

# Future-proofing your naval engineering

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The naval defence industry is being impacted by the growing demand for new technologies, the pace of innovation, an ageing workforce and the increasing threat of attacks, both physical and cyber; but with long lead times in ship design and build, how can companies work to future proof their naval engineering programmes?

Against a backdrop of increased political tensions globally, both Europe and the US are recognising the need to grow their naval forces and develop high-end capabilities. The demand for new technologies in defence fleets to support this growth has rarely been higher. In an industry where warships and boats typically take a decade to design and another decade to build, there is a constant battle to speed up the pace of innovation.

Technology is constantly evolving and new technologies are frequently coming to the market, it's almost impossible to predict where technology will be 20 years from now. Naval defence companies cannot simply change course mid-way through the design and development process and face a difficult challenge when it comes to future proofing their fleets.

## Keeping up with the pace of change

The naval defence industry has typically been more conservative than other government departments when it comes to implementing new technologies. But there is recognition of the need to change and a growing desire for innovation, having seen the improvements in other departments from implementing automated technology platforms. The industry is now looking at how it can use cross-fertilisation to support change and help it get to field faster. There is an increasing demand for new platforms and technologies such as Artificial Intelligence (AI), blockchain and autonomy of both vehicles and operations to support speed and agility.

### Autonomous vehicles to support agility

The development of autonomous capabilities to execute tasks has the potential to assist in the future proofing of naval fleets. Drones (both surface and underwater) and autonomous underwater vehicles (AUV's) are some of the off-board assets which are potential game changers in this area. They are much quicker to develop than a submarine and easier to adapt, meaning newer technologies can be embedded at a later date, midway through a submarine's development lifecycle. They are also capable of performing some of the more challenging operations of a submarine including Search and Salvage, Mine Counter Measures (MCM) and searching for an Unexploded Ordnance (UXO).

### Blockchain to drive supply chain efficiency

Blockchain is a technology which first emerged in 2016 and has since helped companies around the world in a range of industries manage everything from payment networks, to data sharing. Blockchain is now being adopted by naval defence companies to manage their data more effectively. Complex naval supply programmes generate vast amounts of data in various formats, from numerous sources, which can lead to inefficiency across the industry. It is typically difficult to track shipments and parts, and highly time consuming to manage. Blockchain allows supplier data to be stored globally on thousands of servers, enabling anyone on the network to see updates in near real-time. This also provides security benefits as it is difficult for any single user to gain control of the network.

Implementing this type of technology can help companies save valuable man hours, improve visibility and better manage their complex supply chains.

Other types of technology helping automate naval engineering processes include using automated tools to produce ship drawings much faster, speeding up the design process. 3D printing also enables ships and submarines to print spare parts on board as and when required, instead of carrying lots of expensive and unnecessary spare parts.

Successfully adopting and implementing these new technologies will help the naval defence industry to deliver increased efficiency and agility in its naval engineering programmes, helping to ensure their naval fleets will still be fit for purpose 20 plus years from now.

### In demand technologies



AI



Drones



Autonomous vehicles



Blockchain



Automated drawing tools



3D printing

## Managing a skills shortage

Over the years fewer and fewer people have been choosing careers in the ship building industry, resulting in an ageing workforce, a resource shortage and a lack of digital skills to support the changing needs of its end users. Maritime UK's Labour Market Intelligence Scoping Report 2020 highlighted that the Sciences, Technology, Engineering and Maths (STEM) programme in schools, aimed at increasing the number of students studying STEM subjects has not been successful enough.



The report also suggested that priority should be given to training future employees in the topic of automation to, “ensure that the generation currently going through their initial training should leave with a good understanding of the current position in their field and future possibilities,”<sup>1)</sup> further highlighting the impact this is expected to have on the industry.

1) <https://www.maritimeuk.org/programmes/people/skills-commission/reports/labour-market-intelligence-scoping-report-august-2020/>

The length of time it takes to fully train a naval engineer is also an exacerbating factor. It takes 2–3 years to train for an entry level role but typically up to 10 years' experience is required to fit out a ship. This skills shortage, particularly around the digital skills required to implement new systems and technologies, is leading to an increased requirement for companies to partner with skilled experts and outsource aspects of their naval engineering. A 2019 global report from Lloyd's Maritime Academy highlighted that over 67% of people surveyed believe that there is a skills gap within the sector, with over 20% indicating a gap within technology and IT.

Expleo has set-up its own Skills and Development Centre through which it trains its employees to transfer their skills and training in new technologies from other sectors, to the naval sector. Similarly, a naval defence customer of Expleo's has opened its own university to educate and train their employees in the different naval trades and processes, as well as providing ship-based training to their customers or when there is a transfer of technologies. Universities must work closely with the industry to focus their training on the most in-demand new technologies. In addition, an initiative named “le navire des métiers” supported by all of the French shipyards has been established to promote different maritime occupations, with the aim of filling the resource gap in both military and civilian shipyards. While the industry is taking steps to help address this skills shortage, there needs to be a global initiative to ensure it has both the number and calibre of employees it needs for the future.

## Protecting against cyber threats

The growth of cyber threats in recent years means there is also increased demand for strong cyber security to protect naval systems and fleets. The potential impact from a cyber-attack can be catastrophic for organisations and we have already witnessed devastating attacks against some of the world's largest commercial shipping companies, including APM-Maersk and most recently CMA CGM. With the growth of drones and UAV's, naval systems are increasingly vulnerable to hostile attempts to take control.

Currently many operational ships do not have a robust cyber security strategy in place to deal with a potential cyber-attack. Companies need to understand where vulnerabilities are at present and implement robust, industry standard cyber security processes and strategies for dealing with potential cyber-attacks. In particular they must design security controls that mitigate risks by denying unauthorised access to system internal components and networks.

Cyber criminals are constantly developing new ways to infiltrate companies' systems and information. Ensuring the ships and submarines of the future can stay one step ahead of the evolving threat from cyber criminals must be another area for key consideration when implementing new technologies and cyber security systems.

While we have already seen significant advances in the use of autonomous technology in the naval industry, it is likely that these capabilities will continue to develop and improve further over the next decades. Future engineers must be well trained in safety critical autonomous technologies and naval fleets being designed now should plan to integrate these technologies. Autonomy currently offers the naval defence industry its greatest tool to help future proof its naval engineering programmes, while other new technologies such as blockchain, 3D printing and automation tools can help drive increased efficiency, agility and security.



Here at Expleo, we think differently. We like to disrupt the industry through innovation and cross fertilisation across industries. Not only this, but we have been a reliable partner in the Naval industry for more than 20 years.

Improve your operational performance, with a blend of highly skilled and versatile experts across product design and engineering. Our people work in close partnership with you to accelerate innovation and delivery throughout your project lifecycle.

We offer results driven end-to-end support on time critical projects. A local presence combined with a global reach, and a capacity to leverage know-how and expertise from our multi-sector positioning and cross-fertilisation.

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