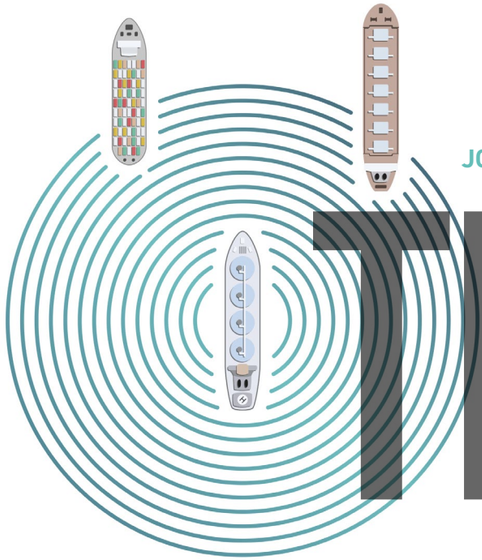
MARITIME AUTONOMOUS SURFACE SHIPS

MASS

A MARITIME AUTONOMOUS SURFACE SHIP (MASS) REFERS TO **A SHIP THAT CAN OPERATE INDEPENDENTLY OF HUMAN INTERACTION.** THEY HAVE THE POTENTIAL TO REVOLUTIONISE THE MARITIME INDUSTRY, MAKING SAFER, MORE EFFICIENT, AND ENVIRONMENTALLY FRIENDLY MARITIME TRANSPORTATION POSSIBLE.

There are many successful MASS models. However, trials of new technology or upscaling of trials are still required. Trials often involve complex, unfamiliar, and untested technology, with an operational scope that can extend beyond coastal waters. To test the capabilities of these technologies under real operational conditions, trials must strive to be as realistic as possible.

Planning for MASS trials should commence well in advance, and we recommend early consultation with the flag state, classification society and other stakeholders.



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TRIALS

1 REGULATORY CHALLENGES

APPLICATION OF EXISTING IMO INSTRUMENTS TO MASS

Current regulations for ship operations fail to fully address the safety and environmental concerns posed by autonomous ships operating at various degrees of autonomy. To address and bridge these gaps, the International Maritime Organization (IMO) is developing a goal-based MASS code. A non-mandatory MASS code is planned to be adopted by May 2025, with the intention for a mandatory code to come into force on 1 January 2032. Additionally, the IMO has issued 'MSC.1/Circ.1604 - Interim Guidelines for MASS Trials'. These guidelines assign responsibility to ensure that MASS comply with the requirements of existing IMO instruments or provide an equivalent or alternative standard adopted for safety and environmental protection. These must achieve acceptance by the flag state of the ship, and from the coastal and port states where trials are being conducted. Flag states should approve and document equivalent or alternative designs as per IMO guidelines 'MSC.1/Circ.1455 – Guidelines for the approval of alternatives and equivalents as provided for in various IMO instruments'.

2 OPERATIONAL CHALLENGES

AREA OF TRIAL OPERATIONS

The area of MASS trials should be determined, marked and communicated to all relevant parties. The area of trial operations involves the coordination and cooperation of coastal states, flag states, and port states.

MASS TRIALS AND HUMAN ELEMENT

Adequate training and understanding of automation systems is essential for personnel involved in MASS trials. Personnel need to be able to effectively interact with autonomous technology, monitor system performance, and intervene when necessary. MASS trials should always maintain human control during the tests/trials. Chains of command and lines of communication regarding responsibility and authority concerning the safety of the MASS should be clearly established.

3 TECHNICAL CHALLENGES

NOVELTY OF THE SYSTEM

Due to the novelty of the technology used and the absence of established testing and commissioning standards, a comprehensive MASS trials risk assessment is essential. This assessment should identify all anticipated risks and necessitate cooperation among the flag state, classification society, and original equipment manufacturer (OEM) for approval. Additionally, it is necessary to conduct both simulation tests and sea trials of the system under real-world conditions.

SAME DEGREE OF OPERATION CAPABILITY AS CONVENTIONAL SHIPS

A MASS aims to achieve all-weather situational awareness by using technologies such as Light Detection and Ranging (LiDAR), infrared cameras, and feeds from other bridge equipment such as radar, ARPA, echo sounder, DGPS, AIS, etc. It acts on data received from these systems to plot courses, detect and avoid obstacles, and make real-time decisions about route adjustments and collision avoidance. MASS technology utilises machine learning algorithms for predictive maintenance and management of machinery, optimising performance and reducing the risk of malfunctions. Criteria should be established for when a trial must be aborted or if equipment necessary to maintain operational capability becomes unavailable or unreliable.

MASS AND COMMUNICATION

Continuous and reliable communication between the ship and the remote-control station is crucial.

MASS TRIALS AND REDUNDANCY

MASS trials should ensure redundancy in critical systems such as power, steering, propulsion, and communication to maintain operational safety and integrity. Redundant systems serve as backup mechanisms in case of failures, thereby reducing the risk of accidents and ensuring uninterrupted operation.

4 CYBER SECURITY CHALLENGES

Autonomous ships rely on digital systems and connectivity. This dependency means they are vulnerable to cyber attacks, necessitating robust cyber security measures and a cyber risk management plan. These safeguards should protect against security breaches, data theft, and system manipulation.

INSURANCE CONSIDERATIONS

MASS trials will require similar insurance coverage as conventional ships. These trials present challenges to the Club in understanding the associated risks, but also offer a learning opportunity to be part of the future of maritime operations. Members wishing to conduct MASS trials are requested to submit a detailed plan to the Club's underwriting team in advance.

FOR FURTHER INFORMATION

Please do not hesitate to contact the Loss Prevention Team at: lossprevention@tindallriley.com