THE FUTURE OF DEFENCE 2030:
AI AND TECHNOLOGICAL SHIFTS

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CONTENTS

EXECUTIVE SUMMARY

We hope you enjoyed the first part of our special report on 'The Future of Defence 2030: Spending Projections and Technological Shifts' (available [here]).

In this second part we concentrate on the effect that Artificial Intelligence (AI) is having on defence and look at how it is set to change a sector that thrives on technological innovation.

New technologies such as drones, robotics and AI have changed how nations defend themselves, transforming the industry and inspiring further developments which are coming on line constantly. AI is set to feature heavily in defence capabilities with a huge range of applications, from data analysis to testing, and from resupply issues to cyber security.

We hope you find the information contained in this report useful to prepare for a new and innovative but challenging future for the defence industry, where technology is at the backbone of a global defence strategy.

GLOBAL AI DEFENCE SPENDING PROJECTIONS

AI DEFENCE SPENDING TRENDS

As a result of ongoing and recent conflicts all over the world, the global defence market grew to a record level of expenditure in 2023, reaching $573.5 billion, and it's expected to reach $3,686.9 billion by 2032, at a CAGR of 5% during this time. We look at the figures in more detail in our previous report, **'The Future of Defence 2030: Spending Projections and Technological Shifts'**.

Despite competing demands on nations' budgets and fiscal restraints, maintaining an adequate defence budget is a priority for most. NATO members, for example, agreed in 2006 to commit a minimum of 2% of their GDP to defence spending to contribute towards stability and defensive readiness in an increasingly uncertain world. In the UK's case, this amounts to £45.4 billion annually.

Globally, military spending has grown over recent years and last year reached $2.44 trillion. Most of this was spent on conventional weapons and defence equipment, but increasingly the focus is turning to technological solutions to defence, most prominently AI.

According to BAE Systems 86% of defence and aerospace decision-makers have already adopted some form of AI for their defence applications to gain a competitive edge in their capabilities.

Globally, the size of the AI military market has increased dramatically and is estimated to have reached $9.86 billion in 2024, with expected growth which will take its value to $17.65 billion in 2028.

The adoption of new technologies, together with research and development, are part of a modernisation program that will enhance nations' capabilities and offer strategic advantages in uncharted technological territories, keeping them one step ahead of hostile threats. In the next section we'll look at how investment in AI is changing defence.

TECHNOLOGICAL INVESTMENTS IN AI

As the nature of defence shifts with the development of new technologies, budgets are becoming increasingly allocated towards sophisticated technologies such as:

AI – with numerous applications within the defence sphere, AI is already being used to predict the failure of mechanical parts, hunt for mines and simplify policies. In the future it has the potential to detect objects in satellite imagery, analyse intelligence data, optimise helicopter training, test new military products, and ensure effective end-to-end logistics and resupply, among many other things. By 2028 it's estimated that the market for AI within the defence industry will be worth around $17.65 billion.

DRONES – playing an increasingly-important role in defence, drones enhance existing military capabilities, reduce both costs and risks and have a wide range of applications including intelligence, surveillance and reconnaissance activities (ISR), target identification and tracking, missile deployment, and suppression of air defence and communication systems. Relatively cheap to produce, drones have the potential to provide around **80%** of the unmanned or remotely-piloted air capability by 2030. It's expected that the drone and counter-drone market will grow to around $16.33 billion by 2028.

CYBERSECURITY – cybercrime not only affects businesses throughout the world (potentially costing as much as $23.84 trillion by 2027) but it's **also a threat** to nations' defence capabilities. In 2022 there were 5.4 billion malware attacks alone worldwide, including many on defence systems around the world. With the increased number of conflicts globally at the moment, cybersecurity has taken on new importance, repelling disruptions such as attacks on communication systems or electric grids. To reflect its importance, the US cyber command has increased its budget to $1.1 billion for this year to train personnel and increase intelligence capabilities.

SURVEILLANCE – vital to collect, analyse and process intelligence, autonomous surveillance, supported by AI, Machine Learning and drone technology offers a sophisticated system to respond to threats quickly and effectively. A report by The International Institute for Strategic Studies notes that surveillance systems that are AI-enabled improve the accuracy of threat detection by at least 40% compared to more traditional methods.

CASE STUDIES

Here we look at a range of transformative uses of technology within the defence sector which utilise the power of AI.

SURVEILLANCE – a software project management and comprehension tool, Project MAVEN utilises AI within military surveillance systems to enhance video footage analysis and processing. The system automates objective detection and classification and reduces the time needed and the personnel hours for manually analysing video. It is claimed to achieve an 85% accuracy rate when identifying potential threats.

DRONES – DARPA's OFFSET (OFFensive Swarm-Enabled Tactics) uses a swarm of drones combining AI algorithms, a variety of sensors and real-time data processing for both reconnaissance and surveillance in order to monitor remote and vast areas and recognise threats. By using drones which collaborate both with each other and a central hub to share data and adapt to their surroundings, the human interaction required to collect data is minimised.

CYBERSECURITY – with incidents increasing in both frequency and severity NATO has launched its own Cyber Security Centre to protect NATO members from malicious attacks. Focusing on technical expertise and collaboration and using AI algorithms, the Centre offers operational resilience and situational awareness for all on-line activities, providing security to members both at home and in the field. It provides cyber security services to NATO Communications and Information Agency (NCIA) customers and users to protect classified and sensitive information.

SURVEILLANCE – ARTEMIS (Autonomous Real-Time Ground Ubiquitous Surveillance Imaging System) is a European Defence Agency surveillance system that's capable of operating in a variety of diverse environments and uses sensors and AI-driven analytics in order to process real-time views of an operational area enhancing decision-making and situational awareness for military personnel, especially in problematic or dangerous conflict zones.

IMPACT OF AI AND TECHNOLOGY ON DEFENCE STRATEGIES

AI is currently ubiquitous and gaining in popularity. Recent developments mean it's found in Google searches, cars, digital personal assistants, online shopping and sophisticated medical diagnostic devices. However, its applications have also been noted for use in the defence strategies as an alternative to conventional systems, and has revolutionised the way warfare is conducted.

The full spectrum of defence needs can be enhanced by AI, and its use can encompass decision-making, target recognition, threat monitoring, transportation and combat simulation, as well as more mundane but equally important activities such as administration, back-office processes and in recruitment.

THE FOUR MAJOR AREAS IN WHICH AI IS GAINING MOST TRACTION WITHIN THE DEFENCE SECTOR...

1 DETECTION
AI-supported systems can be used to collect and analyse data from surveillance feeds, while smart sensors can be used to detect and track personnel or vehicles.

2 PLANNING
AI can make use of the vast quantities of data that the military holds and augment it with machine-learning algorithms which can more accurately anticipate what resources are required, and how much they cost, for both training exercises and missions.

3 FIELD OPERATIONS
AI can offer real-time information and assess that data quickly in order to protect personnel on missions, as well as sensitive information and material assets.

4 SUPPORT FUNCTIONS
AI is able to accelerate the process of procurement and provide cost budget solutions, as well as manage vendor contracts. It is also able to support HR teams and functions and provide automated payroll.

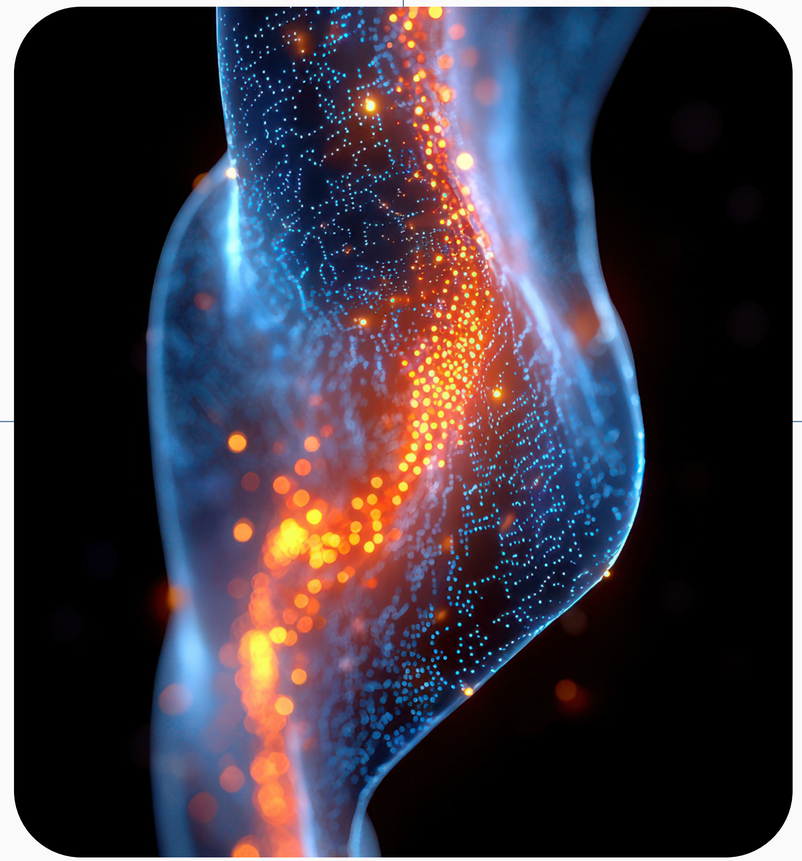
ADVANCED WARFARE USING AI

AI's potential to transform conventional systems into advanced warfare platforms is already highly advanced. Weapons, navigation systems, sensors, surveillance and aviation support already have integrated AI systems to enhance efficiency and reduce human input, potentially saving lives and reducing error.

Autonomous weapons systems, guided by AI, already exist. So called 'slaughter bots' use AI algorithms to identify targets, whether that's enemy infrastructure or a specific person identified as a threat. The recent use of UAVs (Unmanned Aerial Vehicles) by Hezbollah against cities in Israel demonstrates their effectiveness and destructive capabilities. China has already developed drone swarms which are capable of independent coordination and collaboration, as seen in its targeting of a Taiwanese island in 2022.

The USA is developing its own range of AI powered drones, robots and vehicles for surveillance and reconnaissance purposes as well as in a logistical capacity. Other nations are also utilising the power of AI, for example in analysing data from drones and satellites to enhance decision-making in real-time.

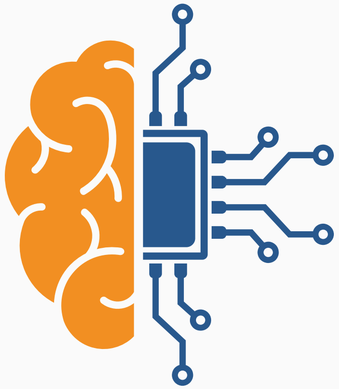
In the future a greater level of autonomy is expected from AI-powered weapons systems as the technology becomes more sophisticated than ever before, demonstrating their potential to save lives in combat.



AI IN DECISION-MAKING, SIMULATION AND OPERATIONAL EFFICIENCY

Despite rigorous training and expertise gained over many years, military decision-makers are only human and, under pressure, can sometimes make the wrong decision.

> **HAD NAPOLEON HAD AI TECHNOLOGY AT HIS FINGERTIPS IN 1812, FOR EXAMPLE, HE MAY HAVE QUESTIONED HIS OWN DECISION TO INVADE RUSSIA, POTENTIALLY SAVING THE LIVES OF THE 500,000 MEN WHO WERE KILLED OVER THE COURSE OF FIVE MONTHS.**



AI cannot make decisions on its own but it has the ability to offer unbiased, clear information to those whose responsibility it is to make them, many of whom are in high-pressure situations and need to respond quickly and exactly. Its algorithms can collect and process data from a wide range of sources, demonstrating particular patterns or connections, and present a range of options on how best to proceed. It can also create simulations of various scenarios and present them for detailed analysis, enhancing, not replacing, the decision-making process and maximising operational efficiency.

FUTURE PREDICTIONS FOR AI INTEGRATION IN NATIONAL DEFENCE STRATEGIES

Despite its potential to revolutionise advanced warfare and play a crucial role in defence, the integration of AI into national defence strategies needs to be handled sensitively.

In 2021 the Pentagon earmarked $874 million on AI-enhanced defence and military technologies, and a further $1.3 billion to military AI to invest in enhanced capabilities which, it hoped, would improve military innovation.

The Centre for Strategic and International Studies published a report entitled, ‘Algorithmic Stability: How AI Could Shape the Future of Deterrence’ in which it speculated about the future of AI. It predicted three things:

1. **States will integrate artificial intelligence and machine learning (AI/ML) into their national security enterprises to gain decision advantages over their rivals**

2. **New technology will change the character but not the nature of statecraft and strategy**

3. **Information about AI /ML capabilities will influence how states manage escalation.**

On a more practical level, AI has the potential to offer information via augmented reality through heads-up displays, much as pilots are provided with information at the moment. This will enable combatants to identify and classify either potential threats or allies using a vast amount of information supplied from sensors and datasets so real-time decisions can be made.

Other potential benefits include automated logistics systems that provide just-**in-**time supplies to the point of need, with mini-robots resupplying weaponry as **and** when it is needed.

Finally, AI could be used to predict potential geopolitical flash points, informing decision-making and averting crises.

CONCLUSION

To combat future risks, many nations are turning to AI as a means of defence, through surveillance, planning, field operations and support functions, leading to an upsurge in research and development in the sector, and an increase in startups related to the technology required to keep us all safe.

What once sounded like futuristic sci-fi is now a reality, and we live in an era of autonomous, highly-automated systems that have the ability to make decisions and process data faster than humans ever could.

This shift towards AI has led to a democratisation of defence, with less affluent nations being able to invest in drones and other AI technology with as much efficiency as prosperous ones. This has led to further investment into systems which can offer alternative forms of defence to traditional ones, many developed by independent, civilian organisations who work in partnership with the military.

The continued rates of investment into AI-enabled defence technology shows no sign of falling, and we can assume that AI will increase in use in the coming years. It has already fundamentally altered the way in which countries defend themselves and will play a decisive role in the nature of defence in the future.

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