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The image shows a tablet displaying the Seaber software interface. The interface is divided into several sections:

- ORDERS:** A table with columns for 'Orders', 'Status', 'Order name', 'From', 'From Region', 'To', 'To Region', 'Amount', 'Commodity group', and 'Commodity'. It lists orders for various weeks (e.g., Week 48/2024, Week 49/2024, Week 50/2024, Week 51/2024, Week 52/2024) with details like origin (MUMBAI, BARCELONA, HOUSTON, TEXAS CITY), destination (NEW ORLEANS, LOS ANGELES, SHANGHAI, ULSAN, AMSTERDAM, JUBAH), and commodity (Ammonia, Ethylene, Butadiene, Methanol, Ummantia, Ethylene).
- SCHEDULE:** A calendar view showing a schedule for January 2025 and February 2025. It includes a 'VESSELS' list on the left with details like 'Beast' (13600 cbm / 37400 mts), 'Eric' (9000 cbm / 27200 mts), 'Cinderella' (38000 cbm / 38000 mts), 'Hades' (36000 cbm / 36000 mts), 'Philo' (39000 cbm / 37000 mts), 'Goofy' (38000 cbm / 37900 mts), 'Gear' (38200 cbm / 38100 mts), 'Minnie Mouse' (37000 cbm / 36000 mts), 'Ariel' (23000 cbm / 22000 mts), 'Hercules' (21000 cbm / 20000 mts), and 'Mulan' (18500 cbm / 18000 mts).
- VESSELS:** A table at the bottom showing vessel details like 'VESSELS', 'AI', '10000', '20000', '40000', 'No acid', 'Epoxy coated tanks', 'Stainless', and 'MarineLINE'.



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How Odfjell is developing AI

At Odfjell, crew are using AI to work with procedures, operations staff are using it to summarise negotiation discussions, and software developers are making apps to manage training. Gunnar Eide explained

Chemical tanker operator Odfjell is already using AI in multiple ways. Crew are using it to find what they are looking for in procedures; operations staff are using it to summarise complex discussions such as about chartering and port operations; and software developers have used it to create apps for managing crew training.

Gunnar Eide, manager of digital applications at Odfjell explained, speaking at People Tech Maritime Bergen in November.

Odfjell started looking at AI tools in 2023, following the release of ChatGPT. "We quickly understood the potential of this. We updated our IT policies to allow people to use these tools, based on clear conditions to protect company data," he said.

Odfjell established an AI taskforce with people from HR, IT and business units, including ship management and commercial operations. This team was provided with training and workshops to understand the potential of AI and opportunities for the business.

Microsoft released CoPilot shortly after

the launch of ChatGPT. Odfjell bought 30 CoPilot licenses for staff members, gave them training to understand how to use the tool, and evaluated what they achieved with it.

A first project was building an IT support chatbot powered by Azure OpenAI. Employees can ask simple IT support questions to the bot and get answers. "We were just playing with the technology. Everybody has made an IT support bot by now I guess," he said.

The IT support bot was then expanded, to include Odfjell news, ship management procedures, and HR employee handbooks. For example, crew onboard can use it to find procedures for cleaning cargo hoses, and staff can ask about paternity leave.

If you need to find something in the procedures, including during a vetting inspection, the bot summarises what the procedures say, and then links to the full text in the procedures. "It has made life easier for crew," he said.

People do not need to accept what the tool says directly, they should assess it, he said.

The system now sees 3,000 queries every month. From its work to develop the bot, Mr Eide's team have learned how complex AI is, he said.

Odfjell tried to use a machine learning tool to optimise spare parts and onboard stores. This was not so successful. "We learned from the project that our data was scattered, fragmented and bad. We realised we need a data platform, and it had better be governed as well."

The four important elements when rolling out AI are people, technology, process and data, he said.

People need to be educated and empowered; technology needs to be available and understood; the underlying processes need to be good, otherwise technology can never deliver good results; and you need a good data platform behind it, he said.

Company staff will probably use AI tools whether they are provided by the company or not. This can be seen from network traffic monitoring. "It is better to govern it and give them the opportunity," he said.

Using CoPilot and ChatGPT

When Microsoft released CoPilot for Windows, included as part of everybody's Windows package, Odfjell encouraged all staff to try it out. "You can do quite good things with it. It is limited but valuable," he said.

"You can do powerful internet research. It can help you summarise text and write text. You can ask for a picture of a chemical tanker at a berth. We made all our employees aware of it [and said] 'start using this tool.'"

Odfjell's IT department realised it would



Gunnar Eide, manager of digital applications, Odfjell

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be better if the AI projects were being driven by operations people, not IT people. "We established an AI champions forum for people who show interest in AI," he said.

These AI champions are provided with licenses to both ChatGPT Enterprise and CoPilot for Office 365. "In return, we expect you to have a good use case, and contribute to our internet social site 'AI Hub.'"

Odfjell has 75 user licenses to ChatGPT Enterprise. It can compare ChatGPT with CoPilot for Office 365. "What we learned so far [is that] CoPilot for Office 365 knows you better," he said. "It has access to your mails, access to your SharePoint. When you start talking to it, it contextualises what you are talking about."

"ChatGPT Enterprise is easier to deal with. You don't need to buy AI credit to build your own agents. You can build an agent, connect to SharePoint and so on."

"We thought CoPilot looks a bit more promising. We increased to 100 users, including the executive management."

"It costs \$40 per user per month, quite a lot of money. We would like to see if there's a return on investment."

"Before you get a license from us you have to join training. We do an evaluation after 4 weeks and 8 weeks, to see what your experience is."

"It takes time for employees to start using

the tools, the tools take a long time to 'learn' us," he said. "Microsoft says CoPilot takes 6 weeks to fully understand you."

But after 8 weeks using AI tools, employees often say it saves them an hour a day. This gives the company a big return on the \$40 per user per month license fee, he said. "It might be 40 x return on investment."

Staff experiences

Mr Eide showed a video of Odfjell staff talking about their experiences with AI.

In the video, a staff member explained how CoPilot can be used to juggle demurrage e-mails and documents, in an environment with complex operations, including with barges, and rigid timelines.

"CoPilot helps me cut through the clutter. I can ask it to summarise key events, pull out details relevant to the laytime calculation, or draft claim e-mails," she said. "It is like having a smart assistant."

Also in the video, a staff member explained how the enterprise search tool is used to assist with SIRE inspections, helping crew find where a certain process is covered in company procedures during the inspection.

A commercial manager talked in the video about how AI tools can be used to negotiate and make contracts for time-chartered vessels, including to summarise long texts,

improve the tone and clarity of emails, and strengthen arguments.

A company software developer explained how AI was used to make a software tool for crew to track training courses they have done, and for this to be remotely verified. This helps the company ensure crewmembers are taking courses suitable to their needs.

The company is developing LLM based chat interfaces with its scheduling and cargo storage planning software.

Three stage plan

Odfjell's broader AI plan is to first make tools to support personal productivity; second to have AI tools which support work groups; and third, to have AI tools which support the enterprise.

Human led AI agents could form part of the second stage. For example, a work group data analyst could create reports assisted by CoPilot, he said.

In the third stage, we may see AI agents talking to other agents.

Agentic AI tools have already been used for software development, including to test, fix and document code.

"Next time it is your turn to show something about AI," Mr Eide said to the audience.

PTM

Seven deadly sins of digital technology implementation

Pride, greed, lust, envy, gluttony, wrath and sloth all obstruct maritime digital technology implementations, said consultant Lars Solbakken. Humility, generosity, patience, and diligence can be very useful

The "seven deadly sins" of pride, greed, wrath, envy, lust, gluttony, and sloth, as taught by the Christian church, all get in the way of good digital technology implementations, said consultant Lars Solbakken, speaking at People Tech Maritime event in Bergen in November.

The opposites, such as humility, generosity, patience, and diligence, can take us a long way.

Mr Solbakken is former CIO of shipping company DOF (2021-2025) and currently on the board of maritime ICT company Globetech and Managing Partner for Vaag Consulting.

The smartest tool the maritime industry has, at least for now, is still the hundreds of years of human experience we have in maritime operations, he said. People are much "smarter" than today's digital technology, which has had only decades of development in comparison.

But our maritime operations are best when we have people, technology and organisation working together.

This means that the biggest challenge organisations face is probably not choosing which tool to use, but how to make whatever tool you choose work together with your people and organisation. This makes digitalisation fundamentally a leadership and organisational challenge,



Lars Solbakken, managing partner, Vaag Consulting

Greed

Greed affects digital technology implementations when people refuse to share their data. “It could be out of habit, out of fear, it could be a power play, ‘I am not sharing my data because that’s what makes me shine”.

“Hoarded data is wasted treasure. Data only creates value when it is shared across the organisation technically and culturally,” he said.

Digital maturity is fuelled by generosity, the opposite of greed.

Lust

Lust obstructs digital technology implementations when people seek out shiny digital tools. They see a demo for a new software tool and want to own it, rather than thinking about how to make what they already have work properly.

“For me, lust is like doing digitalisation without discipline,” he said.

“We buy solutions, we test them out, we don’t understand the real problem. Why we are here, what we are supposed to do. We are running for the next big thing.”

In contrast, “digital maturity means resisting the temptation and investing in the technology that solves your problem. You’ve got to know what your problem is, as well.”

Envy

Envy obstructs digital technology implementations when we want the digital tools other people are using. We imagine if we had their tools we can be as successful as they are, rather than considering if it fits what our company needs, and what effort is involved in implementing it.

“You cannot copy digital success from others. You can [only] get inspiration,” he said.

“Envy distracts us from the real task, understanding our needs and designing for our reality.”

Successful digitalisation projects will be based on your company’s own data, made with your company’s expertise, for your company’s staff, designed to meet your company’s goals, he said.

Gluttony

Gluttony applies when we digitally “overeat,” getting more data than we can work with. “It is so easy to collect that data, we feed the systems with massive amounts of data. But it is low quality, we don’t know the context of that data. So, we choke the system. Lots of



data is very seldom good.”

“The system struggles, we don’t get the result, people get frustrated.”

Wrath

We see wrath when digitalisation doesn’t turn out as expected and we look for someone to blame.

“It happens a lot,” he said. “We blame the system, we blame the vendor, we blame IT, we say ‘let’s go back to do it the old way.’”

“People don’t necessarily have patience to get results. Integrated systems aren’t built overnight.”

The IT department’s capability is limited to investigating and choosing technology and then supporting the system, he said. A system can only work if the entire organisation adopts it.

Sloth

We see sloth when people think that the digitalisation job is done and they can relax. “We still have to do the boring parts, the foundational parts.”

For example, maintaining digital infrastructure, cybersecurity and data quality.

“We have to make human technology and organizations work together. We have to build competence, because it is complex. Whatever that nirvana is for you, you have to build it step by step.”

Lack of leadership support

A lack of leadership alignment and ownership is a root cause behind several of the seven sins, Solbakken said. Companies whose

leadership neither understands nor believes in technology “will not be here in the very near future.”

Digitalisation cannot be delegated or driven bottom-up alone, he added. It requires active leadership engagement, clear priorities, and sustained commitment from the top.

Virtues

All of these seven sins have opposite virtues, such as humility, generosity, patience, and diligence.

We can respect each other’s expertise, share data to the benefit of the whole organisation and its partners, choose technology for its value not its shine, choose solid solutions based on our needs, have clean, contextualised meaningful data, give systems and people time to mature, and carefully climb the full digitalisation staircase.

“Generosity” doesn’t necessarily mean sharing all of your data. No company would share their daily chartering rates externally, for example. But “the problem now is that they are not even shared within the company.”

“The more trust you have in each other, the better you communicate, the more aligned you are, the closer you are to the virtues,” he said.

If you do all this, “there’s a fair chance that you move from fragmented projects to integrated operations and get that ROI everybody is dreaming about. These virtues are not cultural ideals, but practical prerequisites for scalable, resilient, and profitable digital operations.”

It also means that “places like Norway can be a good part of the competitive maritime landscape.”



Danelec – finding your decarbonisation digital path

Every shipping company wants better digital tools for decarbonisation. It is better to think carefully about what you need, choose solutions which integrate, and use high frequency data, said Danelec's Christian Treu

Shipping companies are coming under pressure from multiple directions to decarbonise, including from regulators, charterers (such as through Poseidon Principles), and investors. Consumers of shipped goods, such as IKEA customers, are asking for a greener supply chain. Shipping companies are using CII scores as a key performance indicator in negotiations with charterers.

"Whether we like it or not, it is changing the way we work," said Christian Treu, Vice President Revenue, Danelec, speaking at People Tech Maritime in Bergen in November.

"When you embrace digitalisation, it will create better profitability, and better culture internally," he said.

Danelec offers services for capturing data from vessels and advising how its operations can be optimised. It claims that its systems can enable a typical shipping company to save 10 per cent on fuel costs.

Danelec started 30 years ago with four employees as a "engineering garage shop" developing voyage data recorders. Six years ago, it had around 40 employees. Then with the benefit of private equity investment, it has since grown to 330 employees, 200 partners, and 17,000 vessels using its software or equipment. In August 2025 it was acquired by GTT of France.

Which direction?

In discussion with customers, a first question Danelec asks is, "what kind of business are you running, where are you, where do you want to get to?" Not every shipping company needs to decarbonise at the same speed.

Don't start the digital master plan by saying "everybody should be AI sponsors." Instead, "Start small, start with what is most critical for you. Make sure there's sponsors in the business," he said.

Companies always say they want a lot of data, although they don't always know what they want to do with it, he said.

You may have to choose between the software providers offering services. "You have 8-10 new vendors calling you every week with a point solution promising to save you 20 per cent."

And there can be as many as 60 software applications already running onboard.

Looking for a platform

Increasingly, shipping companies are looking for a "platform solution" which can do multiple tasks, from crew planning to bunker planning, rather than work with "point solutions," he said.

You may find this easier to implement if

you look for separate software companies offering integrations with others, rather than try to find a single big software company that has everything, he said. It is hard for one company to be good at everything.

Even Danelec together with GTT and companies in its portfolio do not offer everything. "If you want a bunker solution then it's not us," he said.

Danelec offers integrations with other software tools, such as the integration between its shipboard data gathering software and StormGeo's voyage optimisation software.

Benefits of HF data

High frequency data can be useful. But if the data is incomplete or inaccurate, it is hard to know how to fix it or who to speak to. I

In contrast, "the good thing about noon reports is you can hold someone responsible," he said.

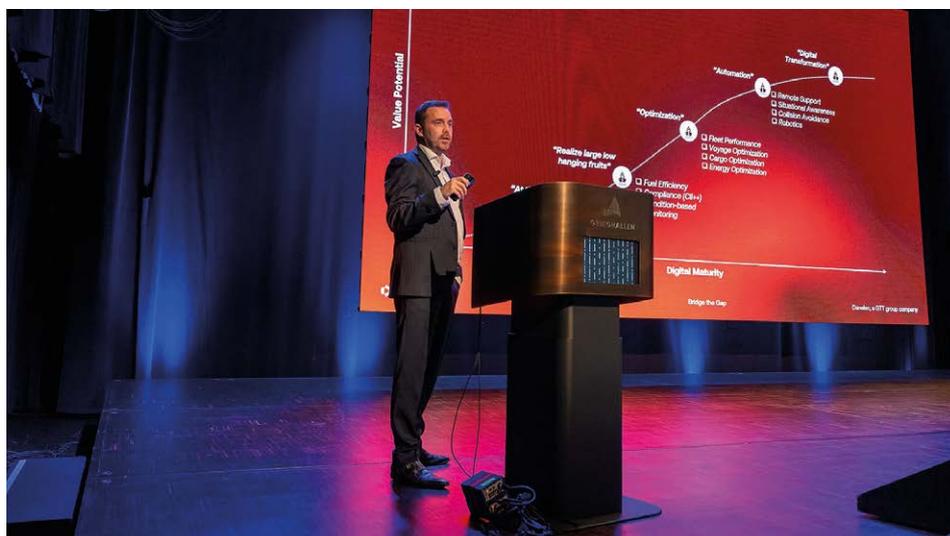
In one example, one shipping company operating 10 vessels within Asia installed high frequency sensors and systems on 5 of the vessels. From analysing the data, it found it was able to save 13 times as much fuel as on the vessels just providing data in noon day reports.

The company defines data as 'high frequency' when a sensor takes a reading at least every five minutes. Some customers have it at higher frequency.

The number of sensors on a ship providing the data can vary from 38 to 6,000, he said. Companies in the cruise, container and LNG sectors typically have more sensors on the vessels.

To get the benefit, you need to make sure that vessels act on the recommendations and insights, he said.

Sometimes older employees are reluctant to take instructions from software, or from junior employees using software. "When the 25-year-old operator calls the 60-year-old captain and says, 'you need to manoeuvre the vessel quickly', it's not always the operator has the final say."



Christian Treu, Vice President Revenue, Danelec

How to reduce crew travel costs 17%

Shipping companies often buy crew travel in a very ad hoc way, although most seafarer tickets can be rebooked free. Exmar is taking advantage of this, together with advanced software, to save 17% on crew travel costs

Any of us who has bought expensive personal family plane tickets is familiar with the stresses and annoyances involved, including being initially promised a low fare which ends up getting much bigger, or never knowing the best time to buy a ticket.

We go to a lot of effort to get the best deal for personal flight purchases.

Exmar's Ivan Renette, who is half Mexican, spends time during October and November looking for the cheapest flights for his family to go to Mexico at Christmas, with prices constantly changing. He tries to pick the best time to pay, then worries afterwards that he has paid too much.

But for business flight purchases, we are unlikely to go to so much trouble. This means a lot of savings get left on the table, Mr Renette said,

Exmar is a gas tanker operator with over 50 vessels. So there is a lot of crew travel.

In shipping, it is usual to pay for a flight for a crewmember as soon as you know when the vessel the person is due to join will arrive in port. Fragmented discussions about the arrangements are made over e-mail, telephone or WhatsApp.

People pay the price of the day, and have no time to check if prices are changing, or if they picked the cheapest option. The industry has worked this way for many years, he said.

Often companies do not even have a clear idea about how many crew changes they are doing, or whether they are doing more than they need.



Mr Renette's job title in Exmar is "business process manager," but most of the time he sees himself as an "electronic plumber," trying to keep digital systems working together to make life as easy as possible for employees.

Tilla

Exmar wanted a data driven platform to help optimise crew changes. It found one from a software company called Tilla.

Seafarer ticket purchases have a big advantage over personal tickets in that they normally allow free cancellation or rebooking.

The Tilla software takes advantage of this. The flight is originally booked through Tilla. Then it continually checks if a ticket

price has reduced. If a better price is available, the software will automatically cancel the original ticket and purchase a new one. Nobody needs to do anything.

"You will not believe the crazy numbers," he said. "A ticket of \$1800 got rebooked two days later for \$1000."

The system also provides advice about the best place to do the crew change. For Jamaican crew, flights from Le Havre to Kingston (Jamaica) tend to be much more expensive than flights from Antwerp to Kingston, although there is only 400km between them. So if you have a choice of where to discharge Jamaican crew, you should choose Antwerp, he said.

You can put parameters in the flight choice, such as the maximum number of flight changes. The flight can be changed up to 3 hours before check-in, to avoid people discovering they have been rebooked after starting their trip to the airport.

Altogether, crew travel cost was reduced 16.7 per cent from using the system. Administration effort was also much reduced. The time saving is estimated at 6 hours work of company staff and 4 hours work for the travel agency for each crew change.

There was some company resistance in rolling the system out, including from the company's internal travel agent and from its crewing department, who thought it was stealing their job. But now people are very happy with the improved transparency and with the cost savings, he said.



Software is “mature” when it supports our understanding

We could consider maritime software to be ‘mature’ when it supports our goals and understands our problems, while supporting our productivity. Dimitris Lyras of Ulysses Systems shared some ideas how to get there

We could define our maritime software as “mature” if it can help us to meet our many organisational goals, said Dimitris Lyras, director of Paralos Maritime and software company Ulysses Systems, speaking at People Tech Maritime Bergen in November.

This would include understanding what the problems are, and whether we need to go in a different direction to solve them. Then the mature software would support us to work productively to get things resolved.

It is not hard to find out what maritime problems are, if you are able to ask senior people what didn't go well this year, he said. Then you can look at your software and see what could have been done to make things better.

Currently, most people working with maritime software are not thinking about the concerns or problems we have which such software could help us with. Instead, they are mainly thinking about what functions it should include, he said.

Mr Lyras' company, Ulysses Systems, makes products which aim to help people understand the world around them, he said.

Situation awareness

The most useful contribution software can make to maritime work is supporting people's situation awareness, he said.

Maritime personnel cannot get the situation awareness they need directly from sensor data, or from systems with data keyed into them, such as ERP.

“Transactional ERP systems cover maybe 30 per cent of what you do in the business,” he said.

To truly support situation awareness, the systems would need to know what the ship is doing at the time, what the priorities are, what the risks are, and what people need to act on. The systems would then know what people are thinking about.

This is not “we give them the data and they make the decision”. It is “we give them the story and they make the decision.”

E-mail

E-mail is central to how all maritime people work and manage their activities today. This is how we get much of our situation awareness.

“I've followed colleagues through the airport looking at e-mail as they are walking to the aeroplane,” he said. “They are looking at e-mail all day. It isn't an efficient way to work.”

Automated e-mails are the “action” part of the ERP system, where we are alerted about something or told to do something.

Software people sometimes imagine that shipping people follow structured processes, which can be digitalised as a “workflow.”

But much maritime work involves difficult judgements, with e-mail being central to the communication process, he said.

For example, a shipowner receives an e-mail saying that an inspection for a ship is late. The ship can only issue its Notice Of Readiness to start the next fixture after the inspection is done. While there is a delay, the shipowner is losing the daily charter rate for the ship, and risks losing the contract. The shipowner needs to work out how to resolve the situation. This is not a structured “workflow,” he said.

We could imagine a better system, which routes e-mails to the most appropriate person in the company.

In this case, for example, there could be an e-mail elsewhere in your company systems saying that a vessel has been delayed, and so the surveyor allocated to that vessel is now available for yours.

There could be automated systems to organise e-mails to make sure the most important ones get read first. AI can help with this.

Improving productivity

Good software should also support people's productivity. The calculation of productivity should be not only related to the time to complete tasks and meet requirements, but also the level of distraction the software provides.



Dimitris Lyras, director of Paralos Maritime and software company Ulysses Systems

If someone is doing a maintenance action report and has to hunt to find a risk assessment or calibration report as part of this, that is a distraction.

The distraction can be reduced if the software has an internal model of what information is related or relevant to other information, so it can find you the right information at the right time.

“Most of the cost of software is from people not getting what they want from it,” he said.

We also see maintenance software designed around the wrong sort of productivity. It is designed to help us complete all of the maintenance tasks in the system, so we can show we have “no over-due items,” achieving a form of compliance. It would be more useful to the business if it could help us assess if the intervals between maintenance are appropriate.

Companies could have a productivity officer, who organises discussions with staff about which processes could be done more efficiently, he said.

Procedures

Useful software could also help us find what we want in company procedures.

The typical thousands of pages of procedures in a shipping company “is not a good thing,” he said. Shipping companies typically write procedures so they can show customers, and regulators, that they have thought about how they do things.

The person doing tasks may only need to read a small amount of this. And the parts they need may not be together in the procedures.

Large language model-based tools can help here, condensing information you need, working out what you might not already know, or what has been changed, he said.

Integration

Mature software should be able to bring together data from multiple other systems. For example, systems for purchasing, maintenance, budgets, travel, service engineers.

Integration means much more than having an API. An API can be thought of like a shop window, where you see the data available and access it. But a more useful integration would have an understanding of the processes behind the data, he said.

For example, every company develops a different set of accounting codes. Integrating one set of accounting codes

with another would be enormous work, because it would require understanding how different items are allocated to the code in each company.

We don't always want to put data points together. A more useful integration in some circumstances may be to connect together all of the documents relating to a certain process, such as a vetting inspection or ship repair, he said.

Software development and upgrading

Making software which does all this is much harder than software which helps us to fill in forms or software which manages data.

It can be easier to build good software if you use the available platforms, such as forms, workflow, building user interfaces, doing software development. "Platform development is extremely important in digital maturity," he said.

Big technology companies often want us to buy a basic platform from them and spend our own money customising it. But

you may need multiple platforms.

For the user interface, it would be better to think about it as a tool for the digital system to capture or support what you are thinking, rather than seeing it in terms of screens and controls, he said.

Software could be made more efficiently if it was made from re-usable building blocks, with repeatable processes, just like a factory making physical items.

Your software provider will be 'mature' if they can provide updates to you in a way which is easy to manage. To have a seamless upgrade, you have to be able to enable the previous version to keep working for some time, so people can go back to it until the new version does everything perfectly. For example, you might find the new software version doesn't recognise some of the documents that the company relies on.

Too often, software companies roll out updates simply by forcing people to use the new version. IT staff have been known to take a holiday at the time software is being upgraded, because they get so many phone calls when things don't work, he said.

PTM

AI – what works, regulation, trust and speed

Odfjell, OSM Thome, Norwegian Maritime Authority, Lars Solbakken and Dimitris Lyras discussed what is working with maritime AI, how to regulate and govern its usage, how to gain trust and find the right speed

Using the LLM capability to understand language may be the most useful application for AI in shipping, including in supporting crew to work with procedures, said Gunnar Eide, Manager Digital Applications, Odfjell, speaking at a panel discussion at People Tech Maritime Bergen in November about developments with maritime AI.

"That's where we have the most positive feedback," he said. "Crew told me it has been a game changer. It is so easy now to find the information we need, especially if you are a new chief officer or new chief engineer. In a busy day onboard there's not always time to do these things."

Odfjell has developed AI systems for crew onboard to 'chat' with AI about procedures, like about the cargo hose, manoeuvring in port, or gangway handling, to verify and learn how we operate onboard, he said. "We see a huge time saving potential both for crew onboard and onshore to manoeuvre in

our procedures."

"Working with the simple things like text, procedures, that has been the biggest game changer."

Text is a comparatively simple form of data for AI, being already structured and contextualised, he said. Using AI on operations technology data from vessels is much harder. It is not structured, not contextualised, and does not all come using the same time series interval. So, you need a data platform and data engineers to get it AI ready. "That is a hard job."

"We are on the way. Once we are there for sure, it will take us places," he said.

OSM Thome is also providing crew with tools containing AI to help them with procedures. "Crew are very happy with it, it is very helpful," said Lars Austgulen, IT Manager, OSM Thome. "There's a lot of time-consuming tasks we can help crew with."

With AI, "there's a lot of shiny tools out there, a lot is happening very quickly," he said. "We have to align it with our processes and see where it can give us value."

Another example is AI to predict maintenance on machinery, said Lars Solbakken, consultant and former CIO with shipping company DOF. "You can predict where things are going to break down and replace them. It is tremendously powerful."

What AI can't do

AI so far has mainly contributed to administrative aspects of shipping, said Nils Haktor Bua, Head of New Maritime Technology, Norwegian Maritime Authority.

"I mostly deal with operational parts of the ships. If we talk about what's working on the AI side there, I believe it is not that much."

There is also no clear definition of what AI is, and it is a label attached to many



The AI Panel

different systems. “We have complex systems onboard, but not everything is AI,” he said.

AI is good at reading, assimilating and interpreting text, said Dimitris Lyras, director of Paralos Maritime and Ulysses Systems, moderating the discussion. But AI cannot act on what it reads, as a person might do, because we make our decisions based on much more knowledge than the material we have read, and our ability to put it together.

For example, if you tell a person that the company has a certain problem, they will keep it at the front of their mind as they do other tasks.

AI has not yet managed to replace many people’s jobs, despite the fact that their working models have been well explained, he pointed out.

We should be thinking about how we can improve people’s performance and having a better run company, he said. Currently much of the AI focus is on seeing if we can make systems which are more intelligent than people. “This is something that will take a long time to answer, and the answer is probably no.”

Ideally, software tools would understand how the enterprise works, as things change every second, and know who needs to be informed about something, Mr Lyras said. “We are looking at AI as though it is mature. It is not mature. It is a 5-year-old kid.”

Shipping companies have to do a lot of work to get a LLM to do something useful for them. It isn’t just about putting the right prompt in,” he said.

How to regulate AI

For regulation and company rules about AI,

People Tech Maritime digital in Bergen - Nov 27 2025

PANEL DISCUSSION: What is working so far with AI in maritime operations



ALENA PEDERSEN
VP CORPORATE IT,
ODFJELL
MODERATOR



GUNNAR EIDE
MANAGER DIGITAL
APPLICATIONS,
ODFJELL



LARS AUSTGULEN
IT MANAGER,
OSM THOME



LARS SOLBAKKEN
CONSULTANT,
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GLOBETECH



NILS HAKTOR BUA
HEAD OF NEW MARITIME
TECHNOLOGY,
NORWEGIAN MARITIME
AUTHORITY

“I would definitely put accountability on the shipowner because they are the ones that implement it and have the operation,” said Norwegian Maritime Authority’s Mr Bua.

We are already working with self-driving ships, remotely controlled and increasingly automated. As a regulator, “we’re far from being able to verify such a system. I can’t predict if or when we will be ready to do that.”

It is much easier to regulate algorithms when they are predictable, but AI is not, he said. “We can manage the data we put in [but] we do not know how the data is processed. It is not easy to say what’s coming out, or if that’s safe.”

“For the high safety risk situations, the verification part of such a system is really difficult.”

There are ways you can use AI to support operations without taking undue risk, he said. “You can have innovation without telling the captain not to look out of the window. There are so many steps before you get to the most safety critical parts of the operation. We are a bit too early to discuss. I don’t think we have to stop the innovation.”

“Maybe at some point we can feel that safety of this system is good enough to be responsible for your function.”

Odfjell’s Gunnar Eide countered that regulators could take a more layered approach, with more specific guidelines about what is and isn’t allowed, and who is responsible for what, at each management level. “The government has to set the framework,” he said.

“It is a very complex question,” said consultant Lars Solbakken. Consider that society is willing to accept the risk of car accidents. We probably wouldn’t accept the

risk if we were not able to pin the blame on someone, normally the driver.

With self-driving cars, we would not know who to blame. Yet self-driving cars “will reduce the number of people dead in traffic by 99 per cent because machines are better drivers than people,” he said.

Or consider the case of a vessel having an accident caused by a fault of the [human] navigator not reading an important piece of information. This would not have happened with AI based navigation, because the AI tool is able to read all the information.

Although this accident scenario could also be considered the fault of the ship manager for putting the crew under information overload, Odfjell’s Mr Eide pointed out. AI tools can help here. “CoPilot can pinpoint what’s important and what’s not.”

Companies should also think carefully if they plan to prohibit staff from using LLM tools, said OSM Thome’s Lars Austgulen. As people get more accustomed to using AI to help at home, they will want to use AI at work with the same services, unless they are told not to, or provided with tools which are more secure. “People know it will improve their work, get things done faster,” he said.

If AI is able to solve a problem, then many people will try to use it and worry afterwards what other problems that may lead to, said Dimitris Lyras.

“There are ways to narrow it down, so it does something useful for you that’s controllable with not a huge amount of risk,” he said. For example, if you use a private AI to get a summary of correspondence describing a dispute with a charterer, so they do not need to read all the text.

How much to trust AI

“AI is an assistant, a tool for simple things,” Odfjell’s Mr Eide said. “We have told crew, ‘never trust AI, always have your own opinion, double check what it gives you’. That’s part of the education you give crew.”

“In order to trust technology in general you need to understand it,” Mr Solbakken said. “The worst scenario is if you have an organisation that doesn’t trust it, [but] you have people using it because they have it in their pocket.”

As a company, it is important to show employees that you understand it, and you want them to understand it. “That’s how I would build trust.”

“To see something work is the best place to build trust,” said Mr Haktor Bua from Norwegian Maritime Authority.

We get trust in AI by using it where it might work, not trying to do everything with

AI, he said. Also recognising that AI is not the best technology for every problem.

Speed of development

“The maritime industry is a very innovative industry,” said Lars Solbakken. But it “works in cycles of the lifespan of your vessel.”

Technology used to work on 5-year cycles, now it can be more like 5-month cycles. “It is difficult to get the entire organisation, or the vessel, or the people, to move at technology speed. There’s a lot of things you need to think about.”

The best way to move forward is to “put the smartest techies on the board of the company and give them as much money as you can afford and move as fast as possible,” he suggested. Mr Solbakken also stressed that speed must be matched with responsibility, governance, and a clear understanding of operational reality.

You will need to figure out how to get value out of AI yourself, you cannot wait for a manual. “Just as parenthood doesn’t come with a manual.”

“The speed at which Silicon Valley moves is, in my opinion, the speed in which they can make money,” said Mr Lyras. “Silicon

Valley only works fast in the area they think they can sell.”

“They throw LLMs over the counter because it reads the internet, they think we will use it. They are not thinking about the things we are trying to do.”

“The engine manufacturers are the most important technologists in our business. They don’t introduce things quickly.”

“I think Silicon Valley have no idea what we are doing,” said Odffjell’s Mr Eide. “We take what they are bringing to the table and see how we can benefit from it. That’s where we are right now.”

P.T.M

NAVTOR – new ways to optimise voyages and port calls

E-navigation and vessel performance company NAVTOR is developing new ways for voyage and port calls optimisation. Bjørn Åge Hjøllo, chief sustainability officer, explained

E-navigation and vessel performance company NAVTOR is leading a three years funded Research project named, “Green AI for Sustainable Shipping” (GASS), to develop new ways to use AI to advise how voyages can improve both safety and efficiency.

Bjørn Åge Hjøllo, chief sustainability officer and co-founder of NAVTOR explained more, speaking at People Tech Maritime Bergen event in November.

The AI uses what NAVTOR calls “genetic algorithms,” which assess a number of different options based on a calculation of their “fitness,” similar to how genetic evolution allows the strongest combination

of genes to survive.

Also involved in the project are ship owners Grieg Star and SinOceanic Shipping, technology company ScanReach, and organisations Maritime CleanTech, R&D partner Simula Research Laboratory, and Sustainable Energy. The project has financial support of 70m NOK (6.5m Euro) from the Norwegian Research Council, Innovation Norway, and SIVA, through the Green Platform Initiative.

The AI-enhanced technology analyses current and historical data to identify ways to improve energy efficiency of voyages, with better routing and speed. As part of this, it develops a digital twin of the vessel

main engine.

The model can identify in more detail how much adverse impact bad weather may have on vessel performance. It is common for navigators to take a route which avoids bad weather if they can. But “quite often, you have too big a safety margin, because you don’t know how the crew, vessel and cargo will react to bad weather and waves,” Mr Hjøllo said.

With improved algorithms, uncertainty in the calculations will be reduced, including for fuel consumption and arrival time, he said.

Input data to the algorithms includes sensor data, fuel data, noon reports, digital logbook data, ocean meteorology data, and vessel statistics and operational parameters.

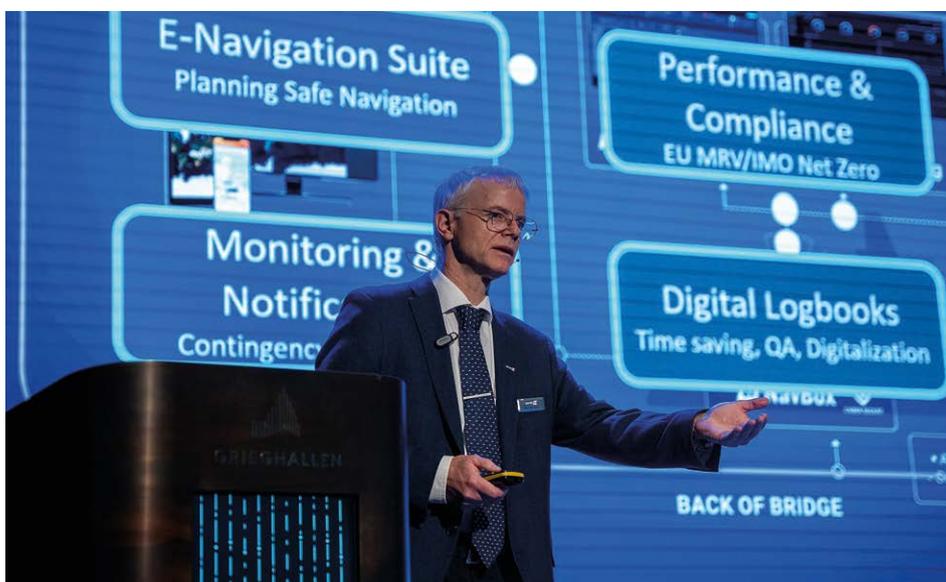
GASS will be developing tools to provide real-time notification to crew about overconsumption, showing what the consumers onboard are doing.

A digital twin of the engine of a Grieg Star vessel was developed and trained on pre-2024 data. It can now predict fuel consumption of the vessel given the sailing plan and weather, within 3 per cent, he said.

As of November 2025, the weather routing optimisation has been developed but will be “further validated and sped up. “We hope to have some services by Q4 2026.”

Port call optimisation

NAVTOR is also involved in the EU funded project DYNAPORT (Dynamic Navigation



Bjørn Åge Hjøllo, chief sustainability officer, NAVTOR

and Port Call Optimisation in Real Time) project, as one of 19 partners. The project supports automated data exchange between vessel and berth, including Estimated Time of Arrival (ETA), or about the time the berth will be available.

It is still typical today for vessels to have to wait days or even weeks to access their berth, after arrival in the vicinity. They may have been able to save fuel by going slower.

One of the reasons for this is that managing port calls in most ports in 2026 is more or less completely manual and non-standardised, Mr Hjøllø said. So, we are a long way from having digital integration between vessels and ports. Many people have dreamt of a digital scheduling solution. Mr Hjøllø has been involved in collaborative projects to try to improve this for 10 years.

So far, DYNAPORT has managed port call optimisation for port calls on the 'green corridor' between Rotterdam and Singapore. There are plans to extend it to 6 larger European ports.

The first live "digital port call" took place in July 2025, with container ship NCL Vestland sailing from Bergen to Rotterdam.

The data exchange between ship and port is based on IMO-FAL standard documents. FAL is IMO's Facilitation Committee. The reports contain large numbers of data elements.

There is an "administration report" where the vessel makes the initial declaration of its arrival, and an "operational report" where the ETA can be continuously updated.

With DYNAPORT, digital reports can be shared automatically from software onboard vessels to software in ports, via APIs. The port's system can send an automated confirmation saying it has received the data.

The vessels have planning software NavStation which generates the reports automatically, taking data from the passage planning software.

In 2026, NAVTOR will add port call optimisation tools to its weather routing software, so the software can find the most effective route and speed considering both weather and expected berth availability time at the destination.

NAVTOR

NAVTOR was launched in 2012. Its original business model was providing systems to make it easier to update electronic charts onboard, so companies would only need to pay for the charts they used.

The company now provides a broader digital ecosystem, with tools for gathering, reporting, and working more kinds of data. This includes navigation software, tools for reporting vessel emissions and performance, digital logbooks, monitoring, and notification tools. It has been providing weather routing optimisation for 2 years.

The company now counts a third of all vessels as customers in some form.

This means that if shipping creates 3 per cent of all global greenhouse gas emission, the "NAVTOR fleet" makes 1 per cent. By

2050, shipping is expected to make 17 per cent of all emissions, as other industry sectors cut emissions faster. This would mean NAVTOR's customers making 5 per cent of total GHG.

If NAVTOR can help its customers cut emissions 20 per cent, that would be 1 per cent of global GHG emissions, plus associated cost savings, Mr Hjøllø said.

Greenhouse gas and politics

CO2 in the atmosphere has increased by 25 per cent since the 1980s.

When Mr Hjøllø graduated in meteorology in the early 1990s in the University of Bergen, there was uncertainty about the impact of CO2 on climate. "Today, there is no uncertainty in it," he said.

"Through media channels, we have learned that the current U.S. president dismisses climate change as a 'con job,' which directly contradicts established scientific evidence."

"NOAA, which helped us identify the ozone hole from the 90s being a much trusted scientific organization globally, is not trusted now by the current US Administration when it comes to identifying the ongoing Climate change."

"We need to reduce greenhouse gas emissions ASAP. We can't wait many years for all people to agree. Stakeholders in the maritime industry have to continue our work together with the global scientific community, without delay"



Improving how we decarbonise

Representatives of ferry operator Fjord1, dry bulk manager Grieg Star, chemical / ro-ro operator Seatrans and service companies Danelec and Manta Marine shared perspectives on improving decarbonisation and data

As a ferry provider always going between the same points, Fjord1 operates in a very "fixed environment". It is possible to compare emissions data from different trips, said Jan Hovden Eide, Energy and Environmental Manager, Fjord1.

He was speaking at a panel discussion held at the People Tech Maritime Bergen event in November, "What are we learning about the best way to manage and present data to support decision making relating to decarbonisation, vessel performance and compliance".

It is still difficult to gather the same data

from all the vessels, and the company has not yet found a good way to use high frequency data yet, he said.

Grieg Star does collect some high frequency data, but "we are not using this to the fullest extent," said Henning Rebnord, Principal Engineer, Grieg Star. "We are not able to trust it, at least on a general basis."

It means that "noon reports are still the bread and butter" for data collection from ships.

High frequency data could be used to better understand the relationship between fuel consumption, revs per minute of the

shaft, and torque (power on the shaft), he said.

Without sensor data, we are reliant on data being entered into forms. It is good if as much of the form as possible can be automatically completed, to save crew workload, he said.

So far, this has proved to be tough to set up, and you still need a person to check it.

You do not need perfect data. It can be possible to work with data which has "some noise" in it, he said. In one project, data analysts found useful patterns in imperfect data "which we would never have found

looking with a naked eye.”

The company has a data steward, a business expert who takes ownership of data and “takes pride in data accuracy,” he said.

If someone takes pride in making sure the data is accurate, then it becomes accurate, added Ådne Brunborg, Chief Data Officer, Seatrans, moderator of the discussion. A great deal of the work of data management comes down to how it is managed, “seeing what is needed and being brave enough to take away what is not needed.”

It is helpful if you can detect if sensors may be drifting, said Christian Treu, VP Revenue, Danelec. You can have a chat with the captain to find out if it is a problem with the vessel or with a sensor.

“If you have a few outliers, you can detect them and do something about that fairly easily”.

Manta Marine collects and analyses data from about 500 vessels as a vessel performance service provider. It then analyses how the vessels are performing, how they are affected by weather, and what can be done to reduce emissions.

“We didn’t have [so much] data in the past, we did our best guess [about how to optimise],” said Robin Wulf, Team Lead Fleet Performance, Manta Marine Technologies. “Now that we have the data it is easier to understand the vessels and pick low hanging fruits [to improve].”

“We have talked a lot about data quality in our company, he said. “You can’t make reliable models if the quality is bad. We have our own data science team constantly investigating data quality.”

However, “it is very hard to define bad data,” he said.

When it comes to gathering data, “we tend to forget the people onboard are already under a lot of pressure and stress from all parties. The more we can prepopulate reports, the better.”

However, “we cannot have automated data flowing through without any human onboard looking at it and confirming that what we have is accurate. It is important for crew to be able to check and manually override if they don’t agree with it,” he said.

Regulatory stress

With environmental reporting, Fjord1 was initially required to provide data for only some of its vessels. The reporting requirement then increased to cover emissions for the whole company, with 250 data points, Mr Hovden Eide said. “There’s a lot of extra work and, we felt, very little value.”



The decarbonisation panel

“I like to work with data in ways that make value,” added Grieg Star’s Mr Rebnord, “not crunch data in different ways for different directives. That’s not what gets my heart beating.”

On the positive side, regulations and associated costs drive people to change direction with emissions, Mr Rebnord said. “When dealing with people in chartering and operations, if I show them what FuelEU means, we are on the same page.”

“The dollar is a common language, everybody understands. It makes my job easier.”

It does not make sense for the European Union to have such detailed reporting requirements while many countries in the rest of the world do not care. It is good that EU is simplifying its carbon regulations through the EU Omnibus package, he said.

“Our fleet spends 10 per cent of time in EU. If you had the same [regulation] worldwide it would be easier for sure.”

For a company only operating in Europe such as Fjord1, stricter regulations can be an advantage, if you are able to reduce emissions, said Mr Hovden Eide.

“We have been successful in running electric hybrid ferries for the last 8 years. We made it a business model that is successful.”

It would be nice to reach a level globally to say, these are the 8 to 10 KPIs we are looking at,” said Danelec’s Mr Treu. “In future, more of these [regulatory] metrics will be industry standard and used as KPIs. That will find its way into the commercial part of shipping. The decarbonisation revolution starts there.”

“Staying compliant is tough,” said Manta’s Mr Wulf. “New things pop up all the time.”

It is very hard to create a software system which enables companies to stay compliant with the complex regulation and is also easy to use for crewmembers, he said.

Aligning charterers and owners

The charter party contracts between charterer and shipowner are often many decades old, Grieg Star’s Mr Rebnord said. “They are not written for what we are seeing today. That creates unnecessary hassle when dealing with these new tax regimes.”

Many charterers are being careful about investing in green technology for ships. They want to make sure the charter period is long enough to get their money back. “The time needed to recover the investment is often longer than typical charter agreements,” explained Manta’s Mr Wulf.

“This opens up a chance for ship owners and charterers to work together on new solutions. As the industry changes, more people are looking for ways to make environmental improvements that also make good business sense,” he added.

If the carbon framework was less complex, it might be easier to create alignment between charterer and owner, said Danelec’s Mr Treu. Charterers are coming under increasing pressure to reduce emissions from their suppliers, he noted.

“It is a matter of finding the right formula,” he said.

Where to spend money

It is very hard to work out which investment on decarbonisation technologies and software will bring the biggest returns. “I



often find vendors underestimate the costs [of implementation],” said Ådne Brunborg, Chief Data Officer, Seatrans.

“Not just the monetary cost, but [also] the strain on [human] resources, especially when it comes to smaller companies. Introducing any system means taking effort away from day-to-day business.”

Vendors often offer a free trial, but it still takes a great deal of people’s time to try out a system, Grieg Star’s Mr Rebnord agreed. It

makes it very hard to assess the technology.

“It feels like a jungle out there,” agreed Manta’s Mr Wulf. “Everyone wants to take initiatives, but no-one knows which are the best. The industry needs to be more transparent about its achievements, so other players can make the same changes. We cannot keep the data to ourselves.”

When Danelec’s customers are implementing its technology, “we go onsite, we say, ‘we are your new best friends, we

will teach you for a week,” Mr Treu said. It also helps a great deal if there are people in the customer company who are enthusiastic about the technology.

Shipping companies may find it easier to choose software systems if they think carefully about where they are on their digital maturity curve, and if the solution would help them get to the next step, he said.

Common language

There can be benefits to having software developers (and other tech resources) sitting close to chartering and/or operations people, to facilitate informal dialogue between resources, said Mr Brunborg of Seatrans.

“Language barriers are something we experience more and more,” said Manta’s Mr Wulf. “It used to be just [between] vessel and office. [Now] it is pretty hard to talk to [software] developers when you are not a developer.”

It is useful for data specialists to have in-depth knowledge about shipping, Grieg Star’s Mr Rebnord said. This hybrid competency is “a huge benefit and something we need.”



OSM Thome – threats with e-mail and fake invoices

Some of the biggest cybersecurity threats to shipping today are with e-mail, both as a means of attack and hackers seeking access to e-mail accounts. Fake supplier invoices are increasing. Arne Sørensen explained

E-mail is a big cybersecurity threat in two ways. It is used for phishing attacks and supporting the hacker’s aim of gaining access to corporate e-mail accounts, explained Arne Sørensen, Senior IT Manager, OSM Thome, speaking at People Tech Maritime Bergen in November.

“We are very vulnerable when it comes to emails. We have about 400 vessels with 5-6 email addresses on each. We have a lot of emails going to all the vessels.”

“We try to adopt zero trust, never assume internal emails are safe, even when it looks like they are coming from the vessels. We handle the vessels’ email addresses as external.”

Logins to access e-mail onboard have historically been role based, such as one login for the master. But it is easier to

manage cybersecurity if logins are given to individuals, so if one account gets compromised, it can be closed, while other crewmembers continue with their access. This is a change likely to happen soon, he said.

Creating individual logins means extra administration work, with 29,000 seafarers on OSM Thome’s database. “We need really good software for that one,” he said.

Multifactor authentication systems to log on to e-mail is a “little bit of hassle but something we need to have,” he said. “That’s something we have been working on over the last few years. There will be more and more need for that.”

It is important to implement DMARC SPF and DKIM on e-mail domains, to ensure that e-mails can only be sent by someone authorised by the domain owner.

Invoices

The company has also seen its suppliers being hacked. Then it receives invoices with different bank account details.

OSM Thome receives around 600,000 invoices a year, so it cannot check them all manually. There are routines in the invoicing system, which route an invoice to a manual check if it does not have the right account code, or there has been a change in the name. There is also a system for making checks on any new vendors.

“Sometimes it takes time to get invoices through the system, but we need to have this thorough control of things,” he said.

OSM Thome has also received invoices from fake suppliers, sometimes with changes which are hard to notice, such as an e-mail from ‘microsoft.com’.



Arne Sørensen, Senior IT Manager, OSM Thome

Operations technology threats

Vessel systems are increasingly connected, including with operations technology onboard, which gives hackers a bigger surface to try to access.

The company seeks to control the networks onboard as well as it can,

including with segregation.

There are threats to GPS services for shipping in parts of the world. This means that vessels need to navigate using other means. "We try to train bridge teams to detect when things are not normal," he said.

Continuous effort

The cybersecurity threat is "evolving a lot," he said. Maintaining defences is a continuous effort, not a one-time fix.

People are both the weakest link but also the first and strongest line of defence, he said. "As we train people, we are strengthening security."

"We try to integrate technology, training and teamwork together to get everything more secure, working together from shore to vessel," he said.

Cybersecurity can be understood differently by people from different cultures. The company is seeking to implement standardised best practise and controls across the company and on all of its ships, he said.

There are procedures for "more or less everything" which are continually updated, he said.

OSM Thome does a great deal of staff training for cybersecurity. "We provide staff with updates about new threats to applications. We run cybersecurity drills, sometimes managed by external companies," he said.

The company stays informed about maritime specific threats and mitigation methods. "If we can see if there's something [for threat mitigation] happening in Asia we can adopt that and take it into Europe," he said.



Omny: making cybersecurity easier to manage

While people may create most cybersecurity risks, only people can manage them – automated tools are not enough. But digital tools can make cybersecurity easier to manage. Andreas Grefsrud from Omny explained

With cybersecurity, "humans are very often the weak link," said Andreas Grefsrud, security specialist, Omny, speaking at People Tech Maritime event in Bergen.

"You can buy the best security product in the world, but that won't help if your people don't understand the importance of their assets and how they support business operations, where the vulnerabilities are, and how certain threats may want to compromise your company."

Mr Grefsrud has been working in cybersecurity for about 20 years, including as a consultant, auditor, and head of cybersecurity in a shipping company. Omny is owned by Aker and Telenor.

Jaguar Land Rover attack

"An adversary will exploit any vulnerability to get to your crown jewels," he said.

Consider the Jaguar Land Rover cyberattack in the UK. The attack started in March 2025, likely with the compromise of Jira accounts. Jira is a project management tool.

Once the attackers had done this, they



Andreas Grefsrud, security specialist, Omny

employed at least 16 further tactics in order to access and gain control of the digital infrastructure of the company.

Eventually, they were able to "launch a denial of service at end points," so people were not able to get access to IT systems. The costs were estimated at £1.9bn. "This happened because someone was negligent about their credentials," he said.

Cannot rely on AI cybersecurity

There are many claims that AI can help with

cybersecurity. "It can be dangerous if the belief is that AI can replace the cybersecurity professionals," he said.

For example, "you will hear AI handles everything automatically, no need for any intervention by humans. Engineers can focus on operations while AI protects in the background," he said.

But an AI system may not realise how critical a certain component is to the safe running of the ship. It may automatically shut it down because of a hack, leading to operational risks. In a safety critical situation,

“human expertise is irreplaceable,” he said.

Instead, Omny emphasises that digital tools should “augment” human capability, rather than seek to replace it. For example, digital tools can give people advice about what they need to do in natural language, such as “controller can be remotely stopped, prepare check in the next window.”

Digital tools “need to translate and not complicate,” he said. They need to “guide, never dictate.”

In the company, “we need to build security intuition, making people better at cybersecurity,” he said. “The best security tools are ones that makes the user smarter about their own solutions.”

Cataloguing your assets

In order to manage cybersecurity, first you need to know what you have. Many shipping companies do not have a clear idea of how critical the operational technology is onboard their vessels.

You can make a list of assets manually doing a survey, which is labour intensive, or use network scanners which look for devices on the network.

A third way to do it is to use platforms like Omny where AI is used to parse

network documentation and create digital representations of them.

This representation can also be merged with any other list of devices you have, such as from a manual survey or from using a scanner.

The Omny platform then generates a network schema, enabling contextual visibility between the digital assets and the physical processes, and how everything is connected. This is what is needed for an OT engineer or cybersecurity professional to work effectively.

The Omny platform classifies devices and components into Purdue levels. Most cybersecurity tools only scan the network layer, and will never be able to capture what is happening on the physical level (level 0 in the Purdue model), he said.

The capability of connecting devices to physical processes, combined with the platform’s agentic AI which connects vulnerabilities and assess how threats could disrupt the operations, is key to understanding and prioritising security risks.

When there is an announcement about a critical vulnerability affecting certain devices, the Omny software can determine which of your devices may be affected, how the operations are affected, and then give you a prioritized list of what to do.

The solution can also consider the geographic location of a vessel, which may be useful if the threat only applies in a certain part of the world.

NIS2 regulations

European shipping companies will shortly need to comply with European Union NIS2 cybersecurity regulations. It builds on the first NIS Directive (NIS1), which had been in force since 2018, including in the UK.

“NIS2 is more relevant and stringent than the existing NIS,” he said. “It is based on good practise and internationally recognised standards.”

All NIS2 measures should be “risk based,” dependent on an assessment of the risk. The regulation states security measures and barriers you should implement but does not specify how it should be done or how strict they should be. The robustness of the measure should align with the assessment of the risk.

NIS2 also includes a requirement to report incidents.

Digital tools like those from Omny can help you navigate legislation frameworks like NIS2, he said.

PTM

The biggest cybersecurity challenges

Speakers from G2 Ocean, OSM Thome, Omny and BASSnet discussed the biggest challenges with cybersecurity in a panel in Bergen, moderated by Erlend Erstad, Business Development Manager, Norma Cyber

Being responsible for overall cybersecurity both on the fleet and shore side, what worries me the most is the speed of technology,” said Kristin Helen Andersen, Vice President IT, G2 Ocean.

She was speaking in a panel discussion at People Tech Maritime Bergen in November, “How is the cybersecurity threat evolving?”

“As a team we don’t control everything, we are dependent on business partners. And we are never stronger than the weakest link.”

“Hackers go for our vulnerabilities and insecurities as human beings. Where we had situations, it was because people were not thinking. You have time to reflect, use it. If something seems weird, it probably is.”

“At some point, at some time, we may experience the worst. And are we prepared for that?”

“We need to bring in information security

as part of our safety culture,” she said. Crew need to be “capable of dealing with the threats at the time that they need to.”

It is not possible for everyone in the company to be a cybersecurity specialist. There has been a shortage of cybersecurity professionals in the past, but the situation is getting better now, she said.

G2Ocean has used game-based cybersecurity training. It also does role play based training of threat situations, with the board of directors, and managers at different levels being involved.

Technology for monitoring potential attacks “must improve,” she said. “As humans we are not capable of doing that kind of monitoring.”

“Patching sounds really boring, but it’s one of the things that makes us more secure,” she said. “It is not always done to the level of expectation.”

It is important to standardise how things are done with IT in the company, she said.

OSM Thome

The constantly changing digital environment is a big challenge to maintaining cybersecurity, agreed Arne Sørensen, Senior IT Manager, OSM Thome.

“It is difficult to predict what kind of system we need to have one year ahead.”

Crew need to understand cybersecurity. Crewmembers from different cultures may have different levels of concern about security in general, he said. “Training of the crew is very important. Inform them as best as possible again and again.”

OSM Thome brings in outside companies to do penetration tests on its on-premises IT system and its cloud system. “We work with vendors a lot,” he said. “It takes a lot of resources to do those things completely right.”



OSM Thome is subjected to many cybersecurity audits from customers and others. The auditors ask to see evidence that these tests have been done.

Omny

With cybersecurity, "the human factor is one of the biggest challenges," said Andreas Grefsrud, Director, Omny.

"This is about psychology really. Any adversary knows that people are gullible. We tend to believe what we are told. That [weakness] is being exploited."

When using digital tools for training, "I found that gamification beats everything else," he said. For seafarers, it is like playing Candy Crush on their phones. It means that people have more active participation. "Passive learning doesn't work."

"Many seafarers in that company had already tried gamified learning in the safety domain, so they were familiar with it," he said.

Many seafarers had already seen computer game type learning tools for safety, so they were familiar with the approach, he said.

Cybersecurity should be seen in the same way as other areas of safety, he said. Maritime safety departments have managed to integrate good practise into everyday work.

Operations technology cybersecurity is many years behind maritime safety

management in its ability to do this, he said. "Most business owners see cybersecurity as a cost centre."

Cybersecurity competency can be seen as a competitive advantage, such as if a supplier who is certified against ISO 27001 might be more attractive to a customer. "If you can claim that you are NIS2 compliant, that will get you a long way."

Achieving NIS2 compliance may require a company to change the way it is organised, for example the CISO may need to report to senior management, not the head of IT, he said, to avoid a possible conflict of interest.

Mr Grefsrud recommends that you "try to understand what is written in the regulations and why it matters."

BASSnet

If shipping companies use cloud hosted software, then many aspects of cybersecurity are taken care of by the software company, said Haakon Dalan, Vice President of Sales, BASSnet.

About 35 per cent of vessels using BASSnet software use the cloud hosted version, he said. "We are taking on the [cybersecurity] burden for shipowners and ship managers."

"All the cybersecurity patches can be applied automatically by the software provider, he said. "We are plugging the hole."

"It is a challenge for many shipping companies to keep themselves up to speed on these issues. This is maybe not their core business."

BASSnet works with a cybersecurity provider called Datadog for threat detection and anomaly detection, providing alerts. BASS staff review the alerts manually. This shouldn't be fully automated, he said. There is a risk that fully automated systems

might shut business critical systems down unintentionally if they see a threat.

Contracts with suppliers

Mr Grefsrud recommends that you write cybersecurity clauses into your contracts with providers, including in service level agreements (SLA), with a definition of roles and responsibilities.

Otherwise, you will only get what you paid for. "The vendor is responsible for what they deliver but it ends there," he said.

"If you didn't get the SLA into the contract on signing, it is almost impossible [to add later]," added G2Ocean's Ms Andersen.

As a supplier, BASSnet was required to meet NIS2 standards in a contract it signed with a German government customer, said BASSnet's Mr Dalan. "We had to step up for that customer," he said. "You will always be better when you have challenging customers."

Mr Dalan recommends that all shipping companies "put requirements on suppliers to get applications designed for security, put security requirements on the cloud hosting part of it, get upgrades regularly."

Insurance

It is very difficult to get good cybersecurity insurance, said Mr Sørensen of OSM Thome. "When we look at the different companies and their terms, there are a lot of exclusions."

The contracts often require the shipping company to be able to prove they have followed 'best practise,' he said.

Insurers require that companies comply to various standards, but "if you do those things you don't need the insurance," said Mr Grefsrud. "That is almost a scam in my view."

"Most Norwegian insurance companies would be bankrupt if they were insuring Jaguar Land Rover," he added.

Cybersecurity risks from AI

If you are implementing AI it is important "not to run too fast with it," Ms Andersen said. "This is a complex area. Understand what you implement, what you are trying to solve. You shouldn't do that without careful consideration, especially when we talk about opening this up to our vessels."

"There are risks [with AI] but you don't really know them, so you need to do the assessments," Mr Grefsrud added.

"You should think twice before injecting company data into the AI platform. In operations technology, it could be quite problematic. Anything that is operations critical, you should be quite wary of automating using AI."

"Using AI as an augmentation tool is the way to go. It is not that smart yet,"



Seaber – using AI to connect cargoes with vessels

Using AI based tools to connect cargoes with vessels enables you to optimise for more parameters, leading to savings of 3 to 8 per cent over doing it with spreadsheets. Seaber explained how it works

Connecting bulk vessels with cargoes is a complex task. This is something shipowners have to do if they have a number of vessels, a number of potential cargoes, and need to work out which cargoes to try to fix.

This is also something charterers have to do if they have their own chartered fleet to match with cargoes they need to have transporting.

Until now, it has been mainly done with a combination of spreadsheets (to try out different scenarios) and voyage planning tools (to work out the costs of carrying the cargo).

By using AI based tools to try out different scenarios, combined with software to work out the costs, it can be possible to save vessel costs by 3 to 8 per cent, Seaber says.

In a study, Seaber compared the savings a real tanker operator would have achieved, if it had assigned vessels to cargoes using Seaber software, with data which was available at the time of doing it, compared to what was actually achieved.

It found that the Seaber match would save 3 per cent of vessel costs, from increased vessel utilisation, lower operations costs, and more laycans met. This was \$720k savings from the actual costs of \$23.7m.

If the model was adjusted to allow short delays, something easy to do in software but harder in spreadsheets, Seaber found options which could save \$2m, or 8 per

cent of total costs. By allowing just one delay, costs could be reduced by \$1m, or 4.2%.

Typically, when matching cargoes to vessels, shipping company staff only seek to find a solution which works, Seaber says. They do not know if they have the best possible solution.

This work involves calculating the costs of carrying the cargo, including an estimation of voyage time and fuel costs. You need to check the vessel's drafts fit the chosen ports, and the proposed cargo is compatible with the previous cargo. You make estimates of port costs and add a margin for bad weather.

You also need to assess the market to see what other vessels may be competing for the same cargo.

If you have more than 3 vessels, the complexity of the spreadsheet can get out of hand," says Arto Vitanen, VP product with Seaber. You may end up jumping between multiple software tools and spreadsheets.

With Seaber's software, you can import many different types of available data to support the decision making. The software can generate different scenarios (different ways to match vessels with cargoes), giving them scores for different KPIs, such as total costs, emissions, or delays. You can then choose which one to go for depending on your business priorities.

You can try things out, such as to see how profitability may improve if you decided a 6-hour delay was tolerable. You may decide that you don't mind the vessel being late for one charterer, but you definitely want to be on time for another charterer. The software can work out a scenario around that.

The Seaber software provides easy visualisations. You can drag and drop to create voyages or cargoes for your vessels, while seeing data about how profitable your current plan will be, and other factors about it.

If the market conditions change, such as with a vessel delay or new cargoes on the market, the software can create new scenarios in minutes.

People still make the final decisions; the software tool is designed to make it easier



A chartering manager assigning cargoes to vessels assisted by Seaber

for people to make the best decision.

One person said the software saved 15 hours work in a week compared to spreadsheets, Seaber says.

Seaber has its strongest customer base in multiparcel shipping, such as with breakbulk, chemicals and clean petroleum products. It also has some dry cargo shipowners as customers. Both charterers and owners can use the software.

Shipping company customers include companies ForestWave, G2 Ocean, Alba Tankers, AAL Shipping, Ultratank and Wilson. Chartering customers include petroleum and biofuel company Preem, Finnish oil products company Neste, and forest product packaging / construction products company Stora Enso.

Data import

To match vessels and cargoes within Seaber's software tool, the first step is to bring in all of the data, including about available cargoes and vessels, restrictions, voyage durations, and costs.

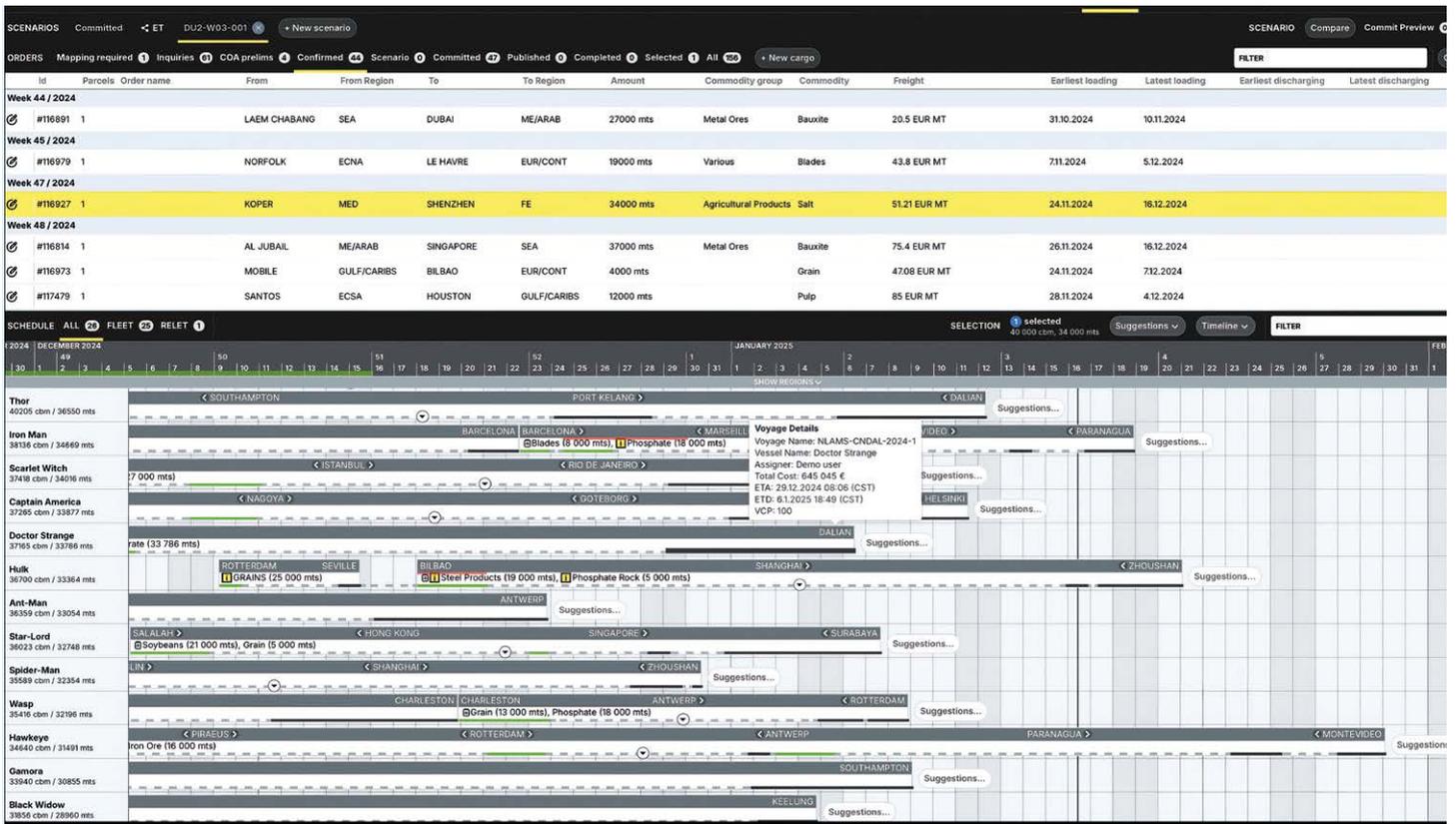
Vessel and cargo data might come from your email, WhatsApp messages, or your ERP system (for charterers with cargoes booked within the company).

Seaber's software integrates with tools from maritime technology company Sedna which parse e-mails to find information about market cargo enquiries. This data is put into a structured format, which can be brought into the software.

The software can take data by dictation. For example, "10,000 metric tonnes of



Arto Vitanen, VP product with Seaber



Matching cargoes to vessels with Seaber software

methanol from Fujairah to Singapore, earliest loading Dec 1, latest Dec 14, loading 200 metric tonnes an hour, discharge rate 200 metric tonnes an hour.”

A LLM based tool in the software can align this data, so that commodities or ports are always spelt in the same way.

You can bring in data about cargo compatibility, specifying which cargo is allowed to follow another cargo, or the required cleaning. Different charterers have different cargo compatibility requirements.

The software will ‘normalise’ all the data, so it can be compared.

Optimisation algorithms

The second component of Seaber’s software is the optimisation algorithms. These work out which cargoes would give us the best daily earnings, considering whatever factors and constraints we set.

You may want a scenario which maximises profits, maximises vessel utilisation, or minimises risks, or something in between – reasonably good profitability and utilisation with low risk.

You can optimise a match covering a few vessels, or hundreds of vessels and thousands of cargoes.

You can also create your own scenario, using “drag and drop” to put cargoes with vessels.

The software can generate individual voyage suggestions, showing which individual cargoes a vessel will carry, and which port it will visit.

You can show cargoes requiring freight and vessels available for a certain region of the world, such as Mediterranean Europe. You can create these regions by drawing on a map.

You can see the expected costs of bunkers and ports, and the voyage profit. If you think you could negotiate a \$3 a tonne increase in the rate, you can see the impact that would have on the earnings.

You can calculate how much the vessel would earn if it had that cargo, estimating the freight rate you will earn from the charterer, and taking its fuel and operations costs into account.

You can also add in specific constraints. For example, you may want to ensure there are no delays with vessels working for a certain charterer, because your vessels with that charterer have been delayed too many times in the past.

You may want to consider, for example, if the vessel is likely to find another cargo for its next voyage, close to the destination port for the current cargo. This may be something which draws on human expertise of markets, rather than available from within the software.

In future, voyage emissions may become a more important factor for charterers,

and so something to consider when connecting vessels with cargoes. You may also want to minimise costs associated with FuelEU Maritime compliance. The software can calculate this as well.

The system is already designed to find ways to reduce fuel consumption, which would mean lower emissions.

Once you have options, you can shortlist them and then compare different scenarios on your shortlist.

As you progress towards fixing (contracting) the cargoes to vessels, your planning moves through various stages, such as enquiries, confirmed, shortlist, scenario, committed, published, completed. You can see all of your cargoes at the different stages.



This article is based on a webinar Seaber held with People Tech Maritime in November.

You can watch the webinar on YouTube here

<https://www.youtube.com/watch?v=bwL93lhqH8c>

The article also references Seaber’s case study, which you can download at: https://www.seaber.io/download-case-study?utm_source=ptm&utm_medium=article&utm_campaign=case-study



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