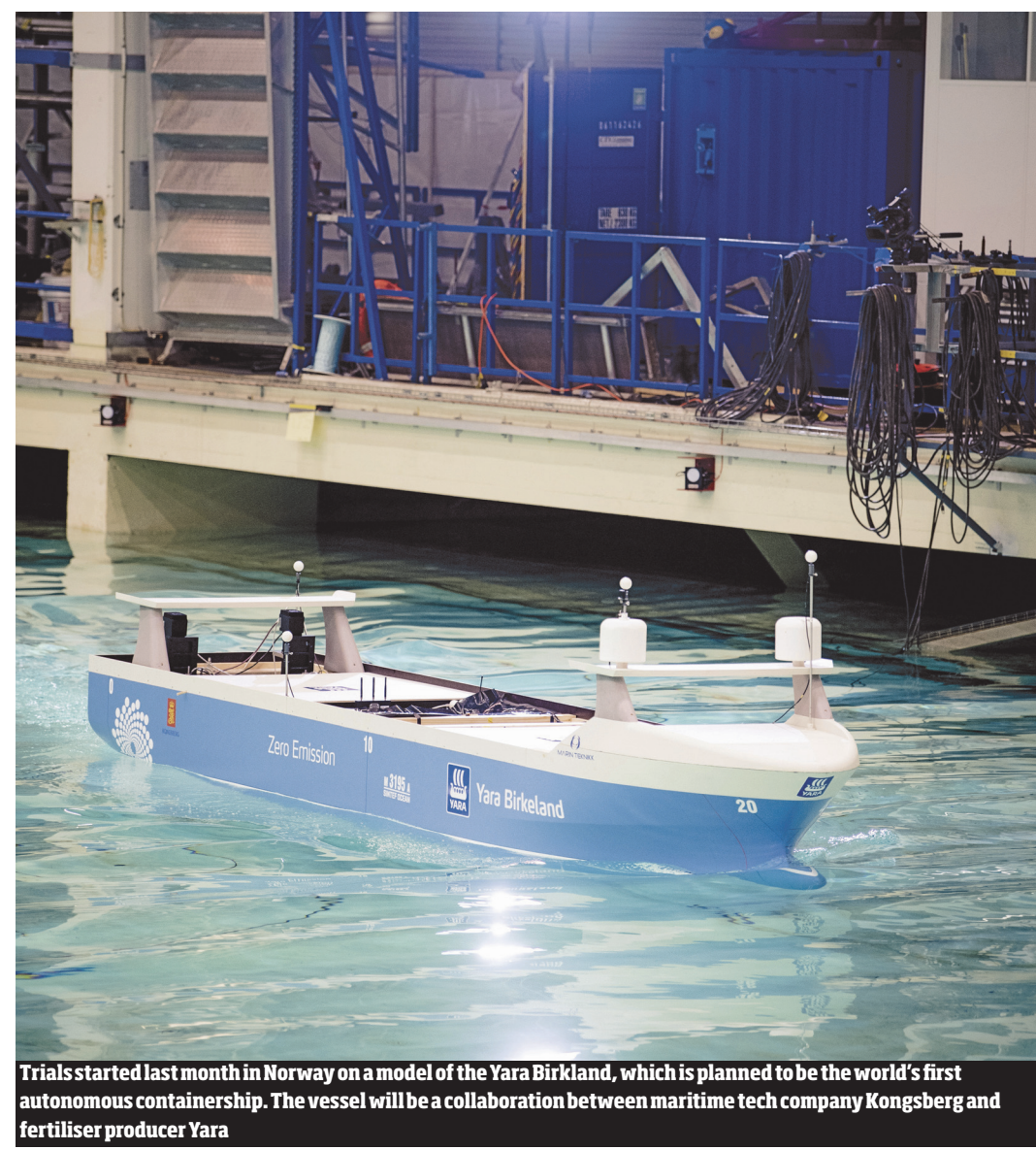


NAUTILUS AT WORK

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Making the most of the new reality



Trial started last month in Norway on a model of the Yara Birkland, which is planned to be the world's first autonomous container ship. The vessel will be a collaboration between maritime tech company Kongsberg and fertiliser producer Yara

Seafaring is set to be transformed by the rapid advances in 'smart' shipping. Nautilus International's UK branch seminar on maritime automation heard.

Southampton Solent University Emeritus Professor Mike Barnett told the meeting that the cheaper satellite communications and the increased ability to transmit huge volumes of data are opening up a wide range of possibilities for the shipping industry — including new business models.

The new generation of high-tech vessels are likely to operate with increasingly reduced crew levels, Prof Barnett said. 'Where there are seafarers on ships, they will be in small numbers but will be highly trained and specialist,' he predicted.

Ships are likely to make increasing use of 'assisted technology' — with certain levels of automation and enhanced support from key systems, depending on certain conditions. Shore-based condition monitoring taking big data from thousands of sensors onboard ships will increase, he added, and will improve vessel performance and efficiency.

However, there could also be a risk that seafarers could be de-skilled and operators may decide to run ships with a handful of low-skilled crew under shore-based control, Prof Barnett warned. 'There is a concern that not enough serious consideration is being given to the question of what skillsets will be required for these ships,' he said. 'We don't see much movement at the IMO, or anywhere else, on this issue.'

The traditional divisions of deck and engine departments may well go and there are big questions about how

With automation now looking to be an inevitable development in our industry, we all need to prepare for the impact of the changes. And where better to start than the Nautilus UK branch automation seminar...?

social life onboard may be affected by these changes,' he added. 'There will be challenges for mental and health and wellbeing for small crews over extended periods and if we are using condition monitoring for machines there could well be a case for doing it for seafarers as well, with sensor equipment to send back data on physical and mental variables.'

Prof Barnett said the industry needs to question what sort of people it will need to recruit for such work and to look at studies done by NASA on the psychological impact of crew being isolated for extended periods.

However, he suggested that the introduction of autonomous ships is likely to vary significantly between different sectors of the industry. 'One of the main drivers will be whether it makes economic sense,' he noted. 'Nobody will do it unless they feel there is some competitive edge that it will give them.'

The 'hybrid space' created by conventional shipping running alongside autonomous vessels could cause problems, he cautioned.

Nautilus Council member Mike Lloyd said seafarers have been working with technology for many years — but issues such as GPS spoofing and satellite interference show the risks of over-reliance on certain systems.

'There are many problems which have



Professor Mike Barnett Picture: John Jones

not been considered by the people who are hyping-up the idea of automation to replace seafarers,' he added.

Iain MacKenzie warned that further reductions in crew complements could add to the pressures on those remaining.

And John Thomson said Nautilus needs to be at the forefront of discussions to ensure that the staff in shore-based fleet control centres are trained professional seafarers — and that proper training is given to those coming in behind them.

Senior national secretary Allan

“If there are seafarers on ships, they will be in small numbers but highly trained and specialist”

Prof Mike Barnett
Southampton Solent University

opportunities,' he suggested. 'But our voice must be heard.'

General secretary Mark Dickinson said seafarers and shipowners need to work together. 'We should be worried about people coming in from outside the industry saying that they can do it better and doing it completely differently,' he added.

'Seafarer will adapt to the technology as we have always done, but their views and experience need to be taken into account. We can use technology to enhance working lives rather than creating a dystopian future and I am confident that seafarers will come out on top, because they cannot do without our skills and professionalism.'



David Appleton, Nautilus professional and technical officer

Unions must make seafarers' voices heard in robotics rush

Safety and social issues are being ignored as big industry players plough huge amounts of money into making autonomous shipping concepts a reality, Nautilus professional and technical officer David Appleton told the seminar.

The big challenge for maritime unions is to ensure that seafarers are made the priority and that technology is used to enhance safety and improve working conditions rather than being used as just another way to cut costs.

Mr said it was hard to see the financial logic of automated ships at present. 'When shipowners are free to pick and choose from the cheapest labour available, hiring and firing at will with none of the normal protections that could be expected by workers ashore, it is difficult to argue that the case for autonomous ships currently makes financial sense when you consider the amount of investment required in additional technology and redundancy,' he said.

As well as major legal obstacles for autonomous ships, there are big questions about the reliability of communications and equipment, the suitability of existing sensors and management of routine maintenance, he pointed out.

However, he added, the prospect is becoming increasingly real — with Japanese shipping company NYK Line planning to sail a containership across the Pacific via remote control in 2019 and the Norwegian ship Yara Birkeland, due to be delivered in 2018, set to be the world's first fully autonomous, fully electric vessel.

Mr Appleton said the problem for seafarers is that they are not high on the agenda as manufacturers spend lots of money on making the technical and economic arguments for autonomous ships.

Social and safety issues need special attention, he argued, and the shipping industry needs to look at the valuable lessons offered by the aviation sector. Automated systems have helped to secure significant reductions in aircraft accidents, he said, but there is also evidence of new risks — including the degradation of key skills as a consequence of automation, the 'stairle' effect when systems fail, over-reliance on technology, diminished situational awareness and alert fatigue.

Mr Appleton said a research project carried out in Poland and published earlier this year, analysed 100 accident reports to determine if they would be more or less likely to occur if the ships were unmanned. It predicted that the likelihood of accidents occurring would be less — but that the consequences of an accident would more often be worse.

In particular, he said, fire and flooding incidents could be much worse without seafarers onboard to take remedial action and minimise damage to the vessel.

However, Mr Appleton stressed, it will be many years before crewless ships are common and for the next 20 years there will be more interaction between seafarers and complex systems onboard their ships.

As well as safety questions, these developments will also pose important social challenges, he pointed out. 'There are examples where properly designed automation has significantly improved the working life of individuals, freeing them from monotonous tasks and allowing them to concentrate on more important decisions, but again there are plenty of examples from history, turning the work of a skilled craftsman into a boring repetitive task.'

'If automation is used in a productive way to reduce working hours, cut fatigue and ease the burden of paperwork and administration, then this can only be a good thing for companies, for the seafarers and for the cargo owners,' he argued.

'The challenge for us now is to ensure that the seafarer is the priority here, and that every step along the way, the introduction of new technology is driven by the need to enhance safety, the protection of the environment and the life of seafarers and not solely as another opportunity to cut costs and maximise profit.'

Research reveals strong views

More than 80% of seafarers see automation as a threat to jobs and almost 86% regard it as a threat to safety, a survey of almost 900 maritime professionals has revealed.

The preliminary findings of Nautilus Federation research into seafarers' views on 'smart' shipping were presented to the UK branch seminar by Nautilus director of communications Andrew Linington. He said the study had been carried out in an effort to ensure that the voice of maritime professionals is not overlooked as manufacturers push for the introduction of autonomous vessels.

The survey attracted more than 890 responses from a wide cross-section of maritime professionals in countries including the UK, the Netherlands, the United States, Denmark, Norway, Sweden, Australia and New Zealand. Around half the participants were masters and chief engineers, but there were also responses from all ranks of officers, superintendents, marine pilots, cadets, cooks, ABs and bosuns.

A large proportion of the respondents were serving in the offshore, cruise, ferry and containership sectors, but feedback also came from members in such diverse areas as windfarm support, superyachts, tugs, tankers and heavy-lift ships.

The survey showed that almost 83% of seafarers believe that commercially viable autonomous or remotely-controlled ships are not likely to be in service by 2020. If, or when, they do come in, members think that such vessels are most likely to be introduced on deepsea services.

While an overwhelming majority see automation as a threat to jobs, Mr Linington said the survey showed that there is no kneejerk opposition to the concept — and almost one-third believe that new technologies replacing seafarers could be beneficial for shipping and almost 20% consider it does offer the potential to improve safety.

More than 82% of respondents said they believed that technology — properly used — could improve the quality of work at sea. Positives could include a reduction in paperwork and administration, the alleviation of fatigue, enhanced watchkeeping support and the elimination of dangerous and dirty jobs — for instance, by using drones to carry out tank surveys.

However, almost 80% said radical changes in seafarer training



Andrew Linington Picture: John Jones

and certification are required to cope with the changing systems.

The skills seen as most essential for the new generation of seafarers are engineering, electro-technical, navigation and management. Many members said traditional expertise will continue to be required to deal with issues such as breakdowns, software problems, emergency response, and preventive and corrective maintenance.

There was almost a 50-50 split on whether the development of shore-based fleet operations centres is a good thing.

Almost 90% of respondents reckoned that owners will only introduce autonomous ships if they are cheaper than using seafarers.

But the drive to cut costs was seen as the most dominant factor behind the development of smart ships, followed by improved operational efficiency, improved safety and a shortage of competent crew.

One member described the industry's push for autonomous shipping as 'a case of the tail wagging the dog'.

Members said they considered the five biggest obstacles to the introduced of crewless remotely-controlled ships to be cyber-security, reliability of communications, legal and liability issues, software quality, and risk assessment and public acceptance.

Many members highlighted the challenges presented by unpredictable sea conditions and the need for on-the-spot decision-making in a dynamic environment.

'One of the biggest recurring themes raised by respondents was the risk of equipment failure,' Mr Linington told the meeting. 'Members said they were deeply concerned over the way in which unpredictable and complex chains of failure can occur onboard and how simple problems like pump and pipe failures or fuel supply problems can quickly escalate into major emergencies without human intervention.'

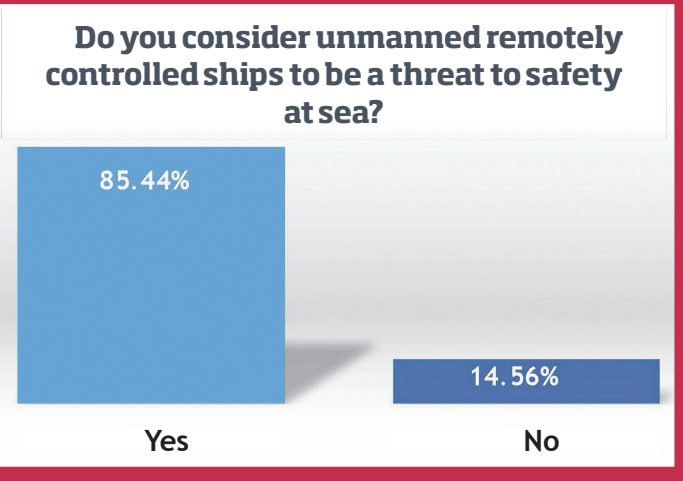
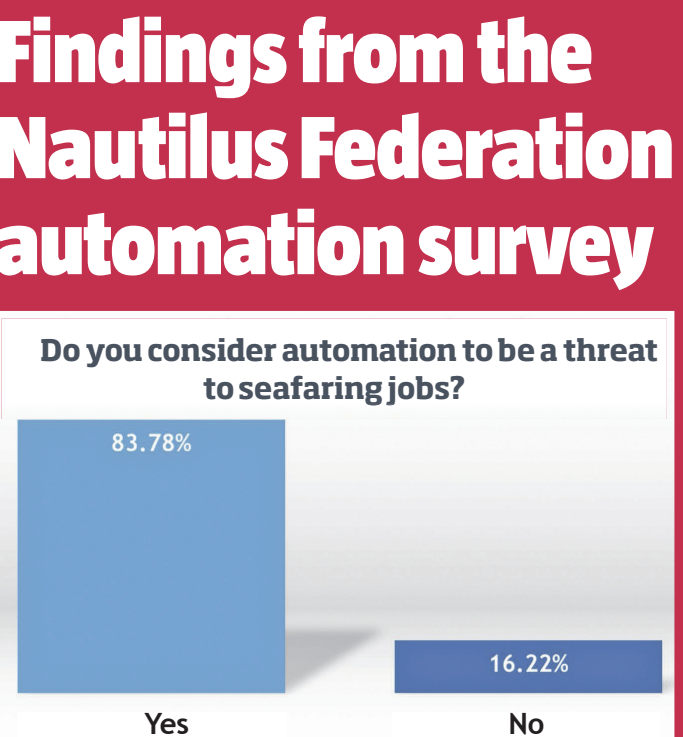
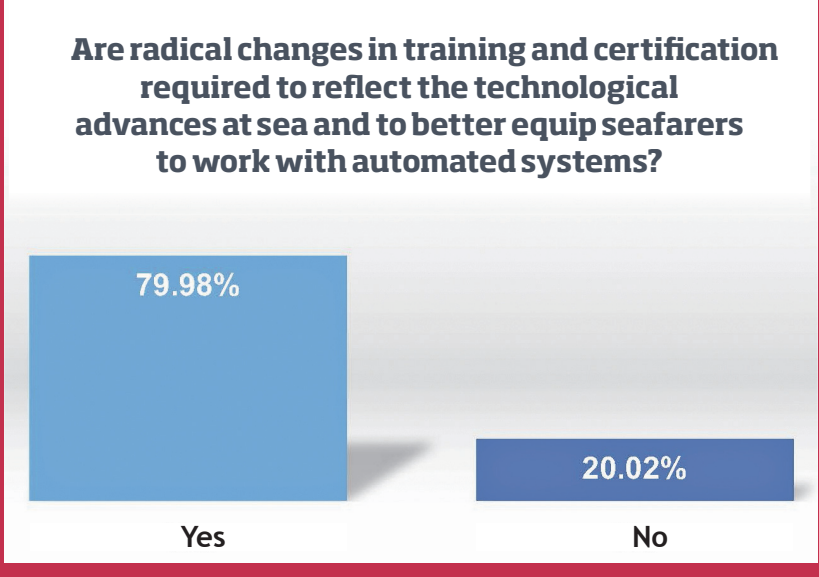
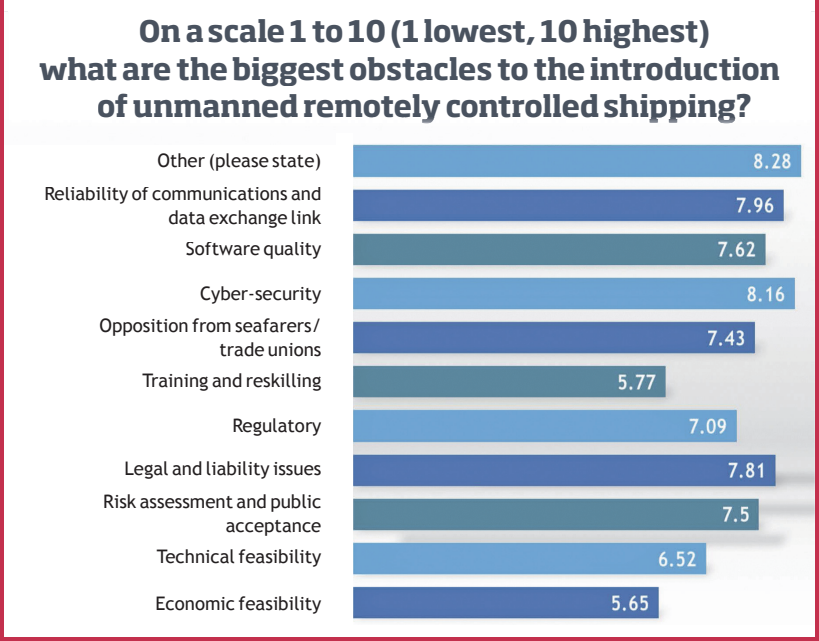
These issues were summed up by one member who stated: 'Engineers work full days just doing routine and corrective maintenance.'

The survey also showed that many seafarers are concerned about the reliability of the systems and equipment used for smart ships, as well as the vulnerability of GPS and satellite communications.

Almost two-thirds of respondents said maritime unions should resist automation. Just over 30% said this resistance should extend to all types of autonomous shipping, 72% said it should focus on unmanned remotely-controlled shipping and just 11% said it should target autonomous shipboard systems.

One member commented: 'We aren't Luddites... Technology to aid ship operation is fine; it's taking operational control out of human hands that poses the danger.'

And another said unions need to embrace technology and get ahead of the curve. 'Accept automation as a fact and get in front of the trend. Make the union the centrepiece of retraining members to operate these modern fleets and become indispensable to the industry.'



Can regulations keep pace?

Grant Hunter, head of contracts and clauses with BIMCO, described the scale of the challenge of revising the global regulatory regime to control the operation of remote-controlled and autonomous ships.

'Many of the international conventions do not sit comfortably with the concept of automation,' he noted, and it could well take more than a decade to overhaul STCW, SOLAS and the collision prevention regulations.

Potential stumbling blocks could include the SOLAS requirements for ships to be 'sufficiently and efficiently manned' and the colreg requirements for the use of seamanship expertise to take action in certain situations.

He suggested that cutting crew costs is not a key factor for owners adopting autonomous shipping. 'From our perspective, we don't see that seafaring costs are a significant driver — the capital costs of autonomous ships will far outweigh the savings from the crew.'

Mr Hunter said these factors mean that it is more likely that the industry will adopt remote-controlled ships rather than autonomous ships. 'The sense of a human presence onboard these vessels means it will be much easier to apply the existing legal framework to them,' he added.



Grant Hunter, head of contracts and clauses with BIMCO