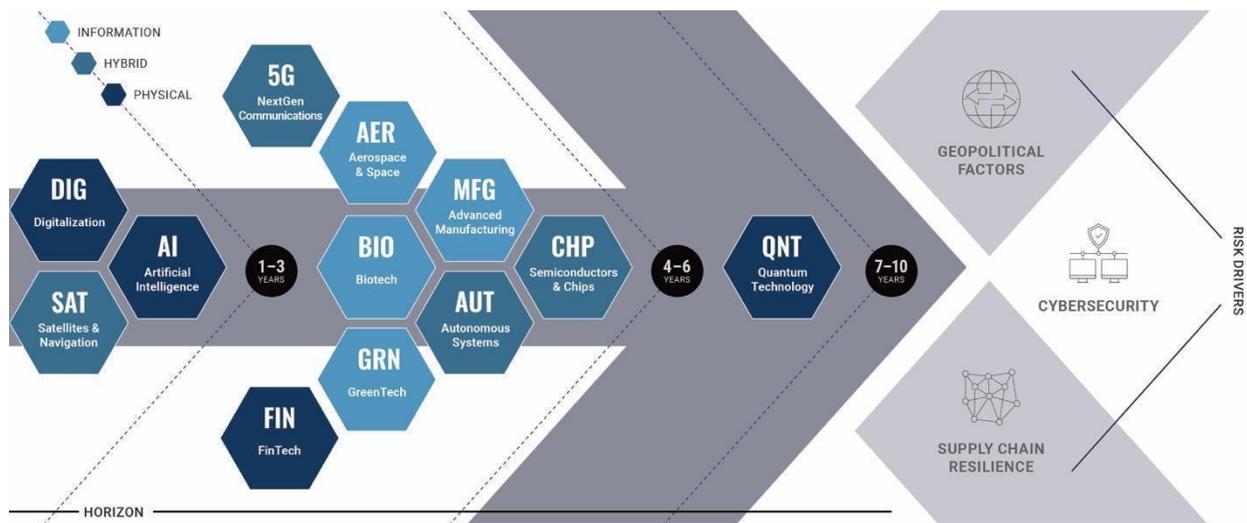




MATRIX MONITOR

Friday May 27, 2022

The only source dedicated exclusively to the emerging technologies shaping the future of business and national security.



This week's Next5 Matrix Monitor features Next5's analysis from the Cyber Initiatives Summit, open source's evolving role in conventional war, Google's text-to-image generator, insider trading of cryptocurrencies, NASA's plans for the Space Launch System, a smart contact lens that measures eye pressure and treats glaucoma, a new technique for extracting hydrogen gas from liquid carriers, 3D printing satellite antennas in space, ASML's plan to launch a new \$400M machine for next-generation chips, and Apple's plan to increase its production outside of China.

NEXT5 NEWS & AMPLIFICATIONS

→ On Wednesday, May 25, Next5 attended The Cipher Brief's Cyber Initiatives Group 2nd Quarter Summit. Key highlights from the expert discussions:

- **Ukraine has demonstrated strong resilience in the war with Russia.** The country has largely maintained business operations and government continuity in the face of military invasion and constant cyber attacks.
- **The Russia-Ukraine conflict has accelerated hacktivism, reliability on OSINT, and empowered non-state actors.** Russian criminal groups demonstrated how political they truly are. And the Ukrainian digital ministry crowdsourced hackers to attack their own target lists. It is also profound what a vital role open source information and social media are playing in the conflict. However, as former senior IC officials argued, the downside is the lack of accuracy in open source information and ability to use it properly.
- **Viasat was a historic moment that demonstrated our lack of formal oversight to prevent adversaries from conducting attacks with spillover.** In this case, after gaining network access, Russia was able to send updates to many modems which resulted in collateral damage as windmills in other countries were compromised as a result. And we lack appropriate oversight to prevent or deter this activity.
- **Companies are playing a vital role in resilience of critical services and functions, and therefore must be held accountable for strong cybersecurity hygiene.** We also may need to ensure they are doing everything possible to limit cyber vulnerabilities that have the potential to cause ripple effects nationwide and internationally.
- **Google leadership argued that delivering secure products rather than security products should be the priority and they should come at cheaper cost.** This cost is not limited to acquisition but also the operating cost. If security gets cheaper, it will be deployed in more places, and security delivers adjacent benefits, whether it is reduced customer friction or increased mission agility, which will all drive demand.
- **Ransomware is the most significant cyber threat in cybercrime, but visibility is increasing with increased awareness.** According to FBI leadership, reporting on ransomware has grown 50% YoY from 2020-2021. The only options we have today are targeting the threat actors, their infrastructure, and their money (usually cryptocurrency). These efforts show mixed results.
- **CISA is well-regarded as having expertise, but it still needs to systematize the process of threat mitigation.** While CISA has been empowered by several new authorities and appropriations, the structure still needs to be built out.
- **The water and wastewater sectors among the 16 critical infrastructure and sub-infrastructure most at risk of cyber compromises.** Attacks on this sector impact national security, economic security, as well as public health and safety. Like pipelines, water infrastructure used to be highly automated. Experts suggested that the EPA should be empowered as the sector risk management agency and proposed better intelligence support and oversight for the sector.

→ **Next5 (now LookingGlass) CEO Bryan Ware co-authored a World Economic Forum article to present how the threat landscape has changed and to propose solutions for leaders around the world.** The future of space requires updated norms, greater cybersecurity awareness, and agreed upon standards so critical innovation in space can continue freely and safely. Bryan led a workshop to discuss how the space ecosystem has changed through commercialization of the sector, increased internet connectivity, and greater dependence on reliable satellite systems for terrestrial activities. Below are the key takeaways:

- Space services used to be separated from networks on Earth, but this model has changed over the last few years, with the two becoming more and more interdependent.
- Space-based services support essential services such as military, utilities, aviation, and emergency communications and therefore get drawn into geopolitical conflicts on Earth.
- This is why there needs to be increased cybersecurity around space-based services as well as regulatory frameworks and collaboration of all stakeholders.

#AER #SAT #Cybersecurity #USA [World Economic Forum](#)

DIGITALIZATION

→ **Open sources – from commercial big data aggregation to information infrastructure across mobile, smart devices, and social media – are reshaping the way intelligence is collected and used in conventional war.** Open source has been used in war and diplomacy before the internet – alongside information stolen or otherwise secretly obtained and closely held. But its prevalence today means what was once cost-prohibitive is now affordable to myriad actors. Information technology erodes barriers to markets across sectors and societies, a concept that has enabled developments in Russia's ongoing war with Ukraine. According to British scholar Matthew Ford, the high level of mobile connectivity among Ukrainians and a notable absence of combat footage from smartphones and headcams suggest an effective information operation may be underway. Social media platforms and cell phones are also a force multiplier for traditionally weaker military powers, such as Ukraine, when it comes to coordinating intelligence collection for targeting activities. Targeting information is now being exchanged online, and successful kills have been celebrated on Telegram. Also, chatbots have been established, helping Ukrainians share target coordinates with their smartphones. Identifying targets doesn't involve complex military systems. It works from civilian information infrastructures, according to Ford; one challenge with this tactic is standardizing crowdsourced intelligence reporting. The Russian invasion of Ukraine is the most digitally connected conflict in history – the challenge for Ukraine is to make its intelligence more actionable than Russia's. #DIG #RUS #UKR [Wired](#)

→ **China's supercomputing program leads the world, according to Jack Dongarra, a US supercomputing expert.** The Chinese breakthrough has come in the race to build exascale supercomputers – systems that can handle 10 to the power of 18 calculations per second. That makes them a thousand times faster than the first of the petaflop systems that preceded them more than a decade ago. In recent months, work has been underway at the US Department of Energy's Oak Ridge national laboratory in Tennessee to assemble and test the first of three

exascale systems planned in the country. If the inevitable “bugs” are ironed out, the arrival of exascale computing in the US could be confirmed at the end of May. By contrast, China’s first exascale system has been running for more than a year and has since been joined by a second. A previous Chinese effort to break the exascale barrier had relied on technology from US chip maker AMD, leaving it vulnerable to US trade restrictions. However, its current two exascale systems are based on domestic chip designs. The local developers of the chips used in the two giant new systems — Tianjin Phytium Information Technology and Shanghai High-Performance Integrated Circuit Design Center — were both on last year’s US sanctions list. While the US has three exascale systems in the works, China’s goal is to have 10 systems by 2025. #DIG #CHP #Geopolitics #SCRM #USA #CHN [Financial Times](#)

→ **Twitter is adding more content guardrails, a potential flashpoint with the company’s prospective new owner Elon Musk, who has said he wants the social-media platform to dial back on moderating tweets.** Musk agreed to acquire Twitter in April in a deal valued at about \$44B. He has said in tweets and in interviews that he wanted to take the company in a different direction and has argued that what he calls the website’s censorship is a particular problem. Yoel Roth, Twitter’s head of safety and integrity, said in a blog post Thursday, May 19 that if a claim on the platform is found to be misleading, Twitter won’t amplify or recommend that content, including in the home timeline as well as the search and explore features. The company said it would also add warning notices to certain tweets, including those from high-profile accounts and accounts controlled by governments or state-affiliated media. On those tweets, users would have to click through the warning to view the tweet, and it won’t be able to be liked, retweeted or shared, Twitter said. #DIG #USA [WSJ](#)

→ **The growing popularity of blockchain technology has presented a new challenge to China’s censorship regime.** China’s censors have systematically erased critical articles and posts on mainstream social media sites about the heavy burden of strict lockdown measures, but once data is sent to a blockchain network, it cannot be deleted or altered by higher authorities. The country’s internet police worked in a frenzy to erase the viral “Voice of April” video from domestic social media, a six-minute protest video documenting the suffering experienced by people in Shanghai under lockdown. Just as the video was taken down from Weibo and the messaging app WeChat, tech-savvy netizens uploaded snapshots of the video to the blockchain, casting them into NFTs. Yet while censors cannot scrub out information from the blockchain, they can block access to it by preventing people from sharing links on social media. Chinese citizens have found other creative ways to adapt to online life under censorship including the sharing of censored articles flipped upside down to avoid algorithmic screening. However, censors are typically only one step behind, quickly discovering the attempts to avoid censorship and ensuring that new leaks of sensitive information do not spark wider online protests. #DIG #CHN [Financial Times](#)

SATELLITES & NAVIGATION

→ **More than 35 companies participated in the US Space Force's first industry day event from May 19-20 focused on space-based ISR.** The conference, held in Washington, D.C., was organized by the Space Systems Command and the Aerospace Industries Association. According to John Galer, assistant vice president for national security space at the Aerospace Industries Association, the command selected a mix of new space and traditional defense firms to brief a group of about 50 government officials on the state of technology for space-based ISR. According to Space Systems Command Lt. Gen. Michael Guetlein, the tactical ISR industry day was part of a broader effort to better understand commercial industry capabilities which are advancing at a rapid pace. In February, the Space Force's deputy director of intelligence, surveillance, and reconnaissance Joseph Rouge said his office was tasked by Air Force Secretary Frank Kendall to examine how DoD could better use commercial capabilities for tactical ISR. In support of this effort, the Space Systems Command is trying to figure out how tactical ISR would be procured from a diverse supplier base that includes satellite operators, sensor developers, data analytics firms, and systems integrators. The industry day was a first step in trying to define what tactical space ISR means and how it should be procured. #SAT #USA [Space News](#)

→ **Russia launched a classified mapping satellite into space Thursday, May 19 from the Plesetsk Cosmodrome – the fifth mission of the year to deploy a Russian military payload in orbit.** The circumstances of the launch – its launch site, the configuration of its launch vehicle, and target orbit – suggest the payload was the Russian military's third Bars-M digital mapping satellite. Made by TsSKB Progress in Samara, Russia, the Bars-M satellite's capabilities are classified, but analysts believe it hosts a digital imager, replacing older satellites that carried film cameras that returned to Earth via parachute to be recovered and developed. The Bars-M satellite's Karat electro-optical camera was developed by the Leningrad Optical Mechanical Association, and the satellite is expected to operate for at least five years, according to documents posted on a Russian government procurement website. The upgrade allows the Bars-M satellites to remain in orbit longer and send imagery to analysts via radio links. The last of the old-generation satellites launched in 2005, leaving Russia with a gap in the imaging capability to be filled by Bars-M, which specializes in collecting stereo images to help create maps for use by the Russian military. #SAT #RUS [Spaceflight Now](#)

ARTIFICIAL INTELLIGENCE

→ **Google announced its own text-to-image generator, Imagen, which just surpassed OpenAI's DALL-E in the quality of its output.** Google claims that Imagen produces consistently better images than DALL-E 2, based on a new benchmark it created for this project named DrawBench. DrawBench is a list of ~200 text prompts that Google's team fed into Imagen and other text-to-image generators, with the output from each program then judged by human raters. Google found that humans generally preferred the output from Imagen to that of rivals. Google isn't making the Imagen model available to the public because of its troubling applications. The system could generate high-quality images for purposes of fake news, hoaxes, or harassment, for example. As Google notes, these systems also encode social

biases, and their output is often racist, sexist, or toxic in some other inventive fashion. Google notes that Imagen “encodes several social biases and stereotypes, including an overall bias towards generating images of people with lighter skin tones and a tendency for images portraying different professions to align with Western gender stereotypes.” This is something researchers have also found while evaluating DALL-E. If DALL-E is asked to generate images of a “flight attendant,” for example, almost all the subjects will be women. And asking for pictures of a “CEO” largely generates pictures of white men. While Google concludes that Imagen is not yet suitable for the public, the company plans to develop a new way to benchmark “social and cultural bias in future work” and test future iterations.



An alien octopus floats through a portal reading a newspaper.



A robot couple fine dining with Eiffel Tower in the background.



A dog looking curiously in the mirror, seeing a cat.



A majestic oil painting of a raccoon Queen wearing red French royal gown. The painting is hanging on an ornate wall decorated with wallpaper.

#AI #USA [The Verge](#)

NEXT GENERATION COMMUNICATIONS

→ **Inmarsat and Honeywell are setting a new benchmark in satellite communications with the launch of SwiftJet, their latest inflight connectivity service for the business aviation industry.** It will enter commercial service in the first half of 2023 and deliver the fastest ever speeds over L-band. As one of the first new services to be introduced on Inmarsat's ELERA satellite network, SwiftJet will offer seamless global coverage across flight routes with maximum speeds of 2.6Mbps, up to six times faster than Inmarsat's existing business aviation connectivity solution over L-band. This will allow passengers to create a secure "office in the sky" with enhanced capabilities for video calls, web browsing, email, texting, cloud-syncing, and collaboration tools such as Microsoft Teams. Social media and video applications such as TikTok and YouTube, which were previously challenging over L-band, will also be enabled. #5G #DIG #USA #GBR [Business Wire](#)

FINANCIAL TECHNOLOGY

→ **Public data suggests that several anonymous crypto investors profited from inside knowledge of when tokens would be listed on exchanges.** Over six days last August, one crypto wallet amassed a stake of \$360k worth of Gnosis coins, a token tied to an effort to build blockchain-based prediction markets. On the seventh day, Binance said in a blog post that it would list Gnosis, allowing it to be traded among its users. Four minutes after Binance's announcement, the wallet began selling down its stake, liquidating it entirely in just over four hours for slightly more than \$500k – netting a profit of about \$140k and a return of roughly 40%, according to an analysis performed by Argus. The same wallet demonstrated similar patterns of buying before listings and selling quickly after with at least three other tokens. **It was among 46 that Argus found that purchased a combined \$17.3M worth of tokens that were listed shortly after on Coinbase, Binance, and FTX.** Insider trading laws bar investors from trading stocks or commodities on material nonpublic information, such as knowledge of a coming listing or merger offer. Some lawyers say that existing criminal statutes and other regulations could be used to go after those trading cryptocurrencies with private information. But others in the cryptocurrency industry say a lack of case precedent specific to crypto insider trading has created uncertainty over whether and how regulators might seek to tackle it in the future. #FIN [WSJ](#)

→ **Open banking payments are likely to become the dominant method of bank transfer payment in e-commerce in the next five years, as well as acting as underlying rails for other alternative payment methods such as buy now, pay later (BNPL) or wallets,** according to UK-based FinTech company Truelayer. Open banking payments offer a number of advantages:

- Consumers pay straight from their bank account – and in many markets they authenticate with their face ID or fingerprint.

- Funds settle with the merchant instantly or near-instantly, helping them manage cash flow and enabling them to ship goods immediately.
- They can be embedded into checkout since open banking providers integrate with their clients (merchants) via application programming interfaces (API), as well as integrate into banks via API. This generally means that the payment starts and ends in the merchant's app or website, increasing convenience for consumers.
- They are based on secure, regulated APIs. No credentials are shared, significantly reducing the risk of fraud.

By bringing together customer bank account data with payment initiation, open banking makes payments smarter and enables merchants and payment service providers to improve processes. In a survey of e-commerce merchants by YouGov and TrueLayer, three quarters (74%) said open banking payments were in their long-term strategy. #FIN [Truelayer](#)

AEROSPACE & SPACE

→ **Space is a key area of cooperation between the US and Japan amid heightened tensions with an increasingly assertive China.** Tokyo hopes to put one of its astronauts on the lunar surface – the first non-American – in the latter half of the 2020s as part of NASA's Artemis program to return humans to the moon. Japan has an extensive space program, mainly focused on developing launchers and space probes, but it doesn't have a human flight program and has relied on the US and Russia to carry its astronauts into space. Space cooperation was on the agenda when US President Joe Biden and Japanese Prime Minister Fumio Kishida met on Monday, May 23. The allies announced progress in the Artemis program and confirmed their intention to include a Japanese astronaut on Gateway, a human outpost near the moon. Japan's space ambitions, and investment, are welcome by the US as it tries to stay ahead of China in a potential new space race. Beijing plans to complete its first space station by the end of this year. #AER #Geopolitics #USA #JPN C#CHN #RUS [Reuters](#)

→ **NASA is gearing up to perform another practice countdown of the Space Launch System in mid-June as it completes repairs to the vehicle from previous tests.** According to NASA on May 20, it expects the SLS will execute its next attempt at a wet dress rehearsal (WDR) in early June, where the vehicle is filled with liquid oxygen and liquid hydrogen propellants and goes through a countdown that stops just before ignition of the core stage's four RS-25 engines. NASA made three attempts at completing a WDR in April but stopped all three early after a series of problems. The agency rolled the SLS back to the Vehicle Assembly Building at the Kennedy Space Center on April 26 to fix both issues with the vehicle and its ground systems as well as with the supply of nitrogen gas at the pad. In the statement, NASA said workers have completed work on the vehicle, including replacing a helium check valve in the upper stage and fixing a hydrogen leak in an umbilical. Crews also modified "purge boots" on umbilical lines leading into the upper stage to protect them from the elements. #AER #USA [Space News](#)

BIOTECHNOLOGY

→ **Chinese researchers developed a smart contact lens that measures eye pressure and treats glaucoma.** The device, according to the researchers from Sun Yat-sen University in Guangzhou, could be used to monitor and regulate eye pressure prior to glaucoma surgery, as well as as a bandage after the procedure without obstructing vision. According to the research team, the device was sensitive and reliable when monitoring and regulating pressure in live rabbit and pig eyeballs, which were similar to human eyes. They stated that while the new device was compatible with existing contact lens mass-production processes, more research was needed before the product could be tested in clinical trials. The researchers stated the wirelessly powered drug delivery module in their device could deliver an anti-glaucoma drug into the anterior chamber of the eye — the space between the cornea and the iris. Iontophoresis was used in the technology, which is a non-invasive delivery system that uses a low-amplitude electrical current to allow positively charged drugs to migrate across corneal barriers. While other researchers have developed contact lens sensing and delivery technologies, the team says that having these two wireless functions on one ultra-small surface without interfering with each other was a significant challenge. According to the team, their prototype separated the channels via different frequencies so that the sensing and delivery modules could operate independently.



#BIO #CHN [SCMP](#)

→ **City of Hope, a leading cancer treatment and research center, announced the start of Phase 1 of its clinical trial to target tumors, in which a patient was injected for the first time with a cancer-killing virus treatment.** Researchers are using a modified virus that produces fragments that can alert the immune system to cancerous cells. Once inside the host cell, the modified virus replicates and then explodes, releasing thousands of new viral particles that attach themselves to cancerous cells. These attachments signal the host's immune system to attack cancerous cells. The treatment used in this trial is called CF-33-hNIS (Vaxinia), which was developed by the Australian company [Imugene](#). The drug has been shown to be effective in shrinking colon, lung, breast, ovarian, and pancreatic tumors in laboratory tests and animal models, according to the research center. The virus will be injected into people with solid tumors who have had at least two prior types of treatment in the phase 1 clinical trial. The virus is either injected directly into the tumor or into a vein. After that, patients will be injected with both the virus and pembrolizumab, an antibody that boosts the immune system's ability to fight cancer cells. #BIO #USA #AUS [Interesting Engineering](#)

GREEN TECHNOLOGY

→ **John Deere is accelerating the movement towards autonomous farming with the acquisition of AI startup Light.** John Deere leadership says this acquisition will not only accelerate the development and deployment of the company's AI technology, but it will also allow the equipment to literally move faster, safely without human intervention. Light is a major player in the autonomous vehicle field. It uses a computer vision approach to self-driving that allows the AI system controlling a vehicle to "see" the world similarly to the way biological systems do. Essentially, Light's algorithms will allow Deere's equipment to use industry standard cameras to achieve virtually unparalleled depth perception. This is similar to the approach Tesla is taking with its Full Self-Driving System. #USA #GRN #AI #AUT [Neural](#)

→ **Researchers from North Carolina State University have developed a new technique for extracting hydrogen gas from liquid carriers which is faster, less expensive, and more energy-efficient than previous approaches.** Hydrogen fuel does not create CO2 emissions. And hydrogen refueling stations could be located at existing gas stations, taking advantage of existing infrastructure. But transporting hydrogen gas is dangerous, so the fuel needs to be transported via a liquid carrier. A key obstacle to this strategy is that extracting hydrogen from the liquid carrier at destination sites, such as fueling stations, is energy-intensive and expensive. The researchers have developed a technique that applies a reusable photocatalyst and sunlight to extract hydrogen gas from its liquid carrier more quickly and using less rhodium – making the entire process less expensive. One key to the success of the new technique is that it is a continuous-flow reactor. The reactor resembles a thin, clear tube packed with sand. The "sand" consists of micron-scale grains of titanium oxide, many of which are coated with rhodium. The hydrogen-carrying liquid is pumped into one end of the tube. The rhodium-coated particles line the outer part of the tube, where sunlight can reach them. These particles are photoreactive catalysts that, in the presence of sunlight, react with the liquid carrier to release hydrogen molecules as a gas. In their prototype reactor, the researchers were able to achieve a 99% yield

– meaning that 99% of the hydrogen molecules were released from the liquid carrier – in three hours. #GRN #USA [Science Daily](#)

→ **Automaker Stellantis and Samsung SDI said Tuesday, May 24 that they would build a new battery plant in Indiana to support the Jeep and Ram manufacturer’s EV production plans.** The \$2.5B plant is expected to open in the first quarter of 2025. According to the companies, the project is projected to create 1,400 jobs and supply battery modules for an unspecified range of EVs made at Stellantis’s North American assembly plants. The move represents the latest of a number of investments in new production facilities for EV batteries across North America. As we previously [reported](#), Hyundai plans to build a new manufacturing complex in Georgia for EVs and batteries. Last fall, Ford said it would build a battery-making production facility in Tennessee with South Korea-based SK Innovation. And, General Motors stated in January that it would build a new battery-cell plant in Michigan. Like other automakers, Stellantis has allocated billions of dollars to boost production of battery-powered vehicles as it races to catch up with Tesla, the market leader. Stellantis has set a goal of EVs representing half of its US sales annually by 2030, and it aims to have more than 75 battery electric-vehicle models on the road by then. #GRN #USA #NLD #KOR [WSJ](#)

ADVANCED MANUFACTURING

→ **Solutions in manufacturing are transforming operations and business models at scale.** Industries using more innovative technology see better production performance, but broader adoption presents ongoing challenges. The access, incentives, and investments available to manufacturers vary depending on factors including location and company size. If left unchecked, climate change, geopolitical instability, wealth disparity, resource shortages, and the escalation of supply chain disruption will widen these gaps. For example, manufacturers in countries with high levels of unemployment will have fewer incentives to implement advanced manufacturing technologies, while disruptions to international investment flow could stall the progress of companies in developing nations. Therefore, the responsibility of the global manufacturing community is to include developing nations and small and medium enterprises in the Fourth Industrial Revolution (Industry 4.0). Public and private sector organizations will need to work together to build roadmaps that re-skill the workforce in preparation for Industry 4.0, allowing manufacturers to develop new capabilities for resiliency across value chains. Advanced manufacturing can help reduce wasted materials, avoid production overruns and mistakes, reduce water and electricity usage, and shrink factory footprints, creating shorter, more stable supply chains and simplified flows. #MFG #GRN [World Economic Forum](#)

→ **Satellite antennas can be 3D-printed in space with the help of sunlight using a new patented technique, eliminating the need for satellite parts that take up space in a rocket.** The new method, developed by Mitsubishi, uses a special type of resin that turns into a rigid solid material when exposed to ultraviolet radiation from the sun that is present in space. The company has so far only demonstrated how the technology works in simulated space-like conditions in a test chamber. Mitsubishi researchers printed an antenna dish 6.5 inches wide

that performed in tests just as well as a conventional satellite antenna. The sensitivity of antennas is directly related to their size; the larger the antenna, the better it detects and transmits its signal. But the size is a problem when launching to orbit, as a large antenna takes up a great deal of space in a rocket fairing. The antennas also need to be sturdy to survive the vibrations during the launch, which makes them heavy. And the heavier a satellite is, the more expensive it is to launch. Components that are 3D-printed in space can be much lighter and thinner, as they don't have to withstand the vibrations of launch. By 3D-printing antennas directly in space, operators would save money, as their satellites would be lighter, and they would also be able to fit smaller satellites with much larger antennas. #MFG #SAT [Space.com](https://www.space.com)

AUTONOMOUS SYSTEMS

→ **British startup [Wayve](https://www.wayve.com) announced that it will use supercomputer infrastructure designed for the company by its investor Microsoft to process massive amounts of data as it develops machine learning-based models for self-driving cars.** Instead of relying on detailed digital maps and coding to tell vehicles how to operate, Wayve's technology relies on machine learning via camera sensors mounted on the outside of the vehicle, where the system learns from traffic patterns and the behavior of other drivers. Chief Wayve CEO Alex Kendall claims that Microsoft will be able to process the terabyte of data generated by Wayve's cars every minute — 1T bytes, or roughly an hour of consumer video. This will be beneficial to the startup as it scales up its self-driving technology for trials on last-mile delivery vehicles with UK online grocery technology company Ocado and supermarket chain Asda. The trials for grocery delivery will begin this year, with a human safety operator on board. Microsoft invested in the London-based startup's \$200M Series B funding round earlier this year. #AUT #AI #DIG #GBR #USA [Reuters](https://www.reuters.com)

→ **Walmart is expanding its drone delivery operations to 4M households across six states, as the retail giant seeks to compete in the space with Amazon and FedEx.** Walmart stated that it will be able to deliver more than 1M packages per year by drone to households in Arizona, Arkansas, Florida, Texas, Utah, and Virginia in as little as 30 minutes. The announcement builds on a partnership with [DroneUp](https://www.droneup.com), which began operating drone-delivery hubs out of Walmart stores in Arkansas in November. Drone delivery has the potential to reduce emissions, trip costs, and traffic congestion on America's roads, while also making rapid deliveries, according to analysts. Walmart announced that it would make its expanded drone network available to local businesses and municipalities, offering services such as insurance, emergency response, and real estate. #AUT #SCRM #USA [WSJ](https://www.wsj.com)

SEMICONDUCTORS & CHIPS

→ **Chip manufacturer Broadcom is in talks to buy cloud service provider VMware for \$60B,** according to people familiar with the matter. Broadcom manufactures a wide range of chips that are used in products ranging from mobile phones to telecom networks. The acquisition of VMware would provide it with access to data centers where Broadcom's technology is used by cloud customers. Additionally, a VMware acquisition would nearly triple

the size of Broadcom's software segment and bring the combined company's overall software mix close to 50%, according to analysts. #CHP #DIG #USA [Reuters](#)

→ **Samsung will invest \$356B over the next 5 years to accelerate growth in semiconductors, biopharmaceuticals, and other next-generation technologies.** Samsung did not provide a breakdown of the figures, but it did say that 80% of the investments will be made in South Korea, and includes a \$190B investment pledge made in August 2021. According to the company, securing domestic chip and bio supply chains will be strategic and important for South Korea's economic security. The investments are expected to create over 1M jobs. #CHP #BIO #SCRM #KOR [Reuters](#)

→ **Spain has approved a plan to invest \$13.1B in the semiconductor and microchip industries by 2027, including \$9.98B to fund build fabrication plants.** The program, which is primarily funded by EU pandemic relief funds, is aimed at the digital economy and the demand created by chip shortages. When Prime Minister Pedro Sanchez announced it last month, it was initially set at \$11.8B. The government stated that the plan will invest in domestic semiconductor production capacity in leading-edge (below 5 nanometers) and mid-range (above 5 nanometers) semiconductor manufacturing with a \$9.98B investment. It will also fund research and development with \$1.18B, and chip design with about \$1.4B. It will also assist Spanish companies in strategic European projects and establish a \$200M Chip Fund to finance start-ups and scale-ups in the Spanish semiconductor sector. #CHP #SCRM #ESP #EU [Reuters](#)

→ **ASML is planning to launch a new \$400M machine for next-generation chips, which it thinks will be its flagship by the late 2020s but remains an engineering challenge currently.** ASML machine shortages, including machines costing up to \$160M each, are a bottleneck for chip makers, who plan to spend more than \$100B in the coming years to build additional fabrication plants to meet demand. Recently, ASML executives said that a prototype would be ready in the first half of 2023 in order to address supply chain shortages of advanced chip making machines. They stated that the business and its R&D partner IMEC were establishing a test facility on the spot — a first — so that top chip makers and their suppliers may investigate the machine's features and prepare to utilize production models as early as 2025. According to an industry specialist who is not involved with the ASML project, the new technology, known as a "High-NA" version of EUV, could provide a significant advantage to some chip makers. Lithography is an important factor in determining how small circuitry on a chip can be, with High-NA promising a 66% reduction. The High-NA machines will be about 30% bigger than their predecessors, which themselves require three Boeing 747s to carry them in sections. #CHP #SCRM #NLD [Reuters](#)

QUANTUM TECHNOLOGY

→ **In a collaboration with [Deutsche Telekom](#), [TU Darmstadt](#) researchers have [developed](#) a secure communication system based on light particles that allows for quantum key exchange without the use of polarization.** The German researchers' system allows for quantum key exchange by providing a common random number to multiple parties in a

star-shaped network. Individual light quanta, known as photons, are distributed to network users in order to compute the random number and thus the digital key. These keys are especially secure because of quantum physical effects. Therefore, communication is highly secure and existing eavesdropping attacks can be detected. So far, such quantum key methods have been complex and sensitive to external influences. In this method, the system distributes photons from a central source to all users in the network and establishes the security of the quantum keys through quantum entanglement. This quantum-physical effect produces correlations between two light particles, which are observable even when they are far apart. For the first time, the group has succeeded in providing a network of users with quantum keys by means of this novel method. The high stability of the transmission and the scalability in principle were successfully demonstrated in a field test together with Deutsche Telekom. As a next step, the researchers at TU Darmstadt are planning to connect other buildings in the city to their system. #QNT #Cybersecurity #5G #DEU [Phys.org](#)

→ **A team of Columbia University chemists and physicists discovered a strong link between electron transport and magnetism in chromium sulfide bromide (CrSBr), a novel quantum material that could enable powerful, compact computers.** The researchers investigated CrSBr layers using an electric field at different electron densities, magnetic fields, and temperatures — variables that can be changed to produce different effects in a material. CrSBr's magnetism changed as its electronic properties changed. Semiconductors can change their electronic properties, and magnets can have different spin configurations. In CrSBr, these two knobs are joined. Magnetism is a difficult property to directly measure, especially as the size of the material decreases, but it is simple to quantify how electrons travel using a metric called resistance. Resistance in CrSBr can serve as a substitute for magnetic states that are otherwise unobservable. The researchers intend to make chips out of such 2D magnets, which may be utilized for quantum computing and storing massive amounts of data in a small space. #QNT #CHP #USA [Phys.org](#)

GEOPOLITICS

→ **MTS, Russia's largest mobile operator, announced that it has begun selling discounted and used smartphones, providing cheaper alternatives after Western brands suspended shipments.** Following the suspension of all product sales in Russia by Western companies such as Apple in early March, sales of Chinese smartphone brands in Russia more than doubled in the first two weeks of March, according to the Kommersant newspaper at the time. MTS now sells smartphones from Chinese manufacturers Huawei, Honor, and Xiaomi, as well as South Korean manufacturer Samsung, for up to 50% less than new devices in its Moscow stores and online. #Geopolitics #RUS #CHN #USA #KOR [Reuters](#)

→ **The Canadian government banned the use of Huawei and state-owned Chinese tech giant ZTE's equipment in its 5G networks, joining allies in banning the Chinese company.** Canada was the only member of the Five Eyes intelligence-sharing alliance that did not prohibit or restrict the use of Huawei Technologies equipment in its 5G networks. The US and the other members – the UK, Australia, and New Zealand — had previously prohibited Huawei. The major

wireless companies in Canada had already begun to collaborate with other providers. For years, the US government has lobbied allies like Canada to bar Huawei from new ultra-fast 5G mobile networks, fearing that China's communist rulers could force the company to assist with cyberespionage. The US has warned that it will reconsider intelligence sharing with any country that uses Huawei equipment. A former Canadian ambassador to China said that under Chinese law, no company can refuse a request from the Chinese government to share information, so allowing Huawei to participate would have been impossible. #Geopolitics #5G #Cybersecurity #CAN #CHN #USA #GBR #AUS #NZL [SCMP](#)

CYBERSECURITY

→ **One year after the Colonial Pipeline Hack, a group of cyber experts transformed the offensive techniques they'd developed to infiltrate foreign computer networks into defensive tools to combat ransomware.** According to American intelligence and law enforcement agencies, the colonial pipeline hack demonstrated that cybercriminals were willing to damage US critical infrastructure in ways that many nation-states are hesitant to do outside of wartime. Jon Miller, a prominent security researcher, founded two companies to mitigate these risks: [Boldend](#), a maker of offensive hacking software for the US government, and [Halcyon](#), a startup that develops anti-ransomware. They created a type of security software, Halcyon, that looks for weaknesses in ransomware code in order to trick the virus into self-sabotage and then reveal secrets about how it works. If ransomware still slips through, the software immediately records everything happening on the system, so the damage can be reversed, and victims won't have to pay. The Halcyon product employs some traditional approaches to scanning unknown files in order to detect ransomware, but Miller claims that the company's key innovations are a "exploitation engine" it developed, which employs automated tools to look for vulnerabilities in the code, and a "resiliency engine," which immediately records the actions of any ransomware that is accidentally allowed through. Miller, for example, mentions how Russian hackers program their ransomware to only work outside of Russia. Halycon's software can trick the malware into believing it has landed in Russia and remain inactive by manipulating the automated checks it performs. Miller stated that understanding how to create attack software that can detect and defeat such defensive countermeasures is critical for developing nation-state-level hacking tools on the offensive side. #Cybersecurity #USA #RUS [Bloomberg](#)

→ [Telenor](#), [Aker ASA](#), and [Cognite](#), all Norwegian companies, announced a new software security company they plan to launch this year that will help companies protect their critical industrial assets from increased cyberattack risk following Russia's invasion of Ukraine. The companies' CEOs said this week in Davos that industrial facilities, control systems, oil pipelines, supply chains, power grids, and healthcare are key targets. Cognite stated that Omny would assist public and private companies in monitoring industrial assets to ensure optimal performance while protecting them from cyberattacks. Omny predicts that the operational technology security market will grow from \$9.8B in 2015 to nearly \$48.9B in 2030, with software accounting for 20-30% of the market. #Cybersecurity #SCRM #NOR #RUS #UKR [Reuters](#)

→ Last week CISA released [Executive Directive 22-03](#) and released a **Cybersecurity Advisory in response to active and expected exploitation of multiple vulnerabilities in several VMware products**. The CSA, [Threat Actors Chaining Unpatched VMware Vulnerabilities for Full System Control](#), provides indicators of compromise and detection signatures from CISA, as well as trusted third parties to assist administrators with detecting and responding to active exploitation of at least two of the vulnerabilities. Malicious cyber actors were able to reverse engineer the vendor updates to develop an exploit within 48 hours and quickly began exploiting these disclosed vulnerabilities in unpatched devices. Based on this activity, CISA expects malicious cyber actors to quickly develop a capability to exploit additional vulnerabilities that were disclosed to VMware on May 18, 2022. #USA #Cybersecurity #SCRM [CISA](#)

SUPPLY CHAINS

→ **MITRE has built a prototype framework for ICT supply chain risks**. The System of Trust (SoT) prototype framework is a standard methodology for evaluating suppliers, supplies, and service providers. It can be used beyond cybersecurity teams, across organizations for assessing a supplier or product. The SoT framework currently includes 12 top-level risk areas - everything from financial stability to cybersecurity practices - that organizations should evaluate during their acquisition process. More than 400 specific questions cover issues in detail, such as whether the supplier is properly and thoroughly tracking the software components and their integrity and security. The SoT will make its official debut at the 2022 RSA Conference in San Francisco. MITRE is best known in the cybersecurity sector for heading up the Common Vulnerabilities and Exposures (CVE) system that identifies known software vulnerabilities as well as for its MITRE ATT&CK framework that maps common steps threat groups use to infiltrate networks and breach systems. #USA #SCRM #Cybersecurity [Dark Reading](#)

→ **Apple has told some of its contract manufacturers that it wants to increase its production outside of China for a variety of reasons, including Beijing's strict anti-Covid policy**, according to people familiar with the discussions. India and Vietnam, which already account for a small portion of Apple's global production, are among the countries being considered as alternatives to China. According to analysts, outside contractors manufacture more than 90% of Apple products in China. Analysts say Apple's reliance on the country poses a risk because of Beijing's authoritarian Communist government and its clashes with the US. Apple had planned to diversify away from China in early 2020, but the Covid-19 pandemic complicated those plans. The company is now pushing again and telling contractors where they should look to build new manufacturing capacity. Many Western companies have experienced supply-chain bottlenecks as a result of lockdowns in Shanghai and other cities as part of China's anti-Covid policy. Apple warned in April that the resurgence of Covid-19 could reduce sales by up to \$8B in the current quarter. Due to China's travel restrictions, Apple has reduced its sending of executives and engineers into the country over the last two years, making it difficult to inspect production sites in person. According to people who have spoken with Apple about its manufacturing plans, Apple sees India as the next China because of its large population and low costs. #SCRM #Geopolitics #USA #CHN [WSJ](#)

→ **Toyota is reducing its production from about 950k vehicles to roughly 850k in June due to the semiconductor shortage.** It also announced the suspension of production at various times in May and June as a result of parts shortages caused by the pandemic lockdown in Shanghai, noting that 16 lines in 10 plants would be affected. The automaker has previously warned that the various effects of Covid-19 and a global parts shortage have hurt its operations and added to uncertainty over its future plans. #SCRM #CHP #JPN [Nikkei Asia](#) [The Hill](#)