THE LAWYER'S DAILY

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Natural Resources

Captain-less ship: Need for regulatory certainty to autonomously explore ocean

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(October 13, 2021, 11:19 AM EDT) -- Canada has the world's longest coastline but, compared to other countries, most notably Norway, our ocean economy — $31.7 billion annually in gross domestic product and almost 300,000 jobs — is relatively underdeveloped.

The federal government wants to change that. The federal Department of Fisheries and Oceans is developing a "blue economy" strategy intended to rapidly harness the ocean's growth potential and develop a strong and sustainable blue economy. By incorporating focused policy development, and strategic investments, the blue economy strategy will aim to develop stronger ocean protections and increase productivity and efficiency in our ocean industries.

But, at present, ocean-related technologies are advancing much more quickly than are the regulatory regimes, and regulatory certainty will be necessary before sufficient investor confidence is in place to justify the massive investments required to help Canada's blue economy reach its potential.

Autonomous ocean exploration

Autonomous ocean exploration is already a reality. Marine autonomous surface ships (MASS) and autonomous underwater vehicles (AUVs) are already in use.

MASS are unmanned ships capable of sailing the ocean either autonomously, or controlled remotely. Similarly, AUVs are robotic vehicles that drift, drive or glide through the marine landscape without real-time control by human operators. This disruptive technology is already in use by companies and researchers off our coast delivering commercial and ocean science benefits.

CBC recently reported on an autonomous wave glider owned by Environment and Climate Change Canada on long-term loan to Dalhousie University. The glider was operating near Sable Island in September, looking for tagged halibut. Contact with the vehicle was suddenly lost and, while operators still knew its location, the vehicle could not be steered. Three days later the vehicle was retrieved and it was discovered that the glider had been attacked, most likely by a shark.

Regulating captain-less ship

As with any novel technology, there are regulatory challenges regarding these unmanned ocean vehicles. What exactly are they and is there even legislation capable of governing their use?

Technically, MASS and AUVs are captured by the broad definition of "vessel" under the *Canada Shipping Act*, and other Canadian maritime laws, which includes:

"[…] a boat, ship, or craft, used or capable of being used solely or partly for navigation in, on, through or immediately above water, without regard to method or lack of propulsion."

Based on this definition, the autonomy of AUVs and MASS is irrelevant in their apparent classification as "vessels" and the corresponding applicability of Canadian maritime law.

The question remains, how will Canadian maritime law substantively apply to autonomous vehicles? Read as a whole, this regulatory scheme was clearly designed in contemplation of traditional vessels with a master (or captain), and which are operated by a crew — in other words vessels with humans actually on board. This results in some unique challenges for a vessel without any human presence.

For example, the *Canada Shipping Act* requires that vessels are seaworthy. For a vessel to be seaworthy, it must be properly manned with a sufficient and competent crew. Where does this leave an autonomous vessel, the point of which is to travel the ocean without a manned crew?

Posing even more difficulties, the *Canada Shipping Act* also imposes a "duty to rescue" upon the master of the vessel. If the vessel is entirely autonomous does this duty still exist? If so, who is responsible to fulfil this duty?

It is possible that these impractical provisions may be interpreted in a manner that permits an autonomous vessel, but at this time these provisions have not been considered by the Canadian courts in the context of this developing technology.

Regulatory developments from International Maritime Organization

The International Maritime Organization (IMO), a specialized agency of the United Nations, is responsible for improving the safety and security of international shipping and preventing pollution from ships. Canada has been a member of the IMO since it was founded in 1948, and has served on the supervisory IMO Council since 1959.

In 2021, the Maritime Safety Committee of the IMO completed a regulatory scoping exercise on MASS with the goal of assessing existing IMO instruments to see how they might apply to ships with varying degrees of automation. The scoping exercise identified a number of high-priority issues that will need to be addressed involving, among other things:

1. The development of MASS terminology and definitions, including the meaning of the term "master," "crew," and "responsible person"; and

2. Addressing the functional and operational requirements of remote-control stations or centres and the possible designation of a remote operator as seafarer.

The committee suggested that the best way forward would preferably be to develop a "goal-based MASS instrument" or "MASS Code," outlining the goal(s), functional requirements and corresponding regulations. The committee invited IMO member states to submit proposals to a future session of the safety committee.

Notably, in June of 2019 the committee approved certain *Interim Guidelines for Maritime Autonomous Surface Ships Trials*. Among other things, the guidelines suggest that trials be conducted in a manner that provides at least the same degree of safety, security and protection of the environment as provided by the relevant instruments governing traditional vessels.

While serving as a useful tool, the interim guidelines do not have the force of law. In order to truly support the development of autonomous vessels, it is critical that Canada enact legislation that provides investors with regulatory certainty, and which closes the regulatory gap between traditional manned vessels and those navigating without a crew on board.

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