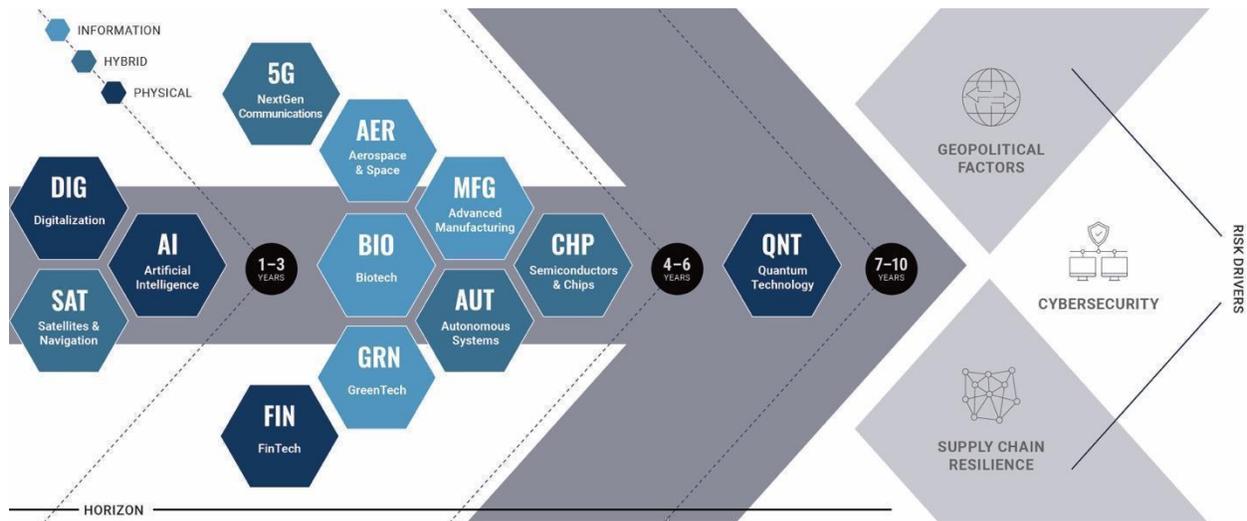




MATRIX MONITOR

Friday January 6, 2023

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



This week's Next5 Matrix Monitor features China's virtual employees, Hikvision "alarms" to track protest activities in China, new applications for OpenAI's chatbot program ChatGPT, the US Senate's \$1.7T spending package, space-based solar power, the transformation of pig livers to look and act like human livers, an environmentally friendly cooling solution requiring no electricity, 3D printing and terracotta to support coral reefs, and the impact on global supply chains due to surging Covid cases in China.

NEXT5 EDITOR'S HIGHLIGHTS

→ **The Next5 Matrix Monitor was recently featured on a new geopolitics podcast series by RunSafe Security.** Check out their newest episode [here](#) with insights from Dmitri Alperovich and stay tuned for more audio highlights from the Matrix Monitor on RunSafe's website or Spotify. #Geopolitics #USA [RunSafe](#)

→ **China is pausing massive investments aimed at building a chip industry to compete with the US, as a nationwide Covid resurgence strains the world's number 2 economy and Beijing's finances.** Top officials are discussing ways to move away from costly subsidies that have so far borne little fruit and encouraged both graft and American sanctions. While some continue to push for incentives of as much as 1 trillion yuan (\$145B), other policymakers have lost their taste for an investment-led approach that's not yielded the results anticipated. Instead, they are seeking alternative ways to assist homegrown chipmakers, such as lowering the cost of semiconductor materials, which would mark a shift in Beijing's approach toward an industry regarded as crucial to challenging American dominance and safeguarding Chinese economic and military competitiveness. It underscores how the country's economic ructions are taxing Beijing's resources and hobbling its chip ambitions - one of Xi Jinping's top priorities. That could have ramifications for spending in other critical areas like the environment or defense. #CHP #Geopolitics #USA #CHN [Bloomberg](#)

→ **Western intelligence officials are investigating whether a network of wealthy and well-connected expatriate Russian investors is part of a covert effort to aid their native country in developing cutting edge technologies such as quantum computing and AI through startups they funded in the US.** Before moving abroad and backing high-tech companies in the US and allied nations, several of the expatriates were affiliated with one or more of three high-profile Russian tech initiatives: the government-subsidized Skolkovo technology area intended to rival Silicon Valley, the Russian Venture Co - a government investment vehicle to help Russian businesses develop innovative technology, and the nonprofit research administrator Russian Quantum Center, which operates 12 labs near Moscow. Russian government money was included in venture funds managed by one of the expats at least as recently as 2019. Records show that some of the people affiliated with these organizations have changed not only their professed political beliefs, but also their company names and rosters, and their own names. And the network's high level Russian government connections and its focus on strategic technologies have unnerved investigators. #RUS #USA #Geopolitics #AI #QNT [Washington Post](#)

→ **Researchers in China claim to have reached a breakthrough in quantum computing, figuring out how they can break the RSA public-key encryption system using a quantum computer or around the power that will soon be available.** Although RSA has largely been replaced in consumer-facing protocols, it is still widely used in older enterprise and operational technology software and in many code-signing certificates. Many experts are questioning the Chinese researchers' findings as it is lacking peer review and it is based on a controversial

paper by the German mathematician Bruce Schnorr. Schnorr himself was less confident the Chinese technique would work after hearing it was based on his paper. The authors of the Chinese research paper are affiliated with some of China's most prestigious universities, including State Key Labs. #QNT #Cybersecurity #CHN #DEU [The Record](#)

DIGITALIZATION

→ **Businesses in China are paying top dollar for virtual employees in fields ranging from customer service to the entertainment industry.** For example, the number of virtual people projects completed for clients by Baidu has more than doubled since 2021, with prices ranging from ~\$3k to ~\$14k per year. Virtual people are digitized human beings who can sing and even interact on a livestream thanks to a combination of animation, sound technology, and machine learning. Some buyers of virtual people include financial services companies, local tourism boards, and state media, according to Li Shiyan, head of Baidu's virtual people and robotics business. Costs have dropped by about 80% since last year as the tech has improved, he claims. Li expects the virtual person industry overall will keep growing by 50% annually through 2025. From a business perspective, much of the focus is on how virtual people can generate content. Brands in China are looking for alternative spokespeople after many celebrities recently ran into negative press about tax evasion or personal scandals, said Sirius Wang, chief product officer and head of marketplace Greater China at Kantar. #DIG #CHN [CNBC](#)

→ **With Europe in the grip of an energy crisis, governments are looking into ways to recycle data center electricity.** In the past year, Big Tech companies have started connecting, or announced plans to connect, major data centers to district heating systems in Ireland, Denmark and Finland. Google has said it is assessing opportunities to recover heat from its data centers across Europe. Meta has been recovering excess heat from its data center in Odense, Denmark, since 2020. Public pressure to increase energy efficiency at data centers has been a major driver, according to industry executives. The EU is in the final stages of negotiating a new energy-efficiency directive that would, according to the latest drafts, require center operators to conduct feasibility studies of using their excess heat for homes and offices. In addition, national and local governments from France to Denmark have introduced tax incentives, or even made recapturing waste heat a requirement for some new building permits. Globally, data centers are estimated to account for roughly 1% of electricity use, according to a 2020 paper in the journal Science, a level that has remained more or less constant despite an explosion in cloud services in recent years. In the EU, however, policy makers say the higher density of data centers and increased usage in recent years mean they use more — accounting for closer to 3% or more of electricity consumption in some countries. Data centers in proximity to district heating systems could provide as much as roughly 50 terawatt-hours a year of excess heat, according to a study from ReUseHeat, an EU-funded project aimed at promoting waste-heat reuse. That would work out to between 2% and 3% of the energy that EU households used on space heating in 2020, according to data from Eurostat. #DIG #GRN #SCRM #Geopolitics #EUR [WSJ](#)

→ **Chinese authorities are using Hikvision software to set up "alarms" to track protest activities, according to a new investigation.** Among the "alarms" are descriptions of protest action such as "gathering crowds to disrupt order in public places," "unlawful assembly, procession, demonstration," and threats to "petition." These activities are listed alongside offenses such as "gambling" or disruptive events such as "fire hazard" in technical documents available on Hikvision's website and flagged to the Guardian by US-based surveillance research firm [Internet Protocol Video Market \(IPVM\)](#). The findings come after the recent massive protests across China against the country's zero-Covid regulations. Despite the fact that the administration relaxed limitations as a result of the protests, several demonstrators afterwards got police calls. The collected data demonstrates the extent of data about individuals that the corporation allows its customers to track. A "personnel dictionary" includes personal characteristics such as political status, religion, and ethnicity, as well as physical descriptions. #DIG #CHN [The Guardian](#)

SATELLITES & NAVIGATION

→ **A SpaceX Falcon 9 rocket launched on Tuesday, January 3rd, from Cape Canaveral, carrying 114 satellites to orbit – the second-most spacecraft ever lofted on a single mission.** The 114 payloads on the Transporter-6 mission include "cubesats, microsats, picosats, and orbital transfer vehicles carrying spacecraft to be deployed at a later time," SpaceX wrote in a [mission description](#). Three dozen of those cubesats are "SuperDoves," Earth-observing satellites the size of a loaf of bread built and operated by the San Francisco-based company [Planet](#). Among the many satellites are six craft that will be operated by Virginia-based space analytics company [Spire Global](#), as well as EOS SAT-1, the first spacecraft in a seven-satellite, agriculture-focused constellation planned by [EOS Data Analytics](#) (EOSDA). The EOSDA network – planned to be running by 2025 – will study farmlands and forests around the world. Its data will help customers monitor crop growth and health and implement sustainable practices, among other applications. #SAT #AER #GRN #USA [Space.com](#)

→ **SpaceX launched a commercial Israeli imaging satellite on December 30th to conclude the busiest year in the company's history.** A SpaceX Falcon 9 deployed its payload, the EROS C3 imaging satellite, nearly 15 minutes after liftoff. The satellite was released in an unusual mid-inclination retrograde orbit, rather than the sun-synchronous orbit commonly used for optical imaging spacecraft. EROS C3 was built by [Israel Aerospace Industries](#) (IAI) for [ImageSat International](#), a Tel Aviv-based commercial imaging company. EROS C3 is part of ImageSat's EROS NG constellation, which includes EROS C1 and C2 as well as a planned future imaging satellite, EROS C4, slated for launch in 2026. EROS NG will also incorporate two synthetic aperture radar satellites that will be owned by an unnamed third party and commercialized by ImageSat. **The launch of EROS C3 completed the most active year to date for SpaceX, which performed 61 launches, all successful, in 2022. SpaceX nearly doubled its launch rate from 2021, when the company performed a then-record 31 Falcon 9 launches. That**

launch activity was driven by the company's Starlink constellation, which accounted for 34 of the 61 launches in 2022. #SAT #AER #USA #ISR [Space News](#)

ARTIFICIAL INTELLIGENCE

→ **The AI algorithms behind OpenAI's chatbot program ChatGPT may soon be able to help doctors detect Alzheimer's in its early stages.** ChatGPT has drawn attention for its ability to generate humanlike written responses to some of the most creative queries. Recently, a [study](#) demonstrated that the GPT-3 program can identify clues from spontaneous speech that are 80% accurate in predicting the early stages of dementia. Reported in the journal PLOS Digital Health, the Drexel study is the latest in a series of efforts to show the effectiveness of natural language processing programs for the early prediction of Alzheimer's. The study leverages current research suggesting that language impairment can be an early indicator of neurodegenerative disorders. The current practice for diagnosing Alzheimer's Disease typically involves a medical history review and lengthy set of physical and neurological evaluations and tests. While there is still no cure for the disease, spotting it early can give patients more options for therapeutics and support. #AI #USA [Science Daily](#)

→ **Microsoft is planning to launch a version of its search engine Bing using the AI behind OpenAI-launched chatbot ChatGPT.** Microsoft could launch the new feature before the end of March and hopes to challenge Google, according to a [report](#) by San Francisco based technology news website *The Information*. Microsoft said in [a blog post](#) last year that it planned to integrate image-generation software from OpenAI, DALL-E 2, into Bing. Microsoft had in 2019 backed OpenAI, offering \$1B in funding. The two formed a multi-year partnership to develop AI supercomputing technologies on Microsoft's Azure cloud computing service. #AI #USA [Reuters](#)

→ **OpenAI has announced the development of a machine-learning system called Point-E that can create 3D images from text much more quickly than other systems.** Over the past year, several groups have announced products or systems that can generate a 3D-modeled image based on a text prompt, e.g. "a young boy wearing a green hat and riding a purple bicycle." These systems first read and interpret the text while a second part, trained on internet searches, renders the desired image. Because of the complexity of the task, these systems can take a long time to return a model, ranging from hours to days. In this new effort, the researchers built a similar system that returns results within minutes. Their system generates point clouds instead of traditional images, which, when viewed together, resemble the desired image. The team took this approach because generating point clouds is far easier than actual images. The system routes images it finds through another AI system the team developed that converts what it receives to meshes, which produce the 3D point cloud model of the intended object. #AI #USA [Tech Xplore](#)

→ **German Bionic will unveil new lightweight smart AI-powered wearable suits and other products at Consumer Electronics Show 2023.** The European robotics firm aims to further workplace safety in physically demanding jobs with its range of smart devices. The firm's

Apogee offering, which is a lighter and more comfortable suit than its predecessors, is dust and water-resistant, providing up to 66 lbs of support for the lower back per lifting movement. The suit also offers walking assistance to help minimize fatigue. German Bionic has ensured that Apogee suits can easily be integrated into various workplaces, especially where lifting and carrying take place, such as in logistics, construction, and the care sector. Separately, the Smart SafetyVest comes with advanced sensors and AI to provide personalized ergonomic insights based on data acquired. The device also provides assessments and recommended actions. According to the company, along with workplace insights, it can pinpoint ergonomic risks and improvement opportunities to reduce fatigue and injuries that can otherwise lead to high levels of illness and absenteeism.



#AI #MFG #BIO #DEU [Interesting Engineering](#)

NEXT GENERATION COMMUNICATIONS

→ On January 3, the European Internet Exchange Association (Euro-IX) warned that requiring Big Tech to pay for telecom operators' network costs could lead to systemic weaknesses in critical infrastructure. Critics of the proposed SPNP (Sending Party Network Pays) model have warned the so-called "traffic tax" could lead content-driven platforms like Facebook and other social media platforms to route their services via ISPs (internet service providers) outside of the EU. This could have a knock-on effect for users in Europe, with

platforms potentially compromising quality and security for the sake of avoiding fees. Alternatively, they could pay the fees, but pass the costs onto end-users. Opponents also argue the proposals undermine the bloc's rules on net neutrality, under which ISPs cannot block or throttle traffic to prioritize some services over others. #5G #DIG #Geopolitics #EU #USA
[Reuters](#)

→ **Commercially available cell phones are now capable of connecting to space.** Late in 2022, hardware behemoths Huawei and Apple released cell phones capable of texting on traditional satellite communications networks. A pair of ambitious startups, AST SpaceMobile and Lynk Global also started building new LEO satellite networks designed to reach conventional 5G phones outside of terrestrial coverage. Huawei has not said when its service will begin working but Apple's partnership with Globalstar has been operational since November. And Lynk Global has agreements with at least 23 telecom providers to begin commercial operations in 2023. AST SpaceMobile says it plans to launch its first five commercial satellites late in 2023, has agreements or understandings with more than 25 telecom providers around the world, and should begin commercial operations in 2024. These offerings are possible thanks to a handful of advances that are now maturing, including declining cost of satellite manufacturing and the shrinking size of satellites. And with so many more of them, it is possible to put satellites into lower orbits above Earth where each covers less ground, while closer satellites allow handsets with less power to reach them. Another improvement is software-defined radios. #5G #SAT #USA #CHN [JEE Spectrum](#)

FINANCIAL TECHNOLOGY

→ **According to the IRS's law-enforcement arm, the agency wants to build ties with crypto companies to fight financial crime.** The IRS Criminal Investigation (CI) division is one of the top US financial crime enforcers handling cases from money laundering to Russia sanctions. It has also turned its eyes to cryptocurrency as one of several federal agencies trying to grapple with the growing industry. In an interview with the Wall Street Journal, an IRS-CI division official stated that the agency, which often competes with the crypto sector for talent, welcomes the "revolving door" – the shuffling of talent between government and industry – as a way to foster ties. The official emphasized that the movement of talent, from the public to the private sector and from the private to the public, creates experience and relationships that serve the US effort to combat fraud and other forms of financial crime. #FIN #Cybersecurity #USA
[WSJ](#)

→ **According to the World Economic Forum, following the major failures of 2022, the countries enabling responsible crypto competition will shape the industry's future.** In 2022, more than \$2T in the largely speculative crypto market evaporated. Millions of consumers and businesses lost money, and the fundamental trust in the promise of crypto-finance, which was supposed to be a correction to many of the misdeeds that gave rise to the 2008 financial crisis, is waning. Meanwhile, policymakers who have been sounding an alarm about crypto's excessive risks – while failing to create sensible regulations – have been vindicated by multiple large-scale failures. According to the World Economic Forum, just as it took the dot-com bubble

bursting in the early 2000s to hand over the future of the internet to more durable companies, business models, and use cases, perhaps 2022 marks a handover of crypto technology and blockchain infrastructure to steadier hands. #FIN #USA [World Economic Forum](#)

AEROSPACE & SPACE

→ **The Senate on Thursday, December 22 approved a \$1.7T spending package that would aid efforts to send US astronauts back to the moon, fund the federal government into next fall, and send another round of financial assistance to Kyiv.** Below are five highlights from the [measure](#).

- NASA would get a \$677M boost – to \$7.5B – toward its efforts to send US astronauts back to the Moon.
- Nearly \$50B in additional aid to Ukraine in its ongoing war with Russia.
- \$40B in disaster recovery assistance for states affected by storms in 2022.
- Billions for enhanced security and operations at the Capitol following the January 6, 2021 attack on the complex.
- Nearly \$39B – an increase of more than \$3B – for the Department of Justice, including more money for federal law enforcement agencies. #AER #Geopolitics [NY Times The Hill](#)

→ **Northrop Grumman has completed ground-based tests to demonstrate critical technology required for a 2025 demonstration of space-based solar power.** The company announced on December 15 the successful demonstration of a key element of Space Solar Power Incremental Demonstrations and Research (SSPIDR), the ability to beam radio frequency energy toward various antennas by steering the beam. Northrop Grumman anticipates using those findings for their prototype in 2025 to show the capability of beaming RF energy down to Earth. Previously, the US Air Force Research Laboratory (AFRL) awarded Northrop Grumman a \$100M contract in 2018 to develop a payload to demonstrate key components of a prototype space solar power system. AFRL conceived of the flight experiment, called Arachne, to spur the development of technology needed for a prototype space-based system that could provide solar power to remote military bases. #SAT #USA [Space News](#)

BIOTECHNOLOGY

→ **Miromatrix, a biotech company, is transforming pig livers to look and act like human livers as part of an effort to alleviate the nation's organ shortage.** The company has ambitious plans for the first-of-its-kind human testing of a bioengineered organ to take place sometime in 2023. Once approved by the FDA, the first experiment will take place outside of a patient's body, with a pig-turned-humanlike liver placed next to a hospital bed to temporarily filter the blood of someone whose own liver is failing. If the "liver assist" procedure is successful, a bioengineered organ transplant, most likely a kidney, would be attempted. According to doctors, the number of organs available will never be enough to meet the demand. Animals can provide a sustainable source of organs, and bioengineering organs can make the transplantation of

animal organs viable. But to make these animal organs usable, the pig cells need to be stripped away as this removes some of the risks of xenotransplantation, such as animal viruses or hyper-rejection. This process already has FDA approval for another purpose, the production of a type of surgical mesh.



#BIO #USA [Interesting Engineering ABC News](#)

→ **Solar Foods, a Finnish startup, is building its first commercial-scale factory near Helsinki, Finland, that will produce food directly from carbon dioxide, with production expected to begin in 2023.** The factory will be able to produce 100 tons of Solein per year, enough to feed 4-5M people. Solein is a yellow powder that can be mixed into food. The animal-free protein can be made by first selecting a soil sample and examining it for the highest-quality organisms. These are cultured until a suitable microbe is available. They are then placed in a bioreactor to undergo gas fermentation. The microorganism feeds on dissolved hydrogen, and electricity is used to separate carbon dioxide from water during the process. It is then given mineral nutrients, which allow it to produce amino acids, carbohydrates, lipids, and vitamins. Excess moisture is then removed from the Solein. The end result is a protein-rich dry powder. The alternative protein, and its application in various foods have already been tested in a pilot factory for two years. Solar Foods recently received a ~\$36M grant from Business Finland, making it the world's largest public grant funding for cellular agriculture. Solar Foods was also chosen to be a part of the European Commission's strategic hydrogen economy core in September 2022. If the electricity is generated by solar and wind energy, the food can be grown with near-zero greenhouse gas emissions. #BIO #GRN #FIN #EU [Interesting Engineering](#)

→ **Scientists have invented a new way to destroy toxic substances known as "forever chemicals" that have become widespread in waterways around the world, posing risks to human health and biodiversity, according to a recent [study](#).** In 45 minutes, the technique successfully degraded 95% of the harmful chemicals known as perfluoroalkyl substances (PFAS). Exposure to PFAS has been linked to ecological damage and a host of human health problems, including certain cancers, which has prompted researchers across many fields to find new ways of removing these toxic chemicals from water systems. Now, scientists at the University of California, Riverside (UCR), have presented "a promising platform to treat PFAS-contaminated drinking water sources" that uses hydrogen and UV-light to obliterate some of these chemicals. The researchers are optimizing it by trying to make this technology versatile for a wide range of PFAS-contaminated source waters. The basic idea is to remove PFAS by injecting hydrogen into a contaminated source, causing water to release electrons and other particles that can weaken the strong molecular bonds in PFAS. UV light pulses accelerate these reactions, shortening the time it takes for toxic chemicals to degrade into harmless components. The method was tested on two types of PFA, perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS), in small amounts of tap water (about two cups). Though the technique is one of many emerging efforts to combat PFAS pollution — a recent project used solvents to degrade a specific type of PFAS known as PFCAs — it has a low energy footprint and produces no harmful byproducts. #BIO #GRN #USA [VICE](#)

GREEN TECHNOLOGY

→ **MIT researchers developed an environmentally friendly cooling solution requiring no electricity.** The number of energy-intensive air conditioning systems is projected to quadruple to 14B by 2050, putting a strain on existing power grids. According to the World Economic Forum, the increase in cooling alone will account for a 0.5-degree Celsius rise in global temperatures. MIT's device resembles a regular solar panel, which, instead of providing electricity, would provide cooling. The cooling system has an architecture that combines radiative cooling, evaporative cooling, and thermal insulation. According to the researchers, the system reached lower temperatures than traditional evaporative cooling while using much less water. MIT's research aims to address previous critical challenges in passive cooling, a potential game changer for addressing the world's growing cooling needs. Soon, billions of people will be buying their first air conditioner (AC) in countries with fast-growing economies. These include countries such as India and Brazil, where already dangerous heat and humidity levels exist. Whether consumers living in these countries adopt environmentally-friendlier units will be a question of whether affordable solutions exist compared to the pollution-heavy models that have long dominated the market since the 1900s. #GRN #USA #IND #BRA [Interesting Engineering](#)

ADVANCED MANUFACTURING

→ **A robotics company named [Aerones](#) aims to save time for the human workforce by cleaning and inspecting wind turbines with remote-controlled robots.** For the blades of wind turbines, erosion is a huge problem. Blade surfaces age gradually due to small airborne

particles, ice, snow, and rain. This harms the turbine blade's aerodynamics over time by wearing off the outer layer of the blade. As a result, less and less energy is produced over the course of the turbine's lifetime. Therefore, regular wind turbine blade maintenance is crucial to maintaining the blades' structural integrity and extending the machines' life. According to Aeronex, its robots can save downtime on wind turbines by four to six times and reduce downtime by five to ten times, thus increasing the annual energy production by 12 percent. Turbine downtime rises due to larger turbines, and blades are harder to maintain using traditional techniques. Each hour a turbine is not in operation costs more and more money as power prices continue to rise. The robots examine the blades using ultrasound scanning and cameras and repair them by cleaning the damaged areas and filling any gaps or eroded surfaces. They can also use a specific coating to stop ice from developing on the turbines in colder climates and a protective coating to avoid further damage. The company has cleaned over 5k turbines in 19 countries and is developing more cutting-edge repair technologies planned to launch in 2023. #MFG #GRN #LVA [Interesting Engineering](#)

→ **A startup in Hong Kong is trying to help coral adapt to human-caused problems with its innovative use of 3D printing and terracotta.** More coral species live in part of Hong Kong's subtropical water than in the Caribbean. But as Hong Kong industrialized, coral reefs suffered from runoff and pollution that bled into the waters. The company, in a world-first, 3D-printed non-toxic and biodegradable artificial reef tiles made from terracotta. The team placed the tiles on the sandy bottom of a protected bay and seeded them with living coral – 95% survived over the past two years. The tiles could have global applications for coral adaptation, with benefits to humanity as well as ocean life. Reef tiles can also help bridge isolated coral communities that are separated because of mass die-offs from climate change. Reefs protect homes and businesses, breaking up destructive waves from storms. More than 1B people depend on coral, which plays an essential role in fisheries, tourism, and medicine. Scientists predict 70% to 90% of coral around the world will disappear in the next 20 years. #MFG #GRN #BIO #HKG [CBS News](#)

→ **The security robots market is set to more than quadruple by 2030.** Polaris Market Research reported that the global security robots market size and share was valued at \$27.32B in 2021 and the researchers expect it to surpass \$116.44B by 2030 - growing at a CAGR of 17.65% during the forecast period. The researchers explained that security robots incorporate AI, streaming video, and other connected technologies to perform security duties that used to be done by humans. Leading applications of security robots including spying, explosive detection, dynamic mission planning, firefighting, de-mining, rescue operations, transportation, and patrolling. #MFG #AI [SC Magazine](#)

AUTONOMOUS SYSTEMS

→ **The US Air Force envisions its sixth-generation fighter as a group of collaborative combat aircraft (CCA) working together with minimal direction from a human pilot.** Unlike today's uncrewed aircraft, which are remotely piloted from the ground, future uncrewed aircraft

will autonomously aviate, communicate and navigate, and then carry out one or more reference missions. But before the service will consider fully adopting and integrating this new capability into combat operations, they must perform predictably and appropriately. Including operators early and throughout the entire process helps establish performance requirements while increasing trust in the technology. In today's combat environment, remotely piloted platforms are operationally challenged in highly contested battle spaces where they can face layers of adversarial defenses or communications jamming. In these environments, collaborative autonomy is necessary to ensure the autonomous aircraft can work with other tactical aircraft to provide the mass and maneuver required to win the fight. These new CCAs could carry out a variety of missions like reconnaissance, electronic warfare, and the suppression of enemy air defenses. And since the crewed and uncrewed aircraft would collaborate and communicate with each other, the team could identify threats and targets quicker than a lone tactical platform. CCAs also act as a force multiplier by extending the sensor range and combat radius of sorties, allowing a smaller number of crewed aircraft to cover larger areas of the battlespace. Furthermore, by mimicking the performance, capabilities, and radar cross-sections of crewed aircraft, CCAs could overwhelm and confuse adversaries by acting as decoys to draw fire away from crewed teammates. #AUT #AI #USA [Defense News](#)

→ **Researchers at Carnegie Mellon have developed a reinforcement learning (RL)-based framework that could help to improve the performance of autonomous vehicles in ramp merging scenarios.** Their framework, presented in a [paper](#) pre-published on arXiv, could potentially help to improve the safety of autonomous vehicles, reducing the risk of accidents. The researchers focused on freeway merging because of the uncertainties on the road and the challenges involved with vehicles at high speeds and drivers with various styles. In their paper, they tried to devise a framework that could effectively capture ramp merging scenarios and plan a vehicle's actions based on its analyses of any possible risks. #AUT #USA [Tech Xplore](#)

SEMICONDUCTORS & CHIPS

→ **Nvidia and Foxconn announced a partnership on January 3 to develop autonomous vehicle platforms.** Foxconn said it will manufacture electronic control units (ECUs) for cars based on Nvidia's DRIVE Orin chip made specifically for computing in connected and autonomous vehicles. Companies developing electric and self-driving vehicles have struggled to bring products to market in recent years due to rising costs and difficulties ramping up production. Nvidia claims that its technology, which includes chips that process data from sensors in real time, will assist Foxconn in overcoming some of these challenges. It sees a \$300B market opportunity in the automotive sector and reported \$251M in revenue from the segment in Q3 last year. The chipmaker stated that the collaboration will allow it to scale its efforts to meet rising demand for chips designed for autonomous and connected vehicles. Foxconn, which has a vehicle manufacturing facility in Ohio, stated that its vehicles will include ECUs for autonomous driving based on DRIVE Orin and Nvidia's DRIVE Hyperion sensors. #CHP #AUT #SCRM #USA #TWN [Reuters](#)

QUANTUM TECHNOLOGY

→ **President Biden recently signed legislation to encourage federal government agencies to adopt decryption-resistant quantum computing technology.** The [Quantum Computing Cybersecurity Preparedness Act](#) comes amid speculation that significant leaps in quantum technology being made by adversary nations, such as China, could allow existing forms of secure encryption to be cracked much more quickly. The law specifically requires the Office of Management and Budget to prioritize government agencies' acquisition and migration to post-quantum cryptography IT systems. It also requires the White House to develop recommendations for government agencies on assessing critical systems one year after NIST publishes projected post-quantum cryptography standards. #QNT #Cybersecurity #Geopolitics #USA #CHN [FedScoop](#)

GEOPOLITICS

→ **China is aiming to grow cooperation with emerging space nations including Saudi Arabia and the United Arab Emirates.** Space was named as one of a number of priority areas for the next three to five years during the first China-Gulf Cooperation Council (GCC) Summit held in Riyadh last month. “China stands ready to work with GCC countries on remote sensing and communications satellite, space utilization, aerospace infrastructure, and the selection and training of astronauts,” according to the text of the keynote speech made by Chinese President Xi Jinping at the summit on December 9th. While broad in apparent scope and ambition, the words indicate only an initial expression of interest in establishing cooperation in these areas, with no indication of a commitment in terms of funding or practicalities at this point. The speech illustrates that China’s Tiangong space station – which became operational last month with its first crew turnover – will be used in engaging countries around the world. #Geopolitics #SAT #AER #CHN #SAU #ARE [Space News](#)

→ **The US is locked in a space race with China and the country needs to “watch out” that its rival does not gain a foothold and try to dominate lunar resources, NASA Administrator Bill Nelson warns.** He added the next two years could determine which country achieves the advantage of the moon’s resource-rich areas. In December, the Chinese government offered its version for a crewed lunar landing, space transportation, infrastructure and space governance. China has also announced the goal of landing taikonauts on the moon by the end of this decade. #USA #CHN #AER #Geopolitics [The Guardian](#)

→ **Huawei claims it has exited “crisis mode” following punishing US restrictions as it reported growth in its telecom-infrastructure business and flat overall revenue for 2022.** Huawei’s chairman stated in a New Year’s message to employees that the company was back to business and that US restrictions were Huawei’s “new normal.” The company expected to end the year with annual revenue of ~\$91.5B, which is essentially unchanged from a year earlier. The results are the latest sign that the Shenzhen-based technology giant has steadied its business after a series of Trump-era sanctions cut it off from advanced chips, crushing its

smartphone business – briefly the largest in the world. The US has also pressed allies not to use the company's 5G telecom equipment, calling it a national security threat, which Huawei has denied. In recent years, Huawei has sought to develop new business lines including software, cloud computing, and technology for automobiles. It has invested in companies across China's semiconductor industry as it seeks to become more independent of foreign supply chains. Still, yearly sales remain well below the 2020 peak of more than \$120B, indicating that the new ventures are far from offsetting its recent business losses. #Geopolitics #5G #CHP #DIG #SCRM #USA #CHN [WSJ](#)

CYBERSECURITY

→ **Software engineers who use code-generating AI systems are more likely to cause security vulnerabilities in the apps they develop, according to a new report.** The paper, co-authored by a team of researchers affiliated with Stanford, highlights the potential pitfalls of code-generating systems. The Stanford study focused on Codex, an AI code-generation system developed by the San Francisco-based research lab OpenAI. The researchers recruited 47 developers ranging from undergraduate students to industry professionals with decades of programming experience, to use Codex to solve security-related problems. Study participants who had access to Codex were more likely than a control group to write incorrect and "insecure" solutions to programming problems, according to the researchers. Even more concerning, they were more likely than the control group to claim that their insecure answers were secure, according to the researchers. Vendors like GitHub may prevent security flaws from being introduced by developers using their code-generating AI systems in a variety of ways, according to the researchers. This includes a mechanism for "refining" user prompts to make them more secure, similar to a supervisor reviewing and revising rough drafts of code. They also advise cryptography library developers to ensure that their default settings are secure, as code-generating systems frequently use default values that aren't always free of exploits. The introduction of security vulnerabilities isn't the only flaw in code-generating AI systems. Users have been able to prompt Copilot (Codex powers Copilot) to generate code from Quake, code snippets in personal codebases, and example code from books like "Mastering JavaScript" and "Think JavaScript" on at least a portion of the code on which Codex was trained. Some legal experts have suggested that using Copilot could expose companies and developers to legal liability if they unintentionally incorporate copyrighted suggestions from the tool into their production software. #Cybersecurity #AI #DIG #SCRM #USA [TechCrunch](#)

→ **CertiK, the largest smart-contract auditor in the world of cryptocurrencies and Web3, has a team of more than 250 people who examine crypto source code for bugs.** Crypto projects are powered by smart contracts, which are pieces of computer code that govern the transactions. Once on a blockchain, smart-contract code cannot be altered. It's too late if a bug is discovered after the fact: the whole point of blockchains is that you can't change anything that's been written to them. Additionally, code hosted on a blockchain is publicly visible, allowing hackers to study it at their leisure and look for flaws to exploit. Blockchain bugs, if discovered and reported, are paid much more than traditional software bugs, with payouts ranging into the tens of millions. The company, which is valued at \$2B, claims to have completed 70% of all

smart-contract audits. It also runs a system that monitors smart contracts in real time to detect any that are being hacked. #Cybersecurity #SCRM #DIG #FIN #USA [MIT Technology Review](#)

→ **A group of hackers bought US military equipment from eBay for \$68, which contained biometric data from troops, known terrorists, and people who may have worked with American forces in Afghanistan and other countries in the Middle East.** It contained unencrypted fingerprints, iris scans, pictures, and descriptions of people, all protected by a "well-documented" default password. In a [blog post](#), the hackers called getting at the sensitive data "downright boring," given how easy it was to read, copy, and analyze. Matthias Marx, who led the group's efforts in researching the devices, called the fact that they had been able to get their hands on it "unbelievable." Though he plans on deleting the data after the club finishes its research, what they've already found raises concerns about how closely the military guarded this information. In all, the hackers purchased six devices, which the military used around a decade ago to gather biometric info at checkpoints and during patrols, screenings, and other operations. Two of the devices — both Secure Electronic Enrollment Kits (SEEK IIs) — had information left on their memory cards. According to the hackers, one of the devices contained 2,632 peoples' names and "highly sensitive biometric data" that appeared to have been collected around 2012. Decommissioned military equipment often ends up in private hands. The disconcerting part is that the data was left on at least some of them and that nobody caught it before the devices were sold on eBay (which technically constitutes a violation of the platform's policies against selling computers with PII). When notified, the DoD simply requested that the device be returned via mail.



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SUPPLY CHAINS

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→ **Australia expects a “substantial impact” on global supply chains from surging Covid cases in China.** Covid cases soared after China abandoned its strict “Covid Zero” protocols, prompting countries from the US to Australia to impose restrictions on Chinese travelers. China is Australia’s biggest trading partner and Australia is one of the world’s most China-exposed developed economies. Covid-19 issues in China have noticeably affected the manufacturing of Apple’s iPhone. Initially, workers from Foxconn’s Zhengzhou base – the primary manufacturing base for iPhone Pro models – had to travel only between their workplaces and dormitories because of China’s strict anti-Covid measures. The near-lockdown led some workers to flee and others to clash with police, obstructing production. But now that China has lifted most Covid-control measures, the leading issue at factories around the country is worker health. Nationwide, at least tens of millions of Chinese are believed to have caught Covid. Yet while Covid continues to impact supply chains, the raging war in Ukraine, fears of a world recession led by the US, rising interest rates, and extreme weather events will be significant determinants of how the global economy fares in 2023. #SCRM #USA #AUS #CHN [Bloomberg](#) [WSJ](#)

→ **The Covid-19 pandemic demonstrated that logistics is lagging other industries in the arena of digital commerce; now, companies around the world are racing to ensure executives stay ahead of supply chains’ digital transformation.** Such advances are fueling an influx of investment in logistics tech startups around the world, at a rate of \$100M a day and more than doubling since 2020 the number of unicorns – those valued at \$1B or more, according to [figures](#) compiled by CB Insights. Such shifts will have longer-term economic benefits in the form of disinflation. Economists see the combination of tight labor markets and better technology as accelerating automation in logistics and offsetting the higher costs that might come with reshoring supply chains. #SCRM [Bloomberg](#)