

COMMERCIAL INSURANCE

EMPLOYEE BENEFITS

PERSONAL INSURANCE

RISK MANAGEMENT

SURETY



**MARINE**  
PRACTICE GROUP



JULY 18, 2024



## No Auto Pilot as Autonomous Ships Tackle Liability, Legal and Operational Challenges

Don Martin | Account Executive

Autonomous cars and flying drones have paved the way for a new era in transportation, and now, the maritime world is on the cusp of its own transformation. On January 17, 2022, the Japanese ferry SOLIEL embarked on a groundbreaking journey, becoming the first vessel to navigate autonomously from the port of Shinmo to the port of Lyonada. This historic 149-mile voyage, accomplished in seven hours at a speed of 21 knots, saw the 728-foot ferry autonomously depart from Shinmo's dock and autonomously dock at Lyonada, marking a new era in maritime innovation.

The [SOLIEL](#) is equipped with cutting-edge technology, featuring autonomous docking and undocking capabilities, collision avoidance routing, visual target ranging, and advanced imaging technology. This suite of tools includes sensors, infrared cameras, LIDAR, satellite data, remote engine monitoring systems, and robust cybersecurity measures.

This milestone voyage has paved the way for further autonomous coastal operations in Japan, including other ferries and cargo ships.

While the advent of autonomous technology in the maritime industry is undeniably impressive and effective, the question of safety remains crucial. Currently, autonomous operations are limited to coastal voyages, but oceanic voyages may be on the horizon as technology advances. Technological challenges can be addressed, but what about the liability and legal challenges shipowners face as autonomous vessels navigate through various jurisdictions, international waters, different port states, and under various state flags?

Historically, international conventions have provided the legal framework and consistency needed for safe international voyages through multiple sovereign waters and jurisdictions. But are these conventions keeping pace with the powerful autonomous technology now being used on ships?

### ABOUT PARKER, SMITH & FEEK

Parker, Smith & Feek is an independent, associate-owned brokerage firm driven by client service. We offer a range of services including commercial insurance, risk management, surety, benefits, and personal insurance solutions. PS&F is an innovative industry leader and in conjunction with our IMA network of companies we rank in the top 25 insurance brokerage firms in the United States.

### LEARN MORE

[Marine](#)

[Our Services](#)

[More Articles](#)

### CONTACT US

Tel: 800.457.0220

### FOLLOW US

*continued >*

This article discusses the critical questions and considerations these innovations raise about safety, liability, and the adequacy of current international maritime laws, as well as the major risks associated with autonomous ship technology. As the industry progresses, it must address these challenges to ensure the seamless integration of autonomous vessels into global shipping practices.

## THE EXISTING LEGAL FRAMEWORK OF INTERNATIONAL SHIPPING

The international framework that oversees shipping is extensive and includes, but is not limited to, the United Nations Convention on the Law of the Sea (UNCLOS) and various International Maritime Organization (IMO) conventions. These conventions encompass the Convention on the International Regulations for Preventing Collisions at Sea (COLREGS), the International Convention on Standards of Training, Certification, and Watchkeeping for Seafarers (STCW), and the International Convention for the Safety of Life at Sea (SOLAS).

Recognizing the impact that autonomous ships will have on international shipping, the IMO has committed to drafting a [framework code](#) to manage them. This involves coordinating with

various international organizations and incorporating autonomous ship technology into the Maritime Safety Committee to address the numerous issues related to autonomous shipping. The approach begins with identifying degrees of autonomy in a stepped, measured manner:

- + **Level 1:** Coastal vessels with some remote functions and a crew on board to supervise and intervene if necessary.
- + **Level 2:** Remotely controlled coastal vessels with a crew on board to step in if problems arise.
- + **Level 3:** Remotely controlled ocean-going vessels with no crew on board.
- + **Level 4:** Completely autonomous ocean-going vessels without a crew and not remotely controlled.

The absence of a human crew aboard a completely autonomous ship presents significant challenges to existing international conventions that govern the safe operation of vessels. For instance, [Article 98](#) of UNCLOS mandates a duty to render assistance to another ship, including after a collision (also known as “seaworthiness”). COLREGS [requires](#) maintaining a “proper lookout by sight and hearing as well as by all available means appropriate in the prevailing circumstances.” STCW stipulates that “at no time shall the bridge be left unattended.” SOLAS



*continued >*

[requires](#) governments to ensure that “all ships be sufficiently manned” and to “establish manual control of the ship’s steering immediately” in hazardous situations.

These examples highlight where autonomous ship technology directly conflicts with the current legal and safety framework. To ensure that autonomous vessels can operate safely alongside manned vessels, the IMO and other international conventions must develop a comprehensive legal and safety framework specifically for autonomous shipping.

## THE QUESTION OF LIABILITY

Autonomous ship technology complicates the determination of [liability](#) by courts in the event of a casualty. Over centuries, case law has established a consistent approach to analyzing liability, such as holding shipowners vicariously liable for unseaworthiness. For instance, if an error in a voyage plan causes a casualty, the shipowner can be exposed to [vicarious liability](#). However, if an autonomous ship makes the same error due to poor software or hardware failure, does this shift liability from the shipowner to the manufacturer under product liability theory? Was the state of the software or hardware and its deficiencies foreseeable to the shipowner? Did the shipowner know, or should they have known, about these deficiencies? These questions highlight the complex legal challenges introduced by autonomous maritime technology.

## AUTONOMOUS OPERATIONS: MAJOR RISKS

Perhaps the greatest [risk](#) to the success of autonomous ship operations is cyber. If a malicious actor were to breach the security of an autonomous ship, the consequences could be catastrophic. One can easily imagine the dangers of an autonomous ship falling under the control of a hacker, potentially

causing collisions with other vessels, including passenger ships, or even damaging bridges and infrastructure. Consequently, international conventions must prioritize cybersecurity in their regulatory frameworks for autonomous ship technology, similar to how lifeboat regulations were crucial for passenger safety 150 years ago.

Operationally, autonomous ships face significant challenges in responding to emergencies. For example, an autonomous vessel cannot effectively assist in a man overboard situation, reducing its role to mere observation rather than rescue. Additionally, autonomous ship technology currently lacks the capability to jettison cargo to save the vessel, complicating scenarios involving general average, which is a principle in maritime law that involves the shared financial responsibility among all parties involved in a sea voyage when a voluntary and necessary sacrifice or expenditure is made for the common safety of the ship and its cargo. The response to pollution incidents also poses a serious issue; if an autonomous ship were to spill fuel due to a software glitch or collision, there would be no crew to deploy response equipment.

Another critical concern is the interaction of autonomous ships with Vessel Traffic Services (VTS). Instructions regarding course and speed changes, communicated over open radio channels, cannot be encrypted solely for autonomous ships, as other vessels in the VTS need to understand these orders. This presents a unique challenge in ensuring safe and secure navigation within busy waterways.

## NEXT STEPS

The [development](#) of fully autonomous ship technology is progressing steadily, with significant advancements in remote control, semi-autonomous systems, and fully autonomous prototypes—each concept developed and supported by testing.

*continued >*

International organizations are actively working on a process to create the necessary regulatory frameworks and standards to support the safe and effective deployment of autonomous ships by gradually removing the role of the onboard crew. The next steps involve further technological advancements, infrastructure development, and extensive real-world testing to ensure the successful integration of autonomous ships into the global maritime industry.

An organization spearheading these efforts is the [Advanced Autonomous Waterborne Applications Initiative \(AAWA\)](#). The AAWA accurately predicted that remotely controlled coastal vessels would be operational by 2025 and that by 2030, remote-controlled unmanned ocean-going ships will have set sail. By 2035, AAWA projects fully autonomous ocean-going ships will be plying the world's oceans.

## CONCLUSION

Automated vessels are the future of shipping. The impact of this technology on the people who currently make a living driving ships is incalculable. However, the associated risks and their mitigation should be carefully analyzed and managed. In international shipping, conventions and regulations can play a crucial role in minimizing these risks and offering solutions. Although addressing the technological, legal, and liability challenges will take time, these issues can be effectively tackled through human ingenuity and expertise.

## References and Resources

1. Eisenhower, B. (2017, October 6). Unmanned ships: Legal issues. American Institute of Marine Underwriters (AIMU). <https://www.aimuedu.org/aimupapers/MID2017LegalIssuesUnmannedShipsEisenhower.pdf>
2. Hauge, C., & Rygh, K. E. (2021, February 16). Liability for damage caused by autonomous ships – A Norwegian perspective. Wiersholm. <https://wiersholm.no/en/newsletter/liability-for-damage-caused-by-autonomous-ships-a-norwegian-perspective/>
3. Yu, H. (2019, March). Legal Aspects and Liability Issues Concerning Autonomous Ships. Science & Technology Law Institute. <https://stli.iii.org.tw/en/article-detail.aspx?no=105&tp=2&i=170&d=8204>
4. IMO. (n.d.-a). Convention on the international regulations for preventing collisions at sea, 1972 (COLREGS). International Maritime Organization (IMO). <https://www.imo.org/en/About/Conventions/Pages/COLREG.aspx>
5. IMO. (n.d.-b). Joint MSC-LEG-FAL working group on maritime autonomous surface ships (MASS-JWG) 2nd session. International Maritime Organization (IMO). <https://www.imo.org/en/MediaCentre/MeetingSummaries/Pages/Joint-MS-C-LEG-FAL-Working-Group-on-Maritime-Autonomous-Surface-Ships-%28MASS%29-.aspx>
6. IMO. (n.d.-c). SOLAS. International Maritime Organization (IMO). <https://www.imo.org/en/KnowledgeCentre/ConferencesMeetings/Pages/SOLAS.aspx>
7. Nishant, S. (2023, February 15). How Autonomous ships are revolutionizing the maritime industry?. Maritime Professionals. <https://maritime-professionals.com/how-autonomous-ships-are-revolutionizing-the-maritime-industry>
8. The Maritime Executive. (2023, May 19). Will Owners of Autonomous Ships be Liable for Autonomous Mistakes? <https://maritime-executive.com/article/will-owners-of-autonomous-ships-be-liable-for-autonomous-mistakes>
9. Sym Naval. (2022). First autonomous vessels already sailing in Japan. <https://www.sym-naval.com/blog/autonomous-vessels-japan/#None>
10. Rolls-Royce. (2016). Autonomous ships - The next step. <https://www.rolls-royce.com/~media/Files/R/Rolls-Royce/documents/%20customers/marine/ship-intel/rr-ship-intel-aawa-8pg.pdf>
11. Schroder, T. (2017, January). Autonomous Ships - Fact or Fiction. Risk Consulting Magazine. <https://www.if-insurance.com/large-enterprises/insight/risk-consulting-magazine/risk-consulting-2017-1/autonomous-ships-fact-or-fiction>
12. UNCLOS. (n.d.). United Nations Convention on the Law of the Sea. United Nations. [https://www.un.org/depts/los/convention\\_agreements/texts/unclos/unclos\\_e.pdf](https://www.un.org/depts/los/convention_agreements/texts/unclos/unclos_e.pdf)