INTERNATIONAL MARITIME ORGANIZATION

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MARITIME SAFETY COMMITTEE
99th session
Agenda item 5

MSC 99/INF.13
12 March 2018
ENGLISH ONLY

REGULATORY SCOPING EXERCISE FOR THE USE OF MARITIME AUTONOMOUS SURFACE SHIPS (MASS)

Establishing international test area "Jaakonmeri" for autonomous vessels

Submitted by Finland

SUMMARY

Executive summary:	This document provides information and experience gained while establishing a dedicated test area for the full scale test of autonomous vessels. This document also describes the possibilities of such areas for different kinds of test and operation scenarios.
Strategic direction, if applicable:	2
Output:	2.7
Action to be taken:	Paragraph 25
Related document:	MSC 98/22/7

Introduction

1 The Maritime Safety Committee, at its ninety-eighth session, having considered the information provided in document MSC 98/22/7 on future possibilities for developments in the automation of ships, digitalization and the use of information technology, invited Member States and international organizations to submit information on studies including technical, legal, operational, training and maintenance aspects of autonomous shipping, information on ongoing research, testing and full-scale projects.

2 This document describes the process, administrative procedures, consultations and hearings with public authorities and interest groups in preparing the establishment of the test area "Jaakonmeri". This document further presents the possibilities for utilizing the area and explains the technical and operational limitations for use of the area as well as safety precautions and procedures applied by the authorities.

Background

3 The marine industry and its stakeholders drafted the Strategic Research Agenda 2025 of the Finnish Maritime Cluster, published on 1 November 2016, which outlines a roadmap for research in the industry. Marine industry is a high-technology sector that strives to be a role model in adopting new technologies. The strategy identified several areas of development one of which was intelligent ships, systems and solutions. The objective of the maritime sector is that in 2025, the Finnish Maritime Cluster will be the world's most creative, flexible and adaptable maritime network.

4 The origin of the Jaakonmeri test area is linked to the Strategic Research Agenda as one of the outcomes of the strategy work was a proposal to create an ecosystem for autonomous maritime transport. The One Sea ecosystem led by the Digital, Internet, Materials & Engineering Co-Creation (DIMECC) was started on 22 September 2016, when the Finnish Funding Agency for Innovation (TEKES) granted partial funding for the ecosystem. The ecosystem brings global pioneers and agile ICT companies together, to develop the world's first unmanned marine transport solution.

5 A need for a test area for autonomous maritime development was identified early. The need for the test area was first expressed on 29 June 2016 in a meeting with the Ministry of Economic Affairs and Employment, based on which Rolls-Royce drafted a plan for the test area. The plan was presented on 19 August in the Team Finland building. The preparatory work for the test area was transferred to DIMECC on 9 November 2016.

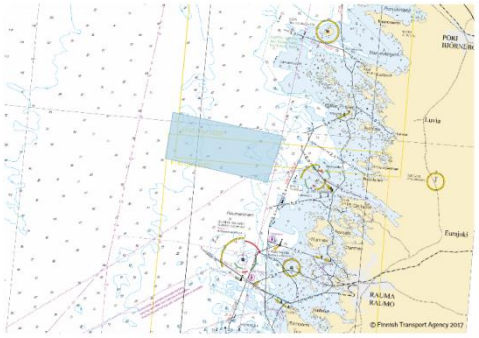
6 Thorough testing in authentic sea conditions is critical to ensure the functionality of systems and technology and to guarantee the required safety and reliability requirements for the autonomous vessels of the future.

Establishing the area

7 The first draft of the test area application was approved by the One Sea Management Board on 10 November 2016 and it was sent to the Ministry of Transport and Communications (LVM), the Finnish Transport Agency (FTA) and Centre for Economic Development, Transport and the Environment (ELY) on 22 November 2016. After a few iterations, the final application was sent to the ELY Centre of Southwest Finland on 21 February 2017, which approved the application on 10 July 2017.

8 Work on establishing the test area involved lengthy and confidential collaboration between different stakeholders. It comprised the active work done by the leading maritime industry actors based on the Strategic Research Agenda, DIMECC's digital and manufacturing co-creation platform, government agencies (LVM, FTA, and Finnish Transport Safety Agency Trafi) as well as TEKES, who enabled the funding for the business-led ecosystem initiative.

9 The FTA as the national VTS Authority participated in the planning of the area and provided information and knowledge about traffic conditions along Finland's coast. Various areas were brought into the discussion and as a result of active cooperation with the industry the test area was finally placed off Eurajoki. FTA also provided its expertise and experience collected in various maritime traffic and fairway related application processes during the past decades.

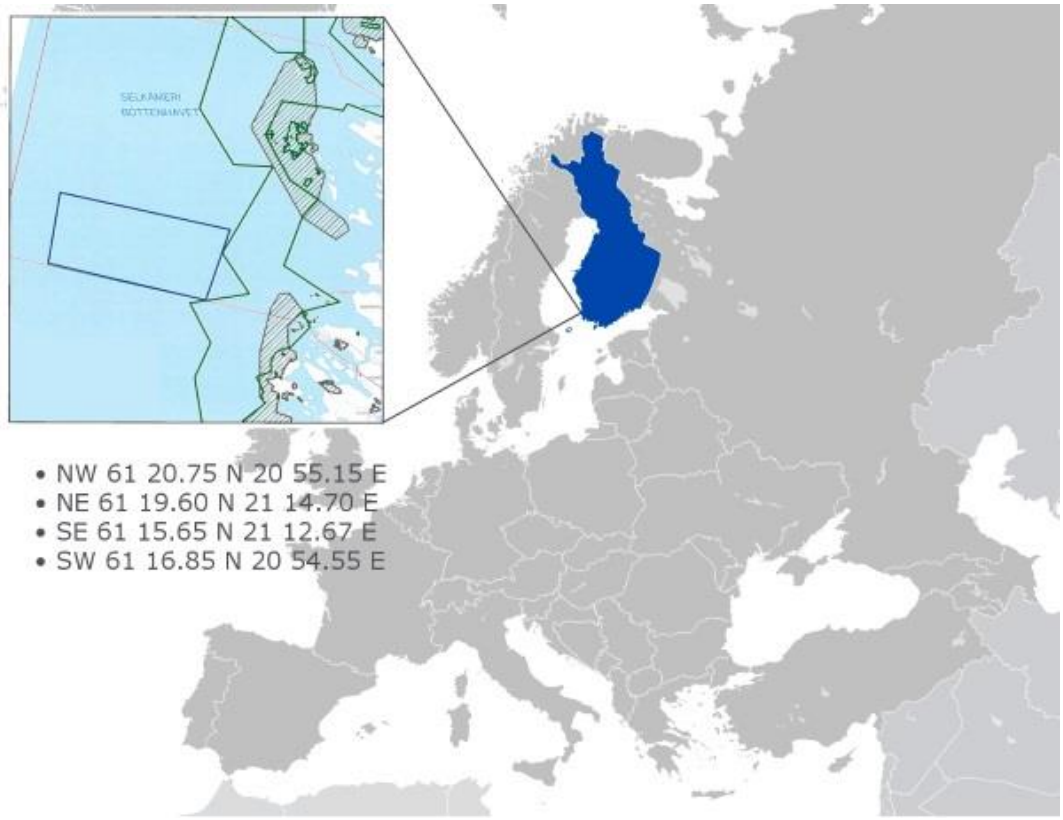


Jaakonmeri Test Area

10 The test area is located off the coast of Finland. The longest side of the area to the north is approximately 17.85 km (9.9 NM) long and the western side is approximately 7.10 km (3.9 NM) long. The area consists of open water on the high seas with depths varying between 16 and 60 meters and also offers testing opportunities in ice conditions during the winter.

11 The Jaakonmeri test area, hosted by DIMECC Ltd., is available for all parties desiring to perform tests regarding automated surface maritime traffic, vessels or technologies related to it. The test area is available for one organization or party at a time.

12 DIMECC will offer connectivity through their partners. The target is to have excellent data connectivity available in the test area. DIMECC is working with its partners to improve data connections in the test area. The connectivity services will be developed incrementally and the plan is also to offer other services to enhance the test experience.



Limitations

13 There are some limitations to the use of the test area. During May and June, the area is reserved for commercial fishing and hence not usable for test purposes. Moreover, the area needs to be kept test-free following each test period for a length of time equalling the duration of the test period (from one to six weeks).

Administrative procedure

14 In order to gain access to the area, a contract is required. The contract specifies the obligations and responsibilities of the testing entities as well as the role and responsibilities of DIMECC, as the governing body of the area. The contract covers the following areas:

.1 time and duration of the test

.2 authorization (i.e. environmental permissions)

.3 liabilities and responsibilities

.4 reporting

.5 safety

.6 supervision of the test area

.7 testing environment.

15 The procedure for processing an application for gaining access to the area is shown below (fig. 2.) In cases where the vessel is governmentally owned or operated, or bathymetric surveys and collection of survey data are to be conducted, a permit is required according to the Territorial Surveillance Act (755/2000).

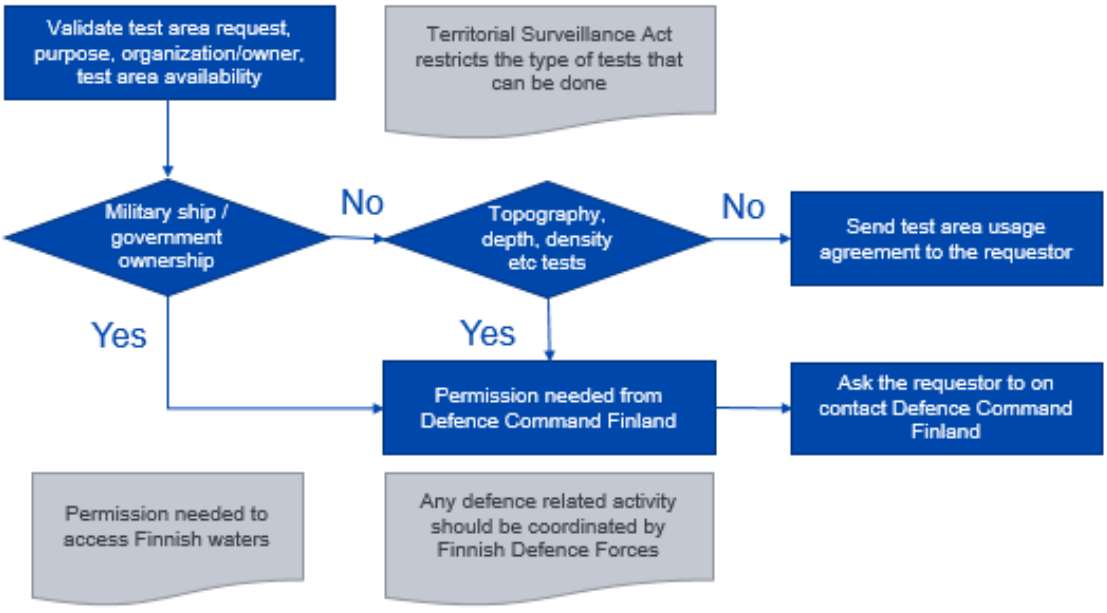


Fig. 2 Approval process to gain access to the area

16 A fee is collected for utilizing the test area. The fee covers the administrative expenses related to the governance of the area and fees to METSÄHALLITUS (Finnish state enterprise that administers the state-owned land and water areas). The amount of the fee depends on the time of the year. During the fishing season March-April an additional fee is collected to cover compensation paid to the professional fishermen in the region for forfeited haul.

Governing the test area

17 On DIMECC's request, the Centres for Economic Development, Transport and the Environment (ELY Centres) have prohibited access to the testing area by all vessels, except for vessels participating in the testing of autonomous shipping, for a limited period. The prohibition of other vessel movements allows for tests to be carried out at full scale in a real maritime environment. The prohibition does not concern vessels carrying out official, paramedic or rescue operations or other government transport.

18 A general outline of the process and testing plan is given below (fig.1). Both the responsibilities and actions required of the party carrying out a test (Testing Entity) and those required of DIMECC during the test are outlined.

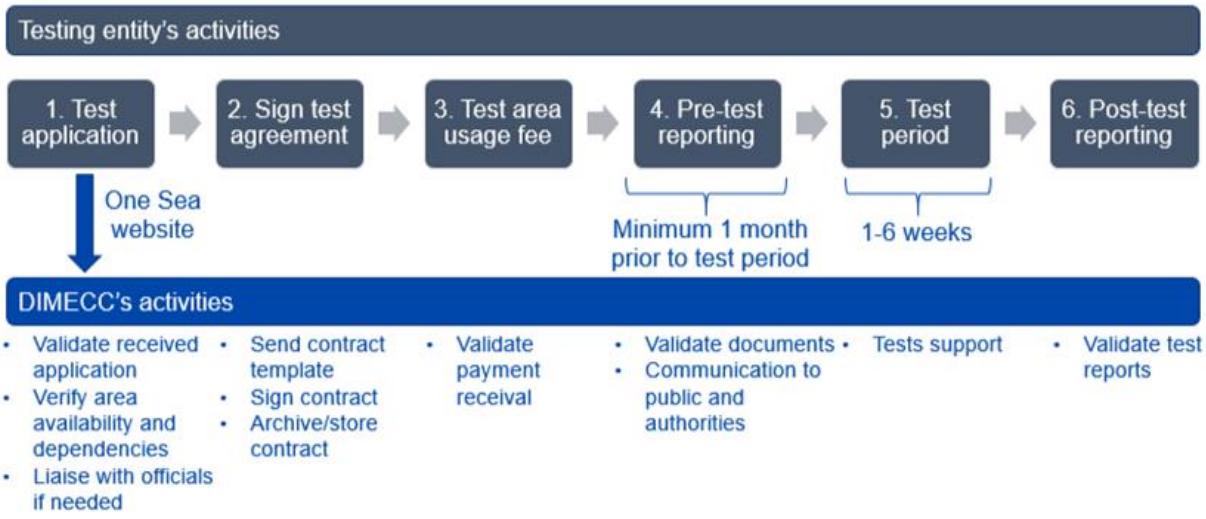


Fig. 1. General description of the procedure for utilizing the test area.

Notifications and publishing of notices to mariners

19 Utilizing the area requires sufficient processes in order to work, as well as a clear announcement and notification plan to ensure that all parties concerned are aware of the testing activities being carried out and the restrictions in place.

20 Notifications of tests to be carried out commences as a minimum a month in advance according to a predefined publishing plan. In order to ensure that the information also reaches the general public, a dedicated website is set up and the information is also reproduced at the official Notices to Mariners website (NtM service), in the social media, public radio maritime weather forecasts and newspapers.

21 The commencing and ending of each testing or piloting period is notified to the parties concerned (fig.3). Additionally, the names and contact information of the persons in charge is forwarded to the authorities.

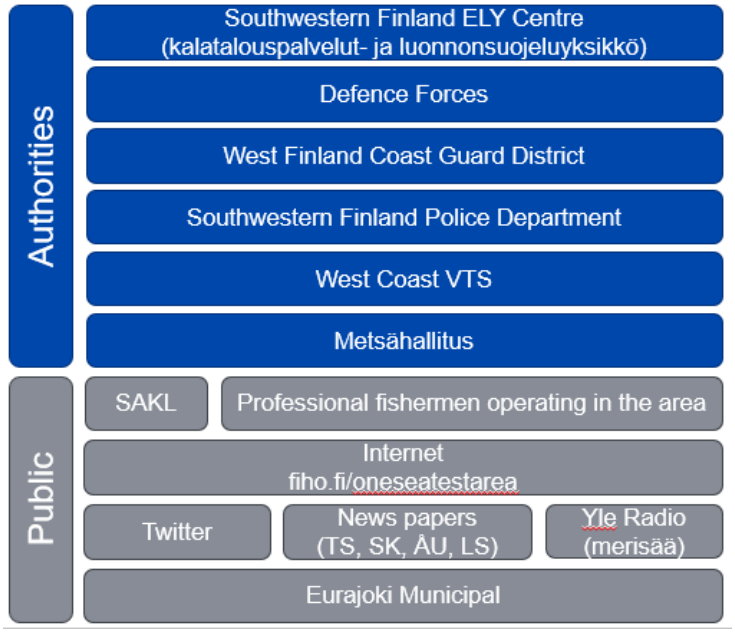


Fig. 3 Flowsheet of notifications.

Maritime Safety and environmental protection requirements

22 Ensuring safety was one of the key criteria in establishing the test area. Hence, the purpose of the test area application was to request authorities to restrict traffic other than related traffic in the area while tests are in progress.

23 Testing of autonomous maritime traffic does not need permits, but traffic restrictions require administrative processes and decisions. Prohibition of traffic is provided for in the Water Traffic Act (463/1996), which allows traffic restrictions whenever it is necessary to protect traffic, environment, fishery or other industries, or other uses of nature or public interest. In order to guarantee the safety of both testing parties and other users of the sea area it was decided to apply temporary restrictions of other maritime traffic in the Jaakonmeri area. As Jaakonmeri is located in the open sea and there are no fairways in the area, the application was processed by the local ELY Centre; otherwise the competent authority would have been the Finnish Transport Agency.

24 The Finnish Hydrographic Office (part of the FTA) will insert the Jaakonmeri test area in its printed nautical charts and Electronic Navigational Charts (ENCs). Additionally, it is possible to mark the corners or boundaries of the test area with virtual Automatic Identification Systems (AISs). Virtual AISs will be operated by the West Coast VTS on DIMECC's request. Virtual AISs will be published also in ENCs and activation of them will be announced in the NtM service. All markings in the chart products will be removed when use of the test site ends. Processes and information sharing between DIMECC and the HO have been agreed on a general level and they will be fine-tuned when more experience is gained.

Action requested of the Committee

25 The Committee is invited to note the information provided above.