Gaining the upper hand

Deriving intelligence from today's data-heavy battlespace

Digital Intelligence

BAE SYSTEMS

The nature of warfare is changing. It is becoming more fluid, more digitally-driven, and more reliant on data to shape operations. As such, making sense of the large volumes of data available in the battlespace and connecting sensors to effectors is critical to creating a condition of decision advantage – characterised by:

- **Improved battlespace awareness and understanding**
- **Rapidly adaptable force planning and application**
- **Fast, precise and resilient kill chains**
- **Resilient sustainment support**
- **Integration of business and other functional applications**

Adopting the digital tools to support decision advantage in the arena of traditional manned systems also creates the conditions necessary for the successful deployment of autonomous and semi-autonomous systems, which will need access to centralised stores of relevant knowledge to make decisions. Correctly applied, autonomy will advance the same five areas listed above, creating further synergies.

Success in today's dynamic and ever changing environment therefore requires the ability to navigate a highly complex multi-domain landscape. Similarly important is enabling the use of automation and artificial intelligence at scale in order to **deliver intelligence when and where it is needed most.**

> The ultimate objective: achieve decision superiority and, in turn, operational advantage over the adversary

Tackling a complex battlespace

When we take stock of the current defence landscape, one critical factor becomes clear: rapid technological change is reshaping the battlespace, impacting how decisions are made.

In today's increasingly digital battlespace, the boundaries between the traditional military domains of land, sea, air, cyber and space are becoming ever-more blurred. Military commanders must work closely together to make the right decisions in seconds – a challenge that is easier said than done given the stream of complex information from multiple sources that they must deal with.

This is all demonstrated in our **2023 global Multi-Domain Integration survey,** which asked 400+ senior business and operational decision makers working in aerospace and defence to give their views on the evolving battlespace.

In the survey, an overwhelming **95% agree that ongoing digitalisation has led to a more dynamic and complex battlespace**, while **98% agree that effective decision making is increasingly reliant on the quick delivery of trusted data.**

Click here to download the report

But it's not just about data in its raw form. The real differentiator is being able to turn that data into something actionable; helping to shape military operations by giving decision-makers the insights and intelligence they need to make quick, lawful and effective decisions in the most highly-pressurised environments.

From data to intelligence

In today's increasingly dynamic and fast-paced military environment, commanders need to be confident that they have a complete view of the battlefield in order to make the most effective strategic and operational decisions. They need to understand the full picture – assimilating intelligence from all domains for the effective planning and delivery of operations, with speed and provenance assured.

Again, this is no mean feat. The modern battlefield contains a vast array of information that is constantly changing. And, while having access to larger pools of data brings advantages, it also makes it harder for analysts to sift out the superfluous data and process the relevant parts into coherent tactical information.

Challenges facing commanders

- Keeping pace with the most dynamic and high-pressure environments
- Gaining a complete view of battlespace information to make the most effective strategic and operational decisions
- Reducing cognitive burden and the time taken to achieve viable courses of action
- Assimilating intelligence from across the deployed battlespace for the effective planning and delivery of operations

Challenges facing analysts

- Accessing integrated intelligence streams from across assets and domains in one place for near real-time situational awareness
- Receiving automated insights based on known threats, available assets, existing terrain and target mission objectives to support rapid and effective asset deployment
- Moving away from manual planning tools to focus on strategic decision making at the speed of relevance
- Being able to collate all available information from across the battlespace and extract intelligence in near real-time

Therefore, a key challenge for today's defence decision makers at a tactical and strategic level is finding ways to deal with the increasing volumes of data on the modern digital battlespace. And this doesn't just mean managing this data efficiently; it means understanding it rapidly and deriving actionable intelligence from vast swathes of information.

The nations that truly gain an advantage are those that can compress the following chain of events:

1. A sensor or source of intelligence observes something in the battlefield
2. That observation is understood and interpreted
3. Appropriate courses of action are identified
4. Plans to undertake the courses of action are disseminated

The key is being able to quickly distil down vast swathes of information from multiple sensors, across multiple domains, into intelligence that can be leveraged for an operational outcome. With 86% of defence and aerospace decision makers believing that the future battlespace will be an information battlespace, this is an issue that will only become more acute over the coming years.

So, how can we address the challenges of agile and high-tempo warfare while offering a solution to the agile, data-heavy, multi-domain future?

> "The key is being able to quickly distil down **vast swathes of information from multiple sensors, across multiple domains,** into intelligence that can be leveraged for an operational outcome"

Technology calls

Given the speed requirements and vast amounts of data involved, this isn't something that can be solved by humans alone. Commanders and analysts need support from digital systems that can integrate intelligence streams from across assets and domains, provide automated insights based on a range of factors (such as known threats, available assets, mission objectives etc.) and extract critical intelligence in near real-time.

This need is shown by the 50% of defence decision-makers who believe that developing systems to deal with the emerging information rich battlespace is key for preparing for the future battlespace.

The same percentage also believe that driving enhanced situational awareness and decision making with AI/machine learning is the most important area of focus for defence technology exploitation, demonstrating the central role of advanced technologies that automate key processes and empower military analysts.

The most effective system must also be modular, scalable and interoperable with third-party apps. It must provide sophisticated analytics capabilities. And it must provide confidence that actions are traceable and made based on all available variables.

Ultimately, today's military leaders need a solution that enables rapid decision making through its ability to provide situational awareness in support of the most critical and high-tempo missions.

The ‘BMIS’ effect

Our **Battlespace Management and Intelligence System (BMIS)** is designed to tackle the data challenges facing today’s military operatives and provide the perspective they need to make the best possible tactical and strategic decisions.

BMIS collates information from a range of sources across the connected battlefield to provide a single operating picture for decision-makers. It then provides insights on top of that – using AI techniques to understand what's going on and present hypotheses as to what adversaries might be up to.

BMIS key features

Knowledge Graph

A structured knowledge graph complying with the Multilateral Interoperability Programme (MIP) Information Model

Knowledge Extraction

Extract structured data from free text into the knowledge graph

Semantic Search

Recall information from a knowledge graph based on semantic matching

Data Ingest

Process structured data and ingest it into the BMIS knowledge graph

Geo Data Service

GIS engine to map/chart data and geo-spatial calculations

Threat Management

Providing indicators and warnings of emerging threats in the battlespace

Autonomous Management

Select and direct appropriate mission assets at a strategic level

Media Ingest & Display

Ingest, store and display media information e.g. live video feeds

This then extends through into automated planning techniques. The system takes a number of objectives, the capabilities that could be used to achieve those of objectives, and any constraints (e.g. asset states, characteristics, no-go spaces, acceptable risk, etc.) to generate a plan designed to optimise key factors such as the probability of successfully achieving mission goals.

This all provides the ability to plan and execute complex operations at an increased tempo – accelerating the **OODA (Observe, Orient, Decide, Act) loop** to deliver operational impact and decision advantage.

BAE SYSTEMS

BMIS

Creates

exploitable information and intelligence from multi-source data through its knowledge platform

Supports

rapid decision making through its ability to provide situational awareness

Reduces

user burden by automating the process of generating mission plans

Accelerates

the implementation of military effect through automated planning and tasking of manned and unmanned systems

With BMIS, not only will all stakeholders have greater situational awareness and be confident that they are operating from a single source of truth. On top of that, Commanders will know they have all the information and support they need to make more impactful decisions, faster responses and targeted effect. **That's the power of perspective in today's digital battlespace.**

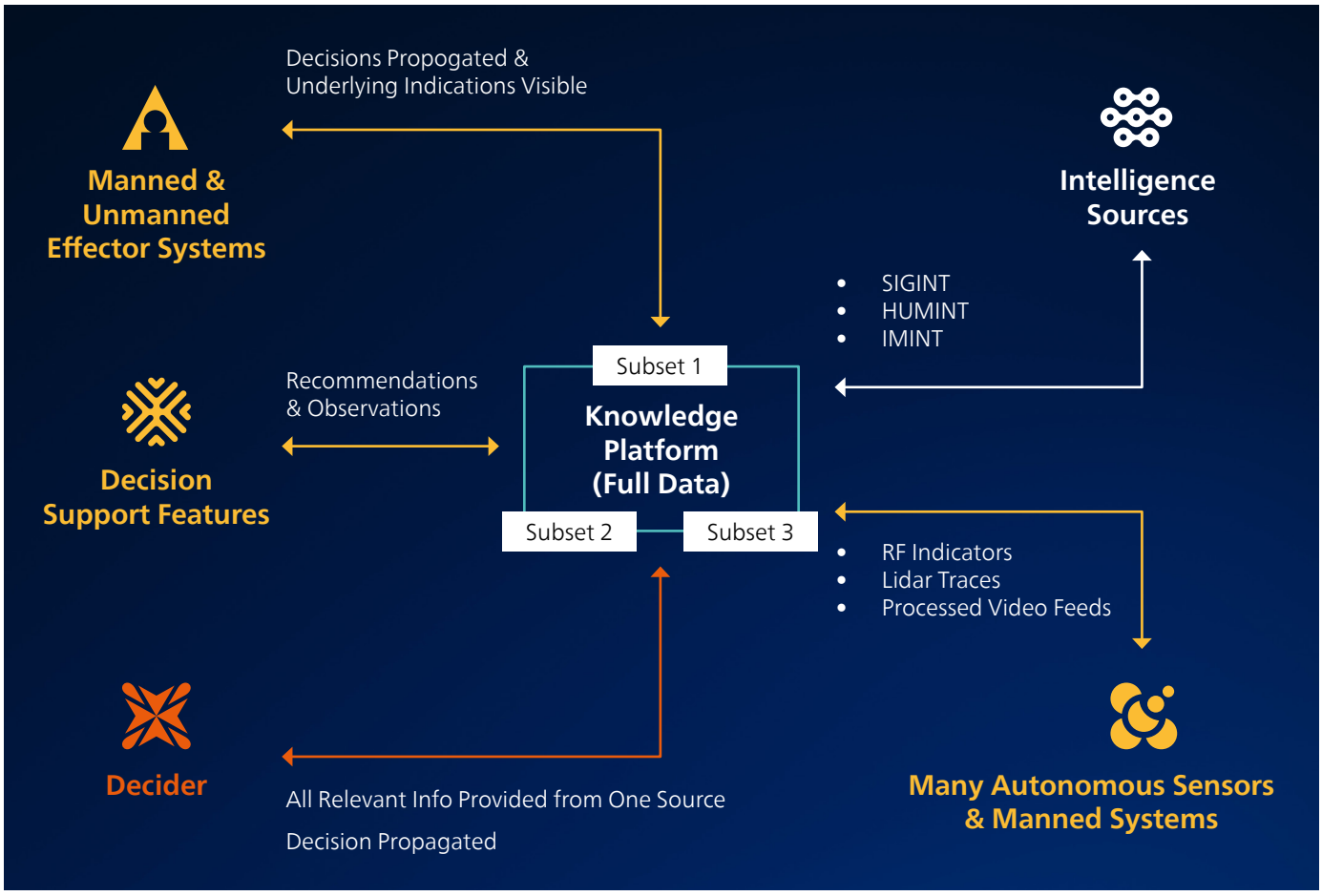
BMIS in action

Recce Strike and the Sensor-Decider-Effector complex

In a Recce Strike scenario, an example of 'best' is where all available battlespace data and intelligence preparation is brought into a single knowledge centre. This data can be subdivided with only relevant elements passed to the edges, as well as use edge processing to mitigate for potentially degraded communications.

This means all decision makers and other actors relevant to any problem have the appropriate shared information to hand and are communicating through a shared platform. It also minimises the opportunity for error or misinterpretation and maximises timeliness of correct decision making.

This arrangement allows other decision support features (analytics functions and AI enablers) to co-exist on the same platform and provide enhanced decision support to the commander.



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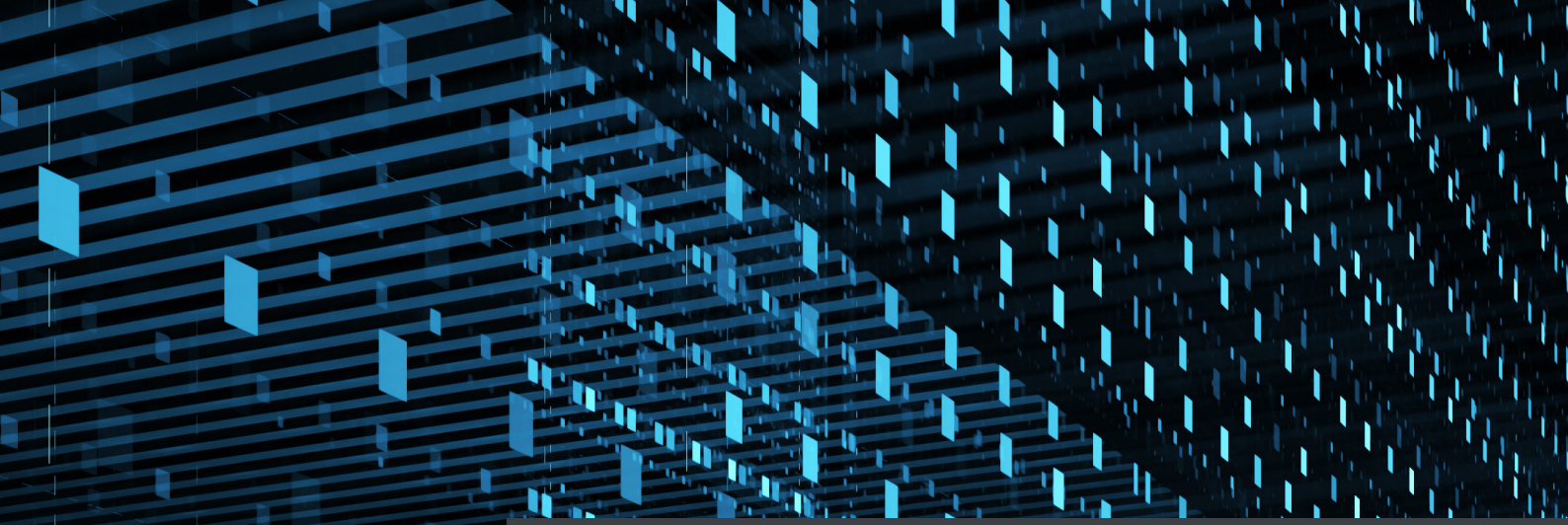

We are Digital Intelligence

Digital Intelligence is home to over 4,700 digital, cyber and intelligence experts across 16 countries. We operate at the cutting edge of digital innovation and at the heart of organisations that keep vital infrastructure running, national security protected and armed forces prepared.

Our teams provide advanced digital capability, products and solutions that weave together digital threads of data so that customers get the vital insight they need – from the fine detail to the bigger picture, providing the power of perspective to confidently make the critical decisions that keep our societies safe and able to thrive.

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. Whether on land, in the air, at sea, in space or cyberspace, we're your digital mission partner, with you every step of the journey.

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