Asia-Pacific Economic Cooperation

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Agenda Item: 3.3

Practical Experience on Autonomous Navigation in the Russian Federation

Purpose: Information
Submitted by: Russia

APEC PERU 2024

Thematic Session on Supporting the Identification and Integration of New and Emerging Smart and Sustainable Maritime Technologies and Services
4 April 2024

Asia-Pacific Economic Cooperation

Maritime Experts' Group Meeting

Supporting the Identification and Integration of New and Emerging Smart and Sustainable Maritime Technologies and Services

«Practical experience on Autonomous Navigation in the Russian Federation»

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Commercial operation of autonomous ferries in Russia

Ro-Ro Ferry «GENERAL CHERNYAKHOVSKY»

In 2023 two ferries, namely “**Marshal Rokossovsky**” and “**General Chernyakhovsky**” were put into commercial operation as autonomous ships. The carriers operate on more than 500 miles route between the ports of Ust-Luga and Baltiisk (Kaliningrad) on Baltic Sea.

Each vessel is about 200 meters of LOA. MASS category is RC_{MC}-MC_{DS} that allows autonomous navigation under remote control with manual control override capability when moving at sea and manual control with the use of a-Navigation systems for decision support when moving in restricted waters and at the entrance to the port.

The vessels are controlled remotely from the first Remote Operation Center located in Saint - Petersburg Passenger Port.

The ferries are equipped with an Autonomous Navigation System (ANS) is designed for:

- automatic analysis of the navigation situation;
- guiding the ship according to a planned route in both the automatic and the remote-control mode;
- automatic decision-making for maneuvering;
- collecting data from the ship’s equipment, the filtering, identifying and displaying data from different sensors;
- loading and displaying navigational map data in both the S57 and S63 formats, displaying navigation data and additional layer’s information.

Ro-Ro Ferry «MARSHAL ROKOSSOVSKY»

For the subject of surveying these ferries and other ships as autonomous, the classification society "Russian Maritime Register of Shipping" developed and published the Regulations for Classification of Maritime Autonomous and Remotely Controlled Surface Ships (MASS). The Regulations contain requirements for Maritime Autonomous Surface Ships, Remote Control Centers (RCC) and various technical means to ensure the autonomous ships' control. The ferries have been assigned an autonomy class with a category of remote control featuring the ability to change-over to the manual control whilst at sea and to the manual control with an option of decision-making when sailing through narrow water passages or when entering to the port.

Remote Control Center (RCC)

Coordinated Motion Control System

MASS Remote Control Station in RCC

The ferry's Remote Control Center is located in the port of St. Petersburg. The Center provides monitoring of the surrounding navigation situation, control of the main movement parameters of the ferries, as well as their remote control at the open sea.

Training of specialists for the Autonomous Navigation

- The composition of equipment at the training Work Station is as close as possible to composition and functionality of MASS Operator workplace.
- The Simulator is implemented on a platform of certified domestic software.
- The simulator is implemented in three versions: VR (Virtual Reality), AR (Augmented Reality), Console.
- The Training Complex was created on a single platform with an Ice Simulator, which makes it possible to create in the future an integrated Training Complex for practicing the principles of navigation, taking into account the specifics of the Northern Sea Route (NSR).
- Provides the opportunity to conduct research and develop practical recommendations for Autonomous Navigation.

Training Programs for specialists involved in operating of autonomous ships have been approved. Programs are based on the applicable Standards of the STCW Code, 1978. The total of 42 autonomous ships Operators have been trained according to said Programs.

Legal regulation pertaining to Autonomous Navigation in the Russian Federation

In July 2023 in the Russian Federation, the Federal Law No. 294-FZ was adopted for regulating legal relations when using autonomous ships.

Feederal Law introduces the changes to a number of national documents aimed to creating a legal framework allowing the operation of autonomous ships, establishing the conceptual apparatus and principles of unmanned navigation.

Currently, the activity is in progress to approve additional by-laws documents whatever necessary to implement the said Federal Law. The relevant requirements will have to be established for the external crew, for the shore-based systems for of autonomous ships' traffic control, for organizations competent in the field of Autonomous Navigation, for the manning of autonomous ships, and also for the rules of controlling the autonomous ships, etc..

РОССИЙСКАЯ ФЕДЕРАЦИЯ

ФЕДЕРАЛЬНЫЙ ЗАКОН

О внесении изменений в отдельные законодательные акты Российской Федерации

Принят Государственной Думой 29 июня 2023 года

Одобрен Советом Федерации 5 июля 2023 года

Статья 1

Федеральный закон от 31 июля 1998 года № 155-ФЗ «О внутренних морских водах, территориальном море и прилежащей зоне Российской Федерации» (Собрание законодательства Российской Федерации, 1998, № 31, ст. 3833) дополнить статьей 13[1] следующего содержания:

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Russian equipment and Autonomous Ecological Ship

Within the Federal project the shore-based equipment and the appropriate software for Autonomous Navigation are under development.

It is planned to equip the sea ports of St. Petersburg, Kaliningrad, Ust-Luga, Arkhangelsk and Petropavlovsk-Kamchatsky with the following equipment:

- new generation of the Vessel Traffic Service (VTS);
- shore-based Radar station for VTS;
- Optical Video Surveillance and Analysis System
- (operating in real time mode);
- shore-based NAVDAT system and AIS/VDES;
- Autonomous Navigation System in the port area.

Construction of an Autonomous Ecological Ship was started in 2023 (project No. RST-38)
The Ecological Ship will operate in the sea port of Petropavlovsk-Kamchatsky (Russian Far-East region).

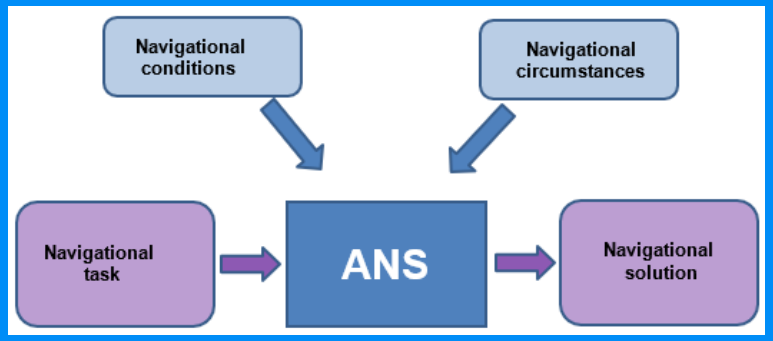
Guidelines for assessing of the quality and functionality of Autonomous Navigation System (ANS)

Submitted by the Russian Federation to 108 session of IMO Maritime Safety Committee

In the Russian Federation there has been carried out a comprehensive scientific research to develop methodology and corresponding Guidelines for assessing of the quality and functionality of Autonomous Navigation System (ANS). That work was based on the results of AIS data analysis in the Baltic Sea area for a period of six months (about 20 million positions), whilst in order to determine the composition and significance of different tasks, a survey was conducted of more than 100 navigators of management level (Masters and Chief Officers).

The Guidelines contain:

- the methodology for assessment of ANS quality;
- the methodology for assessment of ANS applicability;
- provisions for a virtual simulation platform.



Concept of assessment of ANS quality

It is proposed to assess the quality ANS operation on the basis on the results of solving of a set of navigation tasks by that ANS which emerge during the operation of a MASS.

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MARITIME SAFETY COMMITTEE
108th session
Agenda item 4

MSC 108/4/xx
12 February 2024
Original: ENGLISH
Pre-session public release:

DEVELOPMENT OF A GOAL-BASED INSTRUMENT FOR MARITIME AUTONOMOUS SURFACE SHIPS (MASS)

Approaches to assessing the quality of Autonomous Navigation Systems

Submitted by the Russian Federation

SUMMARY

Executive summary:	The document proposes to develop IMO Guidelines / General or Guiding Principles for assessment of the quality and functionality of Autonomous Navigation Systems (ANS) in accordance with the provisions of the MASS Code. Developments regarding the concept and methodologies of assessing the applicability and quality of ANS functioning, which can be used as a basis for the development of such an IMO document, are presented in the annex.
Strategic direction, if applicable:	2
Output:	2.23
Action to be taken:	Paragraph 17
Related documents:	MSC 107/20

Introduction

1 The Committee, at its 107-th session, approved the updated Roadmap for developing a goal-based code for Maritime Autonomous Surface Ships (MASS), as set out in annex 15 to MSC 107/20, which provides the finalization and adoption of non-mandatory MASS Code at MSC 109, as well as continue discussion of recommendations (guidelines) to the MASS Code.

2 As part of the development of the MASS Code, it is expected to introduce a definition of an Autonomous Navigation System (ANS), which should be an integral element of a Maritime Autonomous Surface Ship, as well as main recommendations (and in the future, requirements) for such a system for use in various modes of MASS operation.

3 It is also expected inter alia to introduce a provision in the MASS Code that such ANS should be certified/approved by the Administration and/or recognized organization to assess its functionality in general and in terms of performing all or selected tasks related to the ship operation.

MSC108-4-xx eng final

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Thank you for attention!

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