

Dear Reader,

Before a welcome summer break for some of you, May and June were really busy months with respect to conference and exhibitions, and we are happy to present here some the latest insights. The situation in Ukraine has allowed or forced the development of new solutions that were already presented by the industry, mainly during Eurosatory in Paris.

It is interesting to see that if high technology solutions are still seen as ultimate solutions, the importance of the use of civilian products in specific situation can lead to surprising efficient solution and even revolutionize the way operations are conducted.

Creativity and ingenuity have still a bright future in the development as well as in the use of the different technologies !

1 Applications of AI and data	2
2 Autonomous systems and robots.....	4
3 Energy.....	7
4. Human capacity enhancement	10
5. Computing Power.....	12
6. Sensors.....	13
7. New weapons	15
8. Space	17

We wish you an interesting read and a great summer.

Foresightly Yours,



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1 Applications of AI and data

1.1	<p>The urgent need for explainable AI</p> <p>The chief data officer of the US Special Operations Command (SOCOM) stressed the need for explainable AI that is able to tell an operator “why it made the decision it did” to further and accelerate AI adoption. (source)</p> <p><i>Assessment:</i> During a session at the Special Operations Forces Industry Conference (SOFIC) in Florida on May 19, Thomas Kenney, the chief data officer for SOCOM, observed that “the speed of future warfare will mean AI talking to AI to make decisions that might not have a human at the helm.” As a result, AI agents on which special operators rely must be able to explain their outputs and recommendations. According to Kenney, if AI agents cannot explain how they are “making decisions programmatically, we’re never going to be able to win a strategic fight that is dominated by AI.” One of the key areas Kenney believes needs to be improved is “the semantic layer”—or means by which data is delivered in layperson’s terms. He recommended that mission command systems should have an application programming interface designed in, an open architecture that is platform-agnostic, and real-time data integration.</p>
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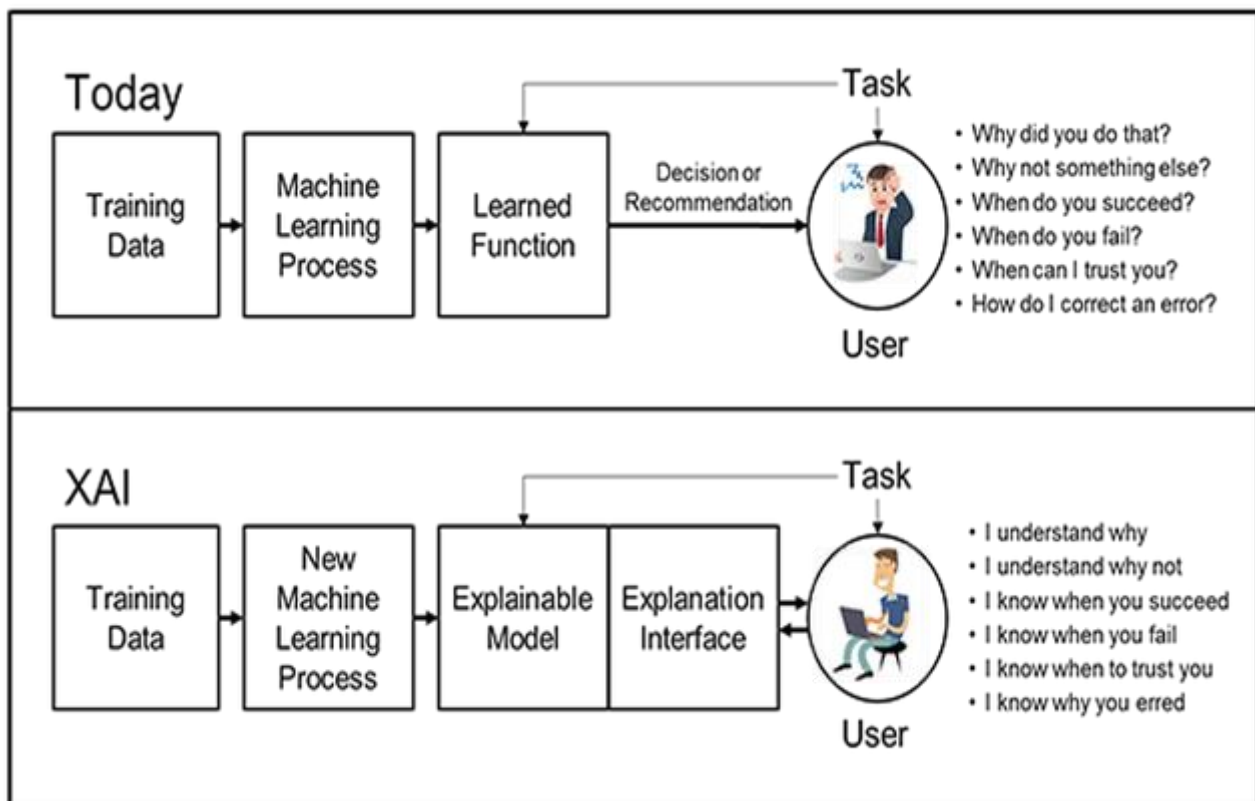


Figure 1: This image demonstrates how the “semantic layer”—or how data is communicated to operators in layperson’s terms—will need to change for AI agents to deliver “explainable” outcomes and recommendations. Source: Defense Advanced Research Projects Agency, via CAISR Net

<p>1.3</p>	<p>Russia developing AI system to monitor Black Sea</p> <p>The Scientific Research Institute for Long-Distance Radio Communications (NIIDAR) in Russia announced it is developing an information system with elements of artificial intelligence to monitor the situation in the Black Sea. (source and source)</p> <p><i>Assessment:</i> NIIDAR is developing a full-scale prototype of an information system that can provide real time situational awareness of both near and remote regions of the Black Sea, an area that is especially sensitive and important for Russian forces given the on-going conflict in Ukraine. The system will receive inputs from various sensors, including NIIDAR's Podsolnukh over the horizon radar that can detect and track hundreds of maritime and aerial targets out to 400 km. One of the Russian Navy's three Podsolnukh radars is deployed in the Black Sea. The information system will then use AI to synthesize and process this information to create real-time situational awareness in the designated area. According to NIIDAR's Director General, "with the help of machine-learning algorithms and elements of artificial intelligence, the system can spot deviations from the normal situation, detect and track potentially dangerous objects, and automatically issue relevant notifications to the military."</p>
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<p>1.4</p>	<p>AI and the need for enhanced sentiment analysis</p> <p>Also during the SOFIC Conference in Florida, US SOCOM leaders spoke about the role AI can play in developing sentiment analysis in support of SOCOM operations, including information operations. (source)</p> <p><i>Assessment:</i> Several senior US SOCOM general officers took part in a panel at SOFIC that stressed the importance of AI and big data analytics in improving the US military's—and SOCOM's specifically—ability to "message and counter-message [in a contested information environment] at speed and scale." According to General Richard Clark, the head of SOCOM, if the US military can "apply big data along with artificial intelligence and machine learning, I think it will give our people that are working [in information operations] an advantage." Other panellists echoed General Clark's sentiments and observed that the United States government has either been reluctant or struggled to fully engage in AI-enabled information operations in the social media age. As a result, is "still a little bit slow as an intergovernmental team" at identifying misinformation and disinformation", according to Rear Admiral Keith Davids who leads US SOCOM South, which is focused on Latin America. Rear Admiral Milton Sands, the head of US SOCOM Africa noted that the presence and savvy information operations of the Russian Wagner mercenaries in Africa has hindered US operations in Mali, an information environment that he described as "very, very interesting, very complex, and . . .very active."</p>
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2 Autonomous systems and robots

2.1	<p>Australian Department of Defence makes big bet on autonomous submarines</p> <p>The Royal Australian Navy (RAN) has signed an ambitious \$100 million contract with Anduril Australia to build three prototypes of extra- large autonomous underwater vehicles (XL-AUVs) within three years. (source)</p> <p><u>Assessment:</u> The RAN is seeking the XL-AUVs to fill a gap in capability before it receives its first nuclear-powered submarine as part of the AUKUS deal in the mid-2030s. The uncrewed systems are expected to be between 40 and 80 feet in length and will be based on a commercial model that is partially 3D printed, making the three-year timeline theoretically achievable. According to Palmer Lucky, the founder of Anduril, “The XL-AUV will harness the latest developments in autonomy, edge computing, sensor fusion, propulsion and robotics to bring advanced capability to the Royal Australian Navy.” The program is directly aligned with the Australian DoD’s strategic research activity, “Remote Undersea Surveillance STaR Shot” designed to develop capabilities to secure Australia’s maritime interests. According to the Australian DoD, these systems “have the potential to provide the ADF with an important, stealthy, multi-role, undersea capability, complementing and enhancing the agility and potency of the Navy’s current submarine and surface combatant force in maintaining peace and stability in the Indo-Pacific region.” The uncrewed submarines will be built in Australia, and Anduril has agreed to partner with Australian small and medium sized enterprises on the project.</p>
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Figure 2: An artist's rendering of the Anduril XL-AUV. source: Anduril

2.2

Australian Royal Air Force (RAAF) designates the MQ-28A Ghost Bat and agrees to purchase seven more

In May, the RAF agreed to acquire a total of 10 MQ-28A Ghost Bat loyal wingman systems, including the three systems it had already agreed to buy ([source](#) and [source](#))

Assessment: The Boeing Australia MQ-28A Ghost Bat is a multi-mission “loyal wingman” system that operates in conjunction with a crewed fourth or fifth generation aircraft, such as the F-35. The system was renamed the MQ-28A Ghost Bat in March 2022. According to former Defence Minister Peter Dutton, the apropos name references “[an Australian hunter which uses sophisticated multi-spectral sensors to detect, hunt, and kill prey in the air and on the ground. They team together in large numbers to confuse and overwhelm an adversary.](#)” In May, the DoD announced that it would spend an additional AUD\$454 million to fast-track the induction of the first Ghost Bats by 2024-2025. The program has already received AUD\$150 million in funding since 2017 and the government had previously committed to procuring three systems. Dutton announced that the 2022 funding “provides for a further seven MQ-28A for the Royal Australian Air Force, leading to a total of ten MQ-28A Ghost Bats owned by the RAAF.”

The Australian program is among the most advanced loyal wingman programs--along with two US programs. Russia, China, India, Japan, and France / Germany / Spain all have active loyal wingman / attritable aircraft development programs, the latter two of which are built into 6th generation fighter programs. In addition, commercial companies such as Kelley Aerospace in Singapore are developing advanced loyal wingman aircraft that are not part of a specific national program. However, on June 24, 2022, [the UK MoD terminated work on the Project Mosquito loyal wingman technology demonstrator past the design phase.](#) Early reporting indicates the MoD is considering smaller and less costly uncrewed systems capabilities to team with fifth and sixth generation fighters.



Figure 3: The MQ-28A Ghost Bat loyal wingman UAS. Source: Boeing

2.3

Israeli company reveals sub-launched UAS

Israeli company Spear has unveiled a new drone that launches from a submarine and loiters for nearly an hour above the surface of the sea, increasing the survivability of the submarine. ([source](#))

Assessment: The Ninox103 encapsulated quadcopter UAS can be launched by a submerged submarine to provide intelligence about above surface conditions while still staying submerged. Boaz Ben Chaim, head of international business development at Spear, asserted that operators “get a very long and high-distance observation capability that they don’t have from the normal [submarine] mast. You don’t need to bring the mast above water, but you can see from above.” [The Ninox 103 makes its way to the surface in a self-contained capsule that can quietly float for up to 24 hours](#), allowing the Ninox 103 to distance itself from its launching submarine so as to not give away the position of the sub if the capsule or drone is detected. Once out of the capsule, it can fly for up to 50 minutes carrying a 1 kg payload and can serve as an expendable surveillance system, communications relay, or loitering munition. The system is apparently fully developed and being tested by the Israeli Defence Forces (IDF) as part of their on-going evaluation.

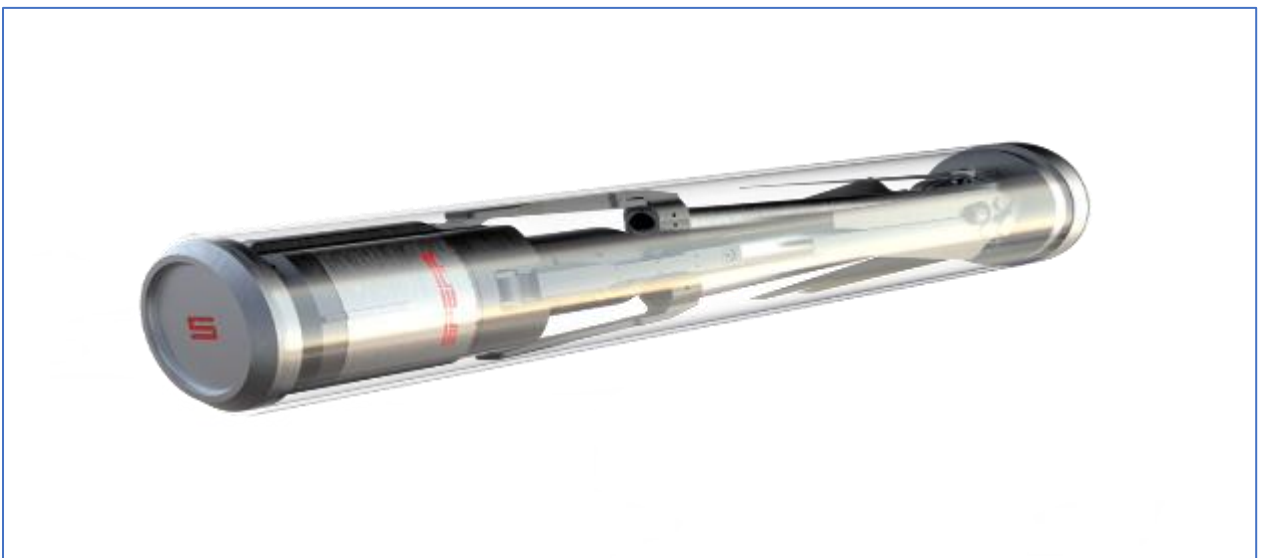


Figure 4: **Top:** A rendering of the Ninox 103 being launched from a submarine. **Bottom:** An image of the encapsulated Ninox 103 drone. Source: Spear

3 Energy

3.1

E-bikes effectively deployed in Ukraine

Ukrainian forces are using electrically powered bikes, some of which are being specifically designed and adapted for Ukrainian forces to be able to avoid detection and increase mobility. ([source](#) and [source](#))

Assessment: The Ukrainian armed forces are using electric bikes made by ELEEK and Delfast to carry out a range of missions including reconnaissance, demining missions, medical deliveries, sniper attacks, and anti-tank operations. The bikes have proven valuable for several reasons. Most notably, they are quiet and have a reduced heat signature, allowing Ukrainian forces to come into closer contact with Russian forces while still avoiding detection. Ukrainian forces have also used the e-bikes' to carry Next Generation Light Anti-Armour Weapons (NGLAW) within range of Russian tanks. Ukrainian company ELEEK has begun mass producing a customized version of the bike specially made for the Ukrainian military and for riding along undeveloped trails. ELEEK also has improved the charging time for the bikes and included a 220V output that allows soldiers to charge additional equipment and can help power Starlink satellite internet terminals. US-based Delfast has not modified its bikes, nor has it sold any to the Ukrainian military, though it has donated some bikes since the start of the conflict. The effective and continued use of e-bikes in Ukraine serves both as an interesting data point validating the value of electric vehicles in an actual combat environment and as another example of how the clever incorporation of commercial technologies is creating real tactical and operational advantages in modern combat.



Figure 5: A Delfast e-bike being utilized by Ukrainian soldiers carrying an NGLAW. Source: Twitter account of Delfast founder Daniel Tonpoki

3.2	<p>Pentagon selects design for ‘Project Pele’ portable nuclear reactor prototype</p> <p>The US DoD Strategic Capabilities Office selected BWXT Advanced Technologies as the prime contractor to build a prototype of a mobile nuclear reactor that will demonstrate the utility of a portable alternative energy source to support military operations in austere locations (source).</p> <p><i>Assessment:</i> BWXT announced on 9 June that the company had been awarded a contract worth as much as \$300 million to produce a prototype of a small, portable nuclear reactor in 2024. The prototype will undergo three years of testing to ensure it can provide “reliable off-grid electric power.” The contract is part of a broader effort to reduce dependence on fossil fuels and local power grids, both of which introduce various security vulnerabilities and risks, especially in an environment in which demand for battlefield energy is certain to increase. A 2016 Defense Science Board study identified energy as a critical enabler of future military operations and that battlefield energy usage will energy needs of future military equipment likely outpacing improvements to energy efficiency and management. The report concluded that “the U.S. military could become the beneficiaries of reliable, abundant, and continuous energy through the deployment of nuclear energy power systems.”</p>
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3.3	<p>French consortium displays hydrogen powered uncrewed ground vehicle</p> <p>French consortium Force W displayed the Weasel hydrogen-powered uncrewed demonstrator vehicle during Eurosatory 2022. (source).</p> <p><i>Assessment:</i> The French Army reached out to industry in February 2022 to develop a hydrogen-powered uncrewed concept vehicle as part of a broader effort to explore the applicability of hydrogen technologies for uncrewed vehicles. The French Army is interested in hydrogen in part because it is a green energy source, but also because of the speed with which the system can be recharged, according to Janes. Weasel’s propulsion system incorporates a hydrogen tank, a fuel cell, and a battery. The 40 kg hydrogen tank can be replaced in approximately 15 – 30 seconds with no need to replace other components or recharge the battery.</p>
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3.4

British Army releases electrification strategy

On 3 May, the British Army released its Battlefield Electrification Strategy. The document establishes the need for, technologies enabling, and means of achieving an enhanced degree of electrification of its forces .([source](#))

Assessment: At the core of the strategy is the assumption that “the electrification of the battlefield is the underpinning enabler of [a new] paradigm that sees lighter more mobile forces with increased human-machine teaming achieving far more while reducing human exposure to risk. The document is divided into several parts, including “Context”, “Vision”, “The Ends”, “Ways”, and “Means”. The “Ends” section includes five direct benefits of battlefield electrification: power generation, power sharing, performance enhancement of vehicles (silent running and silent watch), vehicle design freedoms, and reducing logistics demands and risk. It also articulates five “wider benefits”: reduced through life costs, increased data produced about platforms and systems, reduction of greenhouse gas emissions, opportunities for building domestic energy in key dual use technology areas, cross-government efficiencies, and recruitment and retention.

4. Human capacity enhancement

<p>4.1</p>	<p>Harry Potter-style invisibility cloak revealed</p> <p>The Barracuda division of Swedish aerospace and defence manufacturer Saab has created a new item of clothing called Soldier System. The system obscures a range of optics such as ultraviolet and infrared (IR) (source)</p> <p><u>Assessment:</u> The 600 g, double-sided Soldier System was described as being like 'Harry Potter's invisibility cloak' because it obscures the user from ultraviolet, visible light, near-IR, short-wave IR, and day and night thermal imagers. It can be stuffed into a pack to reduce the carrying burden for personnel. The Soldier System measures 2m x 2m and can be snapped together with buttons to form a cloak, secured to a helmet, or draped over a fixed position to hide its user from sensors. The pattern and colour used on one side of the system can be changed to meet user requirements, while the reverse side is designed to be used at night.</p>
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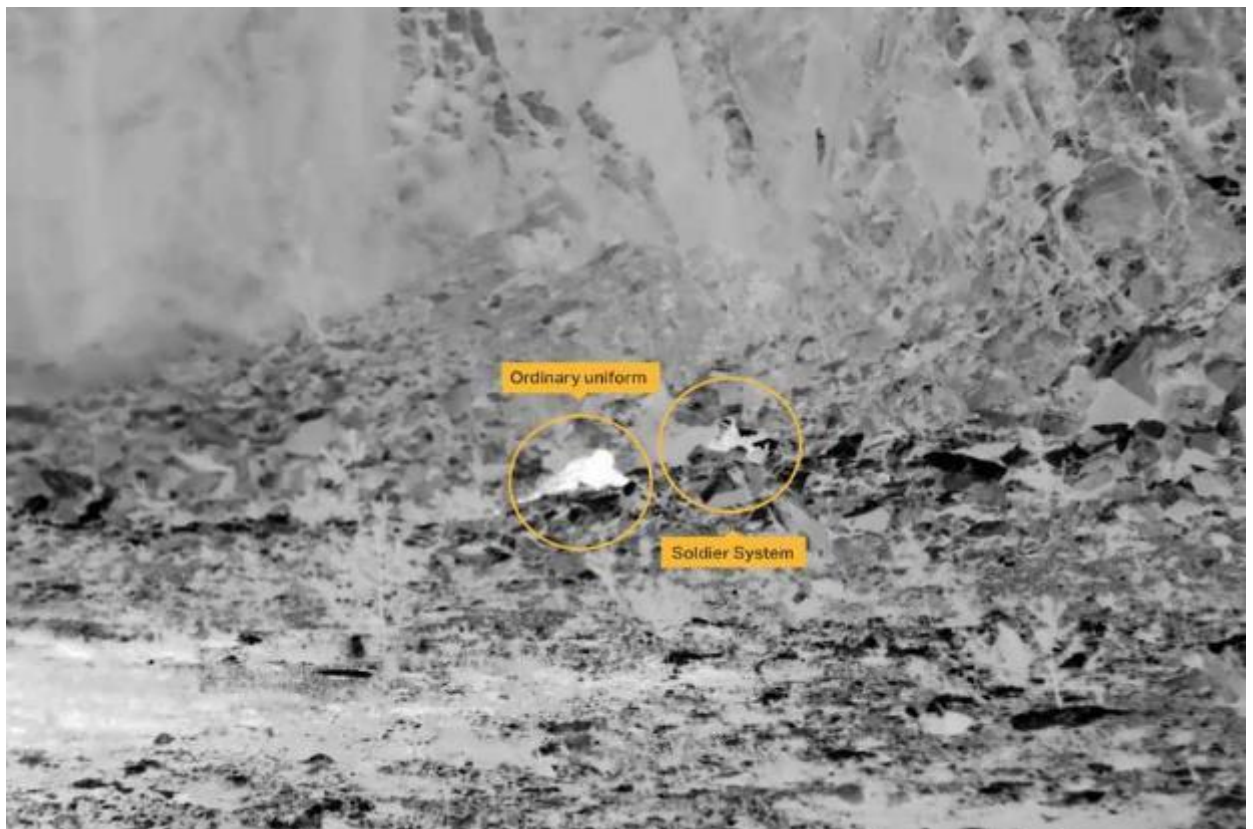


Figure 6: A comparison of an ordinary uniform versus the use of the Soldier System using a thermal sensor. (Photo: Saab, via Shephard Media)

4.2	<p>The US Air Force Cancels Adversary Air Training Contract</p> <p>The proliferation of advanced air threats, especially fifth generation fighters, is changing the nature of high-end adversary air training and led the US Air Force to cancel a long-standing adversary air training contract with Draken International due to concerns that the company’s current fleet of aircraft does not accurately replicate advanced air threats. (source)</p> <p><i>Assessment:</i> Draken International has provided adversarial air training since 2015 and secured a \$280 million in 2018 to continue that training—a contract that now will not be renewed. The Air Force’s concern is that Draken’s fleet of A-4 Skyhawks, L-159As, Dassault Mirage F1s, MiG-21BIS and Atlas Cheetahs was insufficient to replicate the threat posed by fifth generation fighters such as China’s J-20 According to Lt. General David Nahom, the Air Force’s deputy chief of staff for plans and programs, “what we’re finding now though is these contracts aren’t very effective at Nellis AFB in that high-end training environment . . . five, six years ago we wouldn’t be talking about F-35s being adversary air because our adversaries didn’t fly fifth generation airplanes. Well, the Chinese do now.” The US Air Force is pursuing multiple avenues for replicating this threat, including using F-35s in the adversarial air role and increased use of simulation training and virtual-constructive training.</p>
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4.3	<p>US Army training support Soldier Monitoring System II (SMS II) makes debut</p> <p>In June, the US Army’s SMS II training support system was successfully fielded to Army units at Ft. Benning, Georgia. (source)</p> <p><i>Assessment:</i> The original SMS system was developed after the death of a soldier during land navigation training in 2011. The update system allows for challenging training without curtailing objectives or realism while reducing the risk of harm to trainees, especially in trainings that require a level of isolation and / or individual execution. It provides real-time soldier tracking, automated boundary alerts, no-motion alerts and soldier-initiated alerts. The system consists of three components—a monitoring station, mobile monitoring device, and the soldier-word device—and can be tailored to suit specific organisation training requirements and is ruggedized and waterproof. John Lindsay, assistant program manager for SMS, also stressed the importance of SMS II’s “communication redundancies.” According to Lindsay, “it has a Bluetooth mesh technology to help ensure connectivity is maintained” during rigorous training exercises. The system is expected to achieve full operational capability in September 2022.</p>
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5. Computing Power

5.1	<p>UK Ministry of Defence (MoD) acquires government’s first quantum computer</p> <p>The BBC reported in early June that the UK MoD has acquired a quantum computer from British company Orca Computing to explore applications for quantum technology in defence. It is the first quantum computer purchased by the UK government (source).</p> <p><i>Assessment:</i> Quantum computers can make complex calculations very quickly and, as a result, are potentially able to solve more complex problems faster than regular computers. While quantum computing development is still at a relatively early stage—one expert interviewed in the BBC article noted that quantum computers “can’t actually solve any practical problems yet—the MoD’s partnership with Orca will help it better understand the applications of quantum computing for defence activities. Stephen Till, with the MoD’s Defence Science and Technology Laboratory (DSTL), called the development a “milestone moment,” while Orca’s chief executive Richard Murray noted that the company’s support to MoD constitutes a “significant vote of confidence” for the emerging technology. One of the possible advantages of quantum computers is their ability to accelerate and optimise machine learning tasks, such as image analysis and decision-making, both areas in which militaries around the world are already employing AI to support humans. The MoD will use Orca’s small PT-1 quantum computer, which is notable not just for its size but also for its ability to operate at room temperature. Typically, quantum computers require sub-zero environments.</p>
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6. Sensors

6.1 Israeli Aerospace Industries unveils a new passive high-performance gunfire detection system

The system, known as OTHELLO-P, was revealed at the Eurosatory Exhibition in June in Paris. ([source](#))

Assessment: The OTHELLO-P integrates AI processing and extended SWI electro-optics and acoustic sensors to help deployed units immediately detect, geo-locate, and alert troops to incoming fires from small arms, snipers, machine guns, RPGs, subsonic munitions, and indirect fire. The system uses optical sensors to identify muzzle flashes at distance while the acoustic sensors provide identification of sounds as well as shock waves caused by the firing of munitions. It provides 360-degree coverage and is deployed either on a vehicle or building. Information collected from the sensor is displayed on a handheld tablet. According to Asher Abish, director of marketing at IAI-ELTA's Land Division, the sensor "increases survivability and the ability of troops to return fire. It's a smart solution that changes the way the battlefield can be run and managed." OTHELLO-P is designed to mitigate the risks of an increasingly complex battlefield characterised by layers of multi-domain threats; a development that has been highlighted during the conflict in Ukraine. In this environment it can be difficult for troops to get accurate and timely situational awareness and to be able to respond to incoming fires. As Abish noted, "when you know where the threat is coming from, you can eliminate it."



Figure 7: The OTHELLO-P gunfire detection system. Source: Israeli Aerospace Industries

6.2

Teledyne FLIR launches UAS biological detector at Eurosatory

The MUVE B330 is a biological detector designed for UAS and other uncrewed platforms to detect, collect samples, and determine the quantity of biological hazards. ([source](#) and [source](#))

Assessment: The remotely controlled .6 kg payload can be fitted onto the company's Skyranger R70 or R80D SkyRaider and flown into dangerous environments to:

- Make quick assessments of the threat perimeter
- Trigger automated sample collection for follow-on identification
- Enable informed decision-making before human operators approach a hazardous scene
- Locate the threat source and track progression as the scene unfolds
- Cover difficult terrain from the air
- Track threats and hazards as they unfold over time

The system utilises visuals to display identified threats on a map using pin drops. This information is fed directly to the user. The payload has applications for both militaries that may be moving into contaminated environments and first responder communities that could be asked to respond to an accidentally – released biological hazard or to a terrorist attack involving biological weapons. Dr. David Cullin, vice president and general manager of Unmanned and Integrated Solutions at Teledyne FLIR Defense, captured the system's value, saying, remote detection of biological agents using a drone means faster time on scene and safer measures for troops and first responders, all of which saves lives.”

7. New weapons

7.1

China launches its third aircraft carrier

China's People's Liberation Army Navy (PLAN) launched its third aircraft carrier, *Fujian*, in June. The ship is the first PLAN aircraft carrier designed and built in China and is also the most technologically advanced of the growing fleet. ([source](#)).

Assessment: The *Fujian* joins the *Liaoning* and *Shandong* in China's growing carrier fleet. The name refers to China's eastern province that sits just across the Taiwan Strait from Taiwan. The ship is China's first flat-deck carrier—the previous two have employed ski-jump style decks—and is also the first of the fleet designed and built in China. The *Liaoning* was a former Soviet Kuznetsov-class carrier while the *Shandong* was based on the same Kuznetsov design. The *Fujian* is the largest of the three ships—roughly the size of the US Kitty Hawk class—at 316 meters and with a displacement listed in various sources as 80,000 or 100,000 tons. The previous two ships are 305 meters and displace about 65,00 – 70,000 tons. The most intriguing aspect of the new carrier is its electromagnetic launch catapult, which should allow the ship to launch an expanded range of aircraft as well as heavier aircraft such as early warning aircraft than the *Liaoning* or *Shandong*. The launching of the *Fujian* also demonstrates the industrial capacity of China's industrial base. Janes analyst Ridzwan Rahmat noted that the launch of the *Fujian* “[is an important milestone for China's military-industrial complex. This shows that Chinese engineers are now able to indigenously manufacture the full suite of surface combatants associated with modern naval warfare.](#)” The *Fujian* will now undergo sea trials.



Figure 8: A photo of the launching ceremony for the *Fujian*, which will have hull number 18, on June 17, 2022. Source: CCTV YouTube

<p>7.2</p>	<p>Russia claims laser system destroyed a drone in Ukraine</p> <p>Russian armed forces have claimed they used a laser weapon against a drone in Ukraine, reflecting trends in the evolving Ukraine conflict and in defence technology development and experimentation (source).</p> <p><u>Assessment:</u> Russia’s Zadira laser weapon was reportedly used to shoot down a Ukrainian drone “within five seconds”, according to Russia’s deputy prime minister Yuri Borisov. The use of the laser weapon reflects two important trends affecting the conflict in Ukraine and defence technology development more broadly. First, Russia’s focus on directed energy weapons in Ukraine is in part due to its dwindling supplies of missiles. This point was made by Ukrainian President Volodymyr Zelenskyy who said that Russia has fired more than 2,000 missiles since the invasion began. Borisov also hinted at resource constraint as a driver of directed energy weapon development and use, stressing the economic advantages that lasers bring over expensive missiles. Second, the reported destruction of a Ukrainian drone hints at improvements in Russian air defences as the conflict’s focus has shifted to the Donbass region. According to Foreign Policy, there is an active debate among Ukrainian forces about the utility of other expensive, slow, un-stealthy drones such as the General Atomics Gray Eagle. According to one Ukrainian pilot, “It’s very dangerous to use such expensive drones in our case, because of the enemy’s air defence. It’s not Afghanistan here.” The same pilot also offered a stark assessment of the famed Bayraktar TB-2 in the current contested air domain: “They were very useful and important in the very first days, stopping those columns, but now that [Russia has] built up good air defences, they’re almost useless,”</p>
<p>7.3</p>	<p>A new approach to anti-aircraft weapons: spoofing missile launches</p> <p>Slovenia-based Carbotech, a spinoff company from Guardiaris, revealed its new Battlefield Anti-Aircraft Non-Lethal System (BANS) very short-range air defence system (VSHORAD) at Eurosatory 2022 in Paris. The light shoulder weapon digitally simulates a missile launch, leading enemy aircraft to launch their countermeasures against the spoofed threat. (source and source)</p> <p><u>Assessment:</u> The BANS system would be most effective when used alongside other kinetic strike air defence systems such as MANPADS. By forcing enemy helicopters to launch their countermeasures against imaginary threats, BANS creates an opportunity for real missiles to strike a much more vulnerable target. BANS uses a rechargeable battery pack that enables up to 500 ‘shots’ and affords the operator 10 degrees of error in targeting an aircraft. The idea for the system came out of a 2019 request from the Slovenian Ministry of Defence (MoD) to develop a simulator to test the reliability of the missile approach warning (MAW) system on its own helicopters. When the simulator triggered the MAW “went crazy” according to a Guardiaris representative. BANS development, then, shows the importance of experimentation and adaptation in fully exploiting emerging technologies and the capabilities they enable.</p> <p>The system has been successfully tested on Russian-, Swedish-, and US-made helicopters and has been demonstrated to the Hungarian, Portuguese, and Slovenian armed forces, according to <i>Janes</i>.</p>

8. Space

<p>8.1</p>	<p>PLA Strategic Support Force (SSF) is concerned about Starlink Satellite Constellation</p> <p>A paper published in China’s peer-reviewed journal <i>Modern Defence Technology</i> argues that the Starlink Satellite Constellation poses a military threat to Chinese forces and, as a result, the PLA needs to develop novel means to destroy the constellation. The lead author of the paper is a researcher with the PLA’s SSF, which was established six years ago to manage all PLA cyber, space / counterspace, electronic warfare, and psychological operations (source)</p> <p><u>Assessment:</u> The paper argues that the US DoD could leverage the 2,300-satellite constellation to increase data transmission speeds of its crewed and uncrewed platforms and systems by over 100 times. It also suggests that US forces could hide the launches of military satellites among batches of launches of future Starlink commercial satellites. The redundant and disaggregated nature of the satellite constellation poses unique challenges for counterspace operations, as the authors note: “Starlink constellation constitutes a decentralised system. The confrontation is not about individual satellites, but the whole system. This requires some low-cost, high-efficiency measures,” According to the authors, “a combination of soft and hard kill methods should be adopted to make some Starlink satellites lose their functions and destroy the constellation’s operating system.” In November 2021, the Vice Chief of Space Operations with the US Space Force General David Thompson revealed that China and Russia were carrying out daily “reversible” attacks against US satellites. These attacks included electronic warfare jamming, cyber-attacks, and directed-energy dazzling / blinding of satellites.</p>
<p>8.2</p>	<p>Commercial satellite imagery in demand, changing the nature of conflict</p> <p>NATO released a request for information (RFI) earlier this year seeking to engage the commercial satellite industry in an effort to diversity its imagery intelligence efforts (source)</p> <p><u>Assessment:</u> The RFI constitutes an initial step and not a commitment to buy any commercial images but does further demonstrate how commercial imagery is playing a more important role for militaries. NATO has traditionally been highly reliant on the United States to supply imagery intelligence (IMINT) and remote sensing. Diversifying IMINT sources makes sense. Still, there has reportedly been some indication that the US National Reconnaissance Organization (NRO) was resistant to NATO’s effort, though the National Geospatial Agency’s (NGA) position was that it “strongly recommend NATO seek diverse imagery products and services from across the Alliance and from commercial vendors.” Also during the reporting period, Foreign Affairs published an article examining “how commercial satellites are upending conflict.” According to the authors, “gone are the days when only governments could collect advanced intelligence about their rivals and when militaries could keep information about battlefield developments concealed from public view. Now, members of the public can use commercial satellite imagery to reveal activities some governments would rather keep hidden.” The article recounts the many ways in which commercial satellite imagery in combination with other open-source information has affected the war in Ukraine, including enabling governments to counter Russian disinformation campaigns both before and during the conflict.</p>