

The route to regulating MASS

by Fitzwilliam Scott

Following the April 2022 meeting of the International Maritime Organization's (IMO) Maritime Safety Committee, material steps were taken toward formulating an international regulatory framework for Maritime Autonomous Surface Ships (MASS). "However, outstanding questions on terminology and scope must be tackled for regulatory work to progress," says Capt. Marko Rahikainen, One Sea Ecosystem Lead.

This year has seen significant progress in the work towards autonomous ship regulation. Three key committees at the IMO are involved in considering regulations for MASS – the Legal Committee (LEG), the Facilitation Committee (FAL), and the Maritime Safety Committee (MSC). After meetings held this spring, the outcomes of the Regulatory Scoping Exercises to assess how MASS could be regulated internationally resulted in work plans for the three committees.

April's MSC 105th session also agreed on a roadmap for regulating MASS and established the MSC MASS Correspondence Group to take the regulatory work forward. It is a live document that can adapt to change, but it has set the course for developing the much-needed regulations.

Now, the aim is for the IMO delegations to craft a non-mandatory instrument for a goal-based MASS Code by 2025 (for cargo ships in the first instance). Since most of the regulations need to regard maritime safety, the resulting code is envisaged to become mandatory from 2028's start. By making the code goal-based rather than prescriptive, the IMO seeks to make the instrument covering autonomous ships 'future-proof.'

That said, creating the MASS code will be a complex process as it requires working across multiple IMO conventions – not just the International Convention for the Safety of Life at Sea. Each IMO convention has its own processes and procedures for approving new regulations. In addition to the roadmap,

the committees agreed to establish a Joint MSC/LEG/FAL working group to address common issues and ensure communication between the committees as the regulatory process progresses.

Why terminology matters

Currently, there is no common terminology for MASS. Terms and technology types are often used interchangeably; in practice, they have very different meanings. This situation is not acceptable in international regulation, where it would leave room for misinterpretation or 'implementation' at variance with what the regulators intended.

For instance, remote control and monitoring should not be confused with automation, as remote operations can be executed on ships where systems have various levels of automation. Again, automation and autonomous technologies are distinct concepts. A fully automated ship could still have a crew on board, for example, to manage operations, step in as necessary, or undertake modified duties. A fully autonomous ship could operate with or without a crew on board.

In addition, the general term "autonomous operation" is often used loosely when its intended meaning relates to navigational automation. There are other autonomous ship technologies which seafarers already take for granted – such as a ship's stabiliser and anti-heeling system.

The complex nature of the regulatory process offers a clue as to the significance of terminology in developing international

regulations: terminology and definitions must be consistent and unambiguous to make progress on automation and autonomous technology regulations.

It is fair to say that, while regulatory developments on autonomous shipping at the global level have gathered pace, they remain behind advancing technology. The UK has already formulated a position on rule development for autonomous ships, while **the EU's SAFEMASS study** establishes a forward position on regulation. One Sea's stance remains focused on contributing to the development of common rules on MASS as the most effective means of avoiding ambiguity and ensuring consistency in maritime safety standards.

Defining the levels of automation

Earlier this year, One Sea published a new white paper, ***Autonomous Ships: Terms of Reference for Rule Development***, which offers a route forward for developing and implementing an international regulatory framework for MASS. The publication calls for urgency in developing common terms of reference covering autonomous and highly automated ship operations that can be used across the maritime industry. It examines definitions of ship autonomy and levels of automation, exploring how they can be applied progressively to ship operations.

In his foreword, Capt. Eero Lehtovaara, Chairman of One Sea, writes, "The IMO Conventions which provide the safe operating framework for the entire shipping industry have been developed over many



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years, and amendments to accommodate autonomous ship operations demand painstaking work. Experts in digital technologies and seafarer welfare groups suggest that shipping should therefore establish not only priorities but a series of waypoints on its voyage towards autonomy, to support efficient and safe ship operation in the near-term.”

At the core of the paper is a proposal for a scale for determining automation in shipping, based on the SAE Levels of Driving Automation and further developed by One Sea and its members, which describes six ‘levels’ that can be applied to various ship operations or an entire ship.

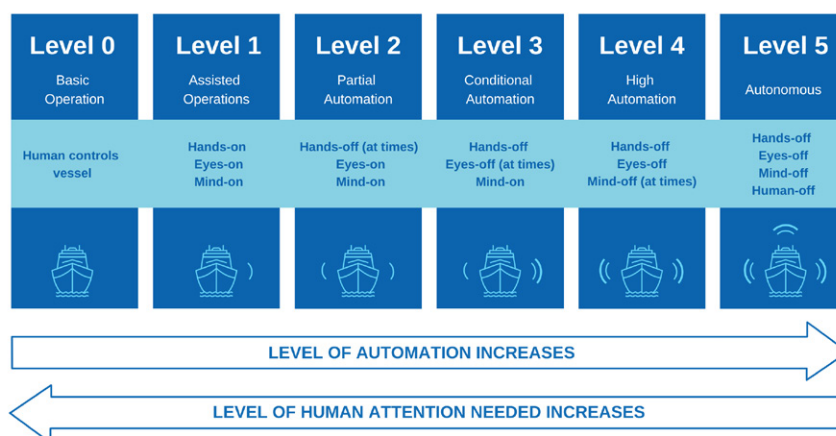
For the purpose of the Regulatory Scoping Exercise (MSC 100/20/Add.1 Annex 2), the IMO defined four degrees of autonomy, but many have interpreted this as a preliminary position. Adding to the confusion, class societies have developed their own gradations of autonomy, meaning multiple definitions are in use within the same industry.

However, during the Regulatory Scoping Exercise, it was acknowledged that the levels defined by the IMO required further consideration for regulatory progress to be made on MASS – and a more detailed description of the degrees of autonomy was required.

The human element

In One Sea’s industry proposal for defining ship automation levels, it is only the last one that is defined as fully autonomous; others represent different levels of automation. Crucially, One Sea suggests that levels of autonomy should be determined on a scale based on the need for human attention/attendance rather than mixing the definition with crewing levels on-board

Levels of Automation in Shipping



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a ship. In addition, the location of the human operator in the loop is not considered relevant when discussing the taxonomy of automation and autonomy: the operative can be based on-board the ship, aboard another ship or onshore without affecting the level of automation.

The development of international regulations for MASS is One Sea’s top priority, and discrepancies in terminology are one of the main obstacles that must be overcome. The purpose of the white paper is to

provide clarity and assist rule development and standard definitions for easy application across the industry. Regulations cannot be successfully developed if different definitions and interpretations of how to categorise levels of automation persist.

One Sea presented its proposal for defining the levels of ship autonomy at the latest meeting of the MSC. The Correspondence Group has been asked to consider amending the definitions of MASS and levels of automation.

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Established in 2016, One Sea is a high-profile ecosystem with a primary aim to lead the way towards an operating autonomous maritime ecosystem by 2025. The collaboration gathers together leading marine experts and is a strategic combination of top research, state-of-the-art information technology and business. Head to www.oneseaecosystem.net to discover more.