liaison with other activities within the STM project: Overall coordination and liaison with other activities.
- Technical integration, coordination and development of necessary functions within the EMSN: Technical coordination and development.
- STM EMSN simulations: Exercise development and execution. STM Simulations: Exercise development and execution.
- Data requirements, collection and analysis: **Data requirements, collection and analysis**.
- Local Simulator Centers within the EMSN: **Local Simulator Centres within the EMSN**.

### 4.2 General Organizational Overview

![Organisation Overview Diagram](image)

**Figure 3 Organisation Overview**
4.3 Organization: Roles and tasks in the EMSN Simulation Test Campaign

4.3.1 Overall coordination and liaison with other activities

4.3.1.1 Activity Coordinator
- To coordinate and schedule all activities and to liaise with the other activities within the project.
- Member of the STM project’s management team.

4.3.2 Technical coordination and development

4.3.2.1 EMSN Technical Coordinator
- To oversee the technical readiness of the simulator centers within the EMSN.
- Implement enhanced simulator network protocol for advanced simulator tests.
- Prepare and perform EMSN integration tests.
- Overall technical coordination between simulator centers and manufacturers.
- To assure the technical functioning of the EMSN and its subsystems.
4.3.2.2 **Data Collection Coordinator**
- To specify how and which of the data should be collected together with the Scientific Coordinator.
- To liaise with other activities within the project regarding data needs and possibilities.
- To assist the local simulator centers with the collection of data.
- To establish a centralized data collection as far as feasible.
- To prepare raw data for initial data analysis.
- To supply other activities within the project with the required data.

4.3.2.3 **EMSN Network Administrator**
- To manage and document the maintenance and development of the EMSN and its components in liaison with participating simulator manufacturers.
- To assist centers with the integration of their local simulator to the EMSN.

4.3.3 **STM Simulations: Exercise development and execution**

![Figure 6 EMSN Simulations Coordination]

4.3.3.1 **EMSN Simulations Coordinator**
- To prepare an EMSN organization including procedures for running exercises.
- To establish a test plan.
• To coordinate all simulation exercises and appoint the Exercise Manager.
• To set the standard specification regarding management of specific exercises.
• To set up a general management plan for simulations including procedures.
• To set the standard and procedures regarding data collection and management.
• To coordinate specific simulation exercises with the Exercise Manager.

4.3.3.2 EMSN Exercise Manager
• Will be appointed by the EMSN Simulations Manager for each particular exercise.
• To liaise with the Scientific Coordinator and Data Collection Coordinator regarding hypotheses, data collection and evaluation and their possible implementation in the scenario.
• To prepare and distribute the exercise scenario according to specification.
• In charge of the running of the exercise.

4.3.3.3 Training Coordinator
• To develop procedures and training for simulations using STM services.
• To organize and lead Train the Trainer Courses regarding the EMSN and its use in the STM project.
• To organize and lead Train the Trainer Courses for the STM-ECDIS.
• To organize and lead Train the Trainer Courses regarding the Shore Center applications.
• To develop training manuals and guidelines.

4.3.3.4 Shore Center Coordinator
• To specify the requirements regarding the SC.
• To test and maintain the functioning of the SC.
• To integrate new functions/application to the SC software.
• To manage and man the SC during exercises.
4.3.4 Data requirements, collection and analysis

4.3.4.1 EMSN Scientific Coordinator
- To coordinate with other activities within the project on the data required from the simulation runs.
- To provide input to the scenario development, test specification and data collection.
- To specify the management of test persons.
- To specify the evaluation of the data.

4.3.4.2 Numerical Data Analysis Coordinator
- To liaise with key persons from other activities regarding data requirements and analysis.
- To identify what needs to be measured, how this is done and analyzed to evaluate the STM concept.
- Investigate the possibilities if these measurements can be obtained by simulator runs, if there are to be made any developments in the simulators and how the data is processed.
- To develop a centralized data logging facility supporting the required analysis.
- To liaise with the scenario builders/EMSN Exercise Managers.
- To liaise with HF Data Analysis on data regarding data logging.

4.3.4.3 HF Data Analysis Coordinator
- To liaise with key persons from other activities regarding data requirements and analysis from the HF aspect.
- To identify what HF aspects needs to be measured, how this is done and analyzed to evaluate the STM concept.

Figure 7 Scientific Coordination
• To investigate the possibilities if these measurements can be obtained by simulator runs, if there are to be made any developments in the simulators and how the data is processed.
• To liaise with the scenario builders/EMSN Exercise Managers.
• To liaise with Numerical Data Analysis on data regarding data logging.

4.3.4.4 Local Observation Coordinator
A Local Observation Coordinator is appointed by each participating simulator centre and is responsible for data collection at the local simulator centre. The tasks include:
• If required: Gathering of video and voice recordings from the bridges and providing it to the EMSN Scientific Coordinator.
• Printing of Informed and Consent forms and Photo-agreement forms.
• Handling of test person numbers.
• Making sure the test persons fill in the Informed and Consent forms and Photo-agreement forms, as well as collecting and sending the forms to the EMSN Observation Coordinator following the completion of the simulations.
• Making sure the Test person number is correctly filled in at the start of each questionnaire and making sure Test persons fill in the web-based questionnaires (if applicable).

4.3.5 Local Simulator Centres within the EMSN

4.3.5.1 Local Simulations Manager
A Local Simulations Manager is appointed by each participating simulator center and is responsible for the set-up of the exercise and bridges for the local simulator center. The tasks include:
• Implementing the distributed scenario and conditions in the simulator.
• Setting up bridges and its equipment including loading routes.
• Setting up and configuring the STM-ECDIS (if applicable).
• Sending of route(s) to the SC before the start of the simulation (if required).
• Setting up of and locally collect and store collected data if required (video & voice from own bridges, and questionnaires).
- Manning of bridges with test persons.
- Organizing a briefing with test persons prior to the exercises.
- Familiarization of test persons with the bridge and the STM-ECDIS.
- Manning of personnel required for the exercise.
- Direct communication with the EMSN Exercise Manager.
- Coordinating the start and stop of the exercise on order by the EMSN Exercise Manager.
- Site contingency planning.

4.3.5.2 Local Instructor(s)
The local instructor(s) is/are responsible for the execution of the exercise for the local bridges and to assist the Local Simulations Manager and the familiarization of the bridges and the STM-ECDIS for the test persons.

4.3.5.3 Local Technical support
The local technical support is responsible for the technical functioning of the simulator(s) and the EMSN network at a local level and for liaison with the EMSN Technical Coordinator.

4.3.5.4 Test Persons
Test persons are requested to perform their tasks in accordance with instructions given at the exercise briefing and by the instructors, based on their professional skills. Instructions regarding handling of test persons are documented in “EMSN Test Person Management”.
5 Integration Management of Simulator Centers

5.1 Preconditions

The specification on how to integrate a local simulator to the EMSN are provided in the document D3.2.1 EMSN Technical Description. To summarize, simulator centers should be equipped and configured for integrating with the EMSN with the following:

a. Appropriate simulator software version installed. Each simulator center needs to liaise with its simulator manufacturer and plan for any necessary upgrades.

b. Own Ships (OS) and target ships (TG) need to be allocated to the DIS protocol as per manufacturer’s instructions.

c. Preconfigured EMSN Router distributed and installed.

d. Teamspeak program installed on one computer per bridge. Handset with PTT to be installed.

e. Audio/video recording and data logging equipment installed.

f. STM ECDIS installed and configured.

5.2 Management of integration tests

Once the local simulator center fulfills the preconditions in 5.1, an integration test is to be performed between the local simulator and the EMSN Technical Coordinator. The date when the tests are held need to be agreed between the EMSN Technical Coordinator and the Local Simulator Manager.

Integration tests concerning the whole EMSN, i.e. all simulator centers connected to the network, are organized by the EMSN Simulations Coordinator together with the EMSN Technical Coordinator and the dates published well in advance.

The following main items are to be tested:

- EMSN communication, i.e. TeamSpeak.
- EMSN DIS exchange of vessels.
- AIS Exchange of data.
- Route exchange with SCs and/or other service providers.
- Route exchange ship to ship.
- Receiving of Navigational Warnings on the STM-ECDIS.
- Chat functionality.

For a comprehensive description of the Integration Tests see documents D3.2.1 EMSN Technical Specification and ID3.2.2 EMSN Integration and Maintenance Tests.
6 EMSN Administration, Maintenance and Regular Testing

6.1 EMSN Network administration and maintenance

The EMSN network is owned by the project and during the STM project administered by CML Fraunhofer. The administrator’s role and tasks are to:

- Manage and document the maintenance and development of the EMSN and its components in liaison with dedicated persons from participating simulator manufacturers.
- If needed, assist centers with the integration of their local simulator to the EMSN.

All three simulator manufacturers (KDI, RDE and Transas) are to be jointly involved in decisions and implementation regarding any changes, modifications, etc. to any parts of the network (software, hardware, protocols, etc.).

All three simulator manufacturers (KDI, RDE and Transas) are to support their own customers regarding connecting their simulator to the EMSN including trouble shooting.

The simulator network and all its sub-systems need to be maintained and tested regularly to ascertain its functioning. Once a month all simulator centers are to connect at least one bridge to the EMSN and verify:

- EMSN communication, i.e. TeamSpeak.
- EMSN DIS exchange of vessels.
- EMSN AIS exchange
- Available and operational STM services

6.2 Specification for regular testing of the EMSN

Refer to document ID3.2.2 EMSN Integration and Maintenance Tests.
7 General Exercise Management Plan

Exercises are to be developed and built upon an agreed hypothesis and/or provide input to a possible FSA, KPI, KPO and KPA as defined by Activity 5. The EMSN Simulations Coordinator together with the Technical and Scientific Coordinator need to identify and define the variables which are to be measured including how they are to be measured, recorded and evaluated. The STM EMSN simulation exercises are developed and run according to the following process:

Figure 9 Exercise Development

Also refer to document “EMSN Test Plan and General Exercise Specification”.

7.1 Test Plan for EMSN Simulations

<table>
<thead>
<tr>
<th>Description</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMSN STM Pilot Simulations: Baltic and English Channel scenarios (Base Line)</td>
<td>2017-10-23 to 2017-10-27</td>
</tr>
<tr>
<td>EMSN STM Simulations Session 1: Baltic and English Channel scenarios (Base Line)</td>
<td>2017-11-13 to 2017-11-17</td>
</tr>
<tr>
<td>EMSN STM Simulations Session 2: Baltic and English Channel scenarios (Base Line)</td>
<td>2018-02-05 to 2018-02-09</td>
</tr>
<tr>
<td>EMSN STM Simulations Session 3: Baltic and English Channel scenarios (with STM services)</td>
<td>2018-03-12 to 2018-03-16</td>
</tr>
</tbody>
</table>
### 7.2 General management notes regarding exercises within the EMSN

#### 7.2.1 Planning phase

The following preparations are made on an early stage in the exercise planning, typically months before the first exercise.

1. Exercise days are to be decided at a very early stage, allowing for simulator centers to correlate to other activities and to check dates against public holidays or other limiting factors.

2. Objective and scope of the exercise should be defined. Geographical area for the exercise and chart datum to be used should be decided in cooperation between the EMSN Exercise Manager and involved simulator centers. Traffic scenario and external conditions should be specified. A list of typical ship models and their DIS to be used should be compiled.

3. Simulator centers should be equipped and configured for integrating with the EMSN.
   
   a. Appropriate simulator software version installed. Each simulator center needs to liaise with its simulator manufacturer and plan for any necessary upgrades.
   
   b. Preconfigured EMSN Router distributed and installed.
   
   c. TeamSpeak program installed on one computer per bridge. Handset with PTT to be installed.
   
   d. Audio/video recording and data logging equipment installed. See section [Data Collection](#).
   
   e. STM-ECDIS installed and configured.

4. Technical integration tests should be carried out between pairs of simulator centers and with the entire network to verify functionality, capacity and stability.

#### 7.2.2 Preparations phase

The preparations phase typically runs over several weeks ahead of the exercise and includes at least the following preparations.

1. Test persons to be recruited.

---

| EMSN STM Simulations Session 4: Baltic and English Channel scenarios (with STM services) | 2018-06-11 to 2018-06-15 |
| EMSN STM Simulations Session 5: Ice scenarios (with/without STM services), Only AM and SSR | 2018-10-08 to 2018-10-09 |
| EMSN STM Simulations Session 6: SAR scenarios (with/without STM services), | 2018-10-22 to 2018-10-26 |

See also [STM Scenarios and Management](#) and document ID3.1.2 EMSN Test Plan and General Exercise Specification. Note that the test plan is subject to the technical development of available STM services including data logging possibilities.
2. A time schedule should be set up for the exercise campaign. Note that the time zone needs to be clearly stated, see section Schedule for running of simulations.

3. A planning meeting with local simulations managers and EMSN Exercise Manager should be held. The exercise plan is presented and discussed.

4. Exercise contingency plans to be reviewed locally at simulator centers and made known to all relevant personnel. See section Contingency Planning.

### 7.2.3 Run-up phase

In the run-up phase before the exercise all capabilities and functions necessary to perform the EMSN simulations are tested and verified.

1. Technical set-up, individual tests and a full-scale EMSN test with all centers to be carried out:
   a. EMSN network functionality tested.
   b. Communication channels tested.
   c. STM-ECDIS route exchange “ship to ship” and “ship to shore” tested.
   d. Other available and operational STM services tested.
   e. Data logging equipment tested.

### 7.2.4 Execution of Exercise

1. All simulators to be online and manned in the EMSN at least 15 min before start of each exercise.

2. All exercises are coordinated by the EMSN Exercise Manager. The normal procedure will be that each center upload their OS and sets the scenario on “stand-by” and then reports back to the EMSN Exercise Manager. Once all centers are ready, the EMSN Exercise Manager will initiate the start by voice or start/stop PDU communication. Stopping of the exercise is also initiated by the EMSN Exercise Manager.

3. All roles defined in the exercise plan are requested to remain manned for the entire duration of the exercise. See section Organization: Roles and tasks.

4. Debriefing and evaluation data: as per the scientific coordinator.

5. Data logs to be uploaded to a dedicated ftp server after each exercise day unless centrally logged within the EMSN as specified.

### 7.3 STM Scenarios and management

A general overview regarding exercise scenario are described in document ID3.1.2 EMSN Test Plan and General Exercise Specification. A detailed documentation for each respective simulation exercise is found on projectplace in folder pertaining to EMSN Specific Exercise Scenarios and Schedules.

#### 7.3.1 STM Scenario “Baltic”

<table>
<thead>
<tr>
<th>Exercise Builder</th>
<th>FUAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>See Test Plan for EMSN Simulations</td>
</tr>
<tr>
<td>Overview</td>
<td>An exercise held in the South Western Baltic sea area encompassing scenarios using all available STM services including a simulated VTS/SC.</td>
</tr>
<tr>
<td>----------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Document</td>
<td>STM EMSN Exercise data for all participating ships available on projectplace.</td>
</tr>
<tr>
<td>Participating centers</td>
<td>All</td>
</tr>
</tbody>
</table>

### 7.3.2 STM Scenario “English Channel”

<table>
<thead>
<tr>
<th>Exercise Builder</th>
<th>WMA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>See <a href="#">Test Plan for EMSN Simulations</a></td>
</tr>
<tr>
<td>Overview</td>
<td>An exercise held in the English Channel South of Southampton encompassing scenarios using all available STM services including a simulated VTS/SC.</td>
</tr>
<tr>
<td>Document</td>
<td>STM EMSN Exercise data for all participating ships available on projectplace.</td>
</tr>
<tr>
<td>Participating centers</td>
<td>All</td>
</tr>
</tbody>
</table>

### 7.3.3 STM Scenario “SAR”

<table>
<thead>
<tr>
<th>Exercise Builder</th>
<th>CJ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>See <a href="#">Test Plan for EMSN Simulations</a></td>
</tr>
<tr>
<td>Overview</td>
<td>An exercise held in an area East of the entrance to the Gibraltar Strait focusing on the use of STM services in Search and Rescue (SAR) operations.</td>
</tr>
<tr>
<td>Document</td>
<td>STM EMSN Exercise data for all participating ships available on projectplace.</td>
</tr>
<tr>
<td>Participating centers</td>
<td>all</td>
</tr>
</tbody>
</table>

### 7.3.4 STM Scenario “Ice”

<table>
<thead>
<tr>
<th>Exercise Builder</th>
<th>AM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>See <a href="#">Test Plan for EMSN Simulations</a></td>
</tr>
<tr>
<td>Overview</td>
<td>An exercise held in the Kvarken area (Bay of Bothnia) focusing on the use of STM services in ice conditions and the assistance and coordination by ice breakers.</td>
</tr>
<tr>
<td>Document</td>
<td>STM EMSN Exercise data for all participating ships available on projectplace.</td>
</tr>
<tr>
<td>Participating centers</td>
<td>AM and SSR</td>
</tr>
</tbody>
</table>
8 Training Management and STM Operational Procedures

8.1 Training needs for simulator managers
All Local Simulator Managers need to ascertain that the necessary competence is available locally regarding:

- The STM concept including its functions and services.
- Basic principles and functioning regarding the network.
- DIS and allocation to OS/TG in the simulator.
- Bridge STM-ECDIS.
- TeamSpeak.
- SC software and functioning (for centers with SC task).
- Procedures for running exercises in the EMSN.
- Managing of test persons.
- Training of test persons.
- Collecting of data.

A Train the Trainer course is organized by the Training Coordinator prior to the start of the STM simulation campaign. Documentation and quick guide lines are to be provided by the Training Coordinator.

8.2 Training for test participants
Education and training regarding the STM concept, its functions and services is held locally at each simulator center organized by the Local Simulator Manager and based on the training material provided by the Training Coordinator. Training material such as quick guides, videos, manuals are uploaded on projectplace.

8.3 STM Operational Procedures and Guidelines
Significant steps have been taken in bringing advancements in technology and innovation into the maritime sector for the future STM creating a more sustainable shipping industry, reduced environmental impacts and improved safety and efficiency. However, in order to implement these advancements and to correctly use the STM functionalities, procedures and guidelines for both the crews on the ships and shore centers are used during the simulations.

In addition to these procedures and guidelines, more specific manuals on how to use new STM services (either integrated or add-on equipment) for both bridges and SC are provided to the test participants.
9 Data Collection Management

Since the focus of the simulation is to gather data for e.g. a Formal Safety Assessment or to evaluate a hypothesis, data collection will focus on gathering data from which such analysis can be conducted. The data collected may be from a “numerical perspective”, e.g. reduction of close quarter situations and/or data in the form of video and audio recordings (video protocol in scientific terms) from the bridges, voice recording from the VHF communication and questionnaires the test participants must fill in. Other data collected may pertain to the usability of the system(s) envisaged in the STM. The EMSN Scientific Coordinator together with the EMSN Technical Coordinator and the EMSN Simulations Coordinator need to ascertain which data needs to be collected or measured, how this is to be done in the local simulator centres and finally how the data will be evaluated together with partners from Activity 5. See document STM_ID3.3.2 Test Persons and Data Collection Management.
10 Contingency Planning and Management

10.1 Loss of EMSN Hub
In case of a failure of the EMSN hub the EMSN will obviously stop functioning. The EMSN Exercise Manager together with the EMSN Technical Coordinator will decide on a case-per-case basis whether the exercise is to be re-run the same day or postponed. If re-routing to the back-up hub is required, this will take quite an amount of time and the exercise for the day will most likely have to be cancelled. Shifting to back-up hub requires that the simulator centres are reconfigured with new IP addresses, which is envisaged to take 15-20 minutes. The simulator centres need to make sure that they have the technical capacity and capability to do so.

10.2 Loss of Connection to one Centre
Depending on the centre there may be several vessels disappearing from the scenario and this may render the exercise useless. It will be up to the EMSN Exercise Manager and the EMSN Simulations Manager to decide whether the exercise may continue or is aborted and a re-run to be held.

The possibility that one centre is acting as a back-up for another centre has been discussed and whilst the conclusion was that it would be possible to dedicate centres to back-up other centres using target ships the feasibility at this stage was questioned. As a result, the back-up will not be implemented for the STM exercises.

10.3 Loss of one Bridge
Considering the amount of OS participating in the STM simulations, the loss of one bridge is not considered as crucial to the outcome/data collection of the simulation.

10.4 Loss of Communication between Centres
In the unlikely event that TeamSpeak stops working, an alternative way of communication needs to be established and GoToMeeting may be used.

10.5 Insufficient amount of Test Participants
The simulator centres should do the utmost to ensure the availability of enough test persons. In case that not enough persons are recruited, the EMSN Exercise Manager needs to be notified immediately. Depending on the circumstances “un-manned” bridges may be replaced by target vessels.
11 Documentation

The documentation in activity 3 is structured the following way (with responsible centers in brackets):

![Figure 10 Documentation Overview](Image)

---

STMVal_D3.14 EMSN Management and Coordination Plan
12 Reference Material

The following documents will be uploaded on [https://service.projectplace.com](https://service.projectplace.com):

- STMVal_D3.14 EMSN Management and Coordination Plan (this document)
- STMVal_D3.15 EMSN Integration Test Report
- STMVal_D3.16 EMSN Summary Test Report

- ID3.1.1 EMSN Test Plan and General Exercise Specification
- ID3.2.1 EMSN- Technical Description
- ID3.2.2 EMSN Integration and Maintenance Tests
- ID3.2.3 EMSN-DIS Interface and Allocation
- ID3.2.4 EMSN-Pilot Test Plan and Exercise Specification
- ID3.3.2 EMSN-Test Person and Data Collection Management
- ID3.3.1 Centralized numerical data collection uploaded on projectplace
- ID3.3.2 EMSN-Test Person and Data Collection Management
- ID3.3.3 Test Report: Evaluation of STM Services through a Traffic Risk Assessment
- ID3.3.4 Test Report: Safety Index
- ID3.3.5 Test Report: Evaluation of the STM services - Ice Scenario
- ID3.3.6 Test Report: Evaluation of STM Services: Human Factors
- ID3.3.7 Test Report: Numerical Data Analysis Southern Baltic Scenario
- ID3.3.8 Test Report: Ship to Ship Route Exchange
- ID3.3.9 Test Report: SAR

- EMSN STM-ECDIS Technical Manuals
- Shore Centre - Technical Manuals
- STM Services - Technical Documentation, manuals, quick guides, videos
- Specific Exercise Scenarios and Schedules
- STM Operational Procedures and Guidelines on
### 13 Appendices

#### 13.1 Participating Simulator Centers (status 01/06-2018)

<table>
<thead>
<tr>
<th>Simulator Center</th>
<th>Available Bridges (OS)</th>
<th>Sim Manufacturer</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chalmers</td>
<td>2 (3)</td>
<td>Transas</td>
<td>Gothenburg, Sweden</td>
</tr>
<tr>
<td>SMA</td>
<td>3</td>
<td>Transas</td>
<td>Gothenburg, Sweden</td>
</tr>
<tr>
<td>Centro Jovellanos</td>
<td>4</td>
<td>Kongsberg</td>
<td>Gijón, Spain</td>
</tr>
<tr>
<td>Fraunhofer CML</td>
<td>3</td>
<td>Rheinmetall / Transas</td>
<td>Hamburg, Germany</td>
</tr>
<tr>
<td>Aboa Mare</td>
<td>3</td>
<td>Transas</td>
<td>Turku, Finland</td>
</tr>
<tr>
<td>SSPA</td>
<td>1</td>
<td>SSPA</td>
<td>Gothenburg, Sweden</td>
</tr>
<tr>
<td>Warsash Maritime Academy</td>
<td>2</td>
<td>Kongsberg</td>
<td>Warsash, England</td>
</tr>
<tr>
<td>FH Flensburg</td>
<td>3</td>
<td>Transas</td>
<td>Flensburg, Germany</td>
</tr>
<tr>
<td>Willem Barentsz</td>
<td>2</td>
<td>Kongsberg</td>
<td>Terschelling, Netherlands</td>
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<tr>
<td>SS Rörvik</td>
<td>5</td>
<td>Transas</td>
<td>Rörvik, Norway</td>
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<tr>
<td>UPC Barcelona</td>
<td>2</td>
<td>Transas</td>
<td>Barcelona, Spain</td>
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<tr>
<td><strong>Associate Partners</strong></td>
<td>****</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HS Emden/Leer</td>
<td>2</td>
<td>Transas</td>
<td>Leer, Germany</td>
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<tr>
<td>NORDLAB</td>
<td>1</td>
<td>Kongsberg</td>
<td>Bodö/Norway</td>
</tr>
</tbody>
</table>
13.2 Organization
## 13.3 Time Line Activity 3 EMSN Simulations Overview (Status 15/09-2017)

<table>
<thead>
<tr>
<th>Item</th>
<th>Date(s)</th>
<th>Responsible</th>
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<tbody>
<tr>
<td>Individual Integration Tests</td>
<td>1/1-2016 to 31/11-2016</td>
<td>Technical Coordinator</td>
</tr>
<tr>
<td>STM EMSN Simulations (1-4) Draft Development</td>
<td>11/03-2016-8/06-2016</td>
<td>FUAS, WMA, CJ, AM</td>
</tr>
<tr>
<td>Exercise review and data collection discussion</td>
<td>8/06-2016</td>
<td>FUAS, WMA, CJ, AM, EMSN Simulations Coordinator, Technical Coordinator, Scientific Coordinator, Act 5</td>
</tr>
<tr>
<td>Data logging definition</td>
<td>01/01-2016 to 30/06-2016</td>
<td>Technical Coordinator</td>
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<tr>
<td>Data logging functionality implementation</td>
<td>01/01-2016 to 31/12-2016</td>
<td>Technical Coordinator</td>
</tr>
<tr>
<td>Exercise development and documentation (FUAS&amp;WMA)</td>
<td>9/06-2016 to 28/02-2017</td>
<td>Exercise builders (FUAS&amp;SMA)</td>
</tr>
<tr>
<td>Area and ENC cells definition (FUAS&amp;WMA)</td>
<td>31/10-2016</td>
<td>FUAS&amp;WMA</td>
</tr>
<tr>
<td>Simulation area building</td>
<td>31/10-2016 to 31/01-2017</td>
<td>Transas areas: SMA KDI area (Channel): WMA KDI area (Baltic): TBD</td>
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<tr>
<td>STM Tools implementation and tests</td>
<td>01/01-2017 to 1/07-2017 (depending on status)</td>
<td>CML/Chalmers</td>
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<tr>
<td>SC Development and integration</td>
<td>01/01-2017 to 1/07-2017 (depending on status)</td>
<td>SMA</td>
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<tr>
<td>Scenario review WMA workshop (numerical and HF analysis input in scenario design FUAS&amp;WMA)</td>
<td>24-26/01-2017</td>
<td>WMA</td>
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<tr>
<td>Finalizing STM Simulations (1-4) FUAS&amp;WMA</td>
<td>26/01-2017 to 28/02-2017</td>
<td>FUAS, WMA</td>
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<tr>
<td>Final Scenario FUAS&amp;WMA documentation and distribution</td>
<td>28/02-2017</td>
<td>FUAS, WMA</td>
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<tr>
<td>Integration test and Pilot Run (FUAS&amp;WMA simulations)</td>
<td>20/02 2017 to 22/02 2017</td>
<td>All centers</td>
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<td>Finalizing STM Simulations AM&amp;CJ</td>
<td>TBD</td>
<td>AM, CJ</td>
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<tr>
<td>Final Scenario AM&amp;CJ documentation and distribution</td>
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<td>AM, CJ</td>
</tr>
<tr>
<td>STM Train the Trainer Course</td>
<td>28/08 2017 to 01/09-2017</td>
<td>SMA</td>
</tr>
<tr>
<td>Activity</td>
<td>Date Range</td>
<td>Location</td>
</tr>
<tr>
<td>---------------------------------------------------</td>
<td>---------------------</td>
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</tr>
<tr>
<td>EMSN STM Simulations Pilot Run without STM services</td>
<td>2017-10-23 to 2017-10-27</td>
<td>All centers</td>
</tr>
<tr>
<td>EMSN STM Simulations Session 1 Base Line</td>
<td>2017-11-13 to 2017-11-17</td>
<td>All centers</td>
</tr>
<tr>
<td><strong>2018</strong></td>
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<tr>
<td>EMSN STM Simulations Session 2 Base Line</td>
<td>2018-02-05 to 2018-02-09</td>
<td>All centers</td>
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<tr>
<td>EMSN STM Simulations Session 3</td>
<td>2018-03-12 to 2018-03-16</td>
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<tr>
<td>EMSN STM Simulations Session 4</td>
<td>2018-06-11 to 2018-06-15</td>
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<tr>
<td>EMSN STM Simulations Session 5 (ice)</td>
<td>2018-10-08 to 2018-10-09</td>
<td>AM, SSR</td>
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<tr>
<td>EMSN STM Simulations Session 6, (SAR)</td>
<td>2018-10-22 to 2018-10-26</td>
<td>All centers</td>
</tr>
</tbody>
</table>
38 partners from 13 countries -
Creating a safer more efficient and environmentaly friendly maritime sector

Demonstrating the function and business value of the Sea Traffic Management concept and its services.

SAFETY - ENVIRONMENT - EFFICIENCY

Swedish Maritime Administration ◦ SSPA ◦ RISE Viktoria ◦ Transas/ Wärtsilä Voyage ◦ Chalmers University of Technology ◦ The Swedish Meteorological and Hydrological Institute ◦ Danish Maritime Authority ◦ Navicon ◦ Novia University of Applied Sciences ◦ Fraunhofer ◦ Carnival Corp. ◦ Italian Ministry of Transport ◦ SASEMAR ◦ Valencia Port Authority ◦ Valencia Port Foundation ◦ C-MINE ◦ University of Catalonía ◦ Norwegian Coastal Administration ◦ GS1 ◦ Cyprus University of Technology ◦ Port of Barcelona ◦ Costa Crociere ◦ Svitzer ◦ OFFIS ◦ Finnish Transport Agency ◦ Southampton Solent University ◦ Frequentis ◦ Wärtsilä SAM Electronics ◦ University of Flensburg ◦ Airbus ◦ Maritiem Instituut Willem Barentsz ◦ SAAB TransponderTech AB ◦ University of Oldenburg ◦ Magellan ◦ Furuno Finland ◦ Rörvik ◦ University of Southamptons ◦ HiQ

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