Optimising Data and Decisions:
Delivering decision advantage straight to the front line

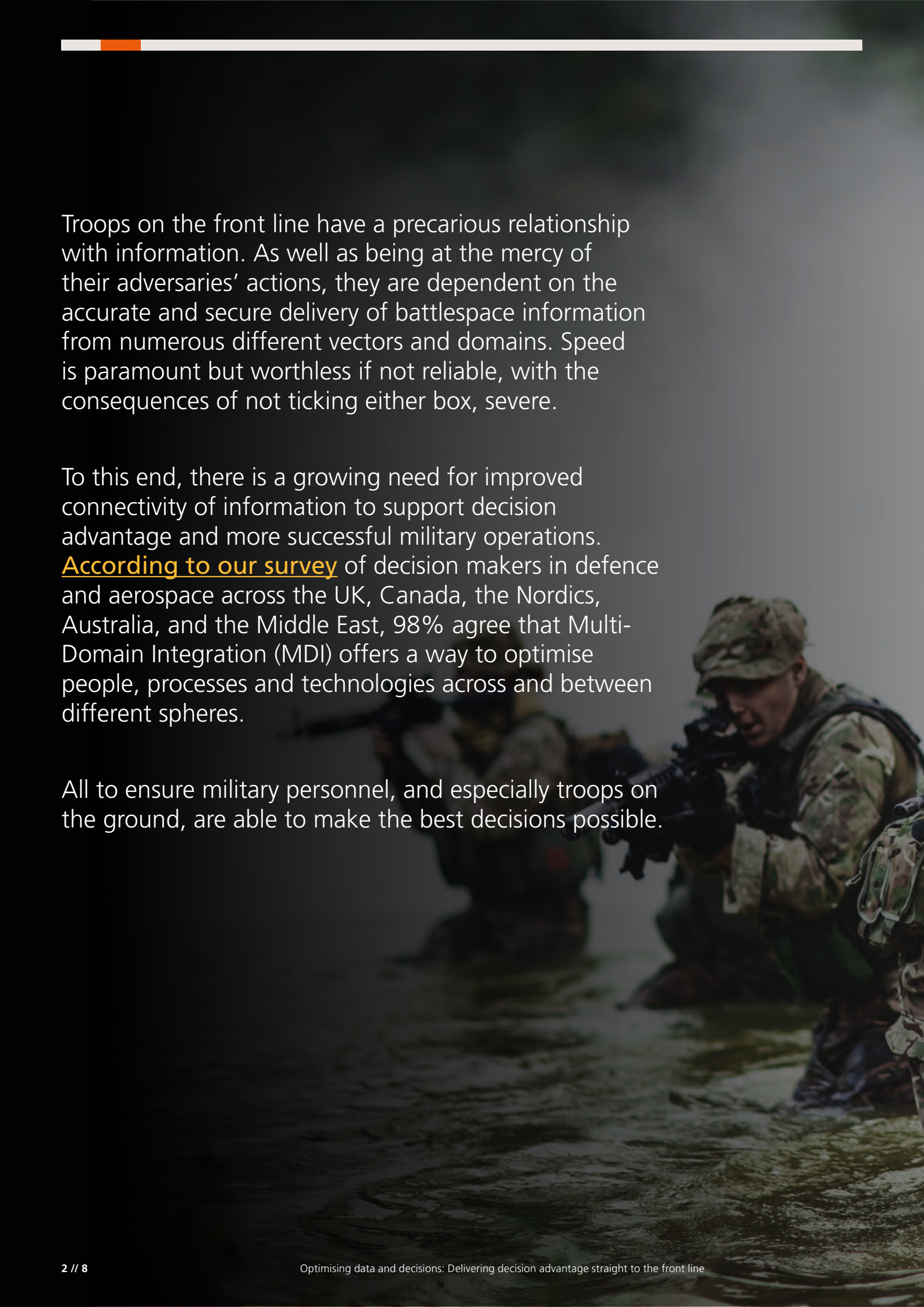
Digital Intelligence

BAE SYSTEMS

Troops on the front line have a precarious relationship with information. As well as being at the mercy of their adversaries' actions, they are dependent on the accurate and secure delivery of battlespace information from numerous different vectors and domains. Speed is paramount but worthless if not reliable, with the consequences of not ticking either box, severe.

To this end, there is a growing need for improved connectivity of information to support decision advantage and more successful military operations. According to our survey of decision makers in defence and aerospace across the UK, Canada, the Nordics, Australia, and the Middle East, 98% agree that Multi-Domain Integration (MDI) offers a way to optimise people, processes and technologies across and between different spheres.

All to ensure military personnel, and especially troops on the ground, are able to make the best decisions possible.



"86% of our respondents believe the future battlespace will be an information battlespace"

A resounding 98% of personnel on active duty confirm that effective decision making is increasingly reliant on the quick delivery of trusted data. A similar majority (90%) also agree there is an urgent need for more seamless information sharing across domains, making the issue not just one of assimilating information, but connecting it. When so much of modern-day conflict is conducted in the 'grey zone', the spread of misinformation is a critical concern (a challenge sited by 61% of respondents), while the attribution of cyber activity (61%) has muddied the waters of what is reliable and where dangers truly lie.

In fact, 86% of our respondents believe the future battlespace will primarily be an information battlespace. The priority in this future – a future that is already upon us – is to ensure the right information is being delivered to the right people and accessed at the right time.

This is where an MDI model becomes so important, as a method to channel vast swathes of data between domains to where it's needed most.

Andy Linton, Head of Future Maritime Aviation Force, BAE Systems - Air, affirms: "MDI is essentially about connectivity, and the ability to effectively make timely decisions in directing employment of assets from across all five domains to achieve the greatest co-ordinated net military effect, faster than the adversary – to know sooner, decide quicker, act faster.

"The key currency is information, derived from data. Without access to the full spectrum of desired information, it is difficult to make effective decisions and thus quantify operational risk."

Finding the needle in the haystack

Connecting the five domains – land, air, sea, space and cyber – is a challenge, as Linton continues, that is "compounded by the fact that there's so much data available in both the civilian (open source) and military (secure) context".

The battlespace is complex in that it is driven by information derived from multiple sources, making it difficult to know what information is available, and then – more importantly – what is relevant.

"It's often a case of trying to find the proverbial needle in a multispectral and multifaceted haystack," Linton confirms, pointing to the need to leverage AI and machine learning to reduce analysis and processing times from days down to seconds.

When the five domains aren't singing from the same hymn sheet – when the right information isn't identified among the "haystack" – the challenge for decision makers becomes vast. And this can lead to severe consequences, such as a lack of clarity around troops' real-time situations and how best to instruct them.

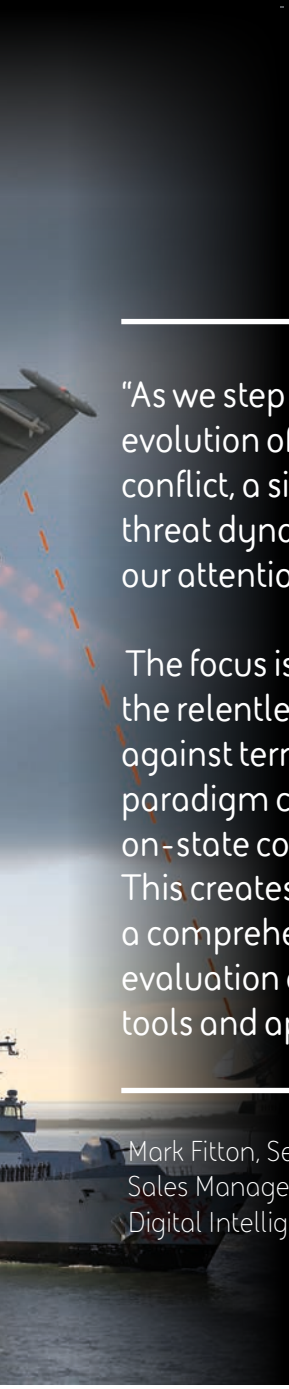
But the benefits of deploying an MDI approach are there to be realised. For more than half, improved situational awareness (54%) and improved quality of decision making (51%) come immediately to the fore. Speed of decision making was also cited as a benefit of MDI among 48% of respondents, confirming the three-pronged data challenge of information accuracy, speed of access and communication to the frontline.

"When executed properly, Multi-Domain Integration will provide forces with a clear decision advantage," says Mark Todd MBE, Head of Products, BAE Systems Digital Intelligence, alluding to MDI's potential to overcome each of those three concerns.

The establishment of secure digital threads across land, air, sea, space and cyber will help deliver a much broader and accurate intelligence picture, resulting in a more informed strategy deployed to troops in a much faster way.

The urgent need for more dynamic data

One key question is what's holding nations back from implementing such a model? The complexity actually lies in the opportunity here, with 46% stating that there is simply too much data to make sense of quickly at this stage.



"As we step into the latest evolution of modern conflict, a significant shift in threat dynamics demands our attention.

The focus is pivoting from the relentless struggle against terrorism to a new paradigm centred on state-on-state confrontations. This creates a need for a comprehensive re-evaluation of our strategies, tools and approaches."

Mark Fitton, Senior Engineering Sales Manager, BAE Systems Digital Intelligence

Those on active operations also confirm they are suffering from a lack of visibility due to incomplete information – an assertion that 57% of senior business decision makers agree with, to confirm their shared bottleneck – while more than half confirm that there are currently too many barriers to collaboration and information sharing (53%).

We're at a cyclic juncture where transforming to an MDI way of working is seen as a technical and operational challenge, while simultaneously acknowledging that MDI would help to reverse many of the issues currently being faced: visibility, connectivity, communication, information sharing, data filtering.

But, with the characteristics of modern warfare demanding a shift, it's becoming apparent that urgency is the order of the day.

Here, aligning with the challenges put forward by those on active operations, Fitton argues that merely sharing information is insufficient.

He continues: "The complexities of the modern battlespace demand a higher standard of integration, cohesion and seamless interoperability to bridge the gaps that have historically impeded swift action. We need to look at information as a dynamic force rather than just a static resource. Information must be timely, actionable, intelligent and available. It doesn't solely inform but also empowers decision-makers to respond with agility and insight."

Unlocking integration

At its core, MDI promotes the development and use of ground-breaking technologies to wade through big data, to provide personnel with the information they actually need so they can make better and faster decisions.

The latter benefit shouldn't be overlooked, with two-thirds of those working in the industry agreeing that MDI will result in faster decision making; compounded by 45% who listed improved quality of decision making when asked how their military and nation would benefit from implementing MDI.

Critically, 58% also pointed to notions of improved collaboration between military branches, partners and allies, moving away from a restrictive, siloed approach to data management that wouldn't necessarily offer the full picture for decisions makers.

Linton explains: "The aim is to connect all actors in the modern battlespace via multi-domain networks and enable access to key information hosted in shared environments. It's also critical to intelligently distil the terabytes of data being collected down to a relevant manageable volume so that it can be shared securely and at the speed of relevance across operational environments."

Ultimately, MDI is all about generating better insights in a fast-paced, equally multifaceted battlespace. And while there are still barriers to overcome, MDI is most certainly off the starting blocks. It is now a case of uniting and collaborating to ensure its success and enhanced adoption moving forwards.

Innovation in the blink of an eye

The future of MDI will likely revolve around a more automated approach, moving away from manual intervention to foster better domain connectivity and enable humans to prioritise what they do best.

Automation forms a critical strand of the wider digital opportunity that sits before defence if it is to fully exploit MDI.

Martyn Orme, Head of Business Development at Techmodal says: "Multi-Domain Integration is being enabled by the speed of change in the technology landscape, but it's also essential because of it. In the information rich battlespace, we need to keep up, driving value across the entire ecosystem. We need the right tools to safely and securely access information across domains."

As many as 41% of industry decision makers pointed to inadequate technologies for complex operational environments as a challenge for personnel on active operations. Clearly, there is a need to modernise, to veer away from legacy, and to seek more seamless and secure ways to filter and share information. Our survey highlighted how investments in this regard are being targeted towards data and intelligence analytics software (selected by 91% of respondents), AI and machine learning (86%), battlespace connectivity solutions such as 5G and software-defined radios (74%), robotics and automation (73%) and CEMA systems (72%).

In deployments, BAE Systems Digital Intelligence has seen AI hit its mark through:

- Analytics and Machine Learning solutions to appropriately and ethically turn ideas into impact, allowing defence organisations to process and analyse data to reveal insights that improve efficiency, reduce costs, increase competitiveness and fulfil missions.
- Command, Control (C2) & Intelligence solutions to help customers make sense of the future battlespace by using open source tools to collaborate with MOD modules, taking sensor information, raw data and intelligence to enable C2 and situational awareness as a mission evolves.
- CEMA solutions that provide insights into the electromagnetic environment in which customers operate, allowing them to manage, synchronise and control their activities to protect equipment and personnel, while delivering operational advantages that simultaneously deny and degrade adversaries' use of the physical and digital battlefield.

What we're seeing as each of these novel technologies get embedded into an MDI model is greater system interoperability, which 94% recognise as essential to driving more effective decision-making in the modern and future battlespace.

For troops on the front line, having this infrastructure in the background is critical. It can provide assurance that the information they're being given is a product of connected information across five domains; that has been filtered for relevance and priority; and that has been translated into an optimal decision for them to act upon – all in the blink of an eye.

We are Digital Intelligence

BAE Systems Digital Intelligence is home to 4,700 digital, cyber and intelligence experts. We work collaboratively across 16 countries to collect, connect and understand complex data, so that governments, nation states, armed forces and commercial businesses can unlock digital advantage in the most demanding environments. Launched in 2022, Digital Intelligence is part of BAE Systems, and has a rich heritage in helping to defend nations and businesses around the world from advanced threats.

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