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Dear Reader,

From the creation of a **bank** dedicated to Defence, Security, to the flying of drones using **fiber-optic cables**. The level of topics showing how the **battlefield is constantly evolving** is very **heterogenous**. And this is without considering the challenges posed by offshore wind farms, the use of biological enhancements in soldiers, and future weapons and space platforms. It reflects on the acceleration of tactical innovation and increasing military-technological convergence worldwide.

We would also take the opportunity to introduce and promote another recently published study in which Tate was involved—the Atlantic Council's Commission on Software Defined Warfare Final Report—on which Tate served as a co-author. More information on the report is included in Chapter 2.

As we prepare for what's next, take a look at these major news:

We wish you an interesting read.

Foresightly Yours,

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1. Applications of AI and data

1.1	**AI Action Summit and discussion of the importance of military AI** The AI Action Summit was held in Paris on February 10 and 11. Global military leaders met during the event to discuss how AI is shaping military operations. (source, source, source, and source) *Assessment:* The Paris event constituted a "significant narrative shift" compared to the two previous related events held in the UK and Seoul respectively in November 2023 and May 2024. These previous events had emphasized the importance of AI safety and risk management while the 2025 event focused on opportunity and taking actions to advance the development and adoption of AI. The event was also considerably larger with over 1,000 participants from over 100 countries, raising awareness of and interest and investment in France's AI sector. The country announced it had secured commitments to invest more than €109 billion over the next few years. The main output of the event was a declaration on inclusive and sustainable artificial intelligence for people and the planet, which was signed by 61 countries and regional blocs. The United States and United Kingdom stood out as countries that did not sign the concluding declaration—the former due to concerns over the document's focus on multilateralism as well as other concepts that have been targeted by the new administration such as inclusivity, diversity, and environmental challenges. The event's expanded scope offered an opportunity for a dedicated session on 10 February at the Ecole Militaire on military AI. The event brought together military delegations, defence industry, researchers, diplomats, and academics to discuss the uses of AI on the battlefield, the challenges of developing AI models, and applications capable of being deployed in environments that are constrained in terms of computing power and energy consumption. Reporting on this sideline session focused on the challenge of data sharing between industry and nations. Defence industry companies are reluctant to share data due to intellectual property and competitive concerns while defence communities would also be hesitant to share classified and sensitive data, even with allies and partners. Nonethless, developing interoperable and shareable data is crucial, especially for Nato. According to NATO Supreme Allied Commander for Transformation Pierre Vandier, data sharing is a priority for the Alliance so "that the 32 members can work together with confidence in the data they use, and with rules that are understood by all." Also during the summit, German-British company Helsing announced it had formed a strategic partnership to jointly develop next-generation AI systems for the defence of Europe. Helsing is focused on the integration of AI into defence platforms such as strike drones and Eurofighter electronic warfare capabilities while Mistral is a French developer of large language models. The partnership will focus on Vision-Language-Action models, enabling defence platforms to better understand their environment, communicate naturally with operators, and allow for faster, more reliable decisions in complex scenarios.

1.2	**Commission on Software Defined Warfare releases report** The high-level Commission formed by the US think tank The Atlantic Council concluded an 18-month research effort with the release of a report on the importance of software to achieving the scale and agility required to deter and fight in future conflicts. (source) *Assessment:* The Commission was led by former US Secretary of Defense Mark Esper, former acting Deputy Secretary of Defense Christine Fox, and President of Purdue University Mung Chiang (the author of this report served as a co-author). The report defines software-defined warfare as "a paradigm of the continuous integration and delivery of cutting-edge technology and leading interoperable software into legacy and future defence systems to drive a software-centric, hardware-enabled approach to warfighting." The underlying premise of the report is that the US Department of Defense (DoD)—much like most modern militaries—needs to affect a profound shift in the way it views, acquires, adopts, and employs software. Specifically, the authors argue that DoDt needs to urgently move away from "Industrial Age practices and legacy software" and instead move toward a "software-centric" approach that is "more prepared to meet the demands of deterring and combating Digital Age threats." To accelerate this shift, the Commission offers nine recommendations focused on technology and digital infrastructure, processes, and people. While the report and recommendations were tailored specifically for DoD, most were informed in part by discussions with individuals supporting non-US defence communities. As such, they reflect challenges and opportunities that are shared by many modern militaries attempting to better incorporate AI, cloud computing, and other software applications into capability development and upgrades. Some high-level recommendations that could be useful to militaries of different sizes and capabilities include: • Create and sustain an enterprise-wide data repository and invest in AI enablers • Modernize software test and evaluation infrastructure to leverage virtual opportunities while still ensuring access to live testing • Use "buy commercial" (as opposed to develop within DoD) as the main approach for software development whenever possible • Develop and track standardized software metrics across all acquisition programs • Identify talent already in the organization and improve training on commercial software best practices and the importance of software to the future fight • Establish a small cadre of software experts with experience in software development and project/product management to help guide the adoption and employment of software across DoD

1.3	**Singapore advances military AI infrastructure through industry collaboration** Singapore's Defence Science and Technology Agency (DSTA) signed two important collaboration agreements with Western firms in March and April to further its capacity to develop and use military AI and cloud computing. (source, source, source, and source). *Assessment:* DSTA announced on 1 April that it had established a joint laboratory with Thales to advance AI-enabled technologies to enhance the combat systems used by the Singapore Armed Forces (SAF). The collaboration will initially work on creating solutions for counter-uncrewed aerial systems (UAS) weapons as well as advanced sensing technologies. DSTA and Thales have a history of collaboration on AI-enabled capabilities dating back to 2022. Thales and DSTA engineers have been working together for five months to develop machine learning (ML) enabled software modules to help reduce false alarms in drone detection and improve the overall performance of counter-UAS sensors. Outputs of the Thales/DSTA c-UAS collaboration were demonstrated at the Singapore Defence Technology Summit held 18-20 March. Also during the Summit, DSTA announced it had signed a collaboration agreement with cloud service provider Oracle to better harness advanced cloud and AI technologies as part of an effort to digitalise and transform SAF operations. The agreement calls for Oracle to provide the Ministry of Defence and armed forces with a pilot of its Oracle Cloud Isolated Region platform, a secure, encrypted cloud environment that is "air-gapped"—or completely disconnected from the internet—making it more difficult to be hacked. The platform facilitates data management, cloud computing, and AI services. An announcement from DSTA stated that the use of Oracle's platform "will transform the Command, Control, Communications, and Computers (C4) functions of the SAF, and will modernize its digital capabilities with increased scalability and performance."

1.4	**US Navy aims to use AI-powered tool to identify and track targets** The Navy's Program Executive Office for Integrated Warfare Systems-X extended a contract with Rebellion Defense to develop the Iris target-processing software in hopes of using it on board two vessels in 2026. (source) *Assessment:* In April, the US Navy extended Rebellion's contract for 14 months for an undisclosed amount. The Iris tool uses AI to filter sensor data and focus human operator attention on targets (or potential targets) behaving in ways that could be suspicious or threatening. Ben FitzGerald, CEO of Rebellion Defense, told *Defense One* that the system will "identify, for humans, any ship that is traveling at 95% or greater of its top speed" and also flag other types of anomalous behaviour. For example, if Iris identifies a ship as an oil tanker "but it's going faster than any oil tanker has ever been known to travel, humans should be looking at that." Leveraging Iris should allow humans "who are so focused on looking at all sorts of other things" to focus on irregular behaviours and variations from established patterns of air and maritime traffic that they may not be able to otherwise detect." This is especially the case if maritime or aerial threats are traveling as part of or alongside large groups of commercial fishing vessels. The Navy expects to test the system aboard two vessels at some point in 2026.

2. Robotics and Autonomous Systems

2.1	**Fiber-optic drones at the centre of Ukraine/Russia drone competition** Ukraine has reportedly employed a new system to defend against Russian first-person view (FPV) drones controlled through a fibre-optic cable. (source)

Assessment: On 29 January, *The War Zone* published an analysis of videos posted to social media by Robert Brovdi, the commander of the Ukrainian drone unit known as the Magyar Birds Brigade. The video purported to show a Ukrainian drone destroying a Russian fibre-optic-controlled first-person view (FPV) drone. fibre-optic-controlled drones have increasingly featured in the conflict in Ukraine over the last several months because they do not use radio waves to communicate between operator and drone and are therefore resistant to jamming efforts. In the video, Borgi claims that Ukraine has developed a new system for detecting and destroying these drones. The system uses mobile radars to travel in advance of Ukrainian positions to detect the typically slower-moving fibre-optic-controlled drones, which are weighed down by the spool of kilometres worth of thin fibre-optic wire they carry. Once Russian drones are detected, Ukrainian forces launch their drones to intercept the incoming Russian threats.

It is unclear from the video what type of radar is being used, though *The War Zone* suggests it "is likely a microwave radar system, like those that operate in the Ku-band for counter drone applications. These radars are useful in detecting small, relatively slow-moving drones, though they do have a limited range—"measured in just a handful of miles"—reducing the amount of early warning they can provide. The limited range will also make the concept difficult to scale. While Brovdi urges the Ukrainian military to "promptly and massively re-equip with mobile versions of radars every 2-4 km of the front line" to defend against the Russian FPV threat, actually developing, acquiring, and deploying sufficient mobile radars to cover the 600-mile front would be a significant challenge, especially given that such commercially available radars are in high demand globally.

Even if this solution is not incorporated across all frontline Ukrainian forces, the video serves as another example of the pace at which important tactical innovations are being made as part of the broader and highly iterative offense-defence competition that is likely to characterize future military operations.

Figure 1: An image of a Russian fibre-optic FPV drone just before it was destroyed by a Ukrainian drone. source: The War Zone

2.2	**Anduril reveals Copperhead uncrewed surface vehicle (USV)** The defence technology company showed off its newest product offering at the Sea, Air, Space exhibition outside of Washington, DC in April. The Copperhead system can carry out several missions and is designed to be launched from larger underwater drones. It is also capable of launching another USV, signalling the important and layered role uncrewed maritime vehicles are viewed as playing in future conflicts. (source and source) *Assessment*: Shane Arnott, company Senior Vice President of Programs and Engineering, told reporters that Copperhead was developed in response to the proliferation of uncrewed maritime vessels being developed and deployed globally. As the environment on the surface of the sea and below it grows more complicated, crowded, and congested with both crewed and uncrewed systems, the need for less expensive and, in some cases more expendable, uncrewed assets capable of carrying several types of missions and delivering different effects increases. One of the interesting aspects of the Copperhead family of systems is that it is designed to be launched from Anduril's Dive-LD and Dive-XL uncrewed underwater vehicles (UUVs) and can also subsequently launch its own smaller UUV or torpedo. This "Russian nesting doll" type of operational concept increases the range of autonomous systems and allows for what Anduril calls "a comprehensive, intelligent maritime capability that allows operators to quickly respond to threats in the undersea battlespace, at a fraction of the cost of legacy options." The Copperhead family of systems includes two variants. The company's website states that the smaller Copperhead-100 can be fitted with several types of payloads, including active or passive sensing, acoustic communications relay, magnetometer, side scan sonar, and chemical detection. It can also be armed with a lightweight-class warhead and serve in a torpedo function (a variant known as Copperhead-100M),. The Copperhead 500 can be armed and used as a torpedo and can also carry other payloads such as active and passive and side scan sonar.

Figure 2: The Copperhead family of systems. Source: Anduril

2.3	**“Simon says ‘attack!’”: Startup successfully tests voice control of uncrewed systems** Conversational-Human-Machine Interface (HMI) converts spoken commands into precise autonomous actions, allowing operators to control individual or groups of uncrewed systems with simple commands (source) *Assessment*: US-based startup Primordial Labs has demonstrated a voice-controlled human-machine interface known as Anura that allows operators to direct drones with verbal commands. In a promotional video, the Primordial Labs product manager issues a small Skydio drone a series of commands as part of a simulated surveillance mission. Some of these commands are simple, such as “take off”, “go to 100 feet”, “fly forward 50 meters”, and “land.” However, others are mission-specific, including “create a point where you are looking called ‘alpha’” and “orbit alpha with a radius of 200 feet”, indicating the capacity for more sophisticated and adaptative tasking. In each case, the drone in the video responds as soon as the order is completed. In addition to allowing for more efficient control, Anura also reportedly can assist with mission planning and intelligence analysis by speeding up data processing, automating analytical workflows, and enabling conversational database queries. The company advertises Anura as platform agnostic, meaning it can be deployed on different-sized drones as well as USVs and uncrewed ground vehicles (UGVs). While Anura can be used to operate a single drone, it offers a potential means of addressing the challenge of a single operating controlling large numbers of different types of drones operating across multiple domains that leverage human actions and attributes. According to Primordial Labs, “the path to mass adoption of autonomous systems is to make the communication mechanism, not the robot itself, more human.”

Figure 3: A screenshot of the Primordial Labs promotional video showing an operating using Anura to command a Skydio drone to "fly to 100 feet." Source: Interesting Engineering

3. Sensors

3.1	**Chinese scientists develop powerful new optical synthetic aperture system** A Chinese Academy of Sciences (CAS) research team published an article in the *Chinese Journal of Lasers* describing a new remote sensing capability that would greatly enhance the resolution of imagery captured both from and in space. (source)
	Assessment: CAS's Aerospace Information Research Institute published research describing the successful test of an advanced synthetic aperture light detection and ranging (LiDAR) system. LiDAR systems use lasers (or optical imaging) to create precise 3D images of target objects and environments. LiDAR sensors are frequently used on commercial autonomous vehicles and other autonomous systems to interpret surroundings more precisely than traditional microwave radar. LiDAR sensors have also been placed on satellites to provide earth observation for a range of purposes. The team reportedly captured images with millimetre-level resolution from distances exceeding 100 km during a trial conducted across Qinghai Lake located in China's northwest. The device was able to spot details as small as 1.7 mm across and determine the distance to objects with an accuracy of 15.6 mm. This constitutes a level of detail that the *South China Morning Post* states is 100 times better than what can be seen with "leading spy cameras and telescopes that use lenses." The team used a 10-watt laser, pairing it with real-time digital processing to handle the huge amounts of data produced by the camera. The result, according to a Beijing-based imaging scientist interviewed by the *South China Morning Post*, is a capability that "isn't just about seeing a satellite—it's about reading the serial numbers. At these resolutions, you could detect micrometeoroid damage on solar panels or identify specific sensor payloads" on satellites in low Earth orbit. Claims of scientific breakthroughs by Chinese scientists covered in international media should be taken seriously. However, there remain challenges to the People's Liberation Army (PLA) operationalizing this capability in the immediate future. At a technical level, the quality of laser imaging is highly dependent on weather conditions (lasers can distort while passing through atmospheric conditions such as clouds) and on developing at scale extremely precise mechanical systems that are not easy to build. Nonetheless, in conjunction with the insights from the *China's Remote Sensing* report profiled in January's volume of this report, there is growing real-world evidence of China's rapidly advancing research and development of highly sophisticated remote sensing technologies with numerous applications. One of the applications highlighted in the *South China Morning Post's* coverage of the paper is providing the PLA the capability to "scrutinise foreign military satellites with unparalleled precision or distinguish details as fine as a human face from low Earth orbit."

3.2	**Hiding in the wind: Understanding and addressing military challenges to threat detection presented by offshore wind farms** After Sweden rejected 13 planned offshore wind projects due to national security concerns, *Recharge* published an informative analysis of the challenges wind farms present to military operations. The article also discussed potential technological solutions being investigated by different companies in Europe. (source, behind a firewall, summary source) *Assessment:* In November 2024, the Swedish government scrapped 13 planned offshore wind projects in the Baltics that together were anticipated to produce 30 GW of capacity. The projects were scrapped due to concerns they would affect the ability of Sweden and its allies to detect threatening Russian military activities emanating from Russia's nearby military exclave, Kaliningrad. The Baltics is not the only region where heightened security tensions have led to the cancelation of wind-related projects, according to *Recharge,* a news source dedicated to the business of renewable energy. Military opposition to offshore wind projects has taken place in Germany, the United States, Japan, Taiwan, and China. The main challenge for militaries is associated with the impact wind farms have on radar. Radio waves sent out by modern radar systems bounce back off the reflective turbine blades. While radar can filter out known static objects like buildings, they typically cannot filter out moving objects like rotating blades. The result is a "desensitisation" of radar signals, the heightened potential for false returns, and the "unacceptable degradation" of a radar's effectiveness. Commander of the Estonian Navy, Ivo Vark, recently told Estonia's public broadcaster that offshore wind farms are like "a fence or barrier, behind which we cannot see." In addition, offshore wind farms can physically interfere with military activities forcing naval forces or low-flying aircraft to navigate around them. In an attempt to balance the growing demand for renewable energy and defence and national security concerns, several countries and companies are investigating novel technological solutions. The *Recharge* article cites efforts to incorporate stealth nanotechnologies into turbine blade composites to help them go undetected; the use of machine learning to help discern turbines from other objects such as military aircraft or missiles; the use of additional radar systems in other locations to provide a more complete picture of the environment around wind farms; and even placing sensors on the tips of turbines to serve as part of a country's air surveillance mesh. Of course, all of these proposed solutions have technical or legal drawbacks. However, there may be a place for novel technologies and operational concepts to help balance the competing needs for renewable energy and the ability to reliably detect fast-moving threats, especially in increasingly tense strategic contexts in Europe and the Indo-Pacific.

4. Connectivity

4.1	**The future of the "Invisible War": UK Defence Science and Technology Lab (DSTL) tests electronic warfare technologies and concepts** In January, the UK Ministry of Defence announced it had completed its "Spectral Prophet" trial that served as a demonstration of prototype electromagnetic (EM) activities combining previously separate disciplines. (source) *Assessment:* The exercise brought together companies and capabilities focused on EM deception, communication, electronic surveillance, electronic attack, and other components of activities that the UK MoD is seeking to carry out in the EM spectrum. Overall, the exercise and other DSTL activities have three main objectives, which are likely consistent across most modern militaries seeking to manage a growing range of activities in the increasingly congested and operationally vital EM spectrum. First, DSTL seeks to synchronize the range of EM spectrum activities to ensure a coordinated capability that reduces vulnerabilities and amplifies advantages. For example, the DSTL Technical Lead for Spectral Prophet, identified in a DSTL video as Jon, noted that "there's no point in us planning a really good electromagnetic deception, if our own communications goes and gives it away." The scope and interconnectedness of EM spectrum activities in which UK forces are engaged place a premium on aligning these activities so that a commander can "fight in the electromagnetic spectrum in a really integrated way." Second, the initiative seeks to build technologies that help curate and funnel information to the appropriate forces when they need it in real-time and to filter less important information out of the large amount of complex electromagnetic surveillance data that the UK MoD is likely to collect. Finally, Spectral Prophet is designed to support, focus, and build the UK's domestic supplier base in electromagnetic technology and help train a UK workforce more knowledgeable of and skilled in electromagnetic operations.

Figure 4: A screenshot of one of the EM spectrum technologies used during the Spectral Prophet exercise taken from a video describing the exercise posted by the UK Government. Source: UK Government/DSTL

5. Human Protection and Performance

5.1	**It's in their blood: US DoD looking to hack service members' blood to improve performance** The US Defense Advanced Research Projects Agency (DARPA) established the Red Blood Cell-Factory program in December 2024 to investigate how to inject "biologically active components" into US troops' red blood cells to protect them from various risks. (source) *Assessment:* The concept behind the Red Blood Cell-Factory is to establish a mechanism to "endow red blood cells with compounds" that, once activated, could help troops operate in harsh environments or more rapidly heal after being injured or becoming ill. Red blood cells are considered a useful delivery vehicle for biological compounds because they can circulate reliably in the human bloodstream for months. Program manager Dr. Chris Bettinger offered a representative scenario of how this process could work: "imagine a world where service members have red blood cells accessorized with a compound that prevents bleeding . . . in this scenario, you have someone prophylactically protected against bleeding, so if they do sustain a trauma, the red blood cells dump out the compound that promotes coagulation and prevents bleeding." Other potential use cases include delivering troops a customized pre-deployment regimen of blood enhancement to help those troops better manage or endure the threats of specific environments to which they will be deployed. For example, troops headed to tropical environments could be infused with an antimalarial peptide that could restore baseline function very soon after an individual was infected with malaria. Of course, the use of biological interventions to support human performance is a controversial issue that raises several ethical and legal questions. At this point, the program has tried to address these concerns by stressing that it is not designed to deliver enhanced capabilities to US forces but rather is entirely focused on protecting troops and restoring their health. Moreover, current research is fundamental, meaning that it is focused on understanding what is possible in terms of introducing blood-borne compounds into a service member's body; assessing the ethical, legal, and social ramifications of the research; and identifying potential partners to develop prototypes for assessment.

6. Platforms and Weapons Systems

6.1	**Boeing wins U.S. Air Force's Next Generation Air Dominance (NGAD) Competition** The surprise announcement—both in terms of outcome and timing—resurrects the Service's 6th-generation fighter program after the Biden Administration paused the program in advance of the 2024 US Presidential election. (source and source). *Assessment:* On 21 March, Boeing was selected as the winner of the NGAD competition. The initial Engineering and Manufacturing Development contract will be worth approximately $20 billion, though Boeing is expected to receive hundreds of billions of dollars across the life of the program. Defence publication *The War Zone* described the announcement as "the biggest development for US Air Force tactical power in more than two decades." The aircraft has been designated the F-47. The announcement was a surprise at two levels. First, the timing of the announcement was unexpected. Last May, the Air Force paused the program due to budgetary concerns and to review program requirements, especially those related to fighting in the massive theatre of the Indo-Pacific. The combination of this uncertainty and the continued—and perhaps more urgently felt—uncertainty over the nature and depth of the Trump administration's efforts to cut government spending meant that few industry media or observers expected an announcement early in 2025. Second, most industry observers believed Lockheed Martin was more likely to be selected over Boeing, given Lockheed's experience in developing stealth fighters (F-22 and F-35) and recent challenges in Boeing-led Air Force programs such as the T-7 trainer and KC-46A aerial refuelling aircraft. The NGAD program is a 6th-generation program similar in concept to the Future Combat Air System (FCAS) and the Global Combat Aircraft Program (GCAP). The January volume of this report also highlighted the surprise reveal of two Chinese aircraft—most notably the J-36—which are likely demonstrators for China's 6th - 6th-generation program. At the centre of the NGAD concept is a crewed aircraft that will be designed with enhanced stealth, improved propulsion technologies, stronger electronic warfare and networking capabilities, and better sensors. However, NGAD, as with other 6th-generation programs, goes beyond the development of a single aircraft concept. Instead, the F-47 will sit at the centre of and control a broader tactical airpower combat system that also involves several autonomous collaborative uncrewed systems. These systems can provide surveillance, strike, decoy, and electronic warfare capabilities to enhance the main aircraft's mission effectiveness and keep it at a distance from enemy air defence systems. Most importantly, the less expensive uncrewed systems allow air forces to scale tactical combat airpower at range in an era in which buying thousands of advanced 5th and 6th generation fighters is likely to become unaffordable. Notably, the US Air Force is also pursuing a related program known as the Collaborative Combat Aircraft (CCA) program involving General Atomics and Anduril. Both Boeing and Lockheed Martin reportedly have flown experimental demonstrator versions of its X-47 offerings. In addition to the US Air Force's NGAD program, the US Navy is pursuing its 6th-generation fighter program known as F/A-XX.

Figure 5: A rendering of the F-47 from Boeing. It is unclear whether this is the working version of the design, given that Boeing is likely hiding or obfuscating some important features from geopolitical and military competitors. Source:Boeing

6.2	**In the blink of an eye: Saab and Sweden unveil Loke counter-UAS technology** Loke is a modular and scalable system that was developed and evaluated in record time, demonstrating the growing pressures on militaries to adapt to fast-moving and frequently changing operational environments and iterative offense-defence competitions. (source) *Assessment:* On 17 March, SAAB announced that it had partnered with the Swedish Air Force to develop and evaluate the Loke counter-UAS concept in a mere 84 days. Saab's press release about the achievement stresses the urgent need to find more cost-efficient and operationally flexible solutions to better manage the threat from small and commercial drones. Loke is a modular and mobile concept that covers the entire kill chain associated with the counter-UAS mission: detection, classification, tracking, and interdiction. The Giraffe 1x multi-mission radar is used for detection and classification while the Trackfire remote weapon station is used for kinetic interdiction. Trackfire is commonly found on naval vessels such as the Combat Boat 90 and has been repurposed for the counter-UAS mission. Supporting these two systems is a lightweight command and control capability based on the short-range air defence (SHORAD) concept. This ability to "cleverly repurpose existing products and integrating new features and technologies" was crucial to the ability to develop and test Loke in such a short time and could serve as a model for additional efforts to develop military systems in response to changing operational and tactical challenges. The system is described as scalable and adaptable to evolving threats, a capability that will be crucial in future operational and tactical environments in which iterative battlefield innovations will disrupt short-lived advantages in the offense-defence competition. Sweden's Air Force Chief Major General Jonas Wikman observed that the country needs to "constantly evolve and find fast and competent solutions to build a stronger Air Force."

7. Space

7.1	**German Bundeswehr contracts with industry to design hypersonic space plane** The spacecraft is expected to be flight-ready by 2028. (source, source, and source)

Assessment: On 27 February, German's Federal Office of Bundeswehr Equipment, Information, Technology, and In-Service Support (BAAINBw) awarded a contract to German start-up POLARIS Spaceplanes (POLARIS) to design a reusable, two-stage, horizontal take-off, hypersonic research spacecraft. The craft is intended to serve as a hypersonic test platform for defence and scientific research as well as to function as a small satellite launcher, allowing it to place satellites into orbit more frequently and less expensively than traditional launch vehicles.

The new vehicle is expected to be 28 metres and capable of ferrying roughly 1,000 kg of cargo into orbit per flight. It will use a jet engine for take-off, landing, and cruise and an aerospike rocket engine to accelerate to a hypersonic speed more than MACH 5. While the initial contract is solely for the design of the spacecraft, there are provisions for follow-on work to manufacture and flight-test a full-sized vehicle. Some reports indicate POLARIS is considering extending the spacecraft's capabilities to include space reconnaissance, offering an additional space-based remote sensing capability.

POLARIS has already developed and tested progressively larger demonstrator aircraft since 2023 including a pair of identical five-metre-long vehicles known as MIRA II and MIRA III, achieving over 100 total test flights.

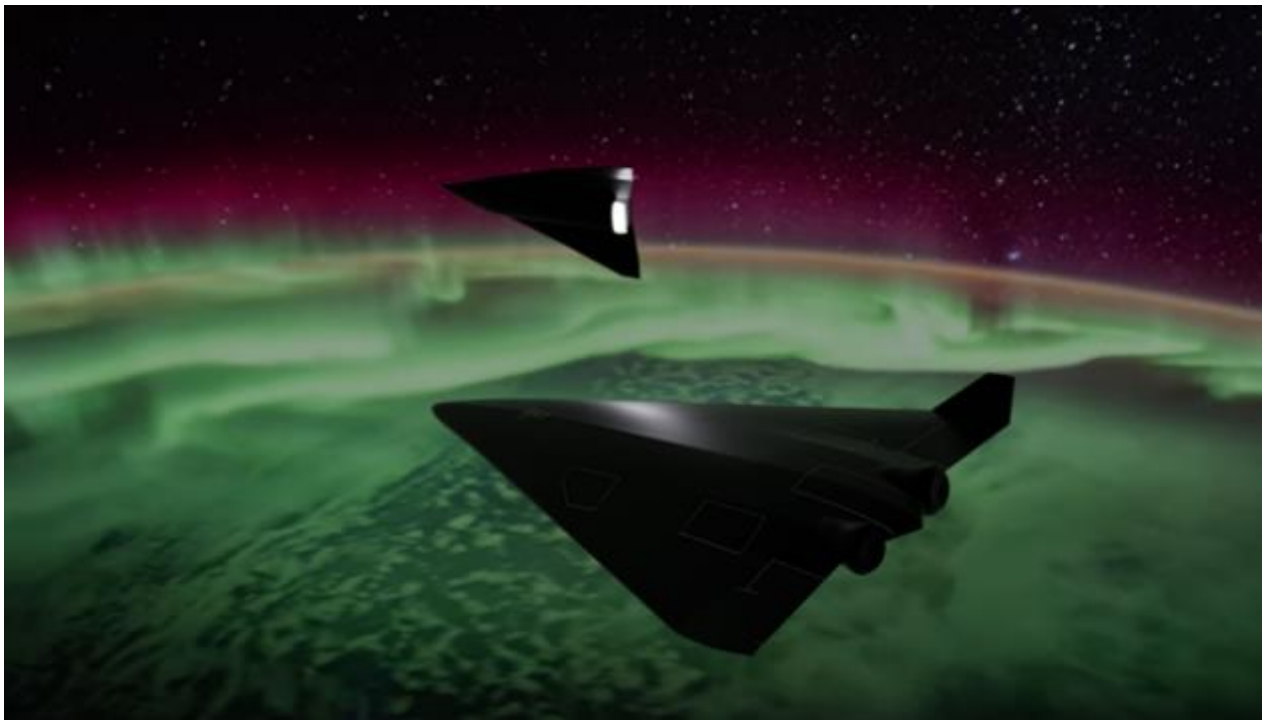

Figure 6: An artist's rendering of the POLARIS spaceplane. Source: POLARIS, via Defence Post

8. Manufacturing and Industry

8.1	**Efforts to establish a Defence, Security, and Resilience (DSR) bank gain momentum** Former head of Nato Innovation leading initiative to support increased production of defence material and support for supply chain resilience as European threat environment expands. The initiative reflects the growing interest in novel ways to invest in defence capabilities that go beyond government procurement. (source) *Assessment:* The aim of the bank, according to the former head of Nato Innovation Rob Murray, is to build an institution from the ground up that confers the benefits of a multi-lateral development bank (MDB) but with a charter explicitly aimed at building up defence production, supply chain resilience, and procurement. Many MDBs are either reticent to invest in defence equipment such as missiles and ammunition or are restricted in their investments by their charters. However, these hard military capabilities are essential for Europe's efforts to deter further threats and to effectively fight and win future kinetic conflicts if necessary. Even in an environment in which European nations are focusing more resources on defence in response to increasing tensions with Russia, in particular, Murray argues that there is a need for an MDB entirely focused on defence capabilities. Absent targeted investment in the "supply side"—that is, the ability of industry to meet increased demand promptly—increased government defence investment could be inflationary. In addition, the DSR bank will focus on funding deep-tier supply chains, a vital and frequently vulnerable component of defence production that is overlooked by MDBs. As Murray noted, "it's great that defence spending is going to be ramping up. But if we don't have the architecture in place to help deal with it, which is what the DSR is trying to do, then there's a really strong risk that we hit inflationary activity by mistake." The DSR Bank is in the process of securing funding from participant states and anticipates operating with an initial £100 billion balance sheet.

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