STREN & BLAN PARTNERS

SMART SHIPPING:

LEGAL CONSIDERATIONS FOR SHIPPING COMPANIES AND STAKEHOLDERS IN THE MARITIME INDUSTRY

INTRODUCTION

The maritime industry is set to witness its fourth industrial revolution with the innovation of Smart shipping. Smart shipping involves adopting digitalized and innovative technological systems to develop remotely controlled or fully autonomous ships. This technological advancement undoubtedly requires robust regulation to ensure the maximum protection of data, the safety of life at sea, cargo on board, and of the vessel itself. In the wake of this rising revolution, the International Maritime Organization (IMO) is taking steps to ensure that the implementation of a regulatory framework for Maritime Autonomous Surface Ships (MASS) keeps pace with technological developments that are rapidly evolving. In 2021, the IMO conducted a regulatory scoping exercise on Maritime Autonomous Surface Ships that was designed to assess existing IMO instruments to see how they might apply to ships that utilize varying degrees of automation. Although, Smart shipping promises several benefits such as reduced operational cost, enhanced safety, and improved efficiency as well as reduced emission of gas and noise, Shipping companies, Seafarers, and other maritime stakeholders have a role to play by complying with relevant regulatory frameworks put in place for the efficiency of Marine Autonomous Surface Ships. This piece seeks to expound on the innovation of Smart Shipping, the current regulatory landscape, and key legal and environmental considerations for shipping companies.

WHAT IS SMART SHIPPING?

Generally, Smart shipping refers to the autonomous operation of seagoing or inland vessels. It is not limited to onboard technologies but also port and waterway design so that a ship can maneuver independently or alert the crew to an emergency based on sensor data. Smart shipping is characterized by autonomous vessels that employ cutting-edge sensors and AI for efficient navigation, remote control systems that enable operators to oversee vessel operations from shore, increasing responsiveness, and data-driven operations that leverage data analytics and predictive maintenance systems to improve performance, fuel efficiency, and route planning that transforms maritime logistics.

REGULATORY LANDSCAPE

The IMO is making concerted efforts to formulate a regulatory framework for autonomous ships. This includes the IMO's Maritime Autonomous Surface Ships (MASS) Work Program aimed at addressing the regulation of autonomous vessels. Although, anticipated future regulations are expected to cover crucial areas like safety standards, liability provisions, and environmental considerations, underscoring the IMO's commitment to shaping a comprehensive regulatory framework conducive for the integration of Smart shipping technologies.

The discussion around the legal implications of integrating autonomous ships within existing maritime regulations revolves primarily around two key international conventions- the International Convention for the Prevention of Collisions at Sea (COLREG)[1] and the International Convention for the Prevention of Pollution from Ships (MARPOL).[2] COLREG specifically addresses collision avoidance protocols and the role of human decision-making in real-time navigation. While there are arguments that autonomous ships could operate under COLREG as long as they maintain proper situational awareness through advanced technological solutions like cameras and sensors, there are differing opinions on whether these vessels can truly replicate human foresight. MARPOL is geared towards avoiding marine pollution although it presents obstacles in accommodating autonomous vessels even when it is projected that autonomous vessels could mitigate intentional pollution. The Convention emphasizes the need to redefine these duties to accommodate autonomous vessels.

[1]The 1972 International Regulations for Preventing Collisions at Sea. Available at https://docs.imo.org/
[2]International Convention for the Prevention of Pollution from Ships

Other Conventions like the International Convention on Maritime Search and Rescue 1979 (SAR Convention) which is aimed at international search and rescue operations present complexities in defining the role of the master on autonomous ships and their capability to assist in distress situations may subsequently need amendments or exemptions to accommodate autonomous ships, especially considering the challenges they pose to traditional search and rescue operations. Similarly, the United Nations Convention on the Law of the Sea (UNCLOS)[3] play a crucial role in governing maritime activities. While UNCLOS does not explicitly define ships, it emphasizes the importance of adhering to generally accepted international regulations. This flexibility allows the IMO to regulate autonomously, notwithstanding specific requirements stated in UNCLOS, by following the principles outlined in the Convention.

LEGAL CONSIDERATIONS

1. Safety and Liability

Smart ships have the potential to minimize the number of maritime traffic accidents caused by human inefficiencies and reorganize the workload of human operators while decreasing the risks of occupational accidents on board. Notwithstanding, the safety and reliability of autonomous ships have presented some obstacles in adapting these systems alongside traditional maritime operations.[4] Interestingly, it has been opined that safety concerns associated with smart ships may increase as the degree of automation rises and human presence decreases. This is because automated systems thrive at repetitive tasks, they may struggle with complex decision-making in novel situations compared to humans.[5]

In determining liability, recourse must be made to the degree of autonomy.[6] Most jurisdictions use a fault-based standard that requires the conclusion of human culpability.[7] However, ships with a high level of autonomy make it difficult to determine human error in such situations. This designation could refer to the inability of remote operators to monitor or intervene, or the shipowner's responsibility for maintaining critical software and selecting software vendors. The vicarious liability of shipowners for the acts and omissions of software vendors, remote operators employing the technology, and system maintenance professionals must also be clarified to comprehend and mitigate any dangers.

[3]The United Nations Convention on the Law of the Sea.

[4]Kim, Te., Perera, L.P., Sollid, MP. Et al. Safety challenges related to autonomous ships in mixed navigational environments. WMU J Marit Affairs 21, 141-159 (2022). Accessed on 24th May, 2024.

[5]National Library of Medicine, 'Safety challenges related to autonomous ships in mixed navigational environments'. Accessed 26th May 2024.

[6]According to the IMO's Maritime Safety Committee, there are four distinct degree of autonomy in smart shipping. Degree one are ships with automated processes and decision support, degree two are remotely controlled ships with seafarers on board, degree three are remotely controlled without seafarers on board while degree four are fully autonomous ships.

[7]Wendehorst, Christiane. "Strict Liability for AI and other Emerging Technologies" Journal of European Tort Law, vol. 11, no. 2, 2020, pp. 150-180. Accessed 24th May, 2024.

Additionally, the issue of limitation of liability under the 1976 Convention on Limitation of Liability for Maritime Claims (LLMC)[8] becomes relevant in the context of autonomous shipping. The LLMC outlines the circumstances in which a person liable may not limit their liability. It also raises concerns about the definition of "the person liable" in the context of an autonomous ship and who is responsible for having the necessary intent or knowledge of the likely consequences of a reckless act— is it the shipowner, the software provider, or the shore operator?

2. Data Privacy and Cybersecurity

Autonomous ships rely heavily on data collection from various sensors. Hence, the collection of extensive data poses risks related to privacy if sensitive information is inadvertently stored. Therefore, implementing policies for data retention and secure disposal is essential to mitigate privacy risks. The General Data Protection Regulation (GDPR) requires entities, including autonomous ships, to be transparent about their data processing activities. It also includes guidelines on how information should be communicated to data subjects.[9] Furthermore, the GDPR provides that data subjects should receive meaningful information about the logic behind any automated decision-making processes and profiling activities.

Additionally, since Smart shipping systems involve digital processes including software and hardware systems to navigate the waterways, autonomous ships risk being exposed to various forms of cyberattacks such as disruption of radio frequency (RF) signals, deception of sensors, and manipulation of sensitive data.[10] For instance, jamming satellite signals is a common form of cyberattack, and this may affect an autonomous vessel's ability to identify locations and obstacles.[11] Thus, there is a compelling need for a multi-layered security approach that includes network segmentation, intrusion prevention, and robust security information to protect Smart Ships.

3. Environmental Considerations

Autonomous vessels possess great potential to bring transformative impacts to the marine environment and maritime safety. These vessels are projected to reduce emissions and improve navigation precision through advanced technologies.[12] The potential efficiency gains present opportunities for reducing fuel consumption

[8]Article 4 of the Convention.
[9]Article 12 of GDPR. Also, Articles 13 and 14 imposes immediate information duty if data is collected directly from the data subject, while a one-month timeframe if data is collected indirectly. Available at: https://gdpr-info.eu ,accessed on 20th May, 2024.
[10]Vinnem, J.E.; Bouwer Utne, I. Risk from Cyberattacks on Autonomous Ships. In Safety and Reliability–Safe Societies in a Changing World; CRC Press: London, UK, 2018; pp. 1485–1492. Available at: http://hdl.handle.net/11250/2586644, accessed on 25th May, 2024.
[11]Andrei, N., & Scarlat, C. (2024). Marine applications: The Future of Autonomous Maritime Transportation and Logistics. IntechOpen. Available at: accessed on 24th May, 2024.

and lowering carbon footprints, contributing positively to air quality and climate change mitigation efforts. Additionally, real-time monitoring systems onboard autonomous vessels can facilitate the continuous tracking of environmental parameters, enabling swift responses to environmental hazards and enhancing overall environmental stewardship.[13]

However, the adoption of autonomous vessels also introduces new risks and challenges. Technical failures, such as sensor malfunctions and software glitches, present concerns that could lead to accidents jeopardizing both the vessel and the marine environment. To ensure the safe integration of autonomous vessels, robust regulatory frameworks, ongoing technological advancements, and comprehensive safety measures are essential. Addressing collision risks, and noise pollution concerns, and prioritizing environmental protection are key factors in harnessing the benefits of autonomous vessels while safeguarding the marine ecosystem and maritime safety.

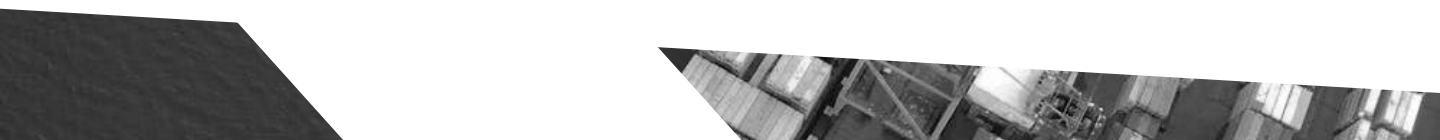
4. Flag State Jurisdiction

The deployment of autonomous vessels faces significant challenges, mainly due to navigating diverse regulatory frameworks across jurisdictions. This leads to uncertainty regarding enforcement and compliance measures. This regulatory ambiguity raises questions regarding liability and the allocation of responsibilities in the event of accidents involving autonomous ships.

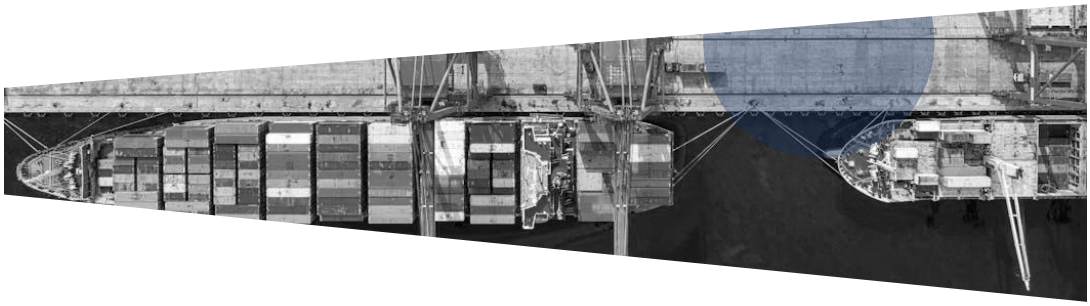
Interactions between autonomous vessels and traditionally manned vessels in busy international shipping lanes also pose challenges. Establishing communication protocols, collision avoidance mechanisms, and ensuring situational awareness between autonomous and conventional vessels are vital to prevent accidents and ensure smooth maritime operations.[14] Standardizing these protocols across diverse fleets and navigating the intricacies of mixed traffic scenarios require careful coordination and cooperation among maritime stakeholders globally.

Moreover, issues related to sovereignty,[15] security,[16] and data governance emerges with the use of autonomous vessels in international waters. Navigating these complexities demands a multidimensional approach that cuts across legal,

[14]Ibid.
[15]Analysis of Regulatory Barriers to the Use of Autonomous Ship, accessed on 24th May, 2024.
[16]Ibid



regulatory, operational, and technological frameworks. Cross-border cooperation, harmonization of standards, and the development of best practices specific to autonomous vessel operations in international waters are essential to comprehensively address these challenges and foster the safe and efficient integration of autonomous vessels into the global maritime domain.



IMPLICATIONS FOR THE NIGERIAN MARITIME SECTOR

The Nigerian Maritime Sector is taking preparatory steps to adopt a digitalized maritime ecosystem such as the recent declaration by the Federal Government to automate the Nigerian Ship Registry and introduce an e-gates system across all Ports. This is a conscious effort targeted at welcoming innovations like Smart Shipping. The Nigerian Maritime Sector currently accounts for over 60% of all imports to West Africa, although with Smart Shipping, the numbers can be higher. Some implications of Smart Shipping on the Nigerian Maritime Sector include:

1. **Increased efficiency:** Utilizing smart shipping technology could enhance the efficiency of the Nigerian Maritime Sector through route optimization, decreased fuel usage, and enhanced vessel performance.
2. **Enhanced security:** Security and the likelihood of piracy and theft can be improved by Implementing smart shipping technologies like surveillance systems and access control on vessels.
3. **Environmental benefits:** Optimizing vessel operations, minimizing fuel consumption, and enhancing waste management through smart shipping can play a crucial role in reducing carbon emission in the Nigerian Maritime Sector.
4. **Job creation:** Fresh employment prospects within the Nigerian Maritime Sector, including roles in data analysis, software development, and cybersecurity can be created by embracing advanced shipping technologies.

5. **Increased revenue:** Enhancing efficiency, cutting expenses, and bolstering security through smart shipping can lead to higher earnings in the Nigerian Maritime Sector, ultimately drawing in more clients and creating additional business prospects.

6. **Compliance with regulations:** Smart shipping can help the Nigerian Maritime Sector comply with international regulations and standards, such as those related to safety, security, and environmental protection.

While Smart Shipping is still in its formative stage globally, adequate preparation must be put in place in Nigeria to ensure that innovations like Smart Shipping reach their full potential. A laudable regulatory framework is the Nigerian Data Protection Act which may address potential data privacy risks.

CONCLUSION

Smart shipping is still in the budding stages of development and testing, but several projects and initiatives have been launched globally to advance the technology and demonstrate its feasibility. Smart shipping will likely become more prevalent and sophisticated in the coming years as technology improves and regulations evolve to address the highlighted legal considerations. However, ship owners and companies are also advised to take note of these legal considerations while integrating Smart shipping systems so as to efficiently maximize the potential of this technological innovation.

ABOUT STREN & BLAN PARTNERS

Stren & Blan Partners is a full-service commercial Law Firm that provides legal services to diverse local and multinational corporations. We have developed a clear vision for anticipating our clients' business needs and surpassing their expectations, and we do this with an uncompromising commitment to client service and legal excellence.

THE AUTHORS

Joseph Siyaidon
Team Lead
Josepsiyaidon@strenandblan.com

Stanley Umezuruike
Associate
Stanleyumezuruikei@strenandblan.com

Michael Afuye
Associate
Michaelafuye@strenandblan.com

Stren & Blan Partners

+234 (0)702 558 0053
3 Theophilus Orji Street, Off Fola Osibo Road, Lekki Phase 1, Lagos, Nigeria

www.strenandblan.com
contact@strenandblan.com
@strenandblan