



DIGITAL FIRST

Graham Grose explains why the future of defence is data driven and how a robust data backbone is key for the industry

The challenges of last year fast-tracked change within the defence sector, with digital maturity being pushed to the top of the agenda for military organisations and their in-service support partners. Organisations within the industry are keen to maintain this momentum and are dedicating large parts of their budget to it for the years ahead. But behind all future digital initiatives is a crucial data chain that will be the foundation for progress in logistics and support.

The defence sector was not immune to the business disruption that characterised 2020 for many industries, but the industry has turned pandemic-induced changes into opportunities for advancement. The widespread transition to remote working and the need for increased collaboration

has led to a dismantling of age-old processes to make way for increased efficiencies that will benefit the industry for years to come. But these developments have exposed a need among military organisations to adopt technologies that will help the defence sector to further embrace remote working opportunities, increase efficiencies and facilitate the break from rigid, traditional and heavily paper-based, operations.

Military organisations across the globe are already making commitments to increasing their technology capacity in the near and more long-term future. Analysts Frost and Sullivan estimates that the US Department of Defense's C4ISR spending, focusing on IT advancements in cloud computing and AI, will reach \$58.5-billion by 2025. The UK Government has also recently announced a military budget increase of \$21.9-billion, with plans to build cyberspace assets as the UK aims for further military modernisation.

More widely, industries across the board are looking to increase their digital transformation spend despite, and perhaps more so because of, business disruption and the financial impact of the Coronavirus pandemic – over 50 percent of organisations said they either want to maintain or increase their digital transformation spend going forward.

But as advanced technology continues to cement its place in the arsenal of military organisations across the globe, the value of the data chain communicating key insights between military assets, personnel and core software will become increasingly important. And it is this data thread that underpins the three developments that I believe will be pivotal for the industry in the year to come.

ANYWHERE OPERATIONS

We are now living in an increasingly digital world, but there will still be situations where constant connectivity to analyse this data in real time is simply not possible, and nowhere more so than in military operations. Gartner projects 'anywhere operations' to be one of the top strategic technology trends that organisations across all industries, not just defence, need to explore in 2021. It defines anywhere operations as: "an IT operating model designed to support customers everywhere, enable employees everywhere and manage the deployment of business services across distributed infrastructures."

The military often performs mission-critical 'disconnected operations' in difficult to reach locations beyond a forward operating base, which means that although anywhere operations will be beneficial to all industries, the defence industry is perhaps the sector with the most pressing strategic need to embrace the idea of 'anywhere operations'. Any disruption in connectivity can not only put pressure on the digital backbone, it can compromise the success of a mission and even put the lives of military personnel at risk.

Optimising operations in such a disconnected setting – whether unplanned in the event of an enemy attack, or even planned due to the sensitive nature of top-secret military missions or the remote environment military units operate in, such as naval ships – means 'racing data' back from these forward operating bases to a main operating base, which has the connectivity to inform maintenance and repair requirements. But this also needs to work the other way round. There are key pieces of information and data that need to be communicated from the military base to the personnel at the forward operating base – the data exchange is a two-way street.

And here's where data connectivity becomes key. AI, machine learning and predictive analytics capabilities cannot optimise maintenance cycles without data to work with. As a result, expect in the coming months to see much more focus on supporting software that must have the ability to collect data in the field then upload, sync and action that information when an asset returns to base.

Military organisations and their in-service support partners have previously been far removed from consumer pressures to make operations more sustainable, given their remit to maintain national security at all costs, but as the climate crisis escalates this is something the defence sector can no longer shy

away from. And as the year progresses, the sector will certainly see increased focus and scrutiny.

In August 2020, a joint UK MOD/Industry white paper was announced entitled Roadmap for Sustainable Defence Support, which outlines the MOD drive to achieve net-zero carbon emissions by 2050. The Swedish Armed Forces are committed to making changes based on the 17 Sustainable Development Goals (SDG) of the UN Agenda 2030. The US Army Corps of Engineers has published a comprehensive sustainability report and implementation plan to fully outline a comprehensive approach to sustainability.

Adopting a more sustainable approach will be a force-wide undertaking, but also one which directly involves logistics and support. This is exactly why Lieutenant General Richard Wardlaw, Chief of Defence Logistics and Support at the UK MOD, has gone on record with the University of Cambridge Institute for Sustainability Leadership and at an interim briefing as part of the Defence Information Defence Sustainability Conference to outline the strategic implications of climate change for the British Army, and how the Army is responding.

Measuring sustainability efforts from a logistics standpoint also keys into the increasingly data-driven

MACHINE LEARNING IS THE NEXT STEP TO MAKE MAINTENANCE AS PREDICTIVE AS POSSIBLE

environment military organisations are introducing. Firstly, more efficient asset management in terms of predictive maintenance will vastly reduce the logistics footprint associated with supporting complex equipment such as aircraft and vehicles. Secondly, the same software components which use data streams to help track asset performance and assess financial costs can track environmental costs as well. Environmental impacts can be assigned to each asset and rolled up into a reporting structure to detail the overall environmental impact of operations.

There has been significant discussion in recent years about the potential for AI and predictive analytics among military, industry and academic commentators. But now, in a practical sense, we are closer than ever to translating these principles into 'on-the-ground' maintenance strategies to revolutionise military asset readiness. The US Congressional Research Service has recently published a paper which outlines how AI will directly impact National Security going forward.

It explains that research is underway in the fields of intelligence collection and analysis, logistics, cyber & information operations, and in a variety of semi-autonomous and autonomous vehicles. In fact, AI has already seen action in military operations in Syria and Iraq. In the UK, General Sir Mark Carleton-Smith, chief of the general staff, has shared a vision for the transformation of the British Army for the digital age, predicting human-machine partnerships would be "commonplace" by 2025.

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▶ 5G is a key enabler for practical AI for military operations. With the proliferation of technology such as 5G connectivity allowing as close as possible real-time data exchange, the stage is set for live maintenance updates from military assets to be fed back into a logistics system. This system can then optimise maintenance personnel on the ground to make seamless scheduled or even unexpected repairs.

THE INDUSTRY HAS TURNED PANDEMIC-INDUCED CHANGES INTO OPPORTUNITIES

Adding in machine learning is the next step to make maintenance as predictive as possible, bringing the ability to aggregate this data and use AI to simulate assets in a digital twin environment. Add in pre-set requirements such as number of sortie hours required of individual assets, and AI and machine learning will allow OEMs and military organisations to simulate wear on critical components such as engines in a fully digital environment. These models

can then be used to inform decision-making for the physical asset – turning simulated data into an on-the-ground strategic advantage.

The Coronavirus pandemic’s lasting legacy on the defence industry will be the impact it has had on technological change inside military organisations. With the benefits of streamlined processes and increased efficiencies across the defence sector already being realised, the next step for the industry is to continue to build on its digital progress. Military organisations and defence in-service support partners must put digital projects at the top of the priority list and ensure that supporting software is capable of supporting each project – as no project can benefit an entire organisation in isolation.

As these digital initiatives advance, the dependence on data will only increase. The ability to collect, access and, most importantly, analyse data will be a focal point for military organisations and support partners in the coming year. To reap the rewards of all upcoming digital initiatives – whether this a drive to more sustainable operations, the rise of anywhere operations or implementing transformational technologies – defence organisations must turn to a software infrastructure that maximises this data backbone and helps the sector become a digital-first industry ●

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Picture credit: US Dept Defense