

Autonomous ambition: NavyX plots a course to machine-speed warfare

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Faced with the need to redress and recover a capability debt, but limited in its number of manned ship platforms, the UK Royal Navy is advancing plans to accelerate the operational exploitation of autonomous techniques and technologies as a means to increase mass, lethality, and agility. *Richard Scott reports*

In early April, the UK Royal Navy (RN) lifted the veil on a bold initiative intended to 'mainstream' the introduction of autonomous technologies into the front-line fleet. Given the name NavyX, this joint military/industry technology accelerator has been funded through the Ministry of Defence's (MoD's) Transformation Fund to engineer a generational leap in the ways and means by which the RN procures, integrates, proves, and scales autonomous systems.



BAE System's P950 rigid inflatable boat (RIB) technology demonstrator is a private-venture development intended to demonstrate and de-risk an autonomous sea boat based on the company's Pacific 24 RIB. (Richard Scott/NAVYPIX)

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This desire to think and act differently has been driven by multiple factors. First, there is a changing and fast-evolving threat across multiple dimensions: the hybrid warfare ‘grey zone’ in which adversaries exploit economic, political, cyber, media, and social environments to seek advantage; the development of new weapon technologies, ranging from low-cost, improvised unmanned explosive devices and unmanned aerial vehicle (UAV) ‘swarms’ to hypersonic missiles and directed-energy weapons; and the re-emergence of peer and near-peer adversaries, which demands the ability to readily scale up to high-end warfare.

Secondly, the RN finds itself in a world of ever-faster technology cycles where data, digitisation, automation, and artificial intelligence (AI) are increasingly pervasive. This presents a challenge to an organisation and supporting infrastructure that is largely founded on the expectation that major capital assets would be procured to serve for up to three decades or more.

Lastly, there is an acceptance that scarce resources and competing demands for investment elsewhere in the MoD’s budget will inevitably constrain major platform acquisitions. Although the RN aspires to grow hull numbers in the longer term, there is an understanding that there will never be sufficient numbers of destroyers, frigates, and offshore patrol vessels to deliver the required mass.

However, autonomy may, in the longer term, help to address the navy’s manpower bill. There is an assumption that recruitment and retention will become increasingly challenging in the years ahead, and while the introduction of autonomous systems is not likely to free up billets in the short term – although it may require a rebalancing of skillsets – there is a broad expectation that manpower savings will be realised over the longer term. Hence, the impact of autonomous capabilities must be considered against headcount, specialist skills, and training requirements.

Thus, the wider exploitation of autonomy and AI is one of the means by which the RN is seeking to overcome these shortfalls and constraints. Initially funded for a three-year period, NavyX has been conceived as a vehicle to catalyse innovation and enable the rapid pull-through of technology to provide front-line users with an operational advantage. As such, it embraces several themes and technologies: the development of innovative unmanned systems, the creation of intelligent networks, and the deployment of systems embodying high-end autonomous behaviours.

However, it is not just focused on nurturing science and technology. There is an understanding that a wider transformation process is essential to grow a UK enterprise and establish a new and streamlined acquisition model that will meet the needs of operators for the fast-track delivery of autonomous systems and technologies. To that end, NavyX is also stressing the value of operational experimentation, tactical development, accelerated procurement, rapid integration, and iterative development.

“This is a step change for the Royal Navy and industry, and an exciting opportunity for change and innovation,” Commodore Mike Knott, Assistant Chief of Staff Maritime

Capability, told delegates at the NavyX kick-off conference on 12 June in Gosport, near Portsmouth. “And there is a big prize at stake for both of us,” he added.

“We need to think and act differently to keep pace with machine-speed warfare. The current acquisition process – with concept and assessment phases lasting years and costing millions – is not suitable for this transformation.

“Projects need to demonstrate agility and pace, which drives alignment tension between ambition and delivery. Therefore, we need an acquisition model that is able to respond to the developing requirements driven by changes in threat and technology, [with] a particular focus on delivering useful software updates.”

Beginnings

Speaking in October 2014, Admiral Sir George Zambellas, then-Chief of the Naval Staff and First Sea Lord, laid out plans to use a forthcoming ‘Joint Warrior’ exercise as a proving ground for the “innovative and robust exploitation of maritime autonomous systems”. Undertaken predominantly in the northwest coast of Scotland, ‘Joint Warrior’ provides a multi-threat environment in which UK, NATO, and allied units undertake collective training – including pre-deployment training in tactical formations – in preparation for employment in a Combined Joint Task Force (CJTF). Two such exercises are held each year.

Adm Zambellas challenged industry and academia to bring forward their technologies and concepts so that these could be put to the test, with the aim to demonstrate, trial, and experiment with the tactical employment of unmanned and autonomous systems in the littoral and wider maritime environments in order to “mature credible capability choices for the mainstream utility of maritime autonomous systems”. At the same time, Adm Zambellas laid down a marker for a navy that should strive to “lead and win through the innovative and robust exploitation of maritime autonomous systems”.

The outcome of this challenge was ‘Unmanned Warrior 2016’ (‘UW16’), run during September and October of 2016 in conjunction with ‘Joint Warrior 16-2’. Led by Navy Command Headquarters’ Maritime Capability (MARCAP) area, ‘UW16’ comprised a programme of demonstration and experimentation spanning the five themed activities: geographic intelligence (GEOINT); anti-submarine warfare (ASW); mine countermeasures (MCM); intelligence, surveillance, target acquisition, and reconnaissance (ISTAR); and command and control (C2).

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