MASSPorts and MASS trials in Singapore

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Automation: Gaining Momentum

IMO Moves Forward to Address Autonomous Ships

The International Maritime Organization (IMO) has agreed on a definition of so-called Maritime Autonomous Surface Ships (MASS) as well as on a framework for analyzing the applicable IMO regulations.

These are said to be important first steps toward international regulation.

At the meeting of IMO's Maritime Safety Committee (MSC), held in London from May 16-25, a framework for analyzing applicable IMO regulations was developed to shed light on the possible gaps between current regulations and the technological development

Image Courtesy: IMO

Yunzhou Tech's trials with autonomous cargo vessel Jin Dou Yun 0 Hao

South Korea embarks on ambitious autonomous ship project

By Shin Ji-hye

ed : Oct 30, 2019 - 14:59
d : Oct 30, 2019 - 14:59

Korea has embarked on an
omous ship project by investi
won ($130 million), seeking t
omestic eco-friendly and smar
ing industry and achieve a 50
l market share by 2030.

Danish shipping must be autonomous

TUESDAY 26 MAR 19 | By Anne Kirsten Frederiksen

Researchers must help Denmark develop the first autonomous ships.

INNOVATION 04 October 2018

The Port of Rotterdam Authority tests autonomous navigation with a floating lab

One Sea — an autonomous maritime ecosystem

NYK Conducts World's First Maritime Autonomous Surface Ships Trial

NYK has conducted the world's first Maritime Autonomous Surface Ships (MASS) trial performed in accordance with the IMO's Interim Guidelines for MASS trials* as the company begins tests to realize its target of manned autonomous ships** for safer operations and a reduction in crew workload.

The first ever zero emission, autonomous ship

By: Asle Skredderberget

Yara Birkeland will be the world's first fully electric and autonomous container ship, with zero emissions. With this vessel, Yara will reduce diesel-powered truck haulage by 40,000 journeys a year.

Singapore

Autonomous ships in Singapore could become a reality with MPA's new innovation lab

China will lead US$1.5Bn autonomous shipping market by 2025

15 Apr 2020 by Martyn Wingrove

Autonomous Ships

Automated Ports

Digital Connectivity

Objectives of MASSPorts

A. Develop detailed guidelines and conditions for MASS trials in port

B. Establish common terminology, form and standards for communication, ship reporting and data exchange to enhance inter-operability of systems across different ports.

C. Facilitate port-to-port MASS trials








A. Develop detailed guidelines and conditions for MASS trials in port

- MASSPorts should endeavour to agree on conditions for MASS trials within their ports, which are in line with IMO's interim guidelines for MASS trials:

  - To **develop best practices for MASS trials** with particular focus on autonomy, communication technologies and connectivity ;
  - To **define the scope for application** of mandatory IMO instruments in ensuring that the intent is met;
  - To develop **risk mitigating measures and emergency plans** for MASS operations in port pertaining to communications, reporting, manning, cyber risk, port infrastructure etc.; and,
  - To determine the extent to which MASS vessels of varying degrees of autonomy should and could **interact with each other and with manned vessels**, during trials in port.
  - To define the **functions and infrastructure of ports required** to support MASS trials of varying functions and degrees of autonomy.

- For a start, MASS trials and developments ***could begin in inland ports***, with an aim to adopt the guidelines developed for ocean-going MASS operation. The network should ***keep these detailed guidelines and conditions under review***, with the aim of amending them in view of the experience gained with their application in trials. To further support the IMO's efforts on the regulatory scoping exercise for use of MASS, MASSPorts should also share their findings and progress at IMO, when appropriate.

MPA SINGAPORE

B. Establish common terminology, form and standards for communication, ship reporting and data exchange to enhance inter-operability of systems across different ports.

- MASSPorts should aim to **establish common terminology, form and standards for communication, ship reporting, data exchange and data governance, where appropriate, between MASS and various stakeholders in port** (authorities, terminal operators, port service providers etc.). The use of common terminology, form and standards would enable integration of existing information digitally to further encourage MASS technology development. **Enhanced inter-operability of various systems would allow international ports to be more accessible to MASS**, especially since the vessel need not apply yet another set of standards or use unique communication systems/equipment when operating within different ports around the world.

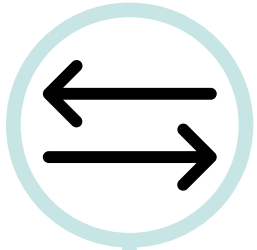
- When appropriate, these benchmarks for port systems, could then be taken to other international platforms such as the IMO and the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) to influence discussions on performance standards of the system/equipment, including the type of mandatory infrastructure onboard vessels.

C. Facilitate Port-to-Port MASS Trials

- When opportune, the MASSPorts should seek to facilitate port-to-port MASS trials**, with the objective of validating the proposed conditions for MASS trials in ports and to test the inter-operability of port-based systems**. The trials should consider the shore-based infrastructure required to support MASS test-beds to ensure reliable communication and data exchange between MASS-and-port, and between port-to-port. These trials will best emulate the international nature of shipping, and allow the network to identify and address additional challenges with regard to operation of MASS at various ports.

- **Results of these port-to-port MASS trials should also be well documented, evaluated and shared** at IMO and IALA when appropriate , for the purposes supporting work on the development of MASS- related regulations.

Projects under MASSPorts



Mapping Exercise - Concept of Operations (CONOPS) for MASS in Ports

- To elucidate the process and forms of interactions (eg. digital/VHF etc.) required of MASS in each port, compare processes and identify areas that may require ports to address together

Guidelines For MASS Trials In Ports And Inland Waters

- To propose guidelines and best practices for MASS trials in ports and inland waters, for adoption by MASSPorts members.

Study on VTS - Types of VHF Communications

- To understand the time used for the different services delivered over VHF and develop a roadmap towards more silent interaction

MASS Trials in Singapore

MASS Pilot Projects – Harbour Tugs

Smart Maritime Autonomous Vessel

with ST Engineering Marine, POSH, ABS, M1, MPA

IntelliTug

with Wartsila, PSA Marine, Lloyd's Register, TCOMS, MPA

Project MINERVA

with Keppel, ABB, ABS, TCOMS, MPA

IntelliTug

Wartsila, PSA Marine, Lloyd's Register, TCOMS, MPA

- Supervised autonomous control with on-board Master
- Autonomous navigation with optimised passage planning
- Real-time collision detection and collision avoidance

On-board Tug Master monitoring on-board console for how the smart navigation system manoeuvres the harbour tug during sea trials

**Picture provided by Wartsila and PSA Marine*

Smart Maritime Autonomous Vessel

ST Engineering Marine, POSH, ABS, M1, MPA

- Shore command centre capable of:
  - Remote control
  - Health monitoring of shipboard systems
- Autonomous waypoint navigation
- Real-time collision detection and collision avoidance

Set-up of shore command centre

**Picture provided by ST Engineering Marine*

Project MINERVA

Keppel, ABB, ABS, TCOMS, MPA

- Shore command centre capable of:
  - Remote control
  - Monitoring of vessel's engine and thruster

Set-up of shore command centre

**Picture provided by Keppel Offshore and Marine*

What Comes Next

WIRED BACKCHANNEL BUSINESS CULTURE GEAR IDEAS SCIENCE SECURITY

ERIC MEILER BUSINESS 10.30.2020 09.00 AM

The Robot Ships Are Coming ... Eventually

As the pandemic fuels demand for less contact and fewer sailors, shipping companies turn to AI-assisted navigation.

China's first autonomous cargo ship makes maiden voyage

TAGS: AUTONOMOUS SHIPPING ARTIFICIAL INTELLIGENCE ASIA UNMANNED VESSELS

Automated shipping coming to Europe's waters

30 June 2020

by Tom Cassauwers

Republish

NYK secures class approval for autonomous ship framework

Jason Jiang · May 15, 2020

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AEGIS looks at combining autonomous ships with automated ports

TAGS: PORTS & LOGISTICS AUTONOMOUS SHIPPING

Eight nations join hands to align standards for autonomous ships

TAGS: AUTONOMOUS SHIPPING ASIA EUROPE PORTS AUTONOMOUS SHIPS

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Singapore: Future Ready Port for MASS operations


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