



Manlius Pebble Hill Model United Nations

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International Maritime Organization (IMO)

Chairs:

Dean Bratslavsky

Amaya Michaelides

Preface

Welcome to the International Maritime Organization at MPH MUN 2025! Chairing the IMO this year are Dean Bratslavsky and Amaya Michaelides. Dean is a junior at Jamesville-Dewitt High School, and this is his second time chairing MUN. In his free time, you can find him playing volleyball, swimming, or tennis while listening to either Cage the Elephant or the Backseat Lovers. Amaya is a senior from the Teen Day Ithaca MUN team who has been participating in Model UN for three years. Outside of MUN, Amaya enjoys writing, hiking, playing the flute, and learning about social psychology.

This committee will be run in a resolution style, meaning delegates are asked to prepare pre-written resolutions in addition to their position paper. Guidelines for submission and other important information can be found under delegate resources on our website, mphmun.org. Everything must be submitted by 11:59 PM on October 24th to IMOmphmun@gmail.com. Delegates are eligible for awards ONLY IF both their position paper and resolution are submitted. All delegates must bring a laptop (and its charger) to participate in committee proceedings, as we will be using a paperless procedure. If you do not have access to a laptop, please send us an email by October 18th. Please feel free to send us any additional inquiries via email, and we are looking forward to seeing you all in committee!

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Introduction to Committee

In 1948, the United Nations created a special agency, known as the International Maritime Organization (IMO). Its main job is to make a framework for the shipping industry that is effective, fair, and universal. IMO's headquarters are based in London, where there are over 170 member states.

Since shipping is a crucial part of global trade, it poses many risks to safety, security, and the marine environment. Because of that, IMO covers a wide range of issues, including maritime safety, legal matters, concerns for the environment, efficiency of shipping, etc. The organization operates through various committees and sub-committees that focus on specialized aspects of maritime affairs.

Effective, fair, and universal, can be difficult to achieve when much of shipping is not directly spearheaded by the governments involved in the United Nations. For example, a framework for reducing Greenhouse Gas (GHG) Emissions until they reach net-zero in 2050, is far from the overall United Nations goal of 2030. However, the IMO is actually fairly ahead of other industry-oriented special committees in the UN; they are the first of such an organization to combine mandatory emissions limits and pricing for GHG emissions. And yet, the regulations only apply for ships over 5,000 gross tonnage, leaving out 15% of CO₂ emissions by sea, a minority, but a significant one.¹

Aside from climate disagreements, the IMO has been fairly effective, especially in the realm of safety.² Delegates should pay particular attention below as to how this close regulation of safety may come into jeopardy as new technologies are introduced.

¹ International Maritime Organization. "IMO Approves Net-Zero Regulations for Global Shipping." International Maritime Organization, 2025, www.imo.org/en/mediacentre/pressbriefings/pages/imo-approves-netzero-regulations.aspx. Accessed 29 Aug. 2025.

² International Maritime Organization. "Brief History of IMO." International Maritime Organization, www.imo.org/en/about/historyofimo/pages/default.aspx. Accessed 29 Aug. 2025.

Topic 1: Digitalization of the Maritime Industry

Introduction

Common perception is that digitalization surrounds human lives everywhere. Unfortunately, a quick look at a global map of 5G coverage will inform the viewer not just on differences between the United States' coverage and other countries' access, but it will leave the portion of the world covered with ocean, nearly more than 75% of the globe, without anything. As the rest of the world has digitalized, the shipping industry still questions whether it would be viable or a financially sound investment. What is proven to be financially sound, however, is digitalization at docks; many recent developments have been taking place there, since they, after all, are nearly on land.

For instance, there has been a significant focus on increasing automation in equipment, especially for the cranes used to transport cargo. This is intended to reduce the amount of labor required, as well as making the process safer and potentially more fuel-efficient. Interest in this area increased significantly as a result of the COVID-19 pandemic, which caused a strain in global shipping networks, as well as an increase in online ordering and concern around human contact. Automation could make the shipping process both smoother and safer under these conditions.

Taking a slightly different angle on these same goals of safety and efficiency, Artificial Intelligence (AI) is also being leveraged to determine routes and facilitate decision making, as well as to monitor and analyze the performance of systems over time, and using sensor data to predict failures. This increases the security of vessels, as well as allowing for planning and decreasing the risk of costly breakdowns. Underwater drones powered by AI are also being utilized to detect underwater hazards that might prove harmful to a vessel; VideoRay, one

company that makes such drones, however, advertises itself as marketing these technologies mostly for defense (navy, coast guard, etc).³ How it will be used in the corporate sector remains to be seen. Additional uses of AI include the promotion of sustainability and fuel-efficiency in the marine industry. By tracking emissions and analyzing real-time data on vessel performance, AI systems are able to optimize the amount of fuel used to travel a certain distance.⁴

Because these processes are international and often focused on communication, the global standardization of shipping practices is integral to optimizing function. Thus, the IMO has been working to create a comprehensive international digitalization strategy, set to be adopted by 2027. Planning for this strategy began in March 2025, focusing on interconnection and automation, especially using AI and autonomous navigation. According to IMO Secretary-General Arsenio Dominguez, this strategy will help to “make smooth, seamless, smart shipping a reality. It will help integrate vessels and ports, improve logistics and optimize routes, while reducing greenhouse gas emissions.”⁵

Since January 2024, the IMO has required all of its member states to use a single standardized digital platform called the Maritime Single Window (MSW) to exchange information, and one key aspect of the current IMO strategy is amending previous MSW guidelines to reduce administrative effort and improve cybersecurity.⁶ The question remains, then, as to how nations with more limited internet access will be disadvantaged.

³ Video Ray. "Technologies You Can Depend On." *VideoRay*, videoray.com/industries/.

⁴ Moniz, Rhonda. "How Digital Tech Aims to Make Commercial Vessels Safer, Cleaner, and More Efficient." *Marine Link*, 5 Dec 2024, <https://www.marinelink.com/news/digital-tech-aims-commercial-vessels-519976>. Accessed 20 Jul 2025.

⁵ "IMO to develop global strategy for maritime digitalization." IMO, 18 Mar 2025, <https://www.imo.org/en/mediacentre/pressbriefings/pages/imo-global-strategy-maritime-digitalization.aspx>. Accessed 20 Jul 2025.

⁶ "Digitalization of trade and maritime transport accelerates thanks to UNECE tools." UNECE, 21 May 2024, <https://unece.org/media/press/391173>. Accessed 20 Jul 2025.

All of these things are in an effort to increase efficiency and standardization on a global scale; however, it must be noted that this standardization comes with its challenges, and, especially, its inequalities. For instance, lower-income and developing nations often lack access to advanced technologies, which causes them increasing challenges in a digitalized world. This may include higher prices and shortages of goods, which in turn would contribute to lower competitiveness, economic growth, and employment in the long run. This would widen the gap between developing and developed economies, and, by decreasing their trade connections with the broader world, exacerbate developing nations' geographical isolation.⁷

Another significant issue in marine digitalization is the security of the system, especially its ability to respond to cyberattacks. Between February and May 2020, cyberattacks increased by 400% in the maritime industry,⁸ and while this was an anomaly, overall, there were 30 cyberattacks in 2023, while there were only 5 maritime cyberattacks in 2015.⁹ When efficiency is increased, security can be left behind—but perhaps it doesn't need to be if capable management can step up.

⁷ Loh, Jessica. "Digital Divide Splits Maritime Industry." Maritime Fairtrade, 17 Jun 2022, <https://maritimefairtrade.org/digital-divide-splits-maritime-industry/>. Accessed 20 Jul 2025.

⁸ "Accelerating Digitalization Across the Maritime Supply Chain." World Bank, 21 Jan 2021, <https://www.worldbank.org/en/topic/transport/publication/accelerating-digitalization-across-the-maritime-supply-chain>. Accessed 20 Jul 2025.

⁹ Fenton, Adam. "Maritime Cyber Incidents by Year 2021-2023." ResearchGate, 2023, www.researchgate.net/figure/Maritime-Cyber-Incidents-by-Year-2001-2023-Recreated-by-author-based-on-data-from_fig1_377653551. Accessed 29 Aug. 2025.

History

The maritime industry is often described as the backbone of the global economy. A key aspect of this is international shipping, which dictates the growth of the industry in the global community. Carrying approximately 90% of the world's merchandise trade, or 11 billion tons of cargo per year, this sector is crucial for supporting the global supply chain, maintaining international connections, and promoting economic growth.¹⁰

International shipping traces its history back to around 3000 BCE, when ancient civilizations in Mesopotamia, Egypt, and China used wind-powered ships to transport and exchange spices, ceramics, textiles, and precious metals via early maritime trade routes. These routes grew with the expansion of civilizations: by 1500 BCE, the Phoenicians in the Mediterranean were traveling as far as the British Isles to trade olive oil and meat. At the same time, trade routes through the Indian Ocean connected civilizations in the Arabian peninsula, Southeast Asia, and the Indus Valley.¹¹

Around the 15th century, more dramatic changes began to take place as many of the long-distance networks that support commerce today, including the Trans-Atlantic route, were developed. This was mainly due to the incorporation of new inventions and technologies, such as more nimble sailing ships and sophisticated methods of navigation, which had been created following cultural advances in astronomy, physics, and mechanics.¹²

¹⁰ "Accelerating Digitalization Across the Maritime Supply Chain." World Bank, 21 Jan 2021, <https://www.worldbank.org/en/topic/transport/publication/accelerating-digitalization-across-the-maritime-supply-chain>. Accessed 20 Jul 2025.

¹¹ Srivastava, Akhilesh. "The Evolution of Shipping: From Ancient Times to Modern E-Commerce." Fenix Commerce, 6 Jun 2024, <https://fenixcommerce.com/the-evolution-of-shipping-from-ancient-times-to-modern-e-commerce/>. Accessed 20 Jul 2025.

¹² Vanham, Peter. "A brief history of globalization." World Economic Forum, 17 Jan 2019, <https://www.weforum.org/stories/2019/01/how-globalization-4-0-fits-into-the-history-of-globalization/>. Accessed 20 Jul 2025.

The next major step in these technological advances, the Industrial Revolution, was sometimes known as the “first wave of globalization” because it marked an even greater expansion of long-distance trade (especially shipping) and the subsequent formation of stronger international connections. The statistics reflect this: trade grew at a rate of around 3% annually over the course of a century, and the value of exports grew from 6% of the global GDP in the early 1800s to 14% as World War I approached.¹³

At the same time, while these developments were generally beneficial for the global economy, they were by no means equitable. Nations with expanded access to these technologies were placed at a significant advantage, while others fell behind. By the end of the 18th century, Great Britain in particular was thriving thanks to inventions such as the steam engine, which radically increased the speed and efficiency of trade and travel. Combined with the ability to acquire valuable products from all around the world, these technological advantages enabled Britain to manufacture goods and grow their economy at a much faster rate than most other nations. It also enabled the country to colonize, so that at its peak, the British Empire dominated around 25% of Earth’s landmass.¹⁴

Subsequent decades brought changes to both trade and colonization on a global scale, particularly with the worldwide conflicts of the 20th century. The fall of financial markets, the Great Depression in the United States, and the outbreak of World War II caused world trade to fall once again from 14% to 5% of the global GDP. Post-war, however, maritime trade rose

¹³ Srivastava, Akhilesh. “The Evolution of Shipping: From Ancient Times to Modern E-Commerce.” Fenix Commerce, 6 Jun 2024, <https://fenixcommerce.com/the-evolution-of-shipping-from-ancient-times-to-modern-e-commerce/>. Accessed 20 Jul 2025.

¹⁴ “British Empire.” Encyclopaedia Britannica, updated 24 Jun 2025, <https://www.britannica.com/place/British-Empire>. Accessed 20 Jul 2025.

again, this time centered in the United States and the former Soviet Union. By 1989, it was back up to 14%, and middle-class incomes had risen along with it.¹⁵

In shipping, this time period was characterized by a focus on efficiency and standardization on a global scale (imagine what words might be used to describe today). One of the most influential changes made was containerization, or the practice of packing goods in standardized containers. This made the shipping process far more efficient, because boxes were easier to move and stack using machinery. Likewise, it significantly reduced labor costs and the risk of damage to cargo.¹⁶ Such innovations paved the way for the fourth, and current, wave of globalization, this time focused on the needs of a digital era.

Marine digitalization can be defined as the process of “introducing and integrating various technologies to improve the operational efficiency of supply chain activities.”¹⁷ The focus of this process has expanded in a modern age to align with current technological advancements and societal concerns. Specifically, there’s been a significant focus on promoting the efficiency of systems, supporting growth potential and more environmentally-friendly methods of transport. Likewise, there’s been a focus on increasing digital monitoring and communication in order to manage the potential for human error, which can cause economic losses, harm to a vessel or the marine environment, and unsafe conditions for those involved.¹⁸

¹⁵ Srivastava, Akhilesh. “The Evolution of Shipping: From Ancient Times to Modern E-Commerce.” Fenix Commerce, 6 Jun 2024, <https://fenixcommerce.com/the-evolution-of-shipping-from-ancient-times-to-modern-e-commerce/>. Accessed 20 Jul 2025.

¹⁶ Heilig, Leonard et al. “An Analysis of Digital Transformation in the History and Future of Modern Ports.” Proceedings of the 50th Hawaii International Conference on System Sciences, 2017, <https://scholarspace.manoa.hawaii.edu/server/api/core/bitstreams/ad143c09-fe29-49a1-ad53-d05d4047b16e/content>. Accessed 20 Jul 2025.

¹⁷ “Digitalization in the Shipping Industry.” Lotus Containers, 15 Apr 2024, <https://www.lotus-containers.com/en/digitalization-in-shipping-industry/>. Accessed 20 Jul 2025.

¹⁸ Rhine, Eric. “Understanding the Impact of Human Error in Vessel Grounding Incidents.” Spagnoletti Law Firm, 1 Mar 2024, <https://www.spaglaw.com/blog/2024/03/understanding-the-impact-of-human-error-in-vessel-grounding-incidents/>. Accessed 20 Jul 2025.

At the same time, human error is a necessary part of society. If we lose too much tolerance for it, we lose the ability to interact as humans.

The development of electronic data interchange (EDI) systems in the 1960s and 1970s allowed companies to exchange business documents electronically. This marked the first major step toward digitalization by allowing for instant communication, reducing the likelihood of error, and supporting a more sustainable paperless system. One of the most significant advancements was the creation of UN/EDIFACT (Electronic Data Interchange for Administration, Commerce and Transport), which provided a single global standard for structuring electronic documents. This innovation was crucial in breaking down barriers between industries and national systems, as it enabled companies from different countries to share purchase orders, invoices, shipping notices, and customs documents in a uniform format. By reducing miscommunication and delays caused by incompatible systems, these standards helped accelerate international trade and created new efficiencies in logistics and supply chain management. In many ways, EDI represented the foundation of today's digital economy, where seamless data sharing and interoperability remain critical to international business operations. Because shipping and the global supply chain are inherently international, the UN was intimately involved in this process, releasing set standards for these messages in the 1980s.¹⁹

Another major development of the 1980s involved the Electronic Chart Display and Information System (ECDIS), which uses data from satellites, GPS, and other sources to ease the measurement processes of navigation. The IMO quickly took an interest in these systems, developing and publishing international ECDIS performance standards. This precluded the

¹⁹ Heilig, Leonard et al. "An Analysis of Digital Transformation in the History and Future of Modern Ports." Proceedings of the 50th Hawaii International Conference on System Sciences, 2017, <https://scholarspace.manoa.hawaii.edu/server/api/core/bitstreams/ad143c09-fe29-49a1-ad53-d05d4047b16e/content>. Accessed 20 Jul 2025.

introduction of the IMO's own system of "e-Navigation," which sought to facilitate the electronic "collection, integration, exchange, presentation and analysis of marine information on board and ashore" in order to further enhance safety and security.²⁰

²⁰Macdonald, Fiona. "The Origins of Maritime Digitalisation." Thetius, 2024, <https://thetius.com/the-origins-of-maritime-digitalisation/>. Accessed 20 Jul 2025.

Automation and Artificial Intelligence

By improving operational efficiency, decreasing human error, and lowering costs, automation and artificial intelligence (AI) are changing maritime trade everywhere. However, if caution is neglected, many lives would be at risk. Global shipping is already testing or implementing AI-powered predictive maintenance, autonomous ships, and intelligent navigation systems.²¹ Through real-time data analysis, these technologies aid in improving routing, predicting mechanical failures, and optimizing the consumption of fuel. AI is also used in smart port management, where AI logistics systems and automated cranes improve loading and unloading productivity and ease port congestion.²²

The principle of the Maritime Autonomous Surface Ship (MASS) is a significant advancement. MASS is defined as “commercial vessels that operate with little or no human intervention,” instead using sensors, software, and other advanced systems to perform necessary tasks. In many cases, this technology is present to assist the crew members on board, but it can also operate more autonomously, determining actions without human input.²³ Benefits of these systems include reducing the operational costs and crew expenses of running a vessel, mitigating the effects of human error, and increasing efficiency by working to optimize routes, speed, and fuel consumption, which, in turn, could make MASS vessels more environmentally friendly.²⁴

However, there are also additional challenges. For instance, due to the novelty of these systems, there aren't yet comprehensive regulations in place to address issues such as insurance,

²¹ <https://www.imo.org/en/mediacentre/pressbriefings/pages/imo-global-strategy-maritime-digitalization.aspx>. Accessed 20 Jul 2025.

²²

<https://www.imohealth.com/resources/the-future-of-clinical-documentation-is-ambient-automated-and-ai-powered/>

²³ McKie, Roly. “Maritime Autonomous Surface Ships (MASS) and SAR.” International Maritime Rescue Federation, <https://www.international-maritime-rescue.org/news/maritime-autonomous-surface-ships-mass-and-sar>. Accessed 20 Jul 2025.

²⁴ McKie, Roly. “Maritime Autonomous Surface Ships (MASS) and SAR.” International Maritime Rescue Federation, <https://www.international-maritime-rescue.org/news/maritime-autonomous-surface-ships-mass-and-sar>. Accessed 20 Jul 2025.

liability, and the testing of vessel capabilities. Likewise, the function of the whole system is reliant on the security and quality of the technology.²⁵ For these reasons, in 2017, the International Maritime Organization (IMO) acknowledged and combated the necessity of creating a global regulatory framework for MASS and initiated a scoping study to examine the safety, legal, and environmental consequences.²⁶

This sort of regulatory action is also necessary for the use of AI in general in the shipping industry; from legal and ethical dilemmas of responsibility to issues of cybersecurity and overreliance on automation, this is a growing field that requires additional consideration and development to ensure safety as well as efficiency. Likewise, the role of human labor must also be considered. As the marine industry moves further toward digitalization, the types of jobs required will change, which will significantly affect the workforce. It will also require additional training, which can cause difficulties especially in developing countries. At the same time, however, experts stress that it's important that workers retain knowledge of the systems involved and avoid becoming overly reliant on technology, which could prove dangerous if there was a tech failure.²⁷

The IMO's mission has always placed a strong emphasis on safety, and as technology advances, it also poses new threats. Technologies like automated distress signals, real-time weather systems, and electronic navigation charts have decreased maritime accidents and increased situational awareness.²⁸ Unfortunately, relying too much on technology creates vulnerabilities that weren't there before. Cybersecurity threats impact critical systems like

²⁵ Singh, Capt. Tanvir. "Navigating the Risks: How AI Poses Threats to the Maritime Industry." Sea and Beyond, 27 Oct 2023, <https://www.seaandbeyond.com/blogs/Navigating>. Accessed 20 Jul 2025.

²⁶ "Autonomous ships: regulatory scoping exercise completed." IMO, 25 May 2021, <https://www.imo.org/en/mediacentre/pressbriefings/pages/massrse2021.aspx>. Accessed 20 Jul 2025.

²⁷ Singh, Capt. Tanvir. "Navigating the Risks: How AI Poses Threats to the Maritime Industry." Sea and Beyond, 27 Oct 2023, <https://www.seaandbeyond.com/blogs/Navigating>. Accessed 20 Jul 2025.

²⁸ https://ijsret.com/wp-content/uploads/2025/01/IJSRET_V11_issue1_193.pdf

propulsion, navigation, and communication, putting the ship and its crew in danger. The IMO Cyber Risk Management Resolution was adopted by the International Maritime Organization in recognition of the increasing reliance on digital technologies in the maritime industry and the corresponding rise in cyber threats. The resolution requires that by 1 January 2021, cyber risk management must be fully integrated into Safety Management Systems (SMS) under the International Safety Management (ISM) Code. This means shipping companies and operators are obligated to identify, assess, and mitigate cyber-related risks as part of their overall safety and operational risk management framework.

Automation also changes the safety dynamic onboard. While AI can reduce human error, over-reliance on automated systems may lead to automation bias, where crew members fail to question faulty outputs. Training and human oversight remain essential. Moreover, as more ships become digitalized, clear protocols must be in place for emergency manual overrides and fail-safe procedures.²⁹ That being said, 80% of all at-sea accidents result from human error.³⁰ One of the first actions of the IMO when it was founded in 1959 was to reestablish safety guidelines, updating the previous International Convention for the Safety of Life at Sea, or SOLAS.³¹ There are 7 different sub-committees of the IMO dedicated to safety that meet roughly once a year. The closest domain of a sub-committee to Digitalization is that of the Human Element, Training, and Watchkeeping (HTW) committee. In their latest meeting, they touched on addressing gaps, of which they found 22, in the Standards of Training, Certification and Watchkeeping Code, created in 1978.³² Some of these gaps included e-certification and emerging technologies on ships, the

²⁹ <https://www.mdpi.com/2076-3417/14/18/8420>

³⁰ DNV. "Maritime Safety Trends 2012-2022: Advancing a Culture of Safety in a Changing Industry Landscape." 2022. PDF.

³¹ International Maritime Organization. "Maritime Safety." *International Maritime Organization*, www.imo.org/en/ourwork/safety/pages/default.aspx. Accessed 21 July 2025.

³² "Sub-Committee on Human Element, Training and Watchkeeping, 11th Session (HTW 11), 10 – 14 February 2025." International Maritime Organization, 14 Jan. 2025, www.imo.org/en/mediacentre/meetingsummaries/pages/htw-11th-session.aspx. Accessed 21 July 2025.

lack of which could cause incidents classified as human error, even when technology is present. However, there is yet to be a safety sub-committee addressing automation and artificial intelligence on ships. It will be important in the future to assess the benefits and drawbacks of automation on safety; human error may be avoided, but machine malfunction, if assumed not to be possible, could create unfortunate incidents as well. For example, case studies from early trials of autonomous vessels have highlighted both efficiency gains and unexpected safety risks, underscoring the need for structured evaluation.

Advantages and Risks of Digital Communication and Standardization

Since January 2024, the IMO has required all of its member states to use a single standardized digital platform called the Maritime Single Window (MSW) to exchange information. In 2018, the Logistics Business Council in Panama proposed this idea to improve efficiency with customs and to create a direct line of payment to the Panamanian government.³³ In result, a single-window system was created. It combines import, export, and transit into one platform, increasing efficiency by streamlining all aspects of trade. The United Nations Center for Facilitating Trade and Electronic Business' Recommendation No. 33 stipulated the guidelines for a single window system in general. Purported benefits include increased transparency, resulting in a reduction in the likelihood of corruption, and greater timeliness in paying the appropriate agencies. The document does not, however, state that all parties may not necessarily be looped into a single window system; a risk that comes with any simplification. Additionally, technology must be more periodically updated than, for example, sheets of paper to be filled out.³⁴ Lastly, a Maritime Single Window allows time in port to be optimized, leading to a cleaner environment.³⁵

Although a MSW system may save work, it is ultimately just consolidation, not radical invention. Digitalization has far more complicated applications, involving Lagrangian motion and complicated physics, concerning temporal and slick motion, such as the emulsification of oil spills. In order to address where the oil has spread, how much is left, and to find the effect of oil

³³ Vargas, Pilar. "Faster change needed." *Latin Trade*, vol. 26, no. 3, Sept.-Dec. 2018, p. 57. *Gale In Context: Global Issues*, link.gale.com/apps/doc/A562236417/GIC?u=nysl_ce_faymanhs&sid=bookmark-GIC&xid=fad60778. Accessed 19 July 2025.

³⁴ United Nations Center for Trade Facilitation and Electronic Business. "Recommendation No. 33." 2020. PDF.

³⁵ "Port Call Optimisation." *European Maritime Safety Agency*, www.emsa.europa.eu/sustainable-ports/port-call-optimisation.html. Accessed 19 July 2025.

on marine life, advanced computer models are necessary.³⁶ Since the Exxon Valdez spill in 1989, incidents have continued to be frequent, if not reaching such an extreme level of severity, but new technologies such as autonomous drones, satellite monitoring, and AI-driven predictive models have been slowly appearing, perhaps hinting that digitalization holds the answer. Cloud computing, has been applied at sea as well. In 2018, the United Arab Shipping Co. upgraded to cloud computing for fuel management, and was able to find better fuel prices than when it had previously managed its oil manually.³⁷ Especially as many maritime companies have distributed themselves around the world, a cloud allows for up-to-date, centralized fleet data. In most recent news, a Florida Sea Terminal began using digital Traffic Control through digital communication to increase efficiency at the unloading dock. Tideworks Technology, part of the private sector, was behind the solution. The system was found to increase the safety of the truck drivers, as they did not have to exit the vehicle. If such systems were to be developed abroad, they may continue to have an effect of increased efficiency, as digitalization is meant to.³⁸

This last development brings up the critical concern with digitalization across such a global space: countries are not equally digitalized on land, as well as at sea. Although methods of efficiency may continue to be implemented, their lack of uniformity could either result in overall decreased efficiency, if shipping staff must learn to adjust to a plethora of different systems. From another angle, certain companies or countries may gain an unfair advantage if they are able to capitalize on access to a cloud or 5G internet in coastal areas near certain countries.

³⁶ European Maritime Safety Agency. "Feasibility Study for the Development of a Software Tool to Support Member States on Oil Pollution Response Operations at Sea." July 2023. PDF.

³⁷ "Embracing Cloud Technologies in the Maritime Sector." *Baluco*, 4 May 2018, www.baluco.com/embracing-cloud-technologies-maritime-sector/. Accessed 19 July 2025.

³⁸ Chand, Nandika. "Florida International Terminal Deploys Tideworks' Traffic Control." *SeaNews*, SeaNews Digital Magazine, 18 July 2025, seanews.co.uk/technology/florida-international-terminal-deploys-tideworks-traffic-control. Accessed 19 July 2025.

Disadvantages of Digitalization

Numerous factors affect the effectiveness of a digitalized system, such as data quality, sensor accuracy, model complexity, real-time processing capabilities, and the integration of human oversight. Even if technology manages to be flawless, there is always the question of who has it and who doesn't. A small, but important sense of inequity is defined as data hygiene. In other words, the cleanliness of files can impact how easily and accurately it can be processed by analytics and AI. In order to clean files, workers specialized in IT with lots of time are needed.³⁹ Poor quality data at sea is very common. In order to more greatly centralize marine organization, ship-to-shore communication is integral, but often features spotty footage, and spread out reports, due to ships having experienced a 1500% increase in size without a proportional increase in crew. ShipIn AI's FleetVision, among other tools, is a clear example of why AI may help increase efficiency. A patented technology, it has been shown to make turning time 1.5 hours faster, leading to 3 more days of at sea time per ship, and increasing profit by around \$400,000 per vessel. With additional benefits, such as monitoring security issues (watching for pirates, detecting hazards, i.e.), such technologies produce too much benefit to be free.⁴⁰

According to the Mediterranean Shipping Company, 90% of cargo owners would gladly switch to digitalization, but whether it be through a lack of compatibility with their ship's infrastructure, or costs despite an easier installation, 66% of these 90% believed they needed external support.⁴¹ A digital ship threatens job security and intrudes on a business that has

³⁹ Bigelow, Stephen J. "What Is Data Cleansing?" *Tech Target*, Informa Tech Target, 6 Mar. 2025, www.techtarget.com/searchdatamanagement/definition/data-scrubbing. Accessed 20 July 2025.

⁴⁰ Michael, David. "Why We Patented ShipIn's FleetVision™ Technology." *ShipIn*, ShipIn Systems, shipin.ai/resources/why-we-patented-shipins-visual-fleet-management-technology/. Accessed 20 July 2025.

⁴¹ Mediterranean Shipping Company. "Beyond Rough Water: The Barriers to Digitalization in the Shipping Industry." *Catching Waves with MSC*, 27 Mar. 2025, www.msc.com/en/lp/blog/technology/shipping-digitalization-barriers. Accessed 20 July 2025

survived for thousands of years without it. The former of these points has gained some attention from the news: On the Eastern Coast of the United States, 45,000 dock workers from the International Longshoreman's Association carried out a four-day strike in October 2024, claiming that the automated gate violated their contract. By October 3, 54 ships were waiting in the port, as compared to 3 ships on September 29. With this short revolt, any extra time at sea from ShipIn AI has been netted as insubstantial. In other words, 3 more days at sea is irrelevant if the crew or the dock workers delays 3 days because they are unhappy with decreased job security. European unions have been proactive in issuing protections against automation,⁴² but the debate raises the question: are organizations that can't afford to digitalize really that much worse off?

Despite the IMO requirement of digital information sharing (DIS), a recent survey has shown that only a third of responding ports are able to be in compliance with DIS standards⁴³, and likewise, another study⁴⁴ found that over 80% of ports worldwide do not have access to certain advanced technologies. There are several reasons for this, among them financial struggles, legal or regulatory issues, lack of infrastructure, and challenges adapting to changes in the workforce (which today requires more advanced training in fields such as data analytics, cybersecurity, and system management)—issues that are disproportionately seen in low-income and developing countries.⁴⁵ Delegates should consider such issues in their research, crafting

⁴² Oladipo, Doyinsola. "US Port Strike Throws Spotlight on Big Union Foe: Automation." *Reuters*, 4 Oct. 2024, www.reuters.com/world/us/us-port-strike-throws-spotlight-big-union-foe-automation-2024-10-04/. Accessed 20 July 2025.

⁴³ "Accelerating Digitalization across the Maritime Supply Chain." *WorldBank Group*, 21 Jan. 2021, www.worldbank.org/en/topic/transport/publication/accelerating-digitalization-across-the-maritime-supply-chain. Accessed 20 July 2025.

⁴⁴ Loh, Jessica. "Digital Divide Splits Maritime Industry." *Maritime Fairtrade*, 17 June 2022, maritimefairtrade.org/digital-divide-splits-maritime-industry/. Accessed 20 July 2025.

⁴⁵ Ruta, Michele, and Adam Jakubik. "Why Digital Trade Should Remain Open." *IMF Blog*, International Monetary Fund, 13 Dec. 2023, www.imf.org/en/Blogs/Articles/2023/12/13/why-digital-trade-should-remain-open. Accessed 20 July 2025.

solutions that would help the IMO to harness the benefits of digitalization on a global scale without compromising safety, security, or the economies of developing nations.

Questions to Consider

- How can the maritime industry ensure that the transition to digital technologies does not compromise safety at sea?
- How can bigger nations help developing nations adapt to digital solutions without creating inequalities in global shipping?
- How should IMO balance environmental goals with the increased energy demands that may come from advanced digital systems on ships and ports?
- To what extent should international regulations affect digital systems?

Further Reading

1. Statements by the ILA against talks including automation
<https://ilaunion.org/ila-halts-negotiations-with-usmx-amid-automation-disputes/>
2. Brief summary of the implementation of digitalization at the Florida International Terminal
seanews.co.uk/technology/florida-international-terminal-deploys-tideworks-traffic-control/
3. An article describing and supporting the current agreement not to place customs duties on electronic transmissions
www.imf.org/en/Blogs/Articles/2023/12/13/why-digital-trade-should-remain-open