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Dear Reader,

First of all, Happy 2023 !

Two words, but a lot of embedded challenges, especially in the first one !

With this first deftech-scan of the year, it is also the opportunity to promote a great piece of work co-written by Tate about the electrification of military ground vehicles. If the focus is for the United States, we believe that there is a lot of useful food for thoughts to be applied elsewhere.

Futures never sleep!



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We wish you an interesting read.

Foresightly Yours,

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1 Applications of AI and data

1.1	Digital Horizon 2022 demonstrates power of AI in a range of applications
	The US Navy's Task Force 59 carried out the Digital Horizon exercise in the Middle East in November and December. The exercise demonstrated how AI can be leveraged as part of human-machine teams to help prioritize resource allocation, identify threats, and employ resilient command and control. (source)
	<u>Assessment</u> : Task Force 59 was established within the US Fifth Fleet to accelerate experimentation with AI and maritime robots as well as to develop more efficient ways to engage industry to support this innovation. The Digital Horizon 22 exercise ran from 23 November to 15 December and included 17 industry partners, which brought 15 different uncrewed systems. The exercise provided interesting examples of applications for AI that bring efficiency and effectiveness to human-machine teams.
	First, the exercise demonstrated how AI can serve as a sensor amplifier and threat prioritization engine, which in turn can help operators make more informed and faster decisions about how best to deploy constrained high-value resources. According to Captain Michael Brasseur, the commanding officer of Task Force 59, "we see the unmanned assets as a way to get a bunch of eyes out on the water, collect the data, and then leverage machine learning and [artificial intelligence] to gather insights from that so we can be more precise in how we deploy our manned assets."
	Another important aspect of the exercise was the ability of operators and watch standers to consume the information produced by AI on what Captain Brasseur called "a single pane of glass." This is a key element that "allows the end user to make decisions quicker and leverages artificial intelligence to make sense of all those data streams that are flowing in."
	A second important take-away from the exercise was the importance of the use of uncrewed systems as part of a "mesh network" of wireless radios to "not only to collect the data to power the machine learning and AI tools, but also to control the unmanned systems."
	Digital Horizon was also notable because it brought together several areas of Al- related experimentation previously pursued separately. According to Captain Brasseur, "we have done a lot of work with Al previously, and we've done computer vision, we've done anomalous behaviour detection, we've done Al- enabled [command and control], but we've done all of those separately. At Digital Horizon, for the first time ever, we did that together on a single stack."



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1.2	Chinese students invent coat that can fool computer vision
	The invention—which incorporated the use of AI algorithms in its design— demonstrates existing vulnerabilities in AI-driven computer vision that can be exploited by criminals, human intelligence operators, and in traditional defence environments (<u>source</u>)
	<u>Assessment:</u> A team of Chinese students from Wuhan University took first prize in the China Postgraduate Innovation and Practice Competition sponsored by Huawei on November 27 with a demonstration of their InvisDefense coat. InvisDefense carries a camouflage pattern on the surface that can interfere with the recognition algorithm of machine vision, ensuring that cameras and supporting identification software cannot recognize the coat's wearer as a human, according to the <i>South China Morning Post</i> . It also incorporates irregularly shaped temperature-controlling modules that create unusual temperature signatures that confuse infrared cameras used to detect humans at night.
	Previous efforts to develop clothes that can avoid modern security camera detection have involved the use of bright colors, though such clothing tends to draw attention of humans within the proximate vicinity. To avoid this challenge, the team used algorithms to identify the least conspicuous patterns for the coat design that can disable computer vision while simultaneously not attracting attention from other pedestrians or humans in the vicinity. Team lead Professor Wang Zheng argued that his team's results "prove that there are still loopholes in current artificial intelligence technology and computer recognition technology." He also identified potential applications on a battlefield increasingly characterized by drones equipped with AI and computer recognition technologies, noting that the cloak could "also be used in anti-drone or human-machine confrontation on the battlefield."





2 Autonomous systems and robots

2.1 Turkey's first drone carrier nearing delivery

The first of two Turkish "drone carrier" ships is nearing completion. The ship is expected to carry the under-development Bayraktar TB3 and the Kizilema jet powered uncrewed aerial system (UAS). (source)

Assessment: Turkey is developing two drone carrier vessels as part of its on-going and ambitious military modernization effort. The first of these ships, the amphibious assault and landing helicopter dock ship TCG Anadolu, was initially launched in 2019 and is undergoing substantial refurbishment and testing with the goal of being delivered by the end of 2022 or early 2023 (there is no affirmative indication that the ship has been delivered by the publication of this report). Work on the second ship, the TCG Trakya, has yet to get underway. The ships will carry two types of drones being developed by Turkish company Baykar Defence: the TB3 and Kizilema UASs. The TB3 is the successor to the successful TB2, which is among the most widely exported UASs in the world and has featured prominently in Ukraine's defence against Russian invasion. The TB3 is expected to have a longer wingspan, folded wings for carrier operations, and nearly twice the payload capacity than the TB2. It also can reportedly stay in the air for approximately 24 hours, providing extended range over the TB2. The Kizilema is a jet powered UAS capable of autonomous take-off and landings and of operating at 35,000 for up to five hours. The aircraft completed its maiden flight on 14 December 2022. According to Ismail Demir, president of the Defence Industry Agency, the Anadolu will be able to carry up to 80 drones and control between 10 and 5 armed drones simultaneously.

Turkey's drone carrier development reflects both its status as one of the world's most prolific developers and exporters of UAS as well as its broader regional geopolitical ambitions. By being able to launch longer distance UAS from the decks of ships rather than relying on land-based operations, Turkey will be able to more flexibly project power further from home.



Figure 1: The Kizilema jet powered UAS during runway and taxi tests on 3 December 2022. Source: <u>Baykar DEfense YouTube</u> video via The Defense Post





2.2 Elbit Systems debuted its Lanius multirole micro drone for urban operations

The system can perform surveillance and mapping in urban environments or serve as a loitering munition targeting enemy forces (<u>source</u> and <u>source</u>)

Assessment: Elbit released a video in November promoting the utility and capability of a new micro-drone for urban warfare known as the Lanius. The Lanius—whose unique design is based on racing drones—is "a highly manoeuvrable and versatile drone-based loitering munition designed for short-range operation in the urban environment. The system can autonomously scout and map buildings and points of interest for possible threats, detecting, classifying and syncing to Elbit Systems' Legion-X solutions. LANIUS can carry lethal or non-lethal payloads, capable of performing a broad spectrum of mission profiles for special forces, military, law enforcement, and HLS." Lanius can be used as an individual UAS or as part of a swarm being controlled by Elbit's Legion-X robotic and autonomous combat solution. The short promotional video shows Israeli soldiers in an urban combat environment and the Lanius system providing intelligence about threats outside of the soldiers' direct line of site. A second vignette in the video shows the Lanius identifying an adversary, followed by a human controller remotely detonating the device and incapacitating the adversary.



Figure 2: A screen grab of the Lanius taken from an Elbit YouTube video introducing the drone. The image depicts the Lanius identifying an armed adversary and is followed by a human controller detonating the device and incapacitating the adversary. Source: Elbit Systems YouTube.





2.3	UK Navy orders uncrewed submarine to meet growing undersea threats
	The 1 December £15.4(\$18.9 million) order with British company M Ship constitutes "the first step in developing an operational autonomous submarine that will work side-by-side with crewed submarines—including the Astute-class hunter-killers and their successors—or independently." (<u>source</u> and <u>source</u>)
	Assessment: The program, named Project Cetus after a mythical sea creature, involves development of a 12 meter long, 2.2 meter wide, 17 tonne vessel that will be battery powered and able to cover up to 1,000 miles in a single mission. Project Cetus is just one of several steps the UK Ministry of Defence has taken recently to improve its crewed and uncrewed capacity to deal with expanding underwater threats, including multiple attacks against underwater pipelines and cables. Additional measures include starting a competition to supply the Royal Fleet Auxiliary with a remotely operated uncrewed deep water salvage capability and the announcement of an accelerated timeline for delivery of the first of two multirole ocean surveillance ships order to protect underwater cables. Minister of Defence Ben Wallace noted in a statement announcing the Project Cetus deal that due to "growing threats to our underwater infrastructure, the Royal Navy needs to be ahead of the competition with cutting-edge capabilities"

2.4	Chinese company displays a clone of the MQ-28 Ghost Bat UAS
	Chinese state-owned enterprise China Aerospace Science and Technology Corporation (CASC) displayed the FH-97A loyal wingman drone during the Zhuhai Air Show in November 2022. The UAS has a striking resemblance to Boeing Australia's MQ-28 Ghost Bat, formerly known as the Air Power Teaming System, which is one of the most advanced loyal wingman programs in the world. (<u>source</u> and <u>source</u>)
	Assessment: This is the second time in two years CASC has displayed a loyal wingman / attritable drone design with a conspicuous resemblance to the design of an already under development aircraft. During the 2021 Zhuhai Air Show, CASC displayed a new drone designed called the FH-97, which strongly resembled the Kratos XQ-58A Valkyrie. The Valkyrie is one of several US loyal wingman designs under development.
	While the FH-97A has a striking similarity to the Ghost Bat—especially the downward slanting nose section—there are significant differences between the FH-97 and FH-97A designs. Chief designer Deng Shuai explained to People's Daily English-language newspaper <i>Global Times</i> that "the electro-optical payload of the FH-97 is under the fuselage, while the electro-optical payload of the FH-97A is above the fuselage. The FH-97 uses an intake on the back, while the FH-97A has side intakes. In addition, there are some differences in the weapons bay, as the new FH-9&A's weapons bay is designed to enhance the manoeuvrability and speed in air combat while the FH-9% weapons bay is designed for land attack." Deng stated that as a loyal wingman aircraft, "the FH-97A is not only a sensor, but also an ammunition depot, and also an intelligent assistant for pilots. It can extend a pilot's situational awareness and scope of attack."







Figure 2: The FH-97A on display at the Zhuhai Air Show in November. Source: Chinese internet





3. Connectivity

3.1	New report on Russia's cyber warfare efforts in Ukraine
	The in-depth report assesses that Russia's cyber operations have had limited impact on the conflict since the initial invasion and attempts to draw lessons for other militaries (<u>source</u>)
	Assessment: The Carnegie Endowment released a report in December entitled "Russia's Wartime Cyber Operations in Ukraine: Military Impacts, Influences, and Implications." Among the key insights are that Russia's cyber "fires" contributed modestly to initial successes on the ground in Ukraine but have not added meaningfully to Russia's kinetic firepower nor disrupted Ukrainian military operations at scale since. The report also finds that intelligence collection rather than offensive cyber fires has been the focus of Russia's cyber activity and is likely to continue to be, though these operations have also "yielded little military benefit." The reasons for the lack of effect are varied, according to the author (Jon Bateman), and include robust Ukrainian defences enabled by a strong Ukrainian digital ecosystem. Inadequate capacity in Russia's cyber forces that have not allowed Russian forces to sustain the tempo of cyber operations necessary to deliver a strategic effect was also cited as a major driver of Russia's relatively ineffective cyber operations to date. Indeed, this later challenge is one that many militaries are likely to encounter, leading the author to recommend that militaries considering large scale operations needed to consider during the planning of operations whether their cyber forces can "realistically meet the high bar of producing and sustaining cyber fires at meaningful levels."

3.2	Israel establishes new cyber training centre
	In November, <i>Defense News</i> interviewed three leaders within the newly established cyber defence training school, which opened in August 2022 (<u>source</u>)
	Assessment: The school was established as part of the Israeli Defence Force's J6 directorate of the command, control, communications, and computers / cyber and intelligence (C4i) forces. It is charged with taking young service members right out of high school and "making them special technology experts." Students are trained in several high-tech fields "from data centre management to cloud-centred training to programming and being the best software engineers." Once they graduate the program, these experts are dispersed across IDF forces and help units meet the growing demand for cyber defence capabilities in operational environments. Students are also trained in programming AI algorithms. Each of the interviewees stressed that entrance into the school is not based on previous knowledge but rather "on the way [prospective students] think." Interviewees also highlighted the importance of recruiting a diversity of social groups and backgrounds and noted that 52% of the students are women as is the head of school.



3.3	Japanese Ministry of Defence think tank report highlights China's increasing cognitive
	warfare efforts
	The National Institute for Defence Studies' (NIDS) annual "China Security" report provides an extensive assessment of China's disinformation, psychological, and cyber operations with a particular emphasis on how these operations are being deployed to erode Taiwan's will to resist and change global perceptions of the status quo regarding the island's status. (original source and additional commentary)
	Assessment: China's armed forces are increasingly engaging in nonmilitary warfare against Taiwan that weaponizes disinformation and psychological manipulation, according to <i>Nikkei</i> <i>Asian Review</i> coverage of the report. China's efforts include a diverse set of methods, including "public opinion warfare" to shape perceptions of China's actions and a changing status quo, "psychological warfare" to intimidate Taiwan's population, and "legal warfare" to bend the status quo in directions that favour China's geopolitical ends and contested territorial claims. The report assesses that the combination of these warfare approaches as well as traditional military threats "are wide ranging and present a major threat to Taiwan." The report also notes Taiwan sustained 1.4 billion cyberattacks against political, economic, and military targets between September 2019 and August 2020. These attacks were mostly an effort to destroy or steal data. The comprehensive report is segmented into three chapters: 1) China's military reorganization and strengthening of non-military means, 2) China's increasing influence operations, and 3) China's maritime grey zone situations



Source: Compiled based on Editorial Committee, 2021 National Defense Report, Republic of China, ed., 2021 National Defense Report, Republic of China, Taipei: Ministry of National Defense, 2021, p. 46.

Figure 3: A diagram of the cognitive warfare approaches of the CCP. Source: China Security report, National Institute for Defence Studies, Japan





4. Energy

4.1 Hermeus achieves "mode transition" breakthrough in hypersonic engine development

Atlanta, Georgia based company Hermeus released a video in November featuring their hypersonic engine successfully transitioning from turbojet to ramjet operation. (source)

<u>Assessment:</u> The November test of Hermeus' "Chimera" hybrid turbojet – ramjet engine is considered a breakthrough in the development of a reusable hypersonic aircraft that can take-off from a traditional runway, such as Hermeus' Quarterhorse technology demonstrator aircraft pictured below. The ability to transition between turbojet mode and ramjet mode is crucial to hypersonic flight. Turbojet engines are not able to achieve hypersonic speeds but ramjet engines—which can achieve Mach 5 and above—can only be used when an aircraft is already at a high speed, around Mach 3. This means that hypersonic planes must use turbojet engines to get to Mach 3 and then transition to ramjet mode to continue to hypersonic speeds. According to Hermeus founder and chief technology officer Glenn Case, mode transitioning is "possibly the most critical challenge in unlocking hypersonic flight." The company had previously demonstrated the capacity to transition from turbojet to ramjet, but this was the first instance in which the milestone was achieved on the Chimera engine that will be used in the Quarterhorse aircraft.



Figure 4: Top: The Chimera engine. Bottom: The Quarterhorse technology demonstrator aircraft. Source: Hermeus





4.2	Report urges acceleration of electrification of US Army vehicle fleet
	An Atlantic Council report entitled "Power Projection: Accelerating the Electrification of US Military Ground Vehicles" released in November argues that electrification of US Army's tactical wheeled vehicle fleet should be a priority due to the operational advantages electrification brings to the battlefield. (source)
	<u>Assessment:</u> The discussion of the need to electrify military vehicles and aircraft is most often framed as an important measure to mitigate against climate change and reduce greenhouse gas emissions. The Atlantic Council report acknowledges the importance of these objectives but also stresses that electrification of tactical and, over time, tracked vehicles should be pursued first and foremost because of the advantages electrical vehicles provide to militaries operating in the electrified future battlefield. These advantages include: 1) improved vehicle performance; 2) the ability to perform silent watch and other new missions; 3) power distribution from electric vehicles to other systems (sensors, soldier systems, etc); 4) speeding uncrewed systems adoption and human-machine teaming; 5) data, sustainment, and life-cycle advantages; and 6) and the simplification of logistics operations.
	Achieving these layered advantages is not easy, especially given the current maturity of crucial technologies such as battery energy density, recharging speed, and electricity generation in a deployed environment. New approaches to distributing energy from fixed bases to forces in the field such as power beaming hold some promise, but still require significant maturation to be viable in a future fight. The report also stresses the need for more precise concepts and requirements for future electric vehicles, better engagement with commercial industry where much of the innovation in core technologies is taking place, and more resilient supply chains.





5. Human Performance Enhancement and Protection

5.1	Dutch company Fectar develops app to help Ukrainian children identify mines The VR/AR company created the explosives education app in response to an article written in June 2022 that outlined the risks of unexploded ammunition and mines in Ukraine. (source)
	<u>Assessment:</u> The <u>original article</u> was authored by a former United States Marine explosive ordnance disposal expert named Charles Valentine and details the scale of explosive contamination in Ukraine. Fectar—a VR / AR company that supplies solutions to multiple industries, including education—worked with Valentine to create an interactive and immersive 3D augmented reality lesson for recognizing mines and other explosives. Fectar's goal is to reach at least 15,000 "ambassadors" with the virtual lesson about unexploded ordnance and mines. Terra Pyra, a Ukrainian national humanitarian organisation dedicated to the clearance of land rendered unusable by explosive remnants of war will introduce the free mobile phone app to residents. The app shows 3D models of different types of ammunition and uses a hologram of a Ukrainian teacher to communicate lessons about recognizing and handling undetonated explosives and suspicious items.





6. New Weapons

6.1	Deterrence the American way: US unveils B-21 Raider
	The US Air Force unveiled its next generation stealth bomber aircraft known as the B-21 Raider in a ceremony in Palmdale, California on 2 December. The Raider is the first new bomber aircraft design in the US in more than 30 years. (<u>source and source</u>)
	<u>Assessment:</u> The Raider has a strong physical resemblance to the stealthy B-2, one of the two aircraft it is being designed to eventually replace. However, Kathy Warden, the chief executive of Northrop Grumman, stressed that the plane is considerably more technologically advanced than its predecessor "because the technology has evolved so much in terms of the computing capability that we can now embed in the software of the B-21." In addition, the aircraft is designed to be even more difficult to detect than the stealthy B-2. According to the B-21 fact sheet, the company is using "new manufacturing techniques and materials to ensure the B-21 will defeat the anti-access, area denial systems it will face."
	The Raider will be the backbone of the future US bomber force and, as a result, can carry both nuclear and conventional weapons. Six planes are currently under production, though the Air Force plans to build a total of 100. The Air Force and Northrop Grumman both have emphasized the relatively short timeline for development (seven years) and that the program is coming in under budget. However, other observers have expressed some scepticism about the costs of the highly classified and secretive program, noting that the plane has yet to fly and that there is still room for costs to increase as challenges are identified in testing. Moreover, there is uncertainty over how much each Raider will cost. The Air Force previously placed the cost at \$550 million per plane in 2010 dollars, which is approximately \$753 million per copy in 2022 dollars.



Figure 5: The B-21 Raider on display at a ceremony held on 2 December 2022 in Palmdale, California. The ceremony was attended by US Secretary of Defense Lloyd Austin who introduced the aircraft saying "Ladies and gentlemen, this is deterrence the <u>American way.</u>" Source: Northrop Grumman





6.2 China state-owned enterprises (SOEs) unveils new short-range air defence system China South Industries Group Corporation (CSGC) and China North Industries Group Corporation (NORINCO) have jointly developed the Type 625E AA Gun Missile Integrated Weapons System. (source and source) Assessment: The system shown during the Zhuhai air show combines a six-barrel 25 mm anti-air Gatling-style gun and missiles on an 8x8 tactical truck. The gun fires lightweight shells with a killing radius of five to six meters after they explode. The missile launchers on either side of the truck can accommodate a range of Chinesemade light air-defence missiles. The Type 625E is an upgrade on the Type 625 self-propelled air defence system that has been in use by the PLA since at least 2020. The highly mobile Type 625E reflects the need for multiple layers of shortrange anti-air solutions to cope with the expansion of novel threats such as more advanced and longer-range artillery, swarms of loitering munitions and other drones, and cruise missile salvos. Also shown during Zhuhai show was the FK-3000 air-defence system, which includes anti-air guns and missiles like the Type 625E but also is equipped with electronic jammers and an active electronically scanned array radar. The Type 625E is likely intended for both PLA use and export.



Figure 6 : The Type 625E short-range air-defence system on display at the Zhuhai air show in November. Source: Chinese internet / Twitter via The Drive





6.3	UK MoD completes first trials of Dragonfire directed energy weapon
	The October test involved firing the long-range Laser Directed Weapon (LDEW) at multiple representative target sets placed at various distances. (source)
	<u>Assessment</u> : The test is a step forward for the UK's effort to build a sovereign directed energy weapons system, which was originally stood up in 2017. The MoD's Defence Science and Technology Laboratory (DSTL) is managing the program and partnering with a consortium of three companies:
	MBDA has overall responsibility for the system. MBDA also has developed the advanced command and control (C2) and image processing capabilities
	 Leonardo has developed the beam director which can track and point at targets with pin-point accuracy
	QinetiQ has built a phase-combined laser capable of generating in the order of 50kW of power, with the ability in the future to scale fire-power levels
	According to DSTL, the need to generate high levels of power and the ability to focus the beam with sufficient accuracy are two particularly important capabilities that need to be demonstrated to progress the program and to prove the viability of LDEW systems.
	In addition, in a DSTL promotional video, Dragonfire technical partner Ben (DSTL does not release surnames of employees in promotional videos) also highlighted the broader challenge of integrating a range of leading-edge technologies into a single system, which certainly applies to other advanced systems beyond directed energy weapons. The DSTL representative observed that "the biggest challenges are around the fact that we are trying to build a system on bits of technology which are absolutely world leading and we are trying to combine them all into a single system. So, we don't have the challenges of trying to do one piece of ground-breaking technology. We've got to do three or four at the same time."





7. Manufacturing

7.1	Japan and US explore the value of 3D printing in tactical environments
	The US Marine Corps' (USMC) 3 rd Sustainment Group (Experimental) held a demonstration of the capabilities and tactical uses of 3D printing for the Japan Ground Self-Defence force in September (<u>source</u>)
	<u>Assessment:</u> The USMC team gave a tour of its Expeditionary Fabrication Shop (X-FAB) currently stationed on Camp Kinser in Okinawa, Japan. The X-FAB is designed to be a forward-deployed facility able to replicate battle damaged gear and returning the equipment to operational standards quickly. The 3 rd Sustainment Group has used the X-FAB to provide replacements for tools, vehicle parts, and even medical equipment using a variety of materials, including Kevlar, plastic, and metal. Brigadier General Adam Chalkley, commanding general of the 3 rd Marine Logistics Group, emphasized the importance of increasing focus on the potential of 3D printing, given the significant advancements in the technology and its deployability in recent years. According to General Chalkey, "I think one of the things that is probably the most exciting is the pace that the technology is advancing. We're going away from building plastic door handles and buttons for radios and industries are now building components for rockets using 3D printing."
7.2	Another example of the growing acceptance of 3D printing and digital manufacturing technologies for defence
	3D printed antenna firm Optisys signed a deal with South Korean aerospace and defence company LIGNex1 to incorporate Optisys technology into a new defence-focused radio frequency (RF) systems (<u>sources</u>)
	<u>Assessment:</u> A memorandum of understanding (MOU) agreement signed by Optisys and LIGNex1 calls for cooperation in the design and development of metal 3D printing antennas. The agreement also establishes a cooperative system in the field of digital manufacturing technology linked to metal 3D printing manufacturing techniques. Optisys CEO Janos Opera observed that "additively manufactured antenna systems drastically reduce size, weight, and power (SWaP), while reducing part count and simplifying the supply chain, all of which are critical factors in reducing total system level costs while improving reliability in the defence and aerospace industries." LIGNex1 has been a leader in the use of 3D printing for its

defence activities and reportedly plans to establish a 3D printing quality management system for defence industry parts that can lead to lowered

timeframes and costs associated with production.

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7.3	European Union revises buy-European effort in light of increased weapons demand from Ukraine
	The latest draft of the European Defence Industry Reinforcement through common Procurement Act (EDIRPA) released in November reduces the commitment to fund exclusively European weapons development and procurement efforts, adding language that the fund can be used to purchase arms from third countries (<u>source</u>)
	<u>Assessment:</u> In July, the European Commission for the first time established funding for the joint procurement of weapons by member states to help European militaries restock and improve military hardware in response to the war in Ukraine. The original proposal called for the funding of consortiums of at least three member states to purchase weapons. At the time, Thierry Breton, EC internal market commissioner, observed that the "initiative will make it possible to replenish part of the stocks following Europe's united and supportive response by way of transfer of arms to Ukraine. Breton also stressed the importance of the funding in "creating an incentive for member states to buy together" and as a "boost" to the European industrial base. However, in November, a new draft of the measure was released that allowed for purchases from non-European partners, including the United States due to the inability of European states to fully meet demand. According to the <i>Financial Times</i> "the dilution is needed to meet short-term needs and restock arsenals cleared out by the necessity to supply weapons to Ukraine." The <i>Financial Times</i> further notes that negotiations are on-going and "the text could change again" if and as there are significant shifts in supply and demand. Previous DEFTECH scans have highlighted the challenges facing the US munitions industrial base in reconstituting stocks of stinger and javelin missiles in response to ounnet bly reiniene forces.
	supplies of both sent to support Ukrainian forces.





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8.1	Japan's government has changed the name of its Air Self-Defence Force to stress importance of space
	The Japan Air Self-Defence Force (JASDF) will now be called the Japan Air Space Self-Defence Force as the government invests more in space operations. (<u>source</u>)
	<u>Assessment:</u> By including "Space" in the name of Japan's air force equivalent, the government seeks to convey to both domestic and international audiences that the Japanese Ministry of Defence is strengthening its response to the increasing military and geopolitical competition occurring in space. In May 2020, the Ministry of Defence established the JASDF's Space Operation Squadron and charged it with responsibility for space situational awareness. This is the first time JASDF's name has been changed since the service was originally stood up in 1954. The change as accompanied by an increased focus on space in Japan's transformative National Security Strategy, which was released in mid-December 2022. The report includes a section on "Reinforcing Comprehensive Efforts for Space Security." The strategy includes multiple mentions of building space capabilities as part of an integrated effort to defend and ensure free and stable use of space, cyberspace, and the electromagnetic spectrum. For example, in a paragraph in a section describing the changing global security environment, the paper asserts "In cyber, maritime, space, and electromagnetic domains, and other areas, the risks that impede free access to and utilization of these areas are becoming increasingly serious." These three domains of conflict were called out in the <u>2020 Defence of</u> Japan white paper as the "new domains of conflict ", and clearly the Japanese national security and defence community see them as not only inexorably linked but as growing areas of competition and sub-threshold conflict.

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