Digital Ship

2nd Quarter 2024

The current cybersecurity threats

State sponsored actors – GPS jamming – influence operations

Per Håkon Meland, Senior Researcher at SINTEF Digital, took to the stage at the Digital Ship Oslo conference to discuss modern maritime cybersecurity threats.

SINTEF Digital is a not-for-profit research organisation which conducts research within the maritime industry amongst other sectors.

Meland stated how, SINTEF Digital "see a lot of the same problems in maritime as it does in other industries, for instance in the aviation and roadside transport industries there is a lot of digitalisation occurring".

State sponsored actors

Meland provided an overview of the current cybersecurity threat landscape. He identified a growing number of state-sponsored cyberthreat actors, underlining how their existence adds another layer of complexity to the cybersecurity landscape.

These highly skilled and well-resourced groups operate with the backing of governments, allowing them to carry out sophisticated and targeted attacks on a global scale.

Meland provided the example of the Conti Group, a ransomware hacker group active from 2020 to 2022, though to be operating from Russia. It functioned as a ransomware-as-a-service (RaaS) provider, allowing other cybercriminals to use its malware for their own activities.

The group deployed double extortion tactics, which involve encrypting victims' files and threatening to expose sensitive data unless a ransom is paid. Conti Group gained widespread attention after reportedly earning approximately $200 million from their malicious activities in 2021.

Despite Conti Group publicly "announcing their support of Putin in 2022, even though they were not a state actor, some of the members of the Conti Group supported Ukraine.

So, in March 2022 these insiders of Conti who supported Ukraine started leaking information about the way they were working and so there was this internal conflict within the group".

The group dissolved shortly after the leaked information about their operations surfaced in March 2022.

The case of the Russian Conti Group highlights the blurred lines between criminal organisations and state actors in cyberspace. Despite close links to state actors, many state sponsored groups are essentially independent bodies with capabilities to act semi-independently.

Meland also referred to the Volt Typhoon group, a state sponsored Chinese cyber operation supported by the Chinese state. Western intelligence indicates that Volt Typhoon focus on espionage rather than malware and distributed denial-of-service (DDoS) attacks.

A DDoS attack is an attempt to disrupt the normal traffic of a targeted server, service, or network by overwhelming the target or nearby infrastructure with a flood of internet traffic.

Volt Typhoon group's activity is believed to be part of a broader campaign aimed at disrupting Western infrastructure, including naval ports, internet service providers, and communications services.

This focus from state sponsored actors on disrupting key western infrastructure highlights the importance of effective cybersecurity and the threat of state sponsored actors within the maritime industry.

GPS jamming

Meland used the example of GPS jamming to exemplify the damaging influence of relatively uncomplicated styles of attack on industries.
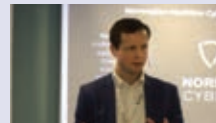
GPS jamming involves generating a strong radio frequency signal to disrupt transmissions from GPS satellites. Victims of a GPS jamming attack will immediately notice that the system cannot provide a geolocation result.

Using challenges faced in Norway as an example, Meland stated how "we

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Per Håkon Meland, Senior Researcher, SINTEF Digital

had a headline from a couple of weeks ago stating that we see GPS jamming within navigation almost every day now and this has also impact on maritime navigation".

Naturally, this creates problems for maritime operations and is an issue Meland identified as "extremely common in Norway, especially towards the north".

Meland highlighted a prevalence of unsophisticated state sponsored cybersecurity threats across industries due to the ease in which they can be conducted.

Influence operations

Influence operations, aimed at manipulating public opinion through disinformation campaigns, are also a growing concern across industries, particularly as technology advances enable the creation of convincing deep fake videos and soundbites.

Influence operations, which "are not really technical attacks but they try to influence, for example through popular opinion, fake news and using AI to create deep fake videos".

Meland used provided an example of a video of Elijah Wood stating that Vladimir Zelensky is a drug addict and needs to go into rehab.

Although this fake video was poorly made and did not cause any real problems, it showcases the potential deepfake technology can have in the wrong hands. The technology has the potential to disrupt maritime operations, with radio transmission a central part of maritime communications.

Threat modelling

In response to the modern cyberthreat landscape, Meland spoke on the value of threat modelling in combatting cyberthreats.

He demonstrated an approach to threat modelling that combines attacker-centric and system-centric perspectives. It is a structured approach to identifying potential security threats and vulnerabilities in software, systems, or applications.

It involves analysing the architecture, components, and interactions of a system as well as the consideration of potential attackers' motivations and means, to anticipate possible avenues of attack.

The methodology aims to rank threats and ensure a comprehensive analysis is conducted. Meland himself defined threat modelling as "trying to think like the attacker, imagining what can go wrong with your system and how it can be attacked".

Attacker-centric threat modelling

Meland explained how "attacker centric threat modelling is a perspective where you look at the opponents and consider the things a security engineer needs to do", and provides insights into the motivations, capabilities, and resources of potential attackers.

This is done through "identifying the likely opponents, the sort of capabilities these adversaries have, the motivation, and who the opponents are", through an attacker-centric lens.

Emphasising the importance of understanding adversaries' skill sets, motivations, and available resources, Meland used the example of the infamous duo, Bonnie and Clyde.

He stated how, "they were driven by the thought of profit. They had a limited skill set and resources. That's why they were in this business to be to begin with, if they had resources, they wouldn't be in that that line of business".

Just as Bonnie and Clyde were persistent in their search for the vulnerabilities of banks, cyber attackers are persistent in their attempts to exploit weaknesses in vessel systems.

The comparison underlines the need for vessel operators to be proactive in defending against cyber threats or attackers will take an advantage.

Meland argued that through gaining an understanding of the tactics and motivations of cyber attackers, the maritime industry can better prepare to defend against cyberattacks.

This helps maritime security professionals in anticipating the tactics of cyber attackers to protect vessels.

System-centric threat modelling

For Meland, the system-centric approach complements the attacker-centric approach by providing a detailed understanding of the characteristic vulnerabilities in maritime systems and infrastructure.

The system-centric approach considers the specific components and operations of the systems themselves.

By identifying potential attack points and weaknesses within onboard and shore-based systems, the system-centric approach enables system users to implement defence and mitigation strategies catered to their needs.

The approach provides the necessary context and information to inform proactive defence measures against the threats identified through the attacker-centric analysis.

In a recent study conducted by SINTEF Digital, a reference model of a ship's system components was created. Meland explained how, "we created a reference model of basically a ship with the different system components here given".

The study highlighted the evolving threat landscape in maritime operations by analysing past incidents like GPS jamming and cyber-attacks, stressing the need for proactive mitigation strategies.

The study was used to create a reference model of ship systems, including navigation, communication, OT, and crew administrative systems, to understand attack points both on the ship and on shore.

The system "created a graph which looked 10 years back on data collected from incidents or successful cyber-attacks, what kind of systems were attacked within the ship, and outside the ship. There were many different attack points even though the total number of incidents hasn't been that many compared to other sectors".

Meland views system-centric frameworks as important in the anticipation of future threats, helping to form the threat modelling approach which is crucial for fortifying defences and ensuring operational resilience against cyber threats.

Theoretical insights

Drawing upon insights from Adam Shostack's 2008 published work on threat modelling, Meland stated how "there is no single best or correct way of performing threat modelling, it's a question of trade-offs and what we want to achieve by doing it".

Meland also cited the threat modelling manifesto, published in 2020 "by a group of security experts who got together to agree on the main principles, the main values, patterns and anti-patterns of threat modelling".

The first was the principle that "the outcomes of threat modelling are meaningful when they are of value to stakeholders, so the important thing is that it should be something of value it's not just something that you do".

Another is called the "perfect representation", which is the idea that when designing threat models, you "shouldn't strive for a perfect as it is not really possible, but instead you should try to create multiple threat modelling representations".

These theoretical insights and previous works on the use of threat modelling help emphasise its value and effectiveness. **DS**

How cybersecurity threats are changing

Lars Benjamin Vold, Managing Director at Norwegian Maritime Cyber Resilience Centre (NORMA Cyber), presented the most significant findings from NORMA's annual cybersecurity assessment report.

Vold, speaking at the Digital Ship Oslo conference, provided insights on the current cybersecurity threat landscape determined by NORMA's report.

Vold spoke on the growing prominence of cyberattack tactics used by a range of threat actors. The growing range of cybersecurity threats to maritime companies formed the foundations of Vold's speech.

The shifts highlighted in Vold's speech underscore the need for organisations to adopt a more rounded approach to cybersecurity, encompassing not only technological defences but also user education, proactive monitoring, and incident response readiness.

About NORMA Cyber

NORMA Cyber is a non-profit organisation in Norway representing 110 members

with 2200 vessels, established in 2021. NORMA has been at the forefront of providing crucial services such as information sharing, incident and crisis response, and secure delivery operations to more than 100 vessels and 6000 staff members.

The NORMA Cyber centre plays an important role in simplifying the complexities of the cyber threat landscape and providing valuable recommendations to maritime organisations for enhancing their cybersecurity approach.

The centre provides reports on threat actors targeting maritime organisations and offers 24/7 incident response support to members who participate in Norway's sectoral response setup for maritime cybersecurity.

Shift in type of attacks

Vold highlighted a significant shift in the type of cyberattacks, with hackers having moved away from traditional malware-based methods. Malware attacks encompass a range of harmful software, including viruses, worms, trojans, ransomware, spyware, adware, and more.

Vold explained how, "in cybersecurity in general we see fewer amounts of attacks done with malware, around 80% of the attacks are done without malware", often involving the exploitation of system vulnerabilities or user credentials.

Vold identified convenient user systems as a key driver behind the move away by hackers from traditional malware-based methods. Explaining how "everything which makes a system easy to log into easy, easy to use, and easy to administrate also makes it fundamentally vulnerable for someone to exploit those features".

For Vold, achieving one-hundred percent cybersecurity is unrealistic due to user needs and the inherent vulnerabilities of user-friendly systems. This indicates a need to rethink cybersecurity strategies, as there is a balance to strike between user accessibility and becoming cybersecure.

The balance consists of users "who want to do their job, want more features and things that make it easier for them to work" and the considerable cybersecurity measures to consider, alongside the overall cost of introducing new measures.

Vold emphasised the importance of integrating cybersecurity into technology discussions early on, rather than it being a mere afterthought. Building effective cybersecurity measures into systems helps ensure they are effective and manageable for the systems in use.

If cybersecurity is not considered when constructing systems then adding them in becomes more difficult and costly, resulting in a less effective and secure cybersecurity system.

Geopolitical landscape

Vold spoke on how NORMA Cyber's assessment shed light on the evolving landscape of cyber threats, with a particular emphasis on espionage threats originating from nation-state actors and state-sponsored actors.

Vold underscored the importance of vigilance, especially for sectors involved in cutting-edge technology development, or those operating in contested geopolitical areas.

Underlining the growing attention around geopolitical issues in the maritime cybersecurity space, Vold explained how when attending a conference, two or three presentations from "different agencies presented their reports specifically mentioning maritime technology as one of the things that they were seeing causing tension, especially in Russia and China".

"I think if you are in a segment where you are using or developing cutting edge technology, if you are operating in a contested area somewhere in the world, or if you have business partners operating in that area, this is something to be aware of now", said Vold.

Heightened awareness and robust cybersecurity measures are essential to mitigate the risks posed by sophisticated state-sponsored actors.

With the geopolitical landscape constantly evolving, it is important for cybersecurity experts to consider potential threat actors in the regions they operate in.

Ransomware and data leaks

Ransomware attacks feature prominently in Norma Cyber's assessment of the threat landscape.

Vold noted a significant increase in ransomware incidents affecting maritime organisations, with the number increasing from 49 in 2022, to 72 in 2023, so we see an increase there in the number of maritime organisations worldwide affected by ransomware".

Vold identified how the "biggest trend is that ransomware in general towards all industries has increased, with more than half encryption".

The increase in ransomware is coupled with an increase in data leaks. With the widespread adoption of cloud systems, encryption becomes more challenging, and data leaks remain a significant concern, which are often overlooked.

Vold explained how many in the maritime industry have already transitioned to cloud-based platforms for various reasons, but the persistence of data leaks in cloud-based systems warrants attention and consideration for future implementations.

This dual threat underscores the need for comprehensive cybersecurity measures, including robust data protection strategies, secure backup solutions, and incident response protocols.

Operational technology

Another area of concern highlighted by Vold is the threat posed to maritime operational technology (OT).

While incidents targeting vessel OT systems have been relatively rare, having "not seen any incidents which have targeted maritime critical vessel systems", NORMA warns of potential future challenges.

Vold expressed concern regarding potential challenges over the coming years, citing the increased targeting of OT and industrial control systems by advanced threat actors.

The danger comes as if a hacker gets "inside of the network there is no authentication or encryption, so that basically means a hacker could do whatever they want as long as they understand the complexity of the system". This allows attackers to manipulate components freely.

While attacks previous may have been limited due to the complexity of systems, the emergence of malware frameworks like "pipe dream" poses a significant threat, as they can exploit existing functionalities within OT networks.

As maritime organisations embrace automation, securing OT systems becomes of increased importance in ensuring safety, reliability, and operational continuity.

Denial of service attacks

Vold discussed NORMA's findings on the growing prevalence of distributed denial of service (DDoS) attacks "where threat actors send a lot of traffic towards a typically an internet page, creates a traffic jam, and takes the service down".

Vold highlighted how this type of attack has been carried out by threat actors as well as activism-driven cyberattacks, with incidents targeting maritime organisations. While less sophisticated than some other cyber threats, these attacks can still disrupt operations, compromise data integrity, and damage organisational reputations.

Providing statistics, Vold stated how "we have seen rapid increase of maritime organisations during 2023 who have been a victim of these types of attacks. When it comes to activism the numbers that we have seen are at 440 maritime organisations being victims of these attacks".

Proactive measures such as DDoS mitigation strategies, threat intelligence sharing, and stakeholder engagement are essential to counteracting these threats effectively.

Vold emphasised the growing capabilities of activist groups worldwide, who he believes will continue to engage in such attacks for their causes at an increased rate.

He uses the example of a Russian hack group, known as "no name", who is a significant protagonist in a large portion of these attacks.

Growing cybersecurity awareness

Speaking on the growing perceived importance of cybersecurity from those within the maritime industry, Vold cited a NORMA survey conducted among top management of member companies in the ship owner association.

The survey revealed that cybersecurity is amongst the top concerns of those surveyed, even surpassing fears related to armed conflict incidents in regions like the southern Red Sea.

Vold recalled a conversation he had with a member of the Norwegian ship owner association, stating, "I called a member and said, 'hey how can this really be the case' and then he said, 'well you can't sail around cyber'".

The growing appreciation of cyber threats as a genuine unavoidable issue is a welcomed development for Vold. He recalled conferences in the not so distant past where cybersecurity was a mere side thought, perceived as a less pressing matter than other maritime issues.

Despite increased appreciation and recognition of cybersecurity as a genuine maritime threat, Vold emphasised the need for greater communication of cyber risks to the top management of organisations.

Vold encouraged a focus on threat actors, their motives, resources, and tactics, rather than technical details. Overfocusing on technical details can make the risks more relatable to non-cybersecurity experts, potentially leading to less action being taken to combat cybersecurity threats.

For Vold there is a need to align communication on cyber risks with an organisation's existing risk management framework. This will smoothen the transition of cybersecurity from a fringe issue into one within a company's risk management framework, ensuring it is well maintained.

Lars Benjamin Vold, Managing Director, NORMA Cyber

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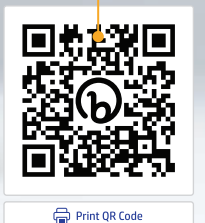
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Shape Up or Ship Out

A maritime cybersecurity manifesto

- By Andrzej Gab, director, maritime cybersecurity implementation, EY Poland

I have a dream. I have a dream that maritime cybersecurity will become a vital part of the maritime industry.

I have a dream that the rush of digitalisation will be balanced by adequate protection of assets and systems.

I have a dream that being in all this together, we will base on key principles, which will form the foundation of our cooperation and work - and could look as follows.

"Shape Up or Ship Out - The Maritime Cybersecurity Manifesto"

In the ever-evolving digital era, Cybersecurity in Maritime is critical to ensure safety, reliability, and continuity in operations. Recognising the importance of fortifying our digital defenses against potential threats and cyber-attacks, we put forth a set of guiding principles in this Manifesto.

As leaders, employees, and stakeholders in the maritime industry, we believe in an approach that is dynamic, collaborative, and focused on innovation. We proudly propose our Cybersecurity Manifesto for Maritime:
1. **PEOPLE OVER TECHNOLOGY**: Leaders, crew, employees at all levels and passengers must understand cyber-security principles and its operations so they can make the right decisions.

We would like to add here that everyone must also understand operations. It is hard for people in cyber to make the right decisions if they don't understand their impact.
2. **PRINCIPLES IN HARMONY WITH REGULATIONS:** Rather than strictly following rigid rules, we adhere to cybersecurity principles. These principles provide us with the flexibility to adjust rapidly to new threats while still conforming to industry regulations and guidelines.
3. **ON-BOARD & ON-SHORE INFORMATION EXCHANGE** as opposed to bureaucratic procedures. Information must be accessible and understood by everyone involved in sea and on-shore activities, especially if both sides are involved.
4. **READINESS FOR CHANGE AND RESPONSE** over strict adherence to plans. Prepared for dynamically changing threats, we are able to quickly adjust our strategies and actions in coordinated way, building and using tools, methods and system to support it.
5. **COLLABORATION BETWEEN ORGANISATIONS** over competition. Digital safety requires wide-scale collaboration between companies, vendors, agencies, and governments.

6. **ONGOING INNOVATIONS** versus traditional solutions: We keep a proactive and innovative approach to safety measures, ceasing to rely solely on outdated tools and practices.
7. **GENERAL SAFETY RULES** over detailed documentation and maritime sector requirements: The implementation of safe/secure systems and practices is more important than convoluted/complex, often outdated documentation and regulations.

Many of these regulations were designed before cyber security challenges emerged. Therefore, the documentation updating process is still required and will remain as such. And we are looking forward to seeing regulations updated to reflect current cybersecurity challenges as well.
8. **RESPECT FOR PRIVACY** over surveillance: With full respect for privacy, we apply appropriate and proportionate measures to protect our systems and assets. As we think of "security by design" we should also consider to think the same of "privacy by design".

In embracing this Cybersecurity Manifesto for Maritime, we acknowledge that we are advocating for a substantial shift in our approach to the digital safety of our industry.

Andrzej Gab, Director, Maritime Cybersecurity Leader, EY Poland

This transformation will not come about easily or quickly. It calls for considerable effort, relentless pursuit of growth, and perhaps most importantly, a shared mental shift across entire organisations.

We commend the courage and resilience that will be required in this journey, and firmly believe that by adhering to these principles, we can significantly enhance our cybersecurity defences, bolster the safety of our maritime operations, and foster a more secure digital future for the entire maritime industry. **DS**

Customised cybersecurity service

A Digital Ship interview with IEC Telecom Group's Product and Solutions Manager, Jalloul Ben Soussia

IEC Telecom Group is an international service provider established in 1995. With a presence in Europe, the Middle East, and Asia, IEC Telecom operates globally, specialising in turn-key network management solutions and value-added services.

OptiShield product

IEC does not offer an off the shelf solution but rather a tailored cybersecurity strategy that considers the "unique architecture and setup of each vessel".

OptiShield is IEC Telecom Group's cybersecurity solution offering protection for onboard networks and aids in enforcing IMO compliance on vessels.

Delivered through unified modular software which considers compliance, protection, and secure access, OptiShield enables users to elevate their cybersecurity measures to an advanced level.

Ben Soussia explained how by understanding the specific requirements and existing infrastructure onboard vessels, IEC Telecom Group collaborates with customers to implement the best tools and architecture to achieve a balance between operational needs and cybersecurity.

This approach generates a customised vessel specific solution, rather than relying on a fix all solution.

Once a vessels existing architecture has been analysed, "we deploy the solution that is best designed for that environment and have the security operations centre who will be monitoring and analysing what is happening on board", once the solution is implemented.

Remote IT support

OptiShield has a 24/7 cyber response team, ensuring timely and critical action against cyber-attacks. The remote 24/7 IT support monitors and responds to cyber threats swiftly, which operates from their Security Operations Centre (SOC).

Ben Soussia explained how "the team is 24/7 aware and 24/7 available to monitor what is going on and to take action within a few minutes to reduce impact".

This service involves "analysing the data, seeing these alerts, evaluating if these are real alerts, and seeing if we have a real breach or if we have real problems somewhere that we can take action immediately".

An example provided by Ben Soussia involves the SOC preventing a cyber-attack which hoped to exploit a vessel vulnerability which existed due to insufficient authentication measures. The SOC detected unauthorised access attempts, allowing them to intervene promptly and prevent further damage.

Ben Soussia stated that the incident acted as a "nice lesson to the customer to comply with our recommendation that was done in the first step when we have the risk assessment as we recommend a two-factor authentication".

The attack also emphases the importance of high-bandwidth access to live outbreak detection databases for effective risk mitigation.

Risk assessments

IEC Telecom Group conduct risk assessments onboard vessels, this is a crucial step .in effective cybersecurity integration.

Ben Soussia explained how, "identifying the vulnerability types assesses the potential associated with specific weaknesses or specific software's that exist onboard is key". The risk assessment process allows the OptiShield system to work as efficiently as possible.

This process has evolved from traditional site surveys to now include comprehensive risk assessments aimed at identifying vulnerabilities and assessing associated risks. For Ben Soussia "this is the cornerstone of building out a cybersecurity safe environment in the vessels".

Risk assessments help form the foundation for building a secure cybersecurity environment tailored to each vessel. By analysing factors including existing software, network architecture, and potential weaknesses, the risk assessment informs the development of targeted cybersecurity solutions.

Customisation

"We customise the cybersecurity solution to fit exactly the architecture or the typical use cases that we have within the vessels. We have not created a new cybersecurity system but have adapted what we have in other industries, like the enterprise media industry, and we now have customised package that will fit, I would say, 95% of the of the vessels that we have".

This tailored approach allows IEC

Jalloul Ben Soussia, Product & Solutions Manager at IEC Telecom Group

Telecom Group to address a significant portion of cybersecurity requirements while maintaining high standards of security. Ben Soussia stressed the importance of offering these solutions at competitive prices, ensuring accessibility for all stakeholders involved in maritime operations.

Ben Soussia highlighted success stories from partnerships in various regions, particularly citing instances in Turkey, where their customised cybersecurity setups have proven effective in providing comprehensive security measures.

Risk of high bandwidth

Ben Soussia views "bringing in new hybrid solutions with high bandwidth or with the availability of the high bandwidth" as the defining modern challenge in cybersecurity.

He stated how "higher bandwidth means a completely different behaviour onboard. It brings a complete change in the trends and in the behaviour of the usage onboard, which means the cybersecurity level has to cope with new problems and issues that high bandwidth can bring on board".

Higher and more accessible bandwidth creates a larger number of entry points for potential cyberattacks. Recognising this evolving nature of cyber threats, IEC Telecom Group harnesses the power of AI to bolster defence mechanisms.

AI

By integrating AI-driven solutions into their cybersecurity suite, the IEC Telecom Group system allows vessels to detect and mitigate threats more effectively.

Through machine learning algorithms and behavioural analytics, AI powered defence mechanisms can identify anomalous patterns and potential security breaches in real time.

Utilising AI, IEC Telecom Group effectively safeguards vessels against cyber-threats by processing vast amounts of data, resulting in fewer successful hacks.

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The pathway for digitalising bunkering

Michael Bruun Østergaard, Group IT Director at Monjasa, spoke on Monjasa's desire to bring the digital revolution to bunkering at a recent Digital Ship conference in Oslo.

Drawing from his experience which spans the IT and shipping domains, Østergaard underscored the importance of transparency within bunkering operations.

Østergaard explained how Monjasa hopes to improve levels of transparency in bunkering. For example, fuel pricing, traditionally kept confidential, has led to inefficiencies and occasional malpractices due to its ambiguous nature.

Østergaard stated how, "it has always struck me as weird that in this billion-dollar business, if you want fuel for your ship you have to call someone, ask them for the price of fuel today in Singapore and you'll get a price. Then call another guy, and another guy, until you kind of figure out somewhere in between is probably the price".

This decentralised approach to fuel procurement, where most purchases occur on the spot market, is inefficient and problematic. Østergaard argued there is a need for greater transparency and standardisation in the fuel procurement process to address these issues.

The absence of a centralised approach means "price and quality vary. Monjasa would like to change that. I would like to change that first and foremost because when you have a market that is not transparent like this corruption happens".

By offering customers unprecedented visibility into fuel pricing and supply operations the platform has disrupted traditional practices. Østergaard champions the call for transparency, signalling a shift towards empowerment for customers and operational efficacy.

Background

Monjasa is a Danish founded bunkering company, who "are today, among the top five bunker providers in the world". According to Østergaard, Monjasa delivers around 6.2 million metric tonnes of fuel each year all around the globe.

Over the past two decades, Monjasa has experienced significant growth in its vessel owning and fuel delivery operations.

Beginning with the acquisition of its first ship in 2003, Monjasa expanded its presence in the Arabian Gulf and West Africa. By 2014, the company established operations in Panama and later North Europe and the Mediterranean.

In 2019 and 2020, Monasa entered the North American market with an office in Houston, followed by expansions into Rio and Shanghai in the subsequent years and Monjasa is poised for further expansion into Japan, solidifying its global presence.

Despite its long-standing importance, the bunkering industry has faced challenges with digitalisation due to traditional methods and unclear pricing systems. "a lot of shipping bunkering is very tradition bound and because of that it's been tough to get digitalisation going".

Despite the constraints of tradition, Østergaard believes the digital age is about to begin for bunkering. Østergaard's talk delved into the extent of the challenges impeding the embrace of digitalisation and change to bunkering.

Improved connectivity

In the past two decades, Monjasa has expanded its global operations, owning, and operating 30 ships and servicing over 800 ports worldwide.

Despite its extensive reach, Monjasa relied on traditional communication methods like WhatsApp, email, and phone calls for its nearly 13,500 bunker supplies in 2022. This manual process often led to inefficiencies and miscommunication.

The advent of Starlink enabled Monjasa to embark on a digital transformation journey. The installation action of Starlink, which improved communication capabilities across Monjasa's fleet, was conducted by crew members aboard vessels, making it the "cheapest and easiest" implementation Østergaard has been a part of.

Despite connectivity challenges in regions like Dubai, China, and parts of Africa, Monjasa continues to enhance its digital platform, enabling real-time monitoring and virtual audits using tools like Microsoft Teams.

This digital evolution has revolutionised Monjasa's operations, improving efficiency and connectivity across its global fleet.

Digital platform

Through improved connectivity Monjasa has created a digital application which utilises real-time data from their global tanker fleet to digitalise bunkering and bunker operations.

Monjasa aims to bridge communication gaps between stakeholders and streamline bunker procurement processes with its digital platform.

The application provides shipowners with transparent, open data regarding bunker orders, all without requiring drastic alterations to business operations or the commercial model.

Monjasa successfully launched its digital platform in 2022, providing customers with access to real-time data and empowering traders with dynamic tools.

When the platform was first released, "traders could start sharing price indications publicly inside the company which was also not done at that time".

As the industry evolves "today if you are a customer you can log into our platform and you can see what stuff costs and what's going on real time as it happens", he said. The development signifies Monjasa's commitment to enhancing customer experience and operational efficiency.

Monjasa's digital platform offers customer-focused enhancements to specialised tools for traders and operational teams. Østergaard hopes by providing stakeholders with immediate insights and promoting a collaborative approach, Monjasa will continue to grow.

Integrating with competitors

Østergaard acknowledged that Monjasa cannot bring about significant change alone. He stated how, "we also know that we are not going to change the world alone and this platform does not add the value that it could if we don't start integrating with other companies".

To maximize Monjasa's value, the company are focused on integrating with other stakeholders in the industry. This includes collaborating with customers, competitors, and others seeking similar advancements.

This has been demonstrated by the "platform which gives an open window into the way that we do business at Monjasa. The next step now is to start integrating not only with customers and their systems but also with people out there in the market trying to do the same as we're doing, even with competitors".

Monjasa takes the approach of as the industry evolves, particularly with the potential for autonomy in the future, integration and automation are crucial. Østergaard stated how the "platform is not super valuable if we don't tell the entire story", underlining Monjasa's open approach.

Ultimately, Monjasa's goal is to establish itself as the go-to brand for bunker procurement, ensuring seamless operations across platforms.

Autonomous ships & bunkering

Østergaard underlined the importance of digitalised systems for bunkering in the coming age of autonomy in the maritime industry.

Stating how "we can agree that autonomy will happen at some point. We can also agree that the robots are not going to call five friends to check out the price of gas in a certain region in the world. We need to be ready to integrate and automate this process".

In the context of an autonomous maritime industry, Østergaard expressed how "we believe that levelling the playing field is better for everyone, we know that Monjasa is not going to be the Expedia of bunkering, but we do want to be the quality brand that integrates so that you can acquire bunkers from us, no matter which platform you choose".

Michael Bruun Østergaard, Group IT Director, Monjasa

Monjasa aims to bridge communication gaps between stakeholders and streamline bunker procurement processes with its digital platform.

MAN Energy Solutions Unveils MAN Data+ for Enhanced Asset Management

What is MAN Data+

MAN Data+ is an advanced API service poised to redefine how customers access structured asset data. This cutting-edge service highlights MAN-ES's commitment to digital innovation in maritime and energy sectors, providing streamlined access to essential structured data for superior fleet operations.

How MAN Data+ helps you

Your MAN engines generate a vast amount of data, and our mission is to ensure that you have the means to effectively monitor, access, and leverage this information, regardless of the number of MAN engines you operate or the scope of your business activities. MAN Data+ merges data ontology with secure and reliable services to unlock unparalleled value. This data is also designed for **easy integration** into your existing platforms and systems. Thanks to fully standardized data structures, you can effortlessly apply solutions from one asset to another.

As part of the MAN CEON Platform, MAN Data+ offers a **secure and smart solution for collecting and integrating engine data** in an accessible and thorough manner. Our extensive understanding of the engines and equipment furnishes us with the necessary context to grasp the data's significance and value.

MAN Data+ facilitates **secure data transmission** through your satellite communication providers, along with data collection, storage, effortless API integration, and a scalable and functional data framework. This suite of features empowers you to **enhance fleet efficiency and performance, reduce operational expenses, minimize onboard labor, and improve the quality of engine performance and monthly reporting.**

Craft personalized visualizations and derive insights using machine learning and process simulations. The application of the data is guided by your business processes and objectives.

MAN Data+ aligns with the maritime industry's standards for **comprehensive security and ensures long-term data availability**. In the rare event of a loss of connectivity, data is preserved on the MAN-ES ATU, with on-site storage capacity lasting up to 6 months. Upon reestablishing connectivity, the stored data will be automatically uploaded in the correct time sequence.

Artificial intelligence, big data, and machine learning offer significant potential for the shipping industry, but they must be effectively integrated with the current ships, machinery, and infrastructure. MAN Data+ provides a key benefit in this regard through its comprehensive integration with MAN machinery. With **APIs**, you can seamlessly **merge your MAN engine data with other platforms and systems**. We gather data from sensors on MAN equipment and enhance it with our algorithms to make it actionable. This refined data can then be utilized within your own IT systems.

Read more

A regulator's perspective on new technology

Nils Bua, Head of new maritime technology at the Norwegian Maritime Authority (NMA), spoke at the Digital Ship Oslo conference on the NMA's approaches to new maritime technology.

Bua's speech emphasised the role of innovation, safety, and collaboration in shaping the future of technology in the maritime industry.

Regulation challenges and new technology projects

Bua discussed the challenges to regulations when implementing new maritime technologies, emphasising the dual responsibility of the NMA in striving for effective safety standards and improved levels of environmental sustainability.

He outlined the NMA's priorities embody this, stating, "from our side, of course safety and the environment are the goals".

The global striving in the maritime sector for net-zero emissions by 2050 requires significant effort and innovation from system developers. The NMA is also committed to promoting Norway as an effective player on the maritime global market.

This provides an insight into the balancing act the NMA plays, aiming to improve levels of safety and sustainability, and Norway's reputation as a maritime power.

With the maritime sector in Norway currently being "quite safe", Bua identified the pressure to innovate and achieve environmental goals as the primary driver of new technology projects.

Background

As the maritime industry evolves into its digital age, Bua and the NMA aim to ensure a safer, more sustainable future for shipping.

With a background in maritime engineering and a keen interest in innovation, Bua has dedicated his career to driving forward advancements in automation, autonomy, and the integration of new fuels within the maritime sector.

The NMA is a government agency responsible for regulating maritime safety, security, and environmental protection in Norwegian waters.

Working in collaboration with industry stakeholders, research institutions, and international organisations, the NMA plays a role in helping promote safe and sustainable operation practices of vessels and offshore installations.

Risk based approach

The pressure driving the development of new technologies in areas such as automation and alternative fuels brings with it concerns surrounding upholding current levels of safety.

Using the example of LNG's emergence, Bua stated, "when LNG came into the market around 2000 that was the beginning of the use of a risk-based approach".

A risk-based approach refers to the method used to assess and manage potential risks associated with new maritime technologies. This approach involves identifying hazards and evaluating their likelihood and potential impact.

Innovative technologies push the boundaries of safety regulations. In the case of LNG, "there was no regulation for LNG use at that time. Today we have IMO regulation, the IGF code, which puts down quite clear regulations".

Bua provided another example of batteries, stating, "in 2015, there were no regulations for battery use. Today, there are more prescriptive regulations, but we may make a full regulation".

A risk-based approach to emerging technologies allows the NMA to implement measures to mitigate or eliminate them.

Understanding threats and vulnerabilities

Bua discussed the importance of understanding threats and vulnerabilities from multiple angles, including potential attacks and weaknesses within the maritime industry itself.

He spoke on the importance of considering these threats when developing safety measures when evaluating maritime security, stating how "we can learn a lot and we can see the emerging threats and develop some proactive mitigation strategies".

For Bua, the use of a holistic approach to evaluating maritime security perspectives can aid in anticipating emerging threats and developing pre-emptive strategies that can be used to prevent safety issues in the maritime industry.

National guidelines

To help the development and support new projects, national guidelines and circulars are made for different types of technology,

Nils Haktor Bua, Head of New Maritime Technology, Norwegian Maritime Authority

as battery, automation and unmanned vessels, and others.

These national circular helps ensure that the implementation of new technologies adheres to safety and environmental standards, pending international standards.

Bua stressed the importance of considering systems outside the vessel, such as port infrastructure and public services.

He encouraged a rounded approach to risk analysis, claiming system users can better anticipate and address vulnerabilities if systems on and off a vessel are considered.

The future

Bua expressed optimism regarding the future of sustainability and safety in maritime technology, citing numerous projects underway in Norway being conducted by the NMA.

For example, Bua spoke on the "projects over the past seven to eight years", which have generated knowledge, which is being integrated into ongoing work, and will lead to a reduced number of onboard personnel and "unmanned vessels at the end".

Another was the Ocean Challenger for deep-sea exploration, with development currently by the NMA. Bua describes the Ocean Challenger as a "24-meter-long ships that does surveyor tasks in the North Sea" increasing the level of automation in shipping.

For the NMA, the consideration of safety alongside innovation in the move towards sustainability is a difficult balance to strike but an important one in the future of maritime operations. **DS**
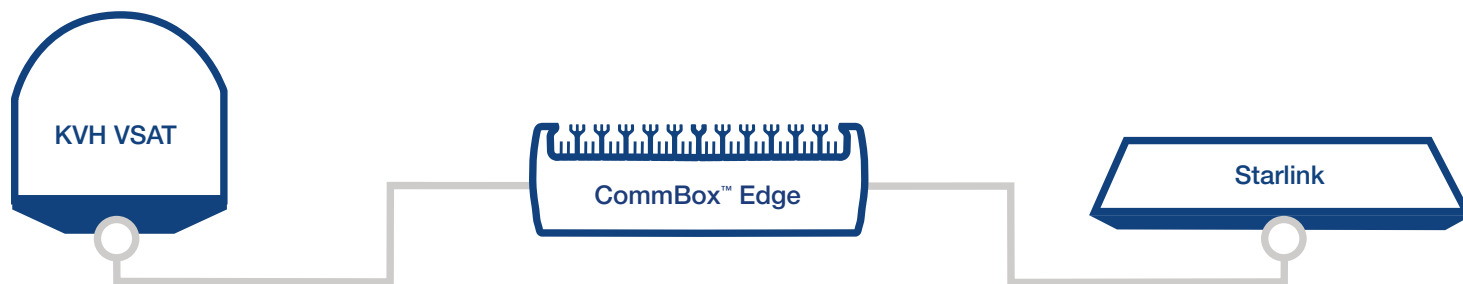

A risk-based approach refers to the method used to assess and manage potential risks associated with new maritime technologies. This approach involves identifying hazards and evaluating their likelihood and potential impact.

TMS DRY Fleet's digital transformation journey

Speaking at the recent Digital Ship - Vessel Performance conference in Athens, Dr. Antonios V. Lalechos, a projects and performance manager at TMS DRY Fleet, provided insights into the company's digitisation journey over the past eighteen months.

Lalechos spoke on how over the past eighteen months TMS DRY Fleet has embraced digitisation, taking steps towards a more efficient, sustainable, and competitive future.

Lalechos' speech provided insights on how the company's strategic integration of technology is developing its maritime operations.

The company wide tactics deployed by Lalechos and his team at TMS DRY Fleet illustrate the value of in embracing digitisation from all angles ensuring companies effectively navigate future industry challenges.

According to Lalechos, digital transformation is the driving force behind a fundamental shift in TMS DRY Fleet's approach to maritime operations.

He stated how, "we're moving away from manual processes and moving towards digital tools and platforms that allow us to make smarter, data-driven decisions. This transformation is not just about improving efficiency, it's about changing how we operate".

This shift away from traditional methods to embracing digitalisation is occurring in all aspects of TMS DRY Fleet's operation. Lalechos highlighted how this journey began with a business plan, something he identified as a change from the norm in the maritime industry.

A more strategic approach allowed his team to outline a strategy which integrated digital technologies into the company's long-term vision. He emphasised how "digitalisation is not a one-time project, we're always investing in technology, talent, and infrastructure so that we continue digitalising".

Data-driven decision making

Central to TMS DRY Fleet's digitalisation journey is a move towards data-driven decision making.

Lalechos explained how "we are moving away from traditional, manual processes and now using digital tools and platforms to make smarter, data-driven decisions".

He argued that data-driven learning provides companies with a competitive advantage. By leveraging data to inform decisions, companies can make more informed choices based on meaningful insights and historical company and industry trends.

For Lalechos, data-driven decisions enable the company to constantly improve its procedures and strategies, allowing TMS DRY Fleet to be responsive to industry trends. This process also means opportunities for growth are identified early, offering a competitive advantage.

Likewise, Lalechos spoke on how data-driven learning has enabled them to identify and avoid risks more effectively, helping with compliance regulation and maintaining safety standards company wide.

Optimisation and machine learning

Optimisation is at the core of TMS DRY Fleet's data-driven approach. Through its analysis of large quantities of data, the company can identify patterns and trends which affect fleet performance.

Lalechos explained how "optimisation is about finding the most efficient and effective ways to do things, be it fuel consumption, maintenance scheduling, or route planning".

Machine learning is a primary example of how TMS DRY Fleet utilises emerging technologies as part of its optimisation efforts. Lalechos explained how using machine learning algorithms is helpful as they can analyse large amounts of data to reveal patterns and insights that people might miss.

Using this data can help optimise vessel processes, including, fuel consumption, route planning, and equipment maintenance. He explained how, "machine learning can continuously learn and adapt to conditions over time, improving optimisation efforts".

Whilst Lalechos believes machine learning is a helpful tool, he explained how there is still room to for improvement before it can be fully relied upon. Despite this, he stressed that "machine learning is already a valuable tool for optimisation within TMS DRY Fleet".

The move towards machine learning has allowed TMS Dry Fleet to "improve operations, efficiency, and reduce risks, without huge amounts of additional work".

Lalechos spoke on how by proactively addressing challenges through machine learning, TMS DRY Fleet can minimise

Dr Antonios V. Lalechos, Projects & Performance Manager, TMS DRY fleet

disruptions to its fleet.

Transforming the culture

Lalechos emphasised that a transition to digitalisation isn't only about adopting new technology, but also an overhaul of how the company operates.

He stated how, "integrating technology is not just about employing new tools, it's about transforming the processes and culture". With this approach, TMS DRY Fleet has moved beyond simply using more technology and embraced digitalisation across the company.

Collaboration across departments

Lalechos spoke on the challenges with departmental isolation and the need for greater integration across systems and departments. A key element of the digital transformation at TMS DRY Fleet has been the collaboration across departments.

He explained how digitalisation is a complex process, involving more than simply converting documents into digital format. It encompasses "more systems including machine learning and data collection platforms".

For example, data collection had traditionally been conducted by "a single person, like a naval architect, mechanical engineer, or a software engineer" as companies "ask them to become the performance engineer, in reality it's not a single person job".

Lalechos stressed the importance of data collection becoming a company-wide initiative to assist with the integration of technology. Unless there is full departmental collaboration on data collection, then the return on efforts diminishes.

In recent years TMS Dry Fleet has implemented IoT sensors for real-time data collection, adopted advanced analytics, and implemented machine learning algorithms. Lalechos explained how full departmental collaboration has allowed for maximum results.

For Lalechos, adopting this approach enhances efficiency, promotes collaboration, and ensures adaptability to evolving needs, optimising operations.

TMS DRY Fleet's position in the industry

For Lalechos, TMS DRY Fleet's position in the maritime industry is characterised by its proactive approach to digital transformation and its integrated technology across its operations.

Lalechos believes that its proactive approach to new technologies and change at TMS DRY Fleet position the company well for the future.

With ongoing discussions about system installations, it is hoped that their proactive approach to technology adoption will allow them to navigate evolving market demands.

Lalechos urged other companies to adopt a similar forward-thinking approach, emphasising the value in being proactive and adapting to new technologies to address market demands ahead of competitors. **DS**

"we're moving away from manual processes and moving towards digital tools and platforms that allow us to make smarter, data-driven decisions. This transformation is not just about improving efficiency, it's about changing how we operate".

How Angelicoussis Group approaches CII

At the recent Digital Ship - Vessel Performance information conference in Athens, Giannis Giannikios, an Energy Efficiency Engineer at Angelicoussis Group, delivered an overview of the Carbon Intensity Indicator (CII) optimisation in the maritime sector.

The Angelicoussis Group is a Greek shipping company which operates a large and diversified fleet, primarily in the tanker and dry bulk sectors.

The company's fleet includes crude oil tankers, LNG carriers, LPG carriers, and bulk carriers. It has a global presence with offices and operations spanning across various countries.

As the maritime industry navigates environmental regulations and sustainability goals, investments in energy-efficient technologies and operational practices are important for moving towards a greener and more sustainable future.

Giannikios argued that through the implementation of the measures he spoke on, stakeholders can effectively contribute to reducing emissions, ensuring maritime sustainability targets are met.

Understanding the challenge

Giannikios began by acknowledging that with global trade on the rise, "emissions from vessels will inevitably increase". The importance of sustainable practise is therefore elevated.

Factors such as the retirement rate of vessels, the costliness of renewable electricity, and the high prices of alternative fuels pose significant additional challenges to achieving emission reduction goals.

Giannikios spoke on how the current retirement rate of vessels is at "4% annually, with renewable electricity remaining at a high cost. It is getting lower and lower every year but it's not as cost-effective as fossil fuels yet, with alternative fuels four-to-eight-time times more expensive".

Net-zero emissions targets, combined with increasing levels of global maritime trade and the costs involved in modernising fleets make hitting sustainability targets difficult.

Regulatory goals

Since 2018, the International Maritime Organisation (IMO) has set ambitious goals to reduce greenhouse gas emissions. By 2023, a 20-30% reduction is targeted, and by 2040, a 70% reduction is aimed at.

To achieve these goals, the IMO relies on a combination of technical and operational requirements, including the CII and the Existing Ship Index (ESI).

Giannikios explained the CII as the "total CO2 emissions divided by the capacity and distance travelled the previous year", providing an annual performance rating for each vessel.

At "the end of a calendar year, data on each vessel is reported to the classification society, a performance rating is then appointed based on the environmental rating of the vessel".

Giannikios stressed the importance of maintaining high ratings to avoid corrective action plans, which are required for vessels with consistently low ratings.

Energy saving devices

Giannikios delved into various strategies for improving CII deployed at Angelicoussis Group, including optimising lubrication systems, employing wind-assisted propulsion, using energy-saving devices, and adopting alternative fuels with lower carbon emissions.

Giannikios spoke on some recent developments in technology which have generated new and innovative ways to reduce emissions.

For example, "there is a way to put ultrasonic conductors on the stand of the vessel and to produce ultrasonic waves and vibration that can mitigate the fowling of the propeller".

For Giannikios, the importance of operational adjustments to minimise emissions will be a key tactic for shipping companies in improving CII and are already being deployed by Angelicoussis Group.

Data gathering & analytics

Giannikios outlined Angelicoussis Group's approach to vessel performance monitoring and optimisation, stating how "Angelicoussis Group has an inhouse performance monitoring system which quantifies deviations in consumptions and the baseline for each vessel".

Machine learning algorithms at Angelicoussis Group are utilised to optimise sailing efficiency and select the optimum trim for vessels.

Using historical data and machine learning models, a performance monitoring and optimisation system has been developed.

Giannikios spoke on how the system ensures vessels operate at their most efficient levels. Giannikios explained how the process works, pointing towards three key performance indicators, corrected power, specific fuel oil consumption, and excess consumption.

Corrected power is monitored using torque meter values to ensure a vessel's engine is operating at its peak efficiency, making necessary corrections for weather conditions to identify any additional resistance the vessel may be facing.

Specific fuel oil consumption is measured using flow meter data from the main engine, allowing Angelicoussis to benchmark the engine's performance against the baselevel of its other vessels.

Excess consumption is a critical indicator, it reveals how much the vessel is over-consuming fuel after considering various factors such as vessel and engine age, as well as weather conditions, with "high excess consumption prompting us to take immediate action to investigate and fix the issue".

The data gathered is grouped into hourly values, which are adjusted based on weather data, ensuring that only stable periods are considered for evaluation.

The optimisation process involves analysing trends and patterns in the data to identify areas for improvement.

Giannikios used the example of the trim optimisation tool, used to "train the model using machine learning, creating a specific draft and speed correlated to fuel consumption of the specific vessel".

Continuous improvement

Continuous Improvement (CI) is another area of focus at Angelicoussis Group.

Giannikios explained how continuous improvement refers to the continuous process of identifying and implementing enhancements to vessel performance, particularly in terms of fuel efficiency and environmental impact.

It involves the constant analysis of data, monitoring of key performance indicators, and adjusting to optimise operational efficiency.

Giannikios explained how the analysis of how excess consumption correlates with CI throughout the year, enables increased understanding of the impact of various operational factors on overall vessel efficiency.

Through monitoring and optimising performance in real-time, Giannikios argued Angelicoussis Group can proactively identify and address issues, leading to cost savings and improved operational efficiency.

Correlation between excess consumption

Another important aspect of Giannikios' talk was the correlation between excess consumption and CII. Giannikios illustrated how excess consumption, if left unaddressed, can lead to a significant increase in a vessel's CII rating.

He spoke on how with continuous monitoring and corrective action, vessel operators can mitigate excess consumption and maintain favourable CII ratings.

Giannikios underlined the importance in understanding the correlation between excess consumption and CII as he believes it is crucial for the continuous improvement efforts.

Giannikios explained that it is possible to positively impact a vessels overall efficiency and maintain a high CII rating by addressing excess consumption.

Importance of investment

Giannikios emphasised the importance of investing in on-board energy efficiency measures.

The IMO has highlighted that improving energy efficiency in the world fleet requires significant investment but yields substantial fuel cost savings.

He argued that each dollar invested in onboard energy efficiency can result in significant savings in fuel production costs.

Giannikios stated how, "calculations show that an improvement in energy efficiency of the worlds fleet would require huge double digit billion-dollar energy investment on efficiency measures on vessels whilst yielding significant fuel production costs".

Continuing, he explained how an investment of $1 in onboard energy efficiency measures, would save up to $10 in fuel production costs. Meaning improving energy efficiency not only reduces fuel consumption but also lowers overall operating expenses.

For Giannikios, investing in energy efficiency is not only about reducing costs, but is also about ensuring environmental sustainability, improving competitiveness, and future-proofing our operations. **DS**

The Digital Ship Vessel Performance Info forum in Athens earlier this year

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More Info

How ESMH manages crewing

Alexandros Serpanos, Fleet Personnel Manager for Euronav Ship Management Hellas (ESMH) presented the major challenges with crewing today, and how the company recruits, trains and retains, with a focus on in-house development

Euronav Ship Management Hellas provides its services to two major clients/owners, Euronav NV and Frontline AS, and also vessels owned by smaller ship owners.

Alexandros Serpanos, Fleet Personnel Manager, has the manning supervision for fifty-nine oil tankers. He is coordinating a crewing team of twenty-eight people including staff in Athens, Belgium, France, Singapore, and Panama. He told the story of how it is done, speaking at the Tanker Operator Athens forum in April.

ESMH aims to develop senior officers and shore staff from within its crew roster, with cadets eventually becoming senior officers, a process which can take 10-12 years. This is somewhat unusual among tanker operators.

This approach requires recruiting seafarers with potential for high performance, supporting them to develop their skills, and working hard to make them want to stay with the company, so that the investment in recruiting and development is not lost. "It is a bet that we put on the people. There is a lot of investment into that," Mr Serpanos said.

Mr Serpanos took the same pathway himself. He joined the industry as a deck cadet with Ceres Hellenic Shipping Enterprises, a company which was later integrated to ESMH, eventually reaching the rank of master at the same company. He subsequently worked at Dynacom Tankers Management as marine superintendent and crew head of department, before returning to ESMH to undertake the current role.

Today ESMH has vessels under multiple flags, including Belgium, France, Greece, Liberia, Marshall Islands and Vietnam. For each flag, there is appointed a separate crew manager. Mr Serpanos' role is to co-ordinate with the crew managers and develop a uniform approach for the manning of all vessels.

Prior joining crewing operations, Mr Serpanos' had been largely involved with managing procedures. He admits to formerly believing crewing was much easier than it actually is.

Crewing absorbs 60 per cent of the vessels' operational expenses, including the cost of crew wages, insurance, traveling, provisions, and training. This also means that there needs to be a great focus on managing the costs, he said.

Major challenges

One of the biggest challenges in tanker crewing today is ensuring that the crew on a ship meet industry and customer requirements, as expressed through TMSA and SIRE.

There is also the challenge of the uncertainty of the spot market, where 90 per cent of the Company's vessels are chartered. Schedules for port calls are constantly changing. This means nine out of ten crew air tickets are amended after initially being booked, such as to bring the date forward or back one day, he said.

Another challenge is getting the balance between having too many or too few crew in its roster. The Company keeps more Seafarers in its roster than it needs at any time, to cover the risk of Seafarers choosing not to work as many months a year as the company expects, and to avoid having to recruit from the open market.

But this means that the progress seafarers make through the ranks is slower. Sometimes Seafarers leave the Company because they feel they are not being promoted fast enough, he said. Some Seafarers do not get as many months of work every year as they would like.

Crewing steps

The crewing process has twenty-five steps, most of them put in place to meet charterer (OCIMF) requirements, he said.

Seafarers initially make an online application. Seafarers can apply for employment through the ESMH crewing software platform from any country. They are then asked to complete a rank-specific competency test and a personality test. Then there is the interview process.

Documentation is checked, to see if there are any further training courses the Seafarer needs to complete. The seafarer needs to do a pre-employment examination. He or she must be familiar with the company safety management system and other tools. Online courses are available to support this.

The next stage is the briefing process, Pre-Employment Medical Examinations, D&A testing, signing a contract of employment, and finally receiving the air tickets.

ESMH uses a software platform called Compas, now owned by Ocean Technologies Group, to liaise with crewmembers. With this platform, the Seafarer can install an app on their mobile phone or computer. This app can be used to declare next availability date for employment, see information about the next assignment, receive air tickets, communicate with Euronav staff, and access own evaluation reports and payroll data.

Training and promotion

ESMH's training team has a "training matrix" showing the training each seafarer should complete, with courses required by regulations (STCW), the industry (SIRE/TMSA) and the company.

When seafarers request a promotion, they are asked to complete an online competency assessment for the desired rank. They also complete another personality test and a set of interviews.

In addition, candidates for Master's position undertake a Bridge Simulator Assessment, often in a training centre in Athens, under the observation of an ESMH Marine Superintendent. The candidate Master is assessed under particularly difficult scenarios, such as transiting the Suez Canal, Singapore Strait, or the English Channel. Following the assessment, the decision can be to accept the candidate, or accept the candidate subject to further training.

Offers to Crew

ESMH seeks to provide its crew roster a "well-structured, well-mapped offer," to encourage them to stay with the company and not be tempted away by competitors.

ESMH wants crew to have a "clear understanding of how we operate and what is to be expected by having a career onboard our ships," he said.

Seafarers' wages are benchmarked per rank against the average of the industry, by Spinnaker Global and adjusted every year in order to remain at the upper quartile of the market's average.

Seafarers' payroll process is done electronically and can be accessed using a VISA physical card. Monthly wages are paid within the first week of the following

Alexandros Serpanos,
Fleet Personnel Manager,
Euronav Ship Management Hellas

Tanker Operator Athens audience

month. Seafarers often report that being paid on time, is more important than the actual amount, Mr Serpanos said.

Senior officers receive a "seniority allowance," and an annual bonus based on last year's personal performance.

ESMH offers senior officers the option of shore assignment in its office, so they can better understand how ship management works. This helps prepare them for the next step, working in the office, if they wish to do so.

Employment contracts duration is 3-4 months for officers and 6 months for ratings. ESMH considers the short employment contracts "one of the most important physical well-being initiatives for our Seafarers." The top-4 officers are also able to invite their spouses to sail with them.

ESMH utilizes the services of three different catering providers for the provisions required for the Seafarers and provides bottled mineral water free of charge.

ESMH allocates a monthly $200 welfare budget. Seafarers form an onboard committee to decide how it should be spent. Some ships opt for karaoke systems, others have bought gaming equipment.

ESMH utilizes an onboard software platform for keeping records of work and rest hours. If planned working hours are exceeded, extra compensatory rest time is provided.

Accommodation items on vessels, such as sheets and mattresses, are assessed and if needed replaced every five years.

Seafarers have internet access onboard.

Almost half of ESMH vessels have Starlink as primary communication system and VSAT as backup. "Feedback is very positive," he said.

Seafarers have an internet allowance of 9 GB per month per person, and no limits to text messages sent via WhatsApp.

The high-speed satellite communications are used to integrate vessels' top four officers to company's management review meetings via video call. "It is very impressive how in the last 10 years the [communications] technology has progressed, being able to have live connection with the management team onboard," he said.

ESMH offers crews physical and mental wellbeing support. Counselling services are available to support mental health issues, either via the vessels' master or directly. In public areas of the ship and in the company's quarterly magazine, the seafarers can find contacts to access the support directly.

Crew do not necessarily need to mention any concerns to other crewmembers. Discussions are confidential, unless the specialized counsellor has concerns about self-harm, and will advise the company that the seafarer should be relieved at the next port.

ESMH organizes annual seafarers' conferences/safety seminars in different areas of the world, with a focus on safety. In addition, a Senior Officers Conference is organized in Athens every two years, for the top-4 officers ranks, which is more for people to get to know each other.

ESMH retention rate for 2023 was 94 per cent both for ratings and for the top-4 officers ranks. "We believe this is proof our strategy works," he said.

ESMH also has one of the highest percentage of female Seafarers in the industry, at over 2 per cent of its crew roster for 2023, he said.

Why develop internally

Mr Serpanos was asked how the extra cost of developing crew internally is justified in a business sense, or are company's senior management so sure that it is a better option they do not need convincing?

"The argument is that when you have Seafarers with loyalty you can expect a better performance on safety and quality. This is not directly measurable, but through the company's KPIs," he replied.

It can typically take 2-3 months for a new hire to adapt to the company culture, he said. Although after this period, there is no significant difference between a new hire and someone who has been with the company for a long period.

Nationalities

ESMH has a crew roster from over thirty different nationalities. Approximate 50 per cent of the ratings are Filipino. There are also a few ratings from Honduras and El Salvador. The officers' major nationalities are Belgian, French, Greek, Panamanian, Ukrainian, Russian, Bulgarian, Romanian, Indian, Pakistani, and Filipino.

There is no indication in any of the crew

evaluations that any nationality is better than any other. "We don't care about the nationality, we care about the competency," he said.

The company still avoids placing Ukrainian and Russian together onboard the same vessel, he said.

In the few cases where there are personal frictions between seafarers, it is usually observed between the same nationality, perhaps because they bring cultural issues from their home countries onboard, he said.

Crewmembers typically talk to each other onboard in English, as the "official working language."

Too much time online?

Mr Serpanos was asked if there was any negative impact of providing crew with better communications, such as people spending less time socialising with other crewmembers, a temptation to use social media while working, or being concerned by events happening at home, which previously they would not have known about.

Mr Serpanos replied that people may be spending more time in their cabins now, and it may affect team building. The company aims to have at least one social event every week on each ship, to encourage people out of their cabins.

Onboard the internet wi-fi connectivity is not provided on the Bridge, the Engine Control Room, and the Cargo Control Room, to prevent the risk that staff being distracted by home communications or social media, he said. **DS**

Challenges with training and how to solve them

Crew training is often not given enough priority, the quality can be poor. It does not help that training schedules are impractically big. Konstantinos Agas explained how the industry could do better.

Everybody says training is "one of the top three issues we need to tackle onboard." But when it comes to actual operational practise, it can easily be forgotten amid commercial pressures, said Konstantinos Agas, training manager and "instructional designer" at Dynacom Tankers, Sea Traders and Dynagas.

These three companies are all owned by George Prokopiou, and operate tankers, LNG, and dry bulk vessels.

Training costs money and does not generate any direct revenues. It is very hard to calculate the return on investment in training. "If someone tells you they can do that, most probably they are mistaken," he said.

Unfortunately, the best way to see the value of training is when we identify what happens when it is not planned and conducted properly, he said. But that is not something you want to see happening.

Training can be defined as activities which enable crew members to develop the required capability. It includes knowledge, skills, and attitude.

Technical skills are easy to identify, such as for an engineer to have the skills to do maintenance on an engine. "If you don't have it, you are forced to develop it or get out of the industry," he said.

Harder to identify are non-technical skills such as having situational awareness, being able to manage workload, and being able to deal with problems. Then there are the so-called 'soft' or people skills, such as communication, leadership, the ability to lead and be led by others, management.

When organising training, more attention is usually given to technical skills, and not enough to the soft skills, he said.

Onboard vessels, crew are expected to do practical training, such as abandon ship drills, firefighting, how to use equipment. They are expected to do theoretical training, such as about the human element, mental wellbeing, and soft skills.

Training onboard can only be provided by other seafarers, and most seafarers are not professional educators. They can be sent on "train the trainer courses" but this does not necessarily make them educators, he said.

Can we do it all?

Is it practical for seafarers to do all the training expected of them?

A shipping company typically creates a training schedule covering the whole year.

According to most training matrices, crew members are expected to do training for approximately one hour every working day, Mr Agas calculates.

Consider that any safety drill, such as for firefighting, can take an hour to conduct. Similarly practical and theoretical training sessions typically last approximately 45 minutes. The full training schedule can add up to more than 20 hours of training per month, or more than one hour of training in each working day.

"Is it feasible to do more than 1 hour training per working day? Not really," he said.

This is happening because we have a lot of training requirements from different sources. Some training requirements come from customers (charterers) and regulators. Other come from the internal training program, which includes customised training based on serious near misses or accidents. There may also be video / online courses crewmembers are expected to work through.

One way to make it manageable is to allow theoretical training to be done while crew are at home.

"We put out a cybersecurity session, and we had two hundred people joining in [from home]. We did a Behavioural Competency Assessment course and had seventy people joining in. You would be surprised how many people would prefer to do this at home at their own pace instead of doing all of this onboard."

For people to be motivated to do training during their time at home, it is important to see it as useful, he said.

How good is your training?

The focus by outside assessors, such as oil company auditors, is typically on the number of topics being covered, not the actual quality of the training, he said.

They usually request to see a training "matrix" showing the topics crew are being trained on, but they rarely ask to see the actual training material.

An audit of training is of course a moment of tension for the company training manager. "I am always afraid they will say, 'very good, but how are you conducting the training. And how can you fit all these topics in their daily routine?' [But] no-one asks about this," he said.

"In most cases, the training department audit is completed in 30 minutes."

"A complicated training matrix full of topics is useful to show to the auditors, but not so beneficial for the actual seafarers," he said.

In a comment on this, Patrick Joseph, a maritime consultant, and former oil company head of vetting, noted that SIRE 2.0 is aiming to assess the results of training.

Doing good training

Many shipping company training managers are appointed based on their backgrounds as seafarers, not their competency as educators. At smaller shipping companies, training is provided by the crewing or safety departments.

Shipping people often wrongly perceive that someone who can do something well is automatically good at training others, he said.

Good trainers know how to make training interesting. "There is nothing worse for crew members than to put them through a procedure they consider boring," he said.

Consider what would be necessary for crewmembers to learn from an incident which happened on another ship, such as a failure of a filter.

Typically, companies send a communication to all vessels about the incident, which might get read. This is better than nothing, "but it's not exactly a training session," he said.

A training session requires having learning objectives training materials and training activities, something which people onboard often do not have time or inclination to create by themselves.

Maritime companies should put big effort into creating training material, including ensuring company lessons learnt about safety incidents, he said.

Also, any "Train the trainers" program, should include practical "microteaching" (mini lessons) sessions for the participants to conduct. Furthermore, on board trainers should be supported from the company by providing training objectives, and lesson plans (specific instructions on how to conduct the training).

"We don't expect people to do the training on their own," he said.

Better practical training

For the practical training, which has to be done onboard, it should be structured to provide the maximum benefit, so people feel that it is a worthwhile use of time.

Briefing and de-briefing is very important, so people know what they are going to do in the actual drill, and afterwards they know what went wrong and right.

Drills should simulate reality as much as possible. It would be easy to do a fire drill with an empty hose. "Get the hose connected to the fire main then we'll see

Konstantinos Agas, training manager and instructional designer at Dynacom Tankers, Sea Traders and Dynagas

how difficult it is," he said.

Many things happen at once during a drill. Mr Agas recommends asking one crewmember to make a simple video recording, which everybody watches afterwards, so they understand what was actually happening.

It is not always obvious what is important to rehearse in a drill. Mr Agas learned this in a former role as chief engineer on a Hellenic Navy vessel which was powered by steam. He could see that one of the biggest risks was a loss of air pressure into the engine. So, Mr Agas designed drills so people could practise what they would do if this happened.

"The first three or four drills were a disaster, we couldn't do it," he said. "Afterwards we got better."

Near miss reporting

It is important to foster an organisational culture of training, where everybody understands that learning is important.

This training culture will mean that people are far more willing to report genuine near misses and know they will not be punished for doing so, he said.

Near miss reporting is important for safety because serious accidents sometimes follow many near misses. From the lack of reporting of near misses, "We're missing a lot of opportunity to learn from these incidents," he said.

But crewmembers can be reluctant to report near misses because it may mean telling others what they have done wrong. When asked to do it, crewmembers often report relatively safe near misses, such as that they left the stove in the galley switched on.

"Most of the near miss reporting we get is not realistic. It is not real problems."

Just asking people to report more near-misses does not help, because you can get more reports of near misses which people feel safe declaring.

"In order for training to be effective, companies need to create a training-oriented organization," he concluded. "This presupposes trust between trainers and trainees, interaction, and proper scheduling of training sessions in times that are convenient for the crew members. **DS**

Coffee break at the Tanker Operator Athens conference

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Martin Shaw on autonomy, decarbonisation, and crew

IMarEST president Martin Shaw shared perspectives on why most tanker companies are not looking at autonomous vessels, the risks, and economics of decarbonisation, and why the term human element is misunderstood

The past few years have been very difficult for tanker operators, with Covid, challenges with Ukrainian and Russian seafarers. Now we have the threat of vessel attacks in the Red Sea and Strait of Hormuz, while decarbonisation requirements grow, said Martin Shaw, president of the Institute of Marine Engineering, Science and Technology (IMarEST), speaking at the Tanker Operator Athens forum on Apr 16.

Amid all of these difficult issues, some areas of the shipping industry continue to pursue the idea of autonomous ships, even though there is no sign any long-haul tanker company looking at them, he said.

Autonomous, uncrewed, ships are useful in warfare where you reduce the exposure of humans, useful for ocean research, where a vessel can spend months at sea doing a careful survey. These scenarios work operationally, on a prepare-deploy-operate-recover maintain cycle. Substantial maintenance and overhaul is needed between deployments

Tankers which are generally 'tramp' traders, in comparison, keep continuously moving around the world, with crew living onboard. The bulk of onboard effort from departing port to arrival at the next is maintenance and to build all that maintenance into a port visit using local contractors is a risk.

Most tankers, other than LNG and some shuttles are 'tramp' ships so a wide port network would be required to support this. So, autonomy is unlikely in the short term. And with the risks lower than for naval ships, and the length of voyages shorter than for research ships, the value to autonomy is less.

"To me, marine uncrewed autonomous ships are not something we need to spend too much time on at the moment on long haul tramp shipping," he said.

"Maybe it will be influencing the next generation of ships but probably not fitted to your current ships," he said.

Yet there continues to be much discussion in IMO about it, despite it being far from the most important issue in shipping, he said. IMO might be better focussing its attention on matters which really impact seafarer safety, such as time pressure.

The big changes in ship automation probably happened in the 1960s to the 1980s, when a typical vessel crew reduced from 50-60 people to 20. It will be very hard for any automation to reduce crewing further on international ships like tankers. Saying otherwise "shows ignorance about ship operations," he said. "Reducing the number is not a sensible objective from a maintenance point of view."

Meanwhile, Mr Shaw has observed that many suppliers of autonomous ship technology are now focussing on their products being designed to help the people onboard rather than replace them. To be truly helpful it is essential that technology is robust and properly tested, and people are trained to use it, he said.

And the more autonomous this equipment becomes, the more the manufacturer of the equipment needs to take responsibility for any problems it causes, he said.

It is possible for faults in automation systems to be hidden for some time, as may have been seen with Boeing 737 Max automation problems.

Any fault is compounded by the fact that the user may not have experience of operating the equipment with the automation not being there.

"What we need is better automation and automation which is better integrated," he said.

Decarbonisation

There is no doubt that the biggest issue facing the planet is climate change, even with all the issues mentioned above, Mr Shaw said. There is a need for everyone ashore and afloat to buy into this. It is important that we face the issues and deal with them. IMO has been talking about having a greater ambition on climate change.

But we should be wary of the fact that the people creating the regulations are not necessarily the people who have to deliver these ambitious goals.

Martin Shaw, president of IMarEST, at the Tanker Operator Athens conference

Someone is going to have to design build and pay for this equipment and for the supply chain required to support them," Mr Shaw said. "At the end of the day it is them that will be held responsible for ambition not being met."

Shipowners recognise that if they buy a low carbon ship today, they will be buying the first generation of the technology, and like the first generation of any other technology, it may not be as good or robust as what follows, he said.

This was seen with the first generation of scrubbers, he said.

Mr Shaw supports the green corridors concept, which he defines as taking 'narrow strips of sea' and putting decarbonisation infrastructure and dedicated ships on it, such as vessels running on ammonia fuel. Over time, the corridors get bigger and eventually join up.

This is a pragmatic solution and illustrates the importance of a step-by-step approach, he said. More and more green corridors will generate more and more infrastructure that spot ships may 'piggyback' on.

But until that happens, it could only work for scheduled shipping services, such as in containers. It does not help tanker owners very much, with vessels going anywhere in the world at short notice. "It is probably not going to change the tanker business immediately other than when aiming to reduce fuel consumption which a lot of owners are working on," he said.

Are green corridors resilient? For example, if you are using a green corridor through the Red Sea, and it is suddenly closed off, you need to re-route vessels around South Africa, where the supplies of low carbon fuel may not be available, he said.

None of this is to say that climate change is not the biggest issue facing the shipping industry and one that needs to be acted on rapidly, he stressed. But you can only progress this when you fully understand the issues.

Ultimately decarbonisation is a cost of staying in business. So, it is something shipowners need to plan for, rather than calculate whether specific investments give them a return, he said.

So perhaps we should not be trying to calculate the return on investment of decarbonisation, but rather recognising that it will be a requirement if they wish to continue in business, he said. We see this ashore where governments often suggest that low carbon will be cheaper. We need to accept that it will cost huge sums of money that will not be justified by conventional economics.

For example, an owner justifies a ship based on residual value often with an assume 18-year write-down to scrap value or a sale price for an earlier sale for trading. Conventional ships built today may not have 18 years of operational life or a resale value for further trading as we near 2050.

To mitigate the risks of shortages of new fuels, vessels will probably be dual fuel for some time to come, just as a century ago we had ships with both sails and steam engines powered by coal. This will continue "until you can go to any port and have hydrogen, LNG or ammonia," he said.

Methanol dual fuel is popular because it is one of the easiest fuels to convert to, he said. It means a shipping company can be ready for the future without having to do any major change.

Mr Shaw also has concerns that the speed of change required to meet 2030 targets could lead to risks. To illustrate the risks, he noted that ammonia has been considered too dangerous in the past to use as a refrigerant in refrigeration plants onboard ships. Now companies are planning to use it as a fuel.

Developing crew

On the question of whether to train your own crew up the ranks or recruit on the market, Mr Shaw noted that the direct

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costs associated with both options, training, and recruiting, can be quantified.

Then there are less quantifiable costs to recruiting new crew each time, such as the time it takes a person to develop and understand company safety culture.

There are less quantifiable benefits from developing your own crew, such as the improvement in safety from having crew who know the ships and the company.

Defining 'human element'

Mr Shaw defines 'human element' in shipping as the interface between the human and the ship and how it works to improve safety.

Procedures are an important part of the human element because they define how people should work with the ship.

Some take a broader definition of the term, saying that it includes issues such as gender diversity and seafarer welfare, he said.

While we can all agree gender diversity and seafarer welfare are important, these issues need to be identified and actioned in their own right not lost under another heading, he said.

IMarEST

Mr Shaw has been a member of IMarEST for 52 years, and at the time of the event was completing his year as president. "IMarEST has been a central part of my education. My career has grown out of it," he said.

IMarEST was originally founded in 1889 with one of its goals as "improving the social standing for engineers". Today it has branches in maritime centres around the world, including Athens, Cyprus, Singapore, and Hong Kong.

IMarEST has published some very useful technical papers over the years. Mr Shaw cited a paper written by Shell engineers in 1970 about how to remove sulphur from ship exhaust gas with a scrubber. It described problems which might be encountered such as formation of sulphuric acid, and materials which might be most suitable. Some of this knowledge has been discovered a second time in recent years, from engineers who had not known of the paper, he said.

IMarEST has also done much work to raise awareness on important topics relating to seafarer safety, including challenges of time pressure, distraction on bridges, and risks of enclosed spaces. It has supported IMO to develop new regulations.

IMarEST is considering developing a "chartered superintendent" qualification, which seafarers can train for, to prepare for work in the office. The training could be provided through distance learning. **DS**

You can watch videos and slides from Tanker Operator Athens at https://www.tankeroperator.com/ath2024.aspx

Perspectives on SIRE 2.0

Gregory Spourdalakis, managing director of CSM Greece; Nikolaos Katechos, Vetting/Marine Manager, Samos Steamship; and Patrick Joseph of Uirtus Marine Services shared perspectives on SIRE 2.0 at Tanker Operator Athens forum

The Phase 3 roll-out of SIRE 2.0, the Ship Inspection Report programme from the Oil Companies International Marine Forum (OCIMF), started in January 2024. In this phase, all tanker companies can do full trial inspections, but the reports are not available to OCIMF members to screen vessels for charter.

It follows Phase 2, starting in August 2023, with trial inspections for invited parties only, and a Phase 1, with initial testing of the system. Phase 4, now expected to start in Q3 of 2024, is where the reports will be used to screen vessels, so there will be commercial implications to the outcome. SIRE inspections under VIQ 7 will be terminated at this time.

At the Tanker Operator Athens forum in April, Gregory Spourdalakis, managing director of Columbia Ship Management Greece, and Captain Nikolaos Katechos, Vetting/Marine Manager, Samos Steamship, shared their perspectives on SIRE 2.0, based on what they have seen so far.

Captain Patrick Joseph of Uirtus Marine Services, an independent consultant, and former head of vetting and operational compliance for an oil major, also shared perspectives.

Why SIRE 2.0 is better

Patrick Joseph, an independent consultant with Uirtus Marine Services Ltd, and former global vetting and clearance manager with an oil major, stated that he had been chair of OCIMF's General Purpose Committee in 2017 which had made the decision to replace SIRE.

"That decision was taken because of many things going on in industry, and there was no indication of improvements in the tanker industry.," he said.

Today, Capt. Joseph provides support for tanker operators in transitioning to SIRE 2.0 as a consultant. "I have given a lot of time and effort to help tanker operators understand the various components of SIRE 2.0," he said.

A benefit of SIRE 2.0 to tanker operators is that it should provide them with better understanding about their own vessels. Many tanker operators could perform better if they have a better understanding of how their own ships are operated, he said.

The granular details entered into reports, such as "subject of concern,"

Patrick Joseph, independent consultant with Uirtus Marine Services

"nature of concern," give companies a much better sense of where they really are, and helps companies better choose which areas to focus on as part of their continuous improvement initiatives.

These were all factors considered when deciding to upgrade the SIRE system, he said.

Mr Joseph added that a large amount of work went into designing SIRE 2.0, including writing questions, providing material for inspectors, and training inspectors. It is still new for many inspectors.

"We shouldn't get distracted from the main purpose of SIRE 2.0, to help tanker operators understand what is happening onboard vs what they think is happening on board," he said. "So, [having] much more granular detail helps you [the tanker operator]."

CSM's Mr Spourdalakis agreed. There are benefits from staff being better at their jobs, as well as from having a better inspection, he said.

Martin Shaw of IMAREST noted that

the rigid structure of an inspection should help keep the focus on the highest risk matters.

In the early days of SIRE, inspections typically started with a tour around accommodation. Consequently, and many SIRE reports began by noting issues seen in the accommodation.

Many reports noted issues which did not affect risk in a meaningful way. As an oil company vetting manager, "I got tired of talking to shipowners about cockroaches in the galley and bubbles in the magnetic compass," he said. "I thought, 'that's not important.'"

At the oil major, Mr Shaw introduced a scheme where observations were given a risk ranking, with cockroaches ranked as low risk. "Cockroaches are your pets, you can deal with them yourself," he joked.

Mr Shaw also noted that SIRE 2.0 seeks to bring the human element into the screening process. Until now, the only 'people' issues addressed were training.

Tanker operators should use SIRE 2.0 to

The SIRE 2.0 discussion panel. Dimitris Lyras, Lyras Shipping / Ulysses Systems; Capt Nikolaos Katechos, Samos Steamship; Gregory Spourdalakis of CSM Greece

Maritime organizations moving towards enhanced cybersecurity maturity

Some organizations in the maritime sector are already aware of the need to protect against cyber-attacks, whose frequency is steadily increasing. Various companies that suffered during security breaches can serve as a model for developing robust cybersecurity policies and programs now.

Like the entire economy, the maritime sector is heading toward complete digitization, which comes with new threats. The convergence of IT and OT systems, along with the combination of Industrial Internet of Things (IIoT) devices and industrial control systems (ICS), exposes maritime organizations to the risk of cyber-attacks. Broadband satellite connectivity also expands the capabilities of cyber criminals, making it easier for them to infiltrate into systems to seek out existing gaps.

The consequences of a successful cyber-attack on the maritime industry can be catastrophic, ranging from endangering human life and environmental damage to financial losses and a tarnished reputation that is difficult to rebuild. According to the CyberOwl and HFW report (Shifting tides, rising ransoms, and crucial decisions, progress on maritime cyber risk management maturity), the average cost of a single security breach in a maritime organization in 2020-2022 was in the region of USD 550,000 and the average ransom for ransomware attacks was USD 3.2 million.

Any organization can experience an attack

For several years, the problem of cyber-attacks in the maritime sector has been growing. The cited CyberOwl and HFW report states that their number grew by 200% in 2022 compared to 2020. A typical fleet of 30 cargo ships experiences an average of 80 incidents per year, and an average incident affecting a ship's system lasts about 57 days.

Attacks as the most common incentive to build a cyber protection system

Over the past few years, the maritime industry has made significant progress towards improving its cyber risk management and increasing threat awareness. It is often that appropriate safeguards were implemented after cyber-attacks that adversely affected the operation of maritime organizations.

Therefore, we recommend launching the process designed to boost the organization's cybersecurity maturity as soon as possible and not after the organization has experienced a security breach. Let's draw on the experience of others who have already paid a much higher price than the potential investments that need to be made.

Cybersecurity as a priority in the sector

Security policies must cover IT, OT and older port and onboard systems, as well as secure communication with third parties. According to DNV Maritime Cyber Priority 2023, ensuring safer supply chains is not easy. To make it happen, operators must carefully verify the compliance of their suppliers' cybersecurity requirements during the purchase, installation, and operation of equipment, systems, and software.

The maritime industry should use regulations and standards as a basis for further improving safety, security and adapting itself to a changing threat landscape. As the International Maritime Organization (IMO) clearly stated, cybersecurity should be a top priority for the entire maritime sector. With this in mind, the IMO has supplemented the International Safety Management Code with new cyber security rules that detail risk management requirements.

On the other hand, E26 and E27, which are standardized requirements developed by the International Association for Classification Societies (IACS), apply to all new ships from 2024 onward. E26 provides guidelines for the secure integration of OT and IT equipment with ship networks throughout their life cycles, i.e., from the design and construction stage to operation. They emphasize digital resilience viewed from the identification, protection, attack detection, response, and data recovery aspects. As for E27, it focuses on improving the integrity of onboard equipment and systems provided by third-party vendors.

Building proper protection is not a one-off project, but a continuous process. It involves coordinated, long-term actions that need to account for changes in both the threat landscape and security systems. Only 36% of maritime professionals believe that complying with cybersecurity regulations is easy and 44% report a lack of required technical knowledge in their organizations. Therefore, it is worth seeking expert assistance in the field to assess risk and build a secure digital environment.

EY Maritime Cybersecurity Team

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Ernst & Young sp. z o.o. Consulting sp. k.

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find better ways to run their ships, rather than working on getting a better inspection 'result', he said.

More 'observations'

Gregory Spourdalakis of CSM Greece has concerns that a SIRE 2.0 inspection generates far more negative 'observations' than in the previous version of SIRE, as the inspector looks at many aspects of vessel operations in more depth.

With the original version of SIRE there might typically be between 1 and 3 'observations' in a typical inspection, he said. He has heard that in twenty-five trial SIRE 2.0 inspections by multiple companies, there were 194 negative observations and fifteen positive ones. So about eight per inspection.

While this will be fine when SIRE 2.0 is fully underway, since both good and bad vessels will see more observations, it is a concern for tanker operators when SIRE 2.0 starts, because a vessel inspected under SIRE 2.0 may be compared to a vessel inspected under the original version of SIRE.

Oil company staff may see a vessel has gone from two observations with the original system to 10 or 12 now, and then declare that the vessel is not good enough.

Capt Nikolaos Katechos, Vetting/ Marine Manager, Samos Steamship said he had also seen that the "observations increased dramatically," three times more than under the original SIRE system.

Most observations related to human element issues, he said.

Also, a single issue, such as seeing drops of oil on a pump, can lead to three separate observations. A problem with the pump itself, the procedure for fixing defective equipment, and how people deal with the issue.

Captain Katechos was also concerned that if the screening department of an oil company suddenly see the number of observations triple, they may believe the vessel is substandard, rather than recognise that the new SIRE generated about three times more observations, he said.

However, Martin Shaw, president of IMAREST, and a former oil company vetting manager, said he thought it was very unlikely that the additional information generated by the SIRE 2.0 inspection will

Capt Nikolaos Katechos of Samos Steamship

affect the ultimate screening decision.

The new information may give more insight about areas where management could be improved, rather than information showing a vessel is unsuitable for charter, he said. "My assumption is that oil companies will be showing some pragmatism."

And whatever happens, oil companies will still need tankers, he said, they are just seeking better ways to assess the risks of them. However, oil companies have not yet shared much about how they will deal with the observations, he added.

Patrick Joseph of Uirtus Marine noted that one of the reasons for the additional detail in SIRE 2.0 was specifically to stop oil companies simply counting the number of observations to make their assessment of a ship, as some companies do with the current SIRE system.

"OCIMF has mentioned at various conferences that they recommend that their members do not use the number of observations as a criteria for screening tankers,' he said. Each OCIMF member has a unique screening process that they do not necessarily divulge, and it is not productive for tanker operators to spend resources in attempting to understand each of these screening process.

Workload for inspections

The trial inspections took 9-10 hours onboard the vessel compared to an initial estimate of 8 hours, Mr Spourdalakis said. The work uploading photos and certificates is additional.

The additional number of observations adds to the workload, because shipping company management need to address each one, following up on them and stating what it is doing to resolve them, he said.

CSM has been training masters, chief engineers and second engineers in advance of inspections. For its fourth trial inspection, it will also train oilers and other more junior staff.

Capt Nikolaos Katechos of Samos Steamship said that the company did one trial SIRE inspection in phase 1 and has done two trials in phase 3. These inspections took 8-12 hours.

Patrick Joseph noted that SIRE guidance is that when inspectors are experienced with the system, an inspection should not take more than 8 hours.

Photographs

Tanker operators are required to submit photographs of different elements of the ship before the inspection. There is no fixed rule about when new photographs need to be taken, only a note that new photographs should be made whenever something has changed.

Captain Katechos noted that it is very hard to assess seaworthiness from a photograph.

Captain Patrick Joseph of Uirtus Marine explained the reasoning behind the use of photographs in SIRE 2.0. In the current version of SIRE, the condition of a vessel was only described in subjective written comments from an inspector. This would often lead to extensive argument between inspector and tanker operator about whether the hull had "hard rust" or "pitting," for example.

Now, the inspector takes a photograph to pass to the oil company screening department, who can make their decision based on that. No written comment from the inspector about the cosmetic condition is required, and therefore prevents further discussion with the tanker operator.

From an oil company perspective, the importance of cosmetic condition depends on where the vessel is trading. "Cosmetic conditions are the least of your worries in when operating in West Africa, but for Long Beach (California), this is something they may consider as part of their screening," he said.

Photographs can also indicate more than a written comment. If a water purifier is dripping, the ship crew may say it is because they forgot to tighten the valve. But the photo evidence can show that the purifier is actually leaking.

For the age of photographs, the guidance is that photos should be no longer than 6 months old.,

Screening criteria

Shipping companies would prefer to have a clearer idea of the impact of the multiple observations that have appeared so far during SIRE 2.0 inspections, CSM's Mr Spourdalakis said. They would like an understanding of how charterers will use them to weigh the decision to accept the vessel. They need to know what is most important.

Uirtus Marine's Patrick Joseph replied

that OCIMF does not itself determine how the data should be used to screen vessels, individual companies do this. It follows that it will never be standardised.

Procedures too long

Nikolaos Katechos of Samos Steamship said that in the past years many oil companies have been encouraging tanker operators to reduce the number of pages in safety management systems and simplify them. But SIRE 2.0 may push things in the other direction, encouraging companies to make their procedures longer.

"We are very good at adding paragraphs to the procedures. We are not very good at taking paragraphs out of the procedures," added Konstantinos Agas of Dynacom. "That's how we end up with 10,000 pages."

Dimitris Lyras, event chair, added that some company procedures are long because they have added more pages every time they were asked to by an inspector. But more pages of procedures may be unlikely to impact safety since they may not even be read.

Mr Shaw added that many company procedures are designed to help a company defend itself in court, rather than as something to use onboard.

Inspection technology

One new issue with SIRE 2.0 is that the inspection is closely guided by instructions on the inspector's tablet computer.

The inspector takes a specific route around the ship, guided by the tablet, including the deck, engine and bridge, Mr Spourdalakis said.

One audience delegate recalled a time in a trial inspection when an inspector was asking a question to the cook in the galley. The cook assumed they would need to find something which had been required in inspections under the first version of SIRE. The inspector had replied, 'no need, it is not asking this on the tablet.'

There is also a need to have a wi-fi printer onboard which the tablet can connect to.

Are we ready?
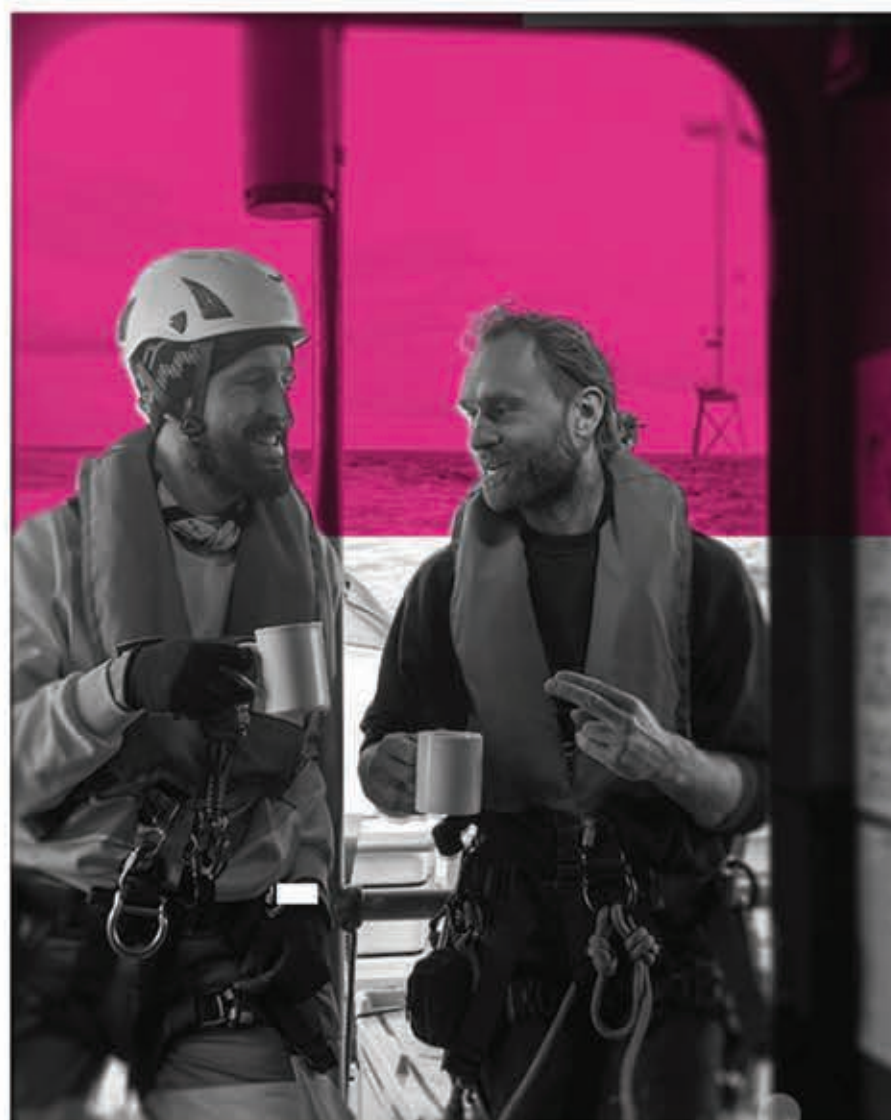
"The million-dollar question is, is the industry ready for SIRE 2.0," said Captain Katechos of Samos Steamship. The answer today is no, he said. But the industry might never be ready for it. **DS**

Lunch on the rooftop bar after the Tanker Operator Athens forum

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Wärtsilä Marine Business and new fuels

Ship power/engine company Wärtsilä explained what they are doing with hydrogen, ammonia, digitisation & other areas of ship decarbonisation

Wärtsilä has a commitment to developing environmentally friendly technologies, such as hybrid propulsion systems, exhaust gas cleaning systems, and solutions for alternative fuels like LNG and hydrogen.

One of the cornerstones of Wärtsilä's efforts lies in advancing engine technology to embrace cleaner and more sustainable fuel options which includes providing more flexible fuelling solutions that meet the needs of customers now and in future.

We also announced that, in addition to our existing Wärtsilä 32 Methanol engine, launched in September 2022, we are expanding our methanol product portfolio to include four additional engines.

We signed a strategic partnership agreement for Decarbonisation Modelling with Raízen, a major Brazilian energy company committed to supporting the sector's decarbonisation.

The aim of the agreement is to build and implement a fleet-wider decarbonisation plan with a particular interest in the future marine introduction of ethanol as a marine fuel.

Hydrogen

Hydrogen blending with natural gas in engine power plants represents a transitional step towards decarbonisation, leveraging the cleaner burning properties of hydrogen while maintaining the infrastructure compatibility of natural gas.

It allows for immediate emissions reductions without requiring extensive modifications to existing vessels or infrastructure. By blending hydrogen with natural gas, ship operators can reduce emissions while leveraging existing onboard and onshore infrastructure.

This scalability allows for gradual adoption and experimentation with varying hydrogen concentrations, enabling ship operators to optimise fuel blends based on

their specific operational requirements and constraints.

When talking about future fuels in maritime, it is important to talk about the space needed onboard a ship. Space on a ship is always optimised for maximum cargo or passengers.

The challenge with hydrogen is that, compared to traditional fuels, it requires close to 20 times more space for storage, making it less practical for vessels with limited onboard space or stringent cargo capacity requirements. The use of hydrogen could pose logistical challenges, limit operational flexibility, and impact vessel design.

Comparatively, methanol blending requires two times more space compared to existing fuels, and for ammonia, it is almost four times.

This is still an acceptable compromise to decarbonise shipping. For this reason, we do not envision hydrogen blending specifically playing a central role in the industry's wider decarbonisation efforts.

Ammonia

Last year, we introduced the marine sector's first commercially available 4-stroke engine-based solution for ammonia fuel.

The main objective of the Ammonia 2-4 project is to advance viable concepts for marine engines running on ammonia fuel. This aligns with Wärtsilä Marine's long-term decarbonisation strategy, which is rooted in driving flexibility in maritime.

Investigating the large-scale application to maritime operations will be key. One of the objectives of the Ammonia 2-4 project is to develop lab-based demonstrators for both two-stroke and four-stroke marine engines capable of running on ammonia as the main fuel.

By leveraging the expertise and collaboration of a powerful consortium comprising Wärtsilä, naval architects C-Job, classification society DNV, ship owner MSC and

Roger Holm, President, Wärtsilä Marine

the National Research Council (CNR) of Italy, this project aims to address the technological, commercial, and regulatory question marks surrounding the use of ammonia as a marine fuel.

The project's outcomes are expected to include advancements in the fuel handling of ammonia, safety strategies and contributing inputs towards a regulatory standard. It represents a unique opportunity to accelerate the development of sustainable solutions.

Portlink Global

At Wärtsilä Marine, our strategy is to shape the decarbonisation of marine. We are focused on driving the end-to-end optimisation of vessel and fleet operations. Our acquisition of PortLink Global in 2022 is enabling this end-to-end optimisation via optimising port operations and connecting vessels and ports.

As part of the acquisition, we have a broad range of solutions which can enhance port efficiency and safety through advanced digital port management.

This includes Port Management Information Systems (PMIS), Port Community Systems (PCS), Pilotage Dispatch systems and Local Port Services (LPS).

Through our Fleet Optimisation and Port Optimisation solutions our customers can optimise their vessel and fleet operations through intelligent voyage planning, optimised routes and connecting vessels

with ports to enable 'Just in Time' operations and optimised port operations.

Digitalisation

Digitalisation will play a key role in the green transition as an enabling technology. Today, most of data generated onboard never leaves the ship, which means operators lose invaluable insights that can improve performance and efficiency, particularly when the industry is so focused on decarbonisation.

The integration of Wärtsilä's Voyage business with Marine brings together different solutions to help establish an end-to-end lifecycle solution. As an integrated offering, this combines the optimisation of vessel operations with port traffic management and performance-based services for customer's fleets.

Wärtsilä's fleet optimisation solution enables seamless data exchange between ships, shore offices and ports, facilitating real-time decision-making. Cloud-based analytics, AI, and intelligent automation, similarly help optimise everyday processes onboard and onshore, reducing costs and potentially environmental impact.

Coordinated traffic management can help to address the important matter of safety and smart coordination at ports. Providing intelligent tools and technologies in this domain can facilitate just-in-time arrivals, improve situational awareness and support ship-to-shore communication.
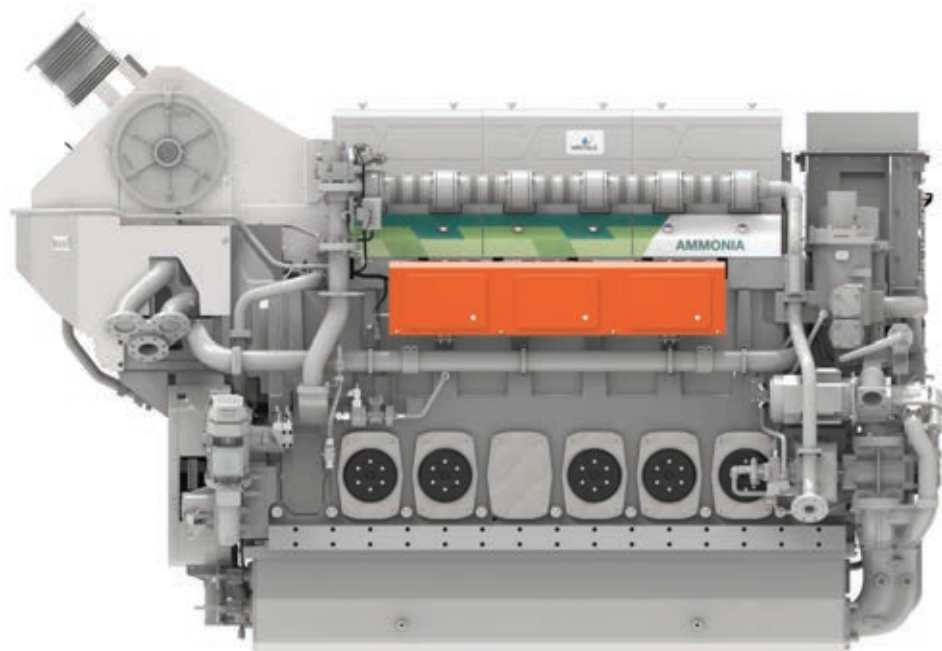
Wartsila's ammonia engine

CT INSIGHTS
BY CHART TRACK

THE VALUE OF INTEGRATION

What if someone told you that you could have a great lunch but every day you would need to go to 10 different stores to get all the ingredients and then put the whole thing together yourself? Would you go through all that hassle just for lunch?

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All the data, one platform.

One single platform that allows you to plan, optimise, verify, and analyse while factoring in additional data such as the vessel model, weather, CII, marine regulations, …

The value of integration, without the investment of in-house development.

Integrating Chart Track soft- and hardware

CT Insights synchronises automatically with the Navigator Suite software onboard the vessel.

Combined with CT-Secure, it does not only provide your vessel with all the necessary digital updates directly to their ECDIS, guaranteeing cyber security, it also allows you to track your vessel and gather sensor data.

On the shore side, this provides you with a digital twin of your vessel as well as situational awareness, allowing you to accurately optimise your future voyages and analyse performance.

CT Insights, the value of integration

CT INSIGHTS
BY CHART TRACK

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Our simulation and training solutions are complementary to this - preparing seafarers for the introduction of even newer and smarter technologies.

Augmented Reality (AR), Virtual Reality (VR) and cloud simulation can provide highly realistic learning environments, helping to ensure and upskill the workforce with a seamless transition into new technologies and processes, which will become essential as more and more green shipping operations become mainstream.

Research and training

In 2022, Wärtsilä opened its new technology centre, the Sustainable Technology Hub (STH). The centre contributes to efforts to advance the global decarbonisation of marine and energy by fostering innovation, collaboration, and the development of green technologies using sustainable fuels and digital technologies.

It features a modern fuel laboratory, flexible technology, and engine testing facilities, as well as a state-of-the-art production system with a high level of automation.

The centre employs 1500 people under one roof, providing operational efficiency as well as a reduced carbon footprint in logistics.

Also housed within the STH are new Wärtsilä Land & Sea Academy training centre and Customer Expertise Centres, which provide remote operational support and predictive maintenance solutions, and support the development of new digital innovations that play a central role in helping customers to optimise their operations throughout the life cycle of their assets.

On average, the STH has about 1,000 visitors per month and has demonstrated its impact as a hub for decarbonisation collaboration in both Marine and Energy.

Other technologies

Decarbonisation is front and centre to our strategy, and the development of engines capable of running on future fuels is crucial to that.

Wärtsilä is focused on taking an innovative approach to supporting the marine industry's transformation to more sustainable operations, and our broad range of solutions and technologies emphasises this.

Through robust research and development initiatives, we are continuously investing in technologies that will facilitate the energy transition towards 2050, and beyond. Increasing R&D spending, now at approximately 4% of net sales, exemplifies our dedication to driving progress.

Looking at specific solutions, one example includes our exhaust gas treatment solutions which comply with the IMO 2020 Global Sulphur Cap as well as the stricter SECA limit. They also generate large reductions in NOx, particulate matter, and black carbon.

The implementation of IMO 2020 was a starting point for continually improving our scrubber technologies. The challenges of the future will only heighten the requirement for truly safeguarded compliance solutions.

That's why our exhaust gas solutions are designed as long-term technology solutions with modular functionality and will be supported across the entire lifespan of an installation with updates and upgrades in line with the best research and development, as well as customer and industry demands.

Initial tests of a Carbon Capture & Storage (CCS) installation at Wärtsilä's offices in Moss, Norway has already demonstrated that it can meet the ambition of capturing 70% of CO_2 emissions – the target set by the IMO.

If all ships with Wärtsilä scrubbers used a CCS solution with this level of effectiveness, it would remove 30 million tons of CO_2 per year. That gives a reduction potential for the scrubber fleet alone of 200 million tons of CO_2 – about 20% of the current maritime greenhouse gas emissions.

Then, when it comes to setting the stage for the use of future fuels, we recognise the significant importance that the reduction of methane slip has on LNG's viability.

Through the development of new combustion technologies, Wärtsilä's 30-year commitment to reducing methane slip has resulted in a 90% reduction in its engines. We are now getting very close to 1 g per kWh, which is an outstanding achievement, and we are taking steps to reduce it even further.

What's more, several of our products, including the Wärtsilä 32 Methanol engine, have received type approval certificates from several classification societies. Certification of these new technologies is well underway.

Flexibility

One of the core elements preventing fleets from acting is uncertainty. From the ever-evolving regulation and policy landscape, at both an industry (IMO) and regional (EU ETS) level, to the confusion around the scale of change required, and fear of making wrong decisions.

There is a sea of unknowns, particularly in relation to future fuels – so, ship owners and operators are worried about investing and getting locked into the 'wrong' solution.

Global IMO rules have put as a target for shipping to be at net zero at or around 2050. This is one vessel lifetime away, so we are talking about a very fast transformation. Especially since we know that the only way to make net zero happen to full extent is using green fuels and these green fuels are only available to a very minor extent today.

With that in mind, ship operators cannot wait for one fuel to become dominant, and it's unlikely that will ever be the case. There are plenty of actions that fleets can already take to reduce their emissions today.

As we understand there is no one-size-fits-all solution to decarbonisation, our overarching approach is designed to tailor flexible solutions and services to the unique needs of owners and operators globally, so that we can empower our customers on their decarbonisation journey.

Collaboration

We understand that the evolution of the maritime sector hinges upon collaborative efforts across the entire ecosystem.

We actively engage in several partnerships and initiatives aimed at advancing sustainable practices through fostering a culture of collaboration, paving the way for a seamless and interconnected ecosystem that supports the energy transition.

For example, Wärtsilä is a core partner in the ZEEDS initiative, which aims to make zero-emission fuels available to the shipping industry. This initiative focuses on themes such as vessel conversion to green ammonia propulsion and the development of offshore production units for hydrogen and ammonia.

We led the SeaTech project, which was an EU-funded initiative focused on developing advanced dual-fuel engine technology to improve fuel efficiency and reduce emissions.

Wärtsilä serves as a Mission Ambassador at the Mærsk Mc-Kinney Møller Center, facilitating collaboration between maritime stakeholders, fuel providers, universities and governments.

The global nature of shipping means working together with others is the only way the industry can unlock the potential to drive sustainable transformations and develop technologies and solutions that meet the needs of the wider value chain – after all, no one party or company holds all the knowledge or experience.

For decarbonisation to become a reality in the maritime industry, collaboration, knowledge sharing, and a wide variety of partnership are needed.

As part of our involvement in the EU co-funded Green Ray project, which is aimed at minimising methane slip from LNG vessels, researchers from VTT, the Technical Research Centre of Finland, conducted a study on methane emissions of two Wärtsilä 31DF engines onboard Wasaline's Aurora Botnia ferry.

The study compared a standard engine configuration with a new combustion concept piloted by Wärtsilä. Results showed lower methane emissions and indicated the potential of the upgraded engine technology to reduce overall emissions, including CO_2 and methane.

Encouraged by the positive results, Wärtsilä launched the new ultra-low emissions version of the Wärtsilä 31DF engine to the commercial market in late 2023.

Another example is our collaboration with Furetank. Last year, we announced that we would be co-developing and testing two technological solutions in Furetank's Vinga-series tankers.

One of them a GHG reduction package, developed by Wärtsilä for dual-fuel engines and the other, a Low Load Optimisation package, which reduces methane slip at low engine loads. The tests performed, both in the laboratory and at sea, show very promising results, with the methane slip reduced by 45-50%

Last year, we also launched the next generation Hybrid Electric LNG carrier design together with our partners Shell Shipping and Maritime and CSSC Hudong-Zhonghua Shipbuilding, which is an exciting project highlighting the potential of electric propulsion on LNG carriers.

Without such collaborations and partners that share an ambition to develop sustainable solutions we would not be able to accelerate the industry's energy transition. **DS**
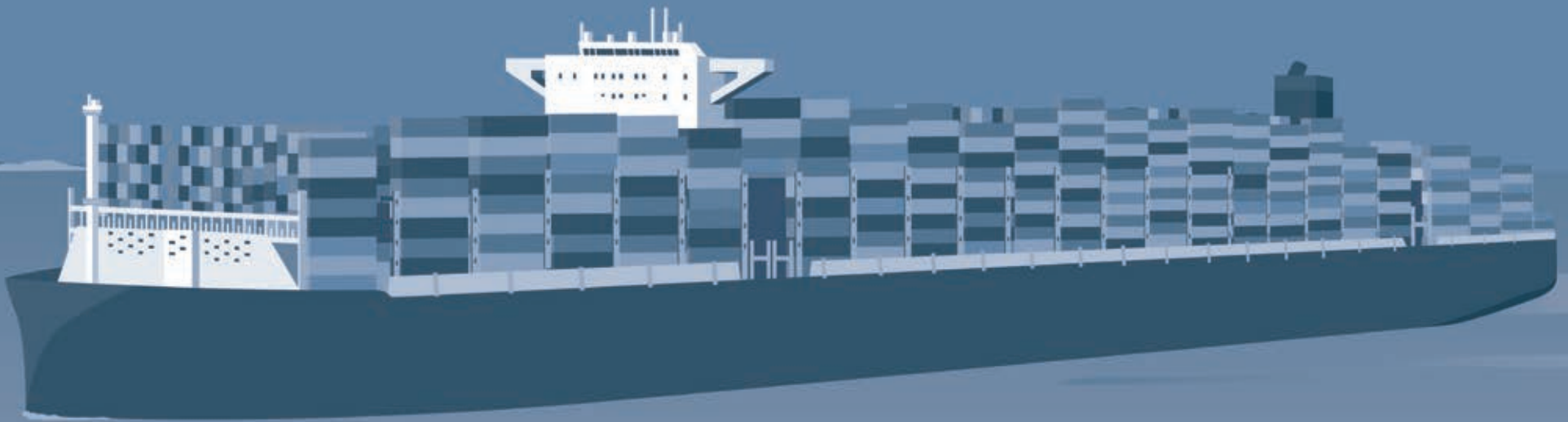
Houlder – data analytics for energy performance

In an interview with Iebum Shim, data analytics lead at Houlder engineering design company, Digital Ship gained insights into "HOME™"

Houlder as design and engineering company are primarily engaged in project-based activities across various areas of maritime architecture, such as marine engineering and hydrodynamics. However, the focus is shifting to incorporate data and digital.

Shin emphasised the challenges faced by vessel owners and operators in the modern maritime industry due to uncertainty and emerging technologies. With various factors to consider, including the lack of a clear path on alternative fuels, there's pressure to make informed decisions.

It is this uncertainty within the industry that Shin believes is motivating the shift towards embracing data and digital analytics.

Shin underlined how the use of the HOME platform provides better insights for clients by assessing multiple aspects of vessel performance comprehensively.

HOME serves as a central location for testing and improving various aspects of maritime architecture, encouraging collaboration across different specialties within the company.

Engineering design background

Houlder is an independent specialist in engineering design, clean technology and sustainability consultancy for marine and offshore. This means it is "not biased to any specific tech providers, we can go about our work from an engineering perspective to assess vessels fairly and advise

Iebum Shin, Data Analytics Lead, Houlder Ltd

our clients, ship owners and operators to make informed decisions".

Unlike other tools that are primarily sold as standalone software, HOME is not marketed to clients for independent use. Instead, "we use as a tool to provide better offerings, trying to advise accurately".

It is primarily focused on enhancing internal services rather than being marketed as specialised software and is not limited to a specific purpose or function.

HOME is a "dynamic platform with ongoing development". It can assess various technologies beyond just greenhouse gas savings, including whole ship optimisation and different energy-saving devices or designs.

Analytics approach

The baseline technology of the HOME system encompasses a modular, physics-based approach to ship design and analysis. HOME deconstructs ships into modular blocks, representing various components and systems such as hull forces, windage forces, and propulsion dynamics.

HOME uses baseline modeling to create a starting point model which users can compare other models or scenarios with. Operational profiling is also used to examine how vessels operate in terms of routes, speeds, fuel consumption, efficiency, and other relevant parameters.

Through baseline modeling and operational profiling, HOME enables its clients to make informed decisions on changes to vessels aligned with industry standards and regulations.

Digital twin technology

Shin explained that the HOME system uses digital twin technology to enhance vessel performance, focusing "on ship efficiency and performance".

Digital twins essentially model vessels in a digital environment, mirroring real-world performance.

With information amassed by the system through the development projects, "HOME has gained huge amounts of knowledge in how ships perform."

There has been an effort to integrate different methods by building a centralised platform, enabled by a digital twin-based

modeling platform to "link different islands within the company". The system combines empirical methods, advanced computational fluid dynamics (CFD) simulations, and operational data, to model ships accurately.

Shin believes HOME encourages better communication by facilitating visualisation as discussions, based on concrete information rather than hypothetical scenarios.

Shin stressed this approach will ensure HOME assists in building stronger relationships with clients by providing informed insights and testing options in the digital platform on an ongoing basis.

A key example of this is the surrogate model of the vessel the system generates from data. The surrogate model can shadow a vessel's real-world performance in a digital environment, helping to improve ship efficiency and performance through a baseline model of the current ship's performance in a digital environment.

Sustainability

By optimising ship designs and energy consumption patterns, HOME can help clients reduce their vessel emissions.

Shin underlines this, stating, "we will optimise vessels to provide maximum efficiency of ship operations and the efficiency of their energy consumptions".

For example, clients using the HOME product to reduce CO2 emissions in accordance with IMO regulations use the baseline generated on their current vessel to "model their ship to actually perform in a digital environment".

HOME "analyses the ship's Automatic Identification System (AIS) data, to see how they operate in terms of their routes, ship speeds and so on". Based on this information, HOME "looks at altering the operational speed or operational profile, creating an alternative digital model ship, which will potentially have one or multiple energy saving devices".

Providing this information to its users, HOME enables clients to view improvements in vessel performance before making real world changes to vessels. HOME is essentially "a platform to assess, test and verify technologies and modifications to give information to the clients".

The platform serves as a tool to assess, test, and verify potential more environmentally friendly options. This ability to test and verify before purchasing technology and implementing new systems helps encourage the adoption of more environmentally friendly approaches.

Modular

HOME's modular, physics-based system facilitates rapid scenario analysis and integration of ship components. As vessels "are made up with different blocks", "you can actually replace one with different model to quickly build a different ship".

This modular approach allows for the easy replacement of vessel components, facilitating customization, for quick analysis of different ship configurations, catering to diverse client needs, ensuring accessibility and ease of use.

Whether simulating wind forces, propeller dynamics, or incorporating innovative technologies like air lubrication systems, HOME improves the modeling process, removing the need for extensive programming or development.

AI

AI capabilities are not currently a significant component of HOME, but there are plans to incorporate more AI elements into the product as the system evolves.

On the use of AI, Shin stated how, "we are fully aware of the big potential of AI, but at the same time very cautious about overusing it. We don't want to create black boxes to do things without us fully understanding them, so at the moment, we're using as a smart data interpreter rather than doing something like a black box".

AI could play an important role in handling and analysing real operational data, identifying trends, and exploring correlations that may not be immediately apparent, enhancing HOME's ability to provide insights and optimise fleet operational performance.

Shin underlined this, stating, "AI can explore the areas we may not have thought about beforehand, it has the ability to explore more freely and widely, and it may be able to find some trends that we didn't really think through". **DS**

Cheaper ENCs for office use

There are benefits to making official electronic charts (ENCs) available for onshore users, but it would need to be at much reduced pricing, because people probably want to have charts for the whole world. NAVTOR explains the progress which is being made. By Paul Elgar, OEM business relationship manager, NAVTOR

Shore-based teams need access to the same charts as vessel crews to enable safe, secure and sustainable industry development. It's an opinion that is now also finding

favour with a growing number of hydrographic offices and Regional ENC Co-ordination Centres (RENCs).

But not everyone's on board just yet. In June 2022 NAVTOR published an

article in Digital Ship that questioned why the maritime industry was unable to use ENC in shoreside systems because of usage restrictions and high pricing.

The article generated a lot of interest

and discussion, not least with the Hydrographic Offices, and the Regional ENC Coordination Centres (RENCs) of IC-ENC and Primar, who control the distribution of most ENC available today.

Scaling the opportunity

NAVTOR CEO Tor Svanes explains how the company's recent merger with Voyager Worldwide is set to deliver smart(er) shipping opportunities to customers across the globe. It's time, he argues, to think big.

NAVTOR's merger with Voyager Worldwide created waves across the maritime world in December last year.
One aspect was the boldness of the move by NAVTOR, which only formed in 2011, to take a business with over two centuries of shipping success under its wing.
However, it was arguably the scale of the agreement that took most by surprise, redefining the landscape of the maritime technology niche.
"It's definitely moved us onto another level," comments Tor Svanes, NAVTOR's CEO and, with over 40 years of high-level industry experience, a well-known figure within this constantly evolving domain.
"We now have products and services on over 18,000 vessels, which is roughly 30% of the entire world fleet within this market. There's no other player that comes close. That scale is vital. For us, but also for our customers. With increased size we can offer increased benefits, making a real impact for an industry targeting greater efficiency, profitability and, of course, sustainability."
And he's keen to explain how.

Connect, integrate, enable

NAVTOR has always focused on 'making life easy' for shipping companies and sailors; introducing wave after wave of innovative solutions that cut administration, automate tasks, simplify safety and compliance, enhance vessel performance, and, when all's said and done, save money, time and energy.
From e-navigation to performance management and optimisation, the team, which now numbers around 400 specialists, are experts at identifying 'pain points' and then priming their digital ecosystem to chew them up and spit them out. The point, no more pain.
Examples of this range from Passage Planning solutions that drastically reduce work and human error, through to emissions calculators (simplifying CII) on fleet management tool NavFleet, and a new generation of digital logbooks.
These accelerate logbooks into the smart shipping age, automating and standardising tasks while unlocking a new source of big data potential for forward-thinking shipping companies.
"We connect, integrate and enable,"-Svanes says, "using our ecosystem to unite vessels, fleets, onshore teams and entire businesses to empower better decision making. Data flows seamlessly and, crucially, can be really utilised to extract maximum value.
"Everything we do is focused on our goal of leading the way

in smart shipping, and we're now in a stronger position than ever to deliver on just that." The Voyager deal is key.

Developing ambition

By joining forces with the Singapore-headquartered business, NAVTOR, which has its own HQ in Egersund, Norway, unlocked a wealth of advantages.
The addition of thousands of customers is crucial, naturally, but so is the expanded network of offices, as well as the Voyager staff and their 'in-demand' talents.
Developers top the list.

"It seems everyone, across multiple industries, are competing for good developers," Svanes admits, "and it was difficult to balance our growth ambitions with the (lack of) availability in the talent pool. With Voyager Worldwide we saw a group of very talented people, with 30 developers in their Aberdeen office alone, that could supercharge our innovation. That was a major incentive."
The projects they'll be working on are myriad, with NAVTOR constantly refining its vessel (NavStation) and shore (NavFleet) platforms, while also partnering with OEMs to pave the way for upcoming milestones, such as the introduction of the richer S-100 hydrographic data standard.
However, one initiative that shows both the ambition of the business, as well as the impact it can make on the industry when operating at scale, really stands out.
Say hello to the GASS (Green AI for Sustainable Shipping) project.

Smoother sAIling

GASS aims to do nothing less than transform smart shipping operations worldwide, leading to huge cuts in emissions, energy use and costs. How huge? Well, 20% per vessel.
Multiple those savings by over 18,000 and the scale becomes truly apparent.
GASS is a three-year endeavour, led by NAVTOR in partnership with Grieg Star, Maritime CleanTech, Scandinavian Reach Technologies, Simula Research Laboratory, SinOceanic Shipping, and Sustainable Energy/SIVA, with support from the Norwegian Research Council, Innovation Norway, and SIVA.
In short, it aims to enable "data driven decarbonisation" by creating AI empowered digital twins of vessels based on precise operational and environmental data. These will then be used to demonstrate a benchmark of real-time optimal

fuel consumption. If the actual vessel – and that's any vessel, anywhere, sailing in any conditions – falls short of that standard the data can be instantly analysed to find out why, leading to corrective, on the spot decision making.
Svanes says the product will be a software module that can be integrated into NAVTOR's ecosystem to empower true "dynamic voyage optimisation".
He explains: "That means both crews and onshore teams can work as one to address issues and deviations from plans as they actually happen. This will be a gamechanger."

Global gains

It quickly becomes clear he means a gamechanger not just for individual companies, but for the entire industry and, indeed, the whole world.
Going back to the scale issue, he stresses: "If we can cut 20% of all vessel emissions, across over 30% of the world fleet, then that means we can help enable a reduction of over 5% in the overall emissions of the entire shipping industry."
Svanes accepts that this sounds ambitious but adds that "we can do this", pointing out the domain expertise of the partners, in addition to NAVTOR's track record of introducing breakthrough industry firsts – NavStation, for example, was the world's first digital chart table, while the company also pioneered 'pay as you sail' ENCs.
"We are dedicated to pushing the possibilities of maritime digital developments," he concludes, "constantly innovating to help our industry access powerful smart shipping advantages.
"The merger compounds the impact our solutions can have, helping a growing customer base meet both their commercial and environmental objectives. I can't think of anything smarter than that!"

It would be useful to have official ENCs in the office as well as on the ship - but only if their pricing is affordable

Paul Elgar, NAVTOR - leading the way for onshore ENCs

We highlighted that ENC needs to be used onshore because many traditional and new tasks are now being done in office environments. Route planning, optimisation, and autonomous navigation to name just a few.

But this was not happening because the cost of a world EBC folio ran into many hundreds of thousands of dollars per year, so unofficial charts were being used instead.

Shortly after the article was published, NAVTOR was contacted by IC-ENC, saying that they wanted to start to make their ENC available to their Value-Added Resellers (VARs) and end-users at a price level that would be acceptable to the market.

Towards the end of 2022 they recommended the new service to all their Hydrographic Office members (currently 50) and suggested greatly reduced pricing.

This was agreed upon unanimously.

This resulted in the ENCs becoming available to IC-ENC Value Added Resellers at about 10% of the standard price.

IC-ENC really have seen the big picture, and their cooperation has been invaluable.

We (Navtor) have also tried to work with Primar RENC to get their 15 full members to price their ENC along the same lines.

We understand from a recent meeting that Primar will adopt the same licensing scheme and price levels as the IC-ENC members, which is very positive and will result in much higher uptake, and of course increased revenue for them.

There a just a few Hydrographic Offices that have not joined the initiative, meaning we must charge the full ENC price.

We urge them to join, in the interests of the marine industry they serve.

If we can get Japan, China, South Korea, and India to recognise that their ENCs really do need to be used in other areas than just ship navigation then we will put the final piece of the jigsaw in place.

NAVTOR

NAVTOR has a new service available called ENC Online by NAVTOR, which delivers ENC to internet connected systems at commercial terms the industry can accept.

This will be followed up in mid-2024 with access being allowed for other types of non-internet connected onshore systems (ENC Onshore by NAVTOR).

When we have full ENC coverage at pricing that is accepted by the industry, we will have taken an enormous step forward for the maritime community and beyond.

Using ENC onshore will accelerate initiatives such as autonomous shipping, AI, Performance and Optimization, Emergency Response and much more.

S-100 will also allow many more layers of data to be used together with ENC (S-57 / S-101), so we really do need it to be available to everyone.

Maybe more importantly, the same official ENC charts will be used both onshore and offshore, which in the end can only lead to increased safety and efficiency, which is something we have all talked about for over 30 years. **DS**

www.navtor.com

IACS addresses ship data quality challenges

Managing data integrity in Industry 4.0

- By R. Srinivas, Cyber Systems Panel Chair, International Association of Classification Societies (IACS)

The maritime industry is digitalising to increase operational efficiency and to meet decarbonisation and zero emissions challenges.

Technological advancements in the Internet of Things, networking and high-speed data communication have helped to increase the adoption rate of digitalisation.

System integration and data sharing with multiple processes and stakeholders and use of advanced data analytics is the future.

Ships are – albeit slowly – moving towards datacentric operations as more and more data-based control systems and applications are employed on board ships.

The importance of data quality is increasingly being recognised with the acceptance that low quality data can have a detrimental effect on decision making processes, due to inaccurate analytics.

It is vital to ensure that data is fit to serve its intended purpose and that the desired quality of data is maintained throughout the data cycle.

Data quality is a critical attribute which provides a measure of the condition of data and refers to the degree to which data meets the specific needs of various business and/or operational scenarios.

The level of data quality will affect the performance, dependability, and safety of onboard systems, and can have an impact on the accuracy of decisions taken based on data.

Data quality problems can emerge anywhere in the data flow pipeline, from master data to data used by a software solution.

Addressing quality challenges

To address data quality challenges and to provide the maritime industry with a generic superior method and approach on how to determine the data quality requirements for a given application, IACS initiated development of a Recommendation on ship data quality.

The Recommendation will cover data generated on board vessels, or received from other sources, and used for various functions.

This Recommendation, through a review of various ISO and industry standards on the principles of data quality management, will describe a process to determine the quality of data generated on board vessels, or received from other sources, and used for various functions such as performance optimisation, condition-based maintenance, system diagnostics, fault prediction, telemetry, or remote monitoring.

As well as qualifying the data quality, it is important that data collectors utilise appropriate dimensions, also known as characteristics.

Noting that there are multiple dimensions to choose from and that they could be specific to an area of application, the Recommendation aims to provide guidance on this aspect through suggested dimensions based on a data lifecycle, while considering the key elements of a data quality lifecycle, such as data identification, data acquisition, data storage, data integration and data processing.

The Recommendation also aims to address data quality verification and validation, data value checks (e.g. range checks), data consistency checks (e.g. keeping information uniform as it moves across a network and between various applications), data semantics checks (e.g. verifying how closely data represent an event, concept, or object in the real word), and more.

The Recommendation is in an advanced stage of development and is scheduled for release by Q2 2024. **DS**

About the author :

Mr R.Srinivas is the Chairman IACS Cyber Systems Panel and also Chairman of IACS Joint Industry Working Group on Cyber systems. He is working as Vice President & Senior Principal Surveyor at Indian Register of Shipping (IRS) and is heading the Electrical and control systems department in IRS plan approval division.

Mr Srinivas specialises in control and automation systems, System integration, Maritime Cyber risk management, failure mode effect analysis and Digitalisation of ship systems. Mr. Srinivas has more than 40 years of Maritime experience.

He has 13 years of experience in shipbuilding and was in charge of installation, commissioning and testing of electrical, control, automation, navigational and communications systems on board.

He has 12 years' experience in ship designs and was involved in the preparation of class drawings, production drawings and also headed various consultancy projects for shipyards and ports in automation, networking & VTMS. He is with IRS for more than 14 years.

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NAPA Studios to support collaborative VP projects

NAPA has launched "NAPA Studios" to support collaboration between different parties involved in vessel design and operations to find new ways to improve vessel performance, drawing on its shipbuilding design technology expertise

We have all heard about sails on ships, we have all heard about voyage optimisation software. But what happens when you use them together? It is a difficult question to answer, because it requires understanding of sails, ship hull performance, weather and voyage optimisation. The voyage would be optimised so that it makes the best use of the sails.

Shipping companies often say they are confused about the options available to them for decarbonisation, and want a better understanding about the returns any investment will give them. So, it would be a useful answer to have.

NAPA, a Finnish company which develops software and data services for both ship design and vessel operation, led a collaborative project to find the answer, which was between 10 and 30 per cent fuel savings.

NAPA believes there could be many other possible collaborative projects to find new ways to improve vessel performance.

Another is being able to provide feedback to shipyards about how their hull designs are performing, using data from the vessel in operation. Shipyards rarely get a good understanding of how vessels with their designs operate in practice.

NAPA has expertise in hydrodynamics, stability, hull design and structural design, from its work providing software for shipbuilding. This can be useful input into finding ways to improve performance.

To nurture such collaborative projects, it has formed a venture "NAPA Studios." It is led by Naoki Mizutani, who is also executive vice president of NAPA group.

NAPA Studios could be defined as a "framework for collaboration to solve difficult challenges," Mr Mizutani said.

The name 'studio' has been used to convey the idea that it will work like a music studio, gathering people together to create something new.

NAPA hopes that shipowners, charterers, shipyards, class, financiers, and insurers will be encouraged to join projects.

The projects will explore practical implications of deploying new technologies and help develop new technologies and operational frameworks.

There could also be projects organised for individual shipyards, shipowners, charterers, and others. The projects can explore how performance models, digital twins and simulation tools, combined with hydrodynamic models, can help.

There can be projects to better understand the impact of technologies such as weather routing, wind propulsion and other energy saving devices.

Another example of a possible project could be to explore how much vessel performance data is improved by installing expensive fuel flowmeters, rather than just working with noon day reports and AIS data.

NAPA has a great deal of reach in today's shipbuilding world, with 90 per cent of newbuilds designed with companies that use NAPA software, the company claims.

"We want to respond to shipping's growing demand for data-based evidence and proven solutions for every aspect of the huge transformation ahead," Mr Mizutani said.

"We are eager to work with companies from across the industry to share knowledge and experience and create innovative solutions together."

Norsepower / Sumitomo project

The collaboration project looking at sails plus voyage optimisation involved Norsepower, a rotor sails company, and Sumitomo, a general trading and shipping company.

This project explored the potential emissions reduction on Panamax tankers from combining four rotor sails installed onboard and voyage optimisation software, to find the best possible route to get the most out of the sails.

It found that the benefits from the sails combined with the software resulted in up to 28 per cent average fuel savings, depending on the routes.

The project team created a digital twin simulation tool and performance model, with the vessel placed on different routes around the world, such as Japan to Australia.

The project explored the aerodynamic performance of the vessel, as well as the hydrodynamic performance.

This research project was presented at the 9th Hull Performance & Insight Conference (HullPIC) 2024 in Tullamore, central Ireland, in March 2024.

Other collaborative projects

Another project was with shipping company MOL and ClassNK to develop a navigational risk monitoring system, predicting

Naoki Mizutani, EVP of NAPA, and leader of the NAPA Studios project

the risk of grounding in advance. The project brought together the expertise of companies involved in ship operations, safe routing, and navigational risk analysis.

It developed a tool which has been adopted on MOL's fleet of over 700 vessels.

This includes vessels which MOL charters in, which it does not operate itself, and so has less oversight over.

Separately, maritime electronics equipment provider FURUNO incorporates NAPA's Voyage Optimization software into its shipboard Planning Station. This is a shipboard voyage planning, monitoring, and briefing system that is currently under development. It does this by connecting to NAPA software via API.

In a further project, trading company and shipowner Marubeni worked with NAPA to understand the impact of EEXI and CII on the bulk carriers in its fleet and find ways to optimise voyages and reduce CO_2 emissions. It managed to reduce fuel bills by 7 per cent and improve CII by 5 per cent.

ClassNK, NAPA's parent company, has a tool called "Zero Emission Transition Accelerator" or ZETA, to support its customers in managing greenhouse gas emissions from ships. It stores data about fuel consumption, emissions, and CII ratings, and simulates how emissions and CII data will change if different methods are adopted.

It links to vessel performance data provided by NAPA software, how ship speed varies with fuel consumption for different weather and sea conditions and loading conditions.

Sharing ship designs

One challenge to collaborative projects involving ship designs is that these designs are traditionally the property of the design company or the shipyard. To date, there has not been any framework to enable those designs to be shared more widely due to intellectual property concerns, in case the design files get stolen and used without the designer's permission or compensation.

But there are ways around this problem. The detailed design data file itself does not need to be shared, but a "digital twin" can be hosted on a cloud system in a secure way. This can be used for several applications, including simulation models which other companies (such as the shipyard's customer) can then access.

Another possibility is that a less granular version of the model is used for simulation, not the full structural model which is used to build the ship.

NAPA has expertise in hydrodynamics, stability, hull design and structural design, from its work providing software for shipbuilding

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MarinePALS – e-learning in an era of low attention spans

Pradeep Kumar Chawla is an experienced figure in the maritime industry, bringing five decades worth of experience and expertise to MarinePALS, a crew e-learning company

Chawla touched upon the thought process behind the MarinePALS project, explaining how, "today most young people don't like to read books and lots of pages of written text".

"There was a King's College London study conducted last year which said that 49% of the population of UK's span of attention has reduced which is happening because of social media".

With people averaging "about seven hours a day on their mobile phones", and "most young people typically getting their news from Instagram or Facebook", Chawla advocates for microlearning and the digitalisation of learning in the maritime industry.

MarinePALS provides seafarers with access to microlearning videos, gamified simulations, and virtual reality experiences, catering to modern styles and preferences for learning.

Chawla emphasised how "the simulators, the microlearning videos, the gaming apps, and the virtual reality programs are going to go hand in hand with classroom learning".

Learning techniques have changed significantly since the turn of the century. "Comparing university teachings to 25 years ago, a professor is no longer just a teacher, they are a facilitator".

"Lecture halls with 200 students are not the only form of learning for students, classes are smaller with discussion within. MarinePALS' modern tools will become part of a teacher's toolkit".

Chawla stressed how the MarinePALS system is designed to complement classroom learning, rather than replace it all together.

Pradeep Kumar Chawla

With a comprehensive understanding of the complexities and challenges faced by

Pradeep Kumar Chawla

seafarers aboard vessels, Chawla is well positioned to advise on methods to advance maritime education and safety standards.

Having retired from Anglo-Eastern in June 2023, Chawla began work with MarinePALS, who he believes will revolutionise maritime educational training through innovative digital solutions.

With a vision to modernise and optimise learning, Chawla, and his team at MarinePALS, have developed an online application platform that offers a range of interactive and engaging learning materials.

Microlearning

Part of the microlearning approach is the move towards the incorporation of shorter informative videos into the MarinePALS platform.

Videos which were once lengthy have been broken down into bite sized learning versions. These videos are part of a series of episodes designed to serve as a cohesive module on a specific subject area.

Chawla stated how "anything over seven-minutes gets too boring for people, so we typically make videos which are anything from one-minute to seven-minutes. The format of the one-minute videos is similar to reels or shorts".

A key benefit of the MarinePALS application for Chawla is that performing tasks whilst applying knowledge learned "increases the retention period" for learners, compared to traditional classroom-style learning, as "typically a classroom lecture is forgotten within thirty-days".

Gamification of learning

The gamification elements in the application incentivise active participation and enable users to monitor their own learning journey.

By assigning points for completed videos and offering badges for achievements, Chawla stressed that MarinePALS fosters a culture of continuous learning and self-improvement.

Through interactive quizzes, simulations, and challenges, seafarers can test their knowledge, reinforce learning objectives, and strive to continuously improve on maritime competencies.

Traditional training methods in the maritime industry often rely on lengthy manuals and classroom lectures, which can be monotonous and ineffective.

"We know how addictive games are and most parents have this problem of taking away their kids from monitors to study, but what if we teach them using gamification".

The competitive aspect of gamification encourages friendly rivalry among peers, enhancing engagement and motivation to

A MarinePALS game – can you spot the defects in the forepeak tank?

excel. By transforming learning into a game-like experience, MarinePALS claims to help motivate seafarers into actively participating in effective training.

Virtual reality

As technology continues to advance, so too does the potential for innovative learning solutions in the maritime industry. Virtual reality is a key component of the MarinePALS platform. It allows users to actively practise tasks in a safe and controlled environment.

Ongoing research and development efforts at MarinePALS focus on integrating artificial intelligence, virtual reality, and augmented reality into the learning platform.

By harnessing these technologies, MarinePALS aims to create immersive learning experiences that simulate real-world scenarios and enhance knowledge retention.

For example, Chawla spoke on how MarinePALS have "made virtual reality examples on familiarising users with the dangers of LNG, connecting the hoses, and doing the bunkering".

"If it is a new subject, with crew sailing on a cargo ship or a bulk carrier who have no idea on LNG for example, they can access a realistic environment provided through virtual reality and the videos series to learn at sea".

Chawla suggested virtual reality also be used to facilitate discussions and training sessions on complex topics, such as ship handling. Participants can share and compare alternate viewpoints and methodologies.

For instance, when comparing two pilots navigating a ship into a port with strong currents, though the underlying science may be the same, individual differences in handling the ship may lead to different manoeuvres.

This process allows for debriefing sessions in which "participants can practically compare methodologies". With virtual reality, participants can be shown various

methodologies, comparing different approaches, and determining which approach best "suits your style".

Digital learning management system

Chawla claimed the learning management system to be one of the first of its kind in the maritime sector "which focuses on the learning mindset of the individual".

Chawla spoke on how improved knowledge retention, combined with immediate and accessible accesses will lead to increased levels of safety, efficiency, and personal responsibility, emphasising the importance of this approach in shaping the MarinePALS application.

The MarinePALS platform offers detailed analytics to measure engagement time and learning mindset. Engagement is measured through various parameters like watching assigned videos, completing learning pathways, and voluntary self-learning videos.

The platform provides statistics on individual and company levels of engagement, enabling the tracking of progress and facilitating efforts to enhance overall knowledge within the organisation.

The MarinePALS platform caters to the needs and preferences of the individual user, offering personalised learning experiences tailored to individual learning styles.

Using statistics to generate targeted recommendations, the user training journey is optimised, with a focus on areas of improvement and professional development specifically relevant to their roles and responsibilities.

The platform also integrates a mentoring feature within its learning management system, facilitating informal connections between employees. Users are encouraged to engage with mentors to help improve learning outcomes.

Chawla claimed this interactive feature to be a genuine success story for the

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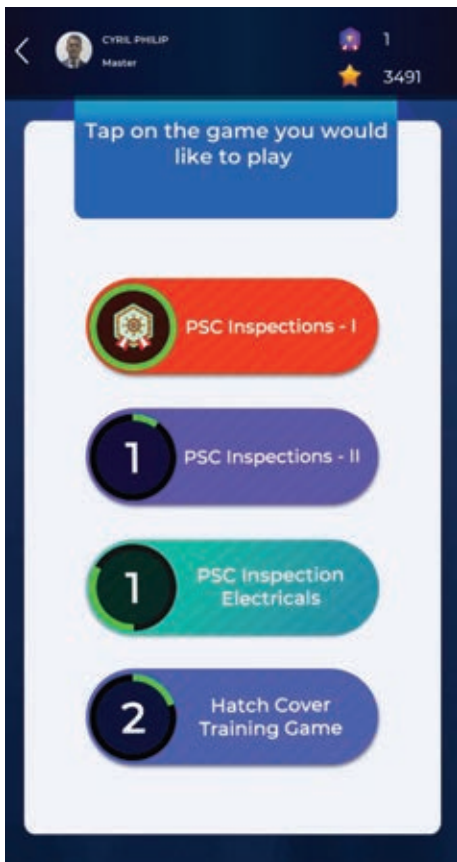
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Which game do you want to play? A Port State Control inspection game, or training on hatch covers?

MarinePALS platform, with it being a feature which distinguishes the platform from its competitors.

Accessibility

The accessibility of the MarinePALS platform is an important aspect according to Chawla. The platform is accessible via a mobile phone app and web app, ensuring compatibility across various devices.

If internet access is a problem, an offline version is available, ensuring learning is possible in low-bandwidth areas. Whether accessing content online or offline, seafarers can engage with learning materials at their convenience.

With "more knowledge being created in the world at the most rapid pace in the history of mankind and developments in AI", Chawla is a proponent of personalised learning available to users whenever desired.

Chawla emphasised how the availability of interactive educational resources when required allows users to focus on the most important everyday aspects of their role.

Improved safety

Given quick decision-making is an important feature of a seafarer's role, Chawla explained the importance of quick access to information in improving safety levels onboard vessels.

The maritime sector demands quick access to important information to prevent accidents at sea. This necessity has propelled the popularity of microlearning videos, offering essential knowledge in condensed formats, ideal for quick reference during emergencies.

For example, "during an emergency situation I may have one to three-minutes to quickly be refresh something that I've seen but I'm not going to read an eight-page manual on it at that time".

Sensitive issues

By accessing concise bite-sized learning modules, videos, and virtual reality simulations, users have access to information as and when they need it, thus improving safety standards onboard vessels.

The educational platform also promotes the safety of seafarers by providing them information on sensitive issues such as sexual harassment and sexual assault.

Chawla stated how "at sea there have been a number of high-profile cases of sex-ual harassment and assault, so we have developed a title on sexual harassment" to help promote knowledge and safety aboard vessels.

The mentoring feature within the systems learning management system enables individuals such as a female officer who may feel uneasy onboard or encounter challenging situations to seek external guidance.

Chawla provided an example, where the platform connected a user with an in-house psychologist, allowing for confidential discussions offline. It extends beyond mental health support to encompass various areas of expertise within or outside the company, such as voluntary helplines offered by organisations.

The connection occurs via both mobile and web apps, where users can select or be assigned mentors tailored to their needs. The online chat communication operates within a controlled environment, helping enhance levels of user safety.

The platform is the first company worldwide, in the training sector, to be awarded an Innovative Endorsement by Class NK and is used by over 31,000 seafarers. **DS**

Too many ships have no crew internet – IDWAL

IDWAL's findings on the impact of increased connectivity at sea, released in their 2024 report.

The IDWAL social impact report 2024 highlights the importance of ensuring reliable internet connectivity for seafarers. Increased connectivity at sea has meant maintaining communication with loved ones and accessing essential information while at sea has become easier in rent years.

However, IDWAL's the social impact report highlights persisting deficiencies in this area. A graph on the social impact score across total vessels was at an average of 5.4 out of 10 for connectivity across vessels.

The report states how the low score "indicates major deficiencies exist across vessels".

With it determining that "providing seafarers with sufficient shipboard connectivity comparable to land-based standards should be a top priority to address this".

The report notes that over half of all vessels provide free Wi-Fi for crew, but limitations such as bandwidth and download allowances restrict meaningful connectivity.

Despite "12.5% of vessels offering unlimited free internet", "an alarming 13% of ships, in this reporting period, had no internet access at all".

This is a concerning statistic in today's connected world, the full internet access provided on 12.5% of vessels underlines the potential for ship owners to provide crew with effective WI-FI connection.

The report states, "the fact that such a significant percentage of vessels are without internet access seems anachronistic in an industry now more connected and data driven than ever".

Impact on crew welfare

The report underlines that poor connectivity contributes to feelings of "isolation from family and life at home", with "general cargo vessels lagging significantly behind in providing crew connectivity".

With crew away from family and friends for extended periods, the report asserts that a lack of internet "compounds existing stresses of long contracts away from home and is extremely frustrating to deal with when trying to access".

Whilst larger ships tend to have better connection, standards still fall short across the board, particularly as "quality declines on older vessels as equipment becomes outdated".

The report advocates for "regular upgrades" and "significant investment by ship owners/operators to improve internet bandwidth, Wi-Fi infrastructure, and access solutions for crew".

When implementing updates, the report stressed the importance of ensuring cybersecurity is taken into consideration. As increased bandwidth and connectivity create a greater number of gaps for cybercriminals to exploit.

The report also touched upon the negative impact poor internet connection can have on learning. Stating how it "prevents many online training/education resources to advance skills and careers".

IDWAL

The IDWAL social impact report is a publication released annually that assesses different social aspects within the maritime industry. It evaluates factors including, crew welfare, environmental sustainability, and safety practices across different types of vessels.
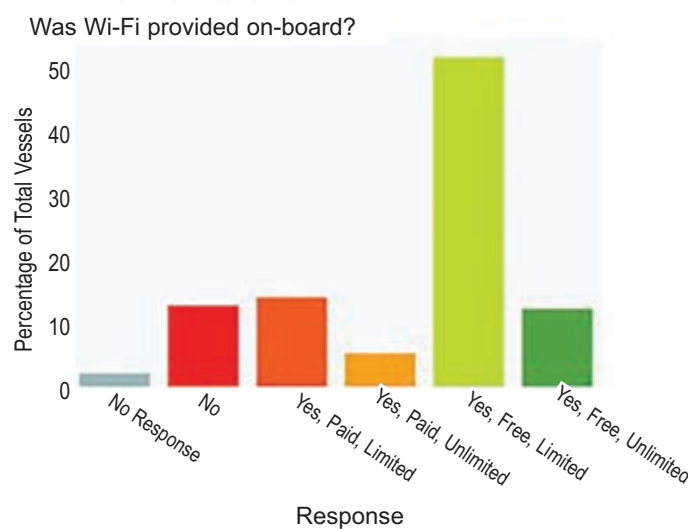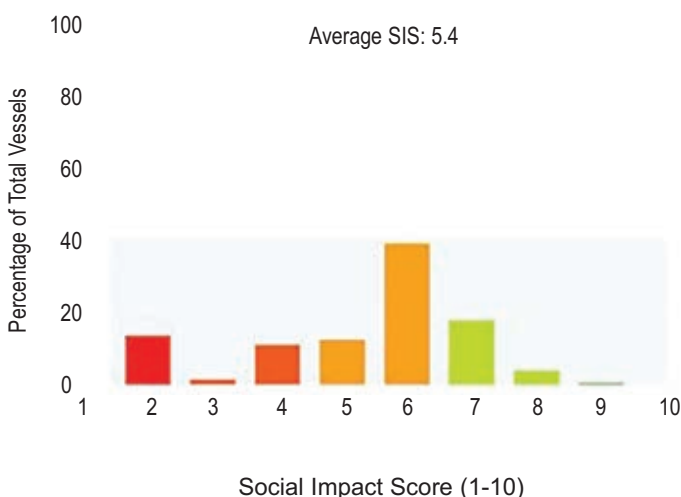
The report provides stakeholders including ship owners, operators, regulators, and industry organisations, with valuable insights into the industry's performance in these areas.

In recent years, connectivity at sea has improved due to advancements in satellite technology, increased bandwidth and coverage, cost reduction, and the emergence of new providers like Starlink, amongst other factors.

The report advocated for vessel owners to invest in better IT infrastructure, emerging technologies, and advocating for regulatory changes.

With shipping bearing the responsibility of keeping global trade afloat, the report highlights key issues with crew welfare, hoping to ensure a more comfortable and connected maritime industry for future generations of maritime workers. **DS**

To read IDWAL's full conclusions about wi-fi provision for crew, see pages 7 and 8 of the report: https://www.idwalmarine.com/social-impact-report

Average SIS: 5.4

Percentage of Total Vessels

Social Impact Score (1-10)

Was Wi-Fi provided on-board?

Percentage of Total Vessels

No Response | No | Yes, Paid, Limited | Yes, Paid, Unlimited | Yes, Free, Limited | Yes, Free, Unlimited

Response

Getting crew buy-in to port documentation software

Shipping company Rederiet Stenersen found that half its crew saw value from its port navigator software from DNV, while the other half were yet to be convinced. It arranged to discuss the software during a crew seminar in Manila

Rederiet Stenersen is one of the key players in the European maritime landscape. Headquartered in Bergen, Norway, Stenersen has a proud history of excelling and visionary thinking.

The company operates in Northern Europe transporting liquid cargo with its fleet of 18 oil and chemical tankers.

In this fast-changing and competitive environment, Stenersen recognizes that only the smartest and most adaptable companies can succeed.

Using digital solutions to help the crew and office with everyday tasks is key. But just because software can help doesn't necessarily mean the workforce will use it.

"We challenge every digital solution in use, by asking one core question: Is it worth it?" says Bjarte Hogelid, HSSEQ & Marine Manager at Stenersen.

"Stenersen defines itself as a smart shipping company, both in the traditional maritime and in the digital way. Ensuring that is part of my job."

Hogelid, who has been sailing for 16 years himself, explains, "there is always an urgent task waiting onboard a busy ship. It can be a huge advantage if we save time and resources with a digital solution. But all tools must be used properly to create value."

Stenersen has a high awareness that not all captains and crew members are equally comfortable with using software on board.

Different levels of digital maturity exist within an organization, even though this gap will gradually narrow with the more digital generations to come.

DNV's Navigator Port

To speed up its port workflows, Stenersen chose Navigator Port by DNV.

The port clearance solution automates the documentation, communication and compliance tasks required for each port.

The daily business of Stenersen's workforce revolves around short voyages and even shorter port calls. Each port call demands a high level of attendance to ensure compliance.

Vishnu Ravendranathan, product manager for DNV's digital port clearance solution, has a passion for the sea.

As a former nautical officer, he sailed on several types of vessels and visited various ports around the world.

In his role, Ravendranathan experienced first-hand the challenges and complexities of the port call process. He has learned about the severe implications of human error and miscommunication.

When he was offered the position as Product Manager for DNV's digital port clearance solution, he didn't think twice, he says.

"By working for DNV on Navigator Port, I could contribute to the digitalisation of the maritime world, which has been my passion for many years."

Seafarer survey

Stenersen surveyed masters to find out their opinion of the Navigator Port software.

The survey was "very positively answered by 50 per cent of the masters," Stenersen's Hogelid says. "However, the other half did not react at all. "

"When Bjarte told me about his masters' great feedback, I was delighted", DNV's Ravendranathan comments. "But the lack of response from so many captains surprised me even more. Action had to be taken."

Crew training session

So Hogelid and Ravendranathan arranged a training session during a crew seminar in Manila, where half of the Stenersen crew attended.

A few weeks after the call, Ravendranathan was standing in front of 30 captains from all over the world, ready to demonstrate the value of Navigator Port.

When asked about his experience with Navigator Port, master Janis Strautmanis shared his surprising experience.

"When I returned from shore leave, I noticed that no one had updated Navigator Port. I assumed nobody used it in my absence."

Bjarte Hogelid, HSSEQ & Marine Manager at Stenersen

Vishnu Ravendranathan, product manager for DNV's digital port clearance solution

He explained how the software reduces his workload and encouraged his fellow captains to see for themselves how it eases port clearance and crew management: "We have so much work to do.

This software feels like our helping hand." Vishnu could not have wished for a better start to his presentation.

Two hours later, the customised training was complete and with it the transformation from doubt to belief. Several questions about data entry, port form updates and crew information were answered by showing the easy-to-use workflows in Navigator Port.

"Basically, there were two schools of thought about our software: that it was easy to use and that it was not", remembers Ravendranathan.

"Those saying it is user-friendly and beneficial were my comrades.

"My task was to show everyone else why their colleagues could work so well with the software. It is part of my job to create these eye-opening moments in training, which I find exciting every time."

"Training is essential in the maritime business. For continuous learning in both Navigator Port Classic and Cloud, we offer several tutorial videos, webinars, and handbooks at any time online", he concluded.

On his way back to the office in Rostock, Germany, Ravendranathan received a call from Hogelid: "Our people were impressed by your training on Navigator Port.

The other half of the crew will have a seminar in a few months. The Philippines are very sunny this time of the year."

Philippines

An estimated 230.000 of 1.6 million seafarers worldwide are from the Philippines. That is 14.4 per cent of the maritime workforce.

This workforce faces a digital evolution in their everyday jobs. Technology and software solutions are transforming how ships operate, communicate, and comply with regulations. Training is essential to keep up with the pace.

Manila, a prominent hub in the maritime industry, presents an ideal location for Rederiet Stenersen to host its regular crew seminars and training sessions.

With a growing emphasis on digital solutions for seafarers, the capital of the Philippines offers a dynamic environment for fostering innovation and professional development. **DS**
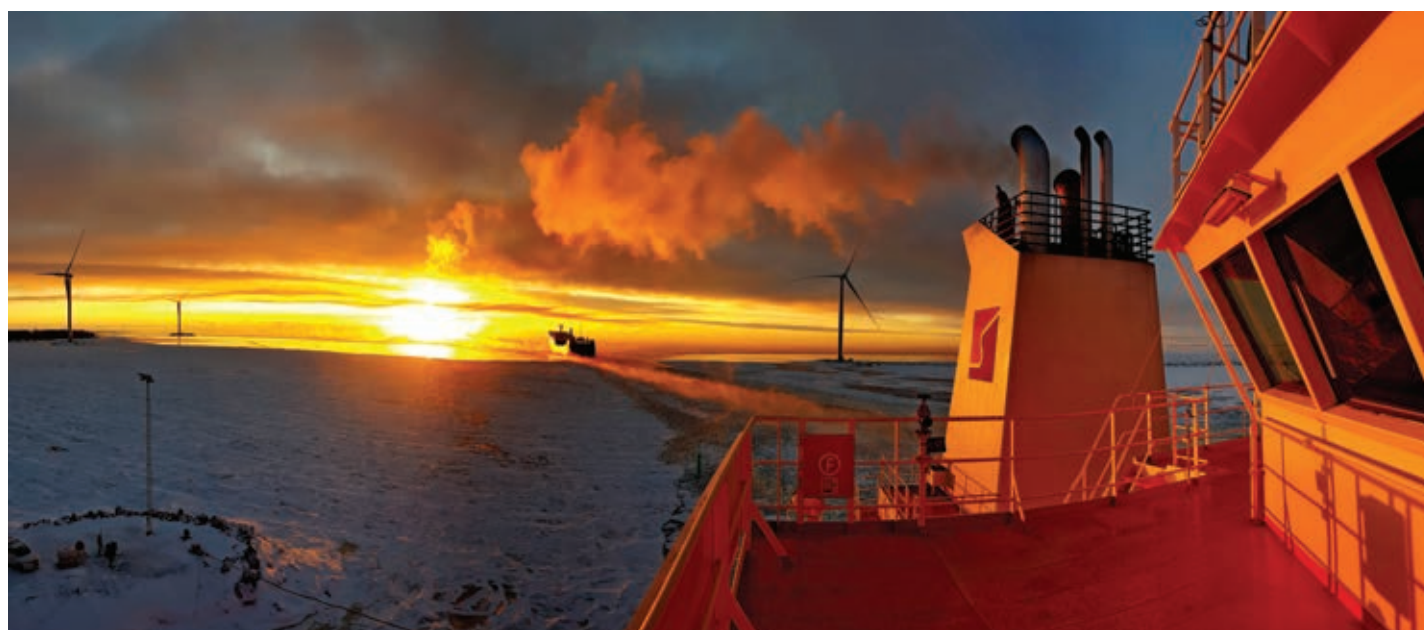
Groke's AI image analytics for navigation

Groke Technologies of Finland provides AI tools to analyse video images, radar, AIS and GNSS data to support watchkeeping

- By Juha Rokka, CEO, Groke Technologies

Over the last year, we've seen geopolitical strife escalate in both the Black Sea and the South China Sea. Now, we can add the risks associated with Red Sea transits to the list of maritime security threats faced by commercial shipping, along with piracy which is on the rise again as vessels detour from typical routes. These threats can add significantly to the stress and fatigue levels of watchkeepers.

Life at sea is already physically and mentally demanding. Crewing levels are tight, work hours are long and irregular, watchkeepers are required to perform administrative tasks while on the bridge, port turnaround times are short, and there's more technology onboard to master.

Watchkeepers can find it difficult to correlate the things they are physically seeing with the instruments providing data on the bridge. They need to be constantly cross-checking different systems. What are the objects I see on the screen? Where are they in the real world? It can take around 20 seconds for bridge systems to update, and this naturally adds to the complexity of the thought processes required of a watchkeeper.

The challenges increase when visibility is low or when there are large numbers of small vessels around. It is hard to predict what these vessels are going to do, and this racks up cognitive stress levels.

Greater awareness

Groke Technologies was established to give watchkeepers unrivalled awareness of their vessel's surroundings with the aim of improving safety and wellbeing onboard. Our product Groke Pro is based on unique AI based sensor fusion technology which combines information from a 225-degree visual camera with a specially-developed 180-degree infrared camera, as well as radar and AIS. An inbuilt inertial measurement unit collects data on pitch, roll, and yaw, and a high-precision GNSS provides positioning data. The resulting informative display allows watchkeepers to detect any navigational hazards and objects in real time.

Unique blending function combines images from day and night cameras. The result is a clear view of the vessel surroundings even during night-time operations or other low-visibility situations such as fog, heavy rain or highly reflective situations. Even under these conditions, for example, the colour of navigation lights and surrounding objects can still be clearly shown.

All the objects detected by the computer vision system, including non-AIS vessels and sea marks, can be projected on to electronic charts. Additionally, real-time risk analysis functionality provides an intuitive risk compass, closest point of approach alarms and relative velocity tracking.

By bringing all this together, we aim to provide the best and most reliable depiction of reality possible. When a watchkeeper is looking outside and looking at our user interface, the delay in the relay of information is well below one second. The information is available via an easy-to-read visual display on a tablet, so it can be viewed from anywhere on the bridge.

I know from my own experience how important this is, especially in busy sea lanes, but rather than the seafaring experience I brought to Groke Technologies, it was my subsequent shoreside career that prepared me for embarking on my dream of building the system. That experience ashore included newbuilding projects for Royal Caribbean International and engineering ship intelligence products for Rolls Royce and Kongsberg.

Six Japanese companies have now invested in Groke Technologies: Mitsubishi Corporation, Japan's largest trading house and a partner since our founding in 2019; Sumitomo Mitsui Finance and Leasing; tanker operators Uyeno Transtech, Tsurumi Sunmarine and Asahi Tanker; and, most recently, tugboat operator Tokyo Kisen. Oldendorff Carriers, one of the world's leading dry bulk owners and operators, has also joined us.

Machine Vision

Groke Pro is the first machine vision solution to obtain Innovation Endorsement for Products and Solutions from Japanese classification society ClassNK. This is a timely achievement. With increasing use of digital shipping technology, combined with a global shortage of experienced officers and crew, we anticipate that integrated ship situational awareness technology will be a mandatory requirement from the IMO by 2030. Before that will come class notations and voluntary IMO guidance, probably by 2026.

Groke Pro has an extensive reference list from Japanese shipping companies, including K Line and U-Ming Marine, and as well as our headquarters in Turku, we have established a Japanese office. We now have over 20 employees supporting new and existing clients in Asia and Europe.

It takes less than a day to install the system which consists of a sensor unit that is mounted on top of a ship's bridge, and a system cabinet installed inside the bridge.

We have more installations contracted for 2024, including return customers looking to roll out Groke Pro across their fleet. We see demand continuing to grow from both domestic and international shipowners, and we are also seeing interest from insurance companies. In high-risk situations, a recording of images is automatically triggered, so Groke Pro provides an irrefutable evidence trail that could ease the investigative work required for concluding claims.

It can also help shipping companies with professional development material, helping them apply lessons learned across the crews in their fleet. We are also providing cloud connectivity for the system so that shoreside managers can gain a real-time view of the challenges faced by their watchkeepers at sea. In the future, we are planning to build guidance into the system so watchkeepers can more easily assess the options they have for responding to challenging situations.

Groke Pro was not designed to replace crew on board but to provide them with the best possible information to support their decision-making. With better decision-making comes improved safety. Improved safety in turn helps to increase crew welfare.

Together with my co-founder Marja-Liisa Laihonen and our dedicated team, we aim to improve the safety and wellbeing of seafarers. **DS**

Groke Technologies co-founder and CEO Juha Rokka
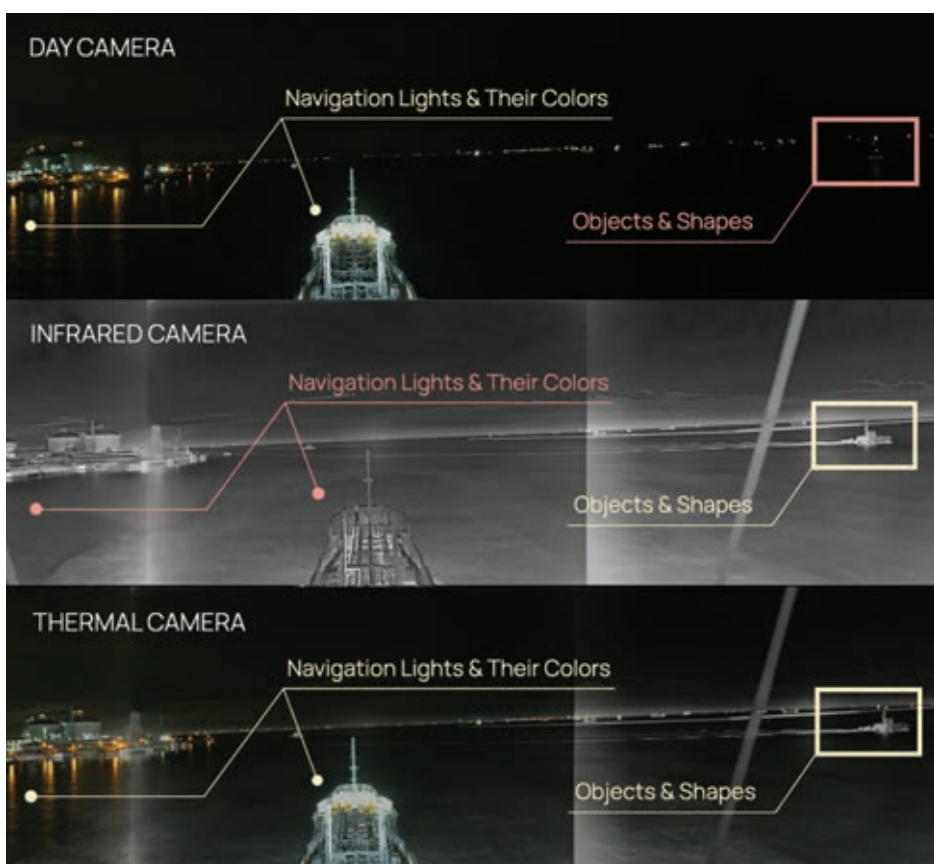
Groke Pro blends images from day, infrared and thermal cameras to provide greater clarity during nighttime operations

Greater situational awareness of what is going on around the ship reduce seafarer stress

JRC

JRC unveils a new GNSS Compass

JLR-41

About the JLR-41

This new GNSS Compass has...

- a smarter antenna design
- much more accuracy
- a better performance
- spoofing/jamming detection

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MAN Energy Solutions Unveils MAN Data+ for Enhanced Asset Management

What is MAN Data+

MAN Data+ is an advanced API service poised to redefine how customers access structured asset data. This cutting-edge service highlights MAN-ES's commitment to digital innovation in maritime and energy sectors, providing streamlined access to essential structured data for superior fleet operations.

How MAN Data+ helps you

Your MAN engines generate a vast amount of data, and our mission is to ensure that you have the means to effectively monitor, access, and leverage this information, regardless of the number of MAN engines you operate or the scope of your business activities. MAN Data+ merges data ontology with secure and reliable services to unlock unparalleled value. This data is also designed for **easy integration** into your existing platforms and systems. Thanks to fully standardized data structures, you can effortlessly apply solutions from one asset to another.

As part of the MAN CEON Platform, MAN Data+ offers a **secure and smart solution for collecting and integrating engine data** in an accessible and thorough manner. Our extensive understanding of the engines and equipment furnishes us with the necessary context to grasp the data's significance and value.

MAN Data+ facilitates **secure data transmission** through your satellite communication providers, along with data collection, storage, effortless API integration, and a scalable and functional data framework. This suite of features empowers you to **enhance fleet efficiency and performance, reduce operational expenses, minimize onboard labor, and improve the quality of engine performance and monthly reporting.**

Craft personalized visualizations and derive insights using machine learning and process simulations. The application of the data is guided by your business processes and objectives.

MAN Data+ aligns with the maritime industry's standards for **comprehensive security and ensures long-term data availability**. In the rare event of a loss of connectivity, data is preserved on the MAN-ES ATU, with on-site storage capacity lasting up to 6 months. Upon reestablishing connectivity, the stored data will be automatically uploaded in the correct time sequence.

Artificial intelligence, big data, and machine learning offer significant potential for the shipping industry, but they must be effectively integrated with the current ships, machinery, and infrastructure. MAN Data+ provides a key benefit in this regard through its comprehensive integration with MAN machinery. With **APIs**, you can seamlessly **merge your MAN engine data with other platforms and systems**. We gather data from sensors on MAN equipment and enhance it with our algorithms to make it actionable. This refined data can then be utilized within your own IT systems.

Read more

There's a New Star in the Sky

Introducing Pulsar

Pulsar stars are the universe's most reliable beacons. The Pulsar Network combines Earth's leading satellite networks with our own ground-based infrastructure and managed services for reliable cybersecurity, crew and compliance solutions beyond basic connectivity.

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- Local Offices in Greece, Cyprus, The Netherlands
- 24/7 European Support for Maritime
- Starlink, Inmarsat, Iridium, SES and Intelsat Connectivity

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See Us at the Posidonia 2024 Shipping Exhibition - Stand 1.127
www.pulsarbeyond.com