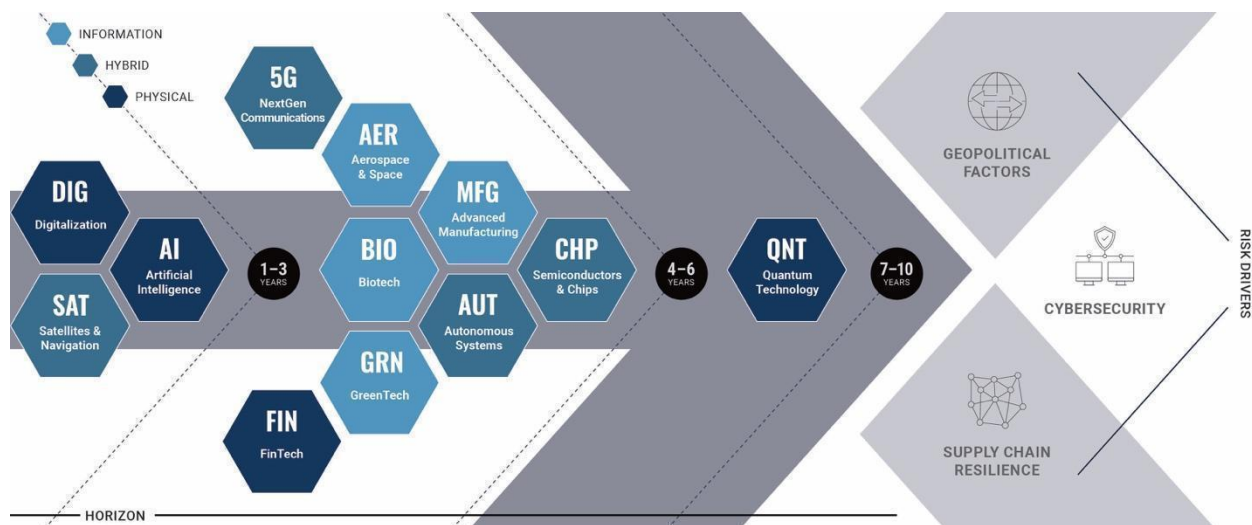




# MATRIX MONITOR

Friday January 21, 2022

Welcome to Next5's weekly digest – emerging technology news and analysis to keep you on your game and ready for what's Next



*This week's Next5 Matrix Monitor features DARPA's plan for a spacecraft powered by a nuclear propulsion system, the US Chamber of Commerce's new AI Commission, AT&T and Verizon's temporary 5G concession to address air-safety concerns, Walmart's plan to create its own cryptocurrency and collection of NFTs, NASA's process of bringing the James Webb Space Telescope into focus, the fastest DNA sequencing technique in the world, a proclaimed test of the world's first fully autonomous ship navigation system, and evolving approaches in quantum computing.*

## NEXT5 NEWS & AMPLIFICATIONS:

→ According to an op/ed written in *The Atlantic*: **How Xi interprets - or misinterprets - the outcome of the US-Russia standoff in Ukraine could influence whether and how China tries to reunify with Taiwan.** Xi will likely scrutinize the situation in Ukraine for useful intelligence about which tools Biden can and will ultimately employ to pressure Russia to back off, how much he is willing to give up in a potential compromise with Putin, and how effectively POTUS works with allies and his own diplomats. However, the Ukraine and Taiwan flashpoints are not exactly the same - though Biden has ruled out unilaterally sending troops to defend Ukraine, he has deliberately left his position on military intervention in Taiwan unclear to deter China. And the US may have more reasons (and flexibility) to fight for Taiwan than Ukraine since Taiwan is home to critical links in strategic critical technologies like chips and in some ways has formed the backbone of US power in the Pacific. And, ultimately, US decisions in Ukraine could be constrained by NATO and the EU. However, in both Ukraine and Taiwan, autocracies are testing Washington for weaknesses to calculate their next moves. Ukraine and Taiwan both show how easily US weakness - or the mere perception of weakness - could unravel the strained networks and alliances that support the American world order, potentially ushering in a new era of global conflict and instability. #Geopolitics #RUS #UKR #CHN #TWN #USA #SCRM [The Atlantic](#)

→ **In response to recent malicious cyber incidents in Ukraine - including the defacement of government websites and the presence of potentially destructive malware on Ukrainian systems - CISA published an [Insights Report](#) this week to help organizations protect against “Potential Critical Threats.”** This report strongly urges leaders and network defenders to be on alert for malicious cyber activity and provides a checklist of concrete actions that every organization should immediately take, regardless of sector or size. As the situation progresses, US officials anticipate cyber attacks will continue to play a role in any potential invasion of Ukraine, which could have cascading or spillover effects worldwide. **Next5 advises companies to review detection response plans now, as tensions rise, particularly those in industry sectors that are likely to be targeted or leveraged by US actions. If the US takes action that targets a specific industry, American companies in that industry should assume they are viable targets for reciprocal Russian retaliation.** For more information about Russian TTPs, detection, and mitigation procedures, read this joint [guidance](#) released by CISA, FBI, and NSA. **Those seeking further information or preparation advice are encouraged to [set up a meeting](#) with the Next5 team to discuss.**

→ **The World Economic Forum Cybersecurity Leadership Community (120 executives from 20 countries, which includes Next5 leadership) released its first Global Cybersecurity Outlook [Report](#) this week.** Key findings from the report include:

- 81% of executives believe that digital transformation is the main driver improving cyber resilience.

- There are 3 main gaps between CIOs and CEOs: prioritizing cyber in business decisions, gaining leadership support for cybersecurity, and recruiting/retaining cyber talent.
- The ransomware threat is continuing to grow.
- Small & medium sized enterprises are seen as a key risk to supply chains, partner networks, and ecosystems.
- Cyber leaders have indicated that clear and productive regulations are needed that would allow and encourage information sharing and collaboration.

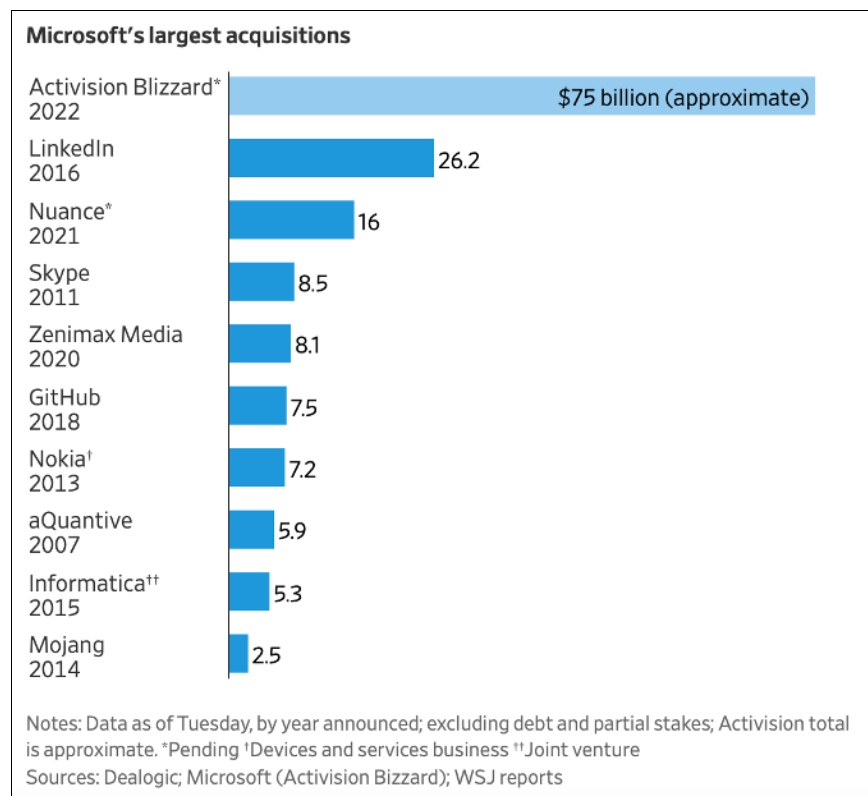
→ A new [report](#) from Ernst & Young highlights the advantages of corporate venture capital and makes recommendations on the approach. At this point in the pandemic, with digitalization on the rise, now may be the perfect time for corporate venturing. And CVC deals are becoming more popular, but more than 80% of S&P 500 companies still do not have a dedicated CVC arm - and therefore could be missing an opportunity as CVCs have potential to create higher ROI than traditional VCs. The following key considerations can help organizations determine the best way to set up and operate a CVC fund:

1. Identify capabilities, products or markets that are missing in your company's portfolio and understand how CVC can fill these gaps.
2. Figure out how to differentiate your CVC fund & avoid characteristics of a "tourist CVC."
3. Proactively build a diverse portfolio of startup investments aligned to the company's strategic mandate.
4. Balance financial and strategic goals to reap value and synergies from investments by actively building networks among portfolio companies to spark inspiration, skill building, and collaboration.
5. Take a measured approach that hedges risks and seek a return on innovation, not just a financial ROI.

## DIGITALIZATION

→ Microsoft agreed to buy Activision Blizzard in a deal valued at about \$75B, using its largest acquisition to grab a videogame heavyweight. The deal, if completed, would expand Microsoft's already sizable video game operation, adding a lineup of popular game franchises including Call of Duty, World of Warcraft, and Candy Crush to Microsoft's Xbox console business and its own games like Minecraft and Doom. According to Microsoft, the transaction would make it the world's third-largest gaming company by revenue, behind China's Tencent and Japan's Sony Group. The deal follows a boom in the videogame business during the pandemic. It also comes as Microsoft and other technology giants are competing for position amid changes in the sector, including a shift toward cloud-based gaming and the rise of a virtual world known as the metaverse where people can play, work, and shop across different platforms using digital avatars. Buying Activision would increase Microsoft's video game revenue by about half. Analysts estimate that Activision's sales in 2021 totaled \$8.7B, according to FactSet, while

Microsoft reported \$15.4B in gaming revenue for the fiscal year through June, accounting for about 9% of its total.

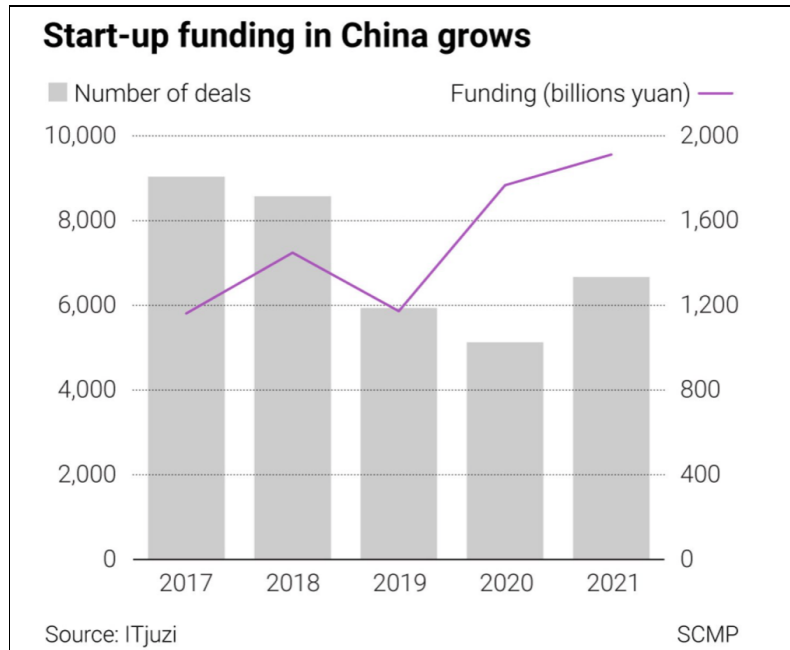


#DIG #USA [WSJ](#)

→ **Big tech companies are facing the biggest expansion in potential technology regulation in a generation.** New laws under consideration in Europe, Asia, and the US could put sharp limits on how big tech companies can treat smaller competitors and restrict their use of AI technologies like facial recognition. Other proposals could ban common practices such as companies giving their own products a boost in their own rankings. At the same time, regulators globally are advancing dozens of investigations related to competition and privacy with substantial implications for tech giants. Under consideration are orders or settlements that could cut off trans-Atlantic data flows, inhibit some kinds of digital advertising, delay major product changes, or force ongoing oversight of activities. So far, regulation has had little effect on Silicon Valley's bottom line or valuations. But the fresh wave of scrutiny has already made it more difficult for tech giants to cash in on potential growth from acquisitions. #DIG #AI [WSJ](#)

→ **Funding for Chinese start-ups hit a record high last year, boosted by investments in semiconductors and healthcare amid a tech war and ongoing Covid-19 restrictions;** concurrently, Beijing's harsh regulatory crackdown undercut the internet and video gaming sectors. Total funding for private sector firms in the "new economy" – a term that covers 21

sectors mostly in hi-tech and the internet – totaled 1.89T yuan (\$296B) in 2021, up 6.6% from the year before, according to Beijing-based market researcher ITjuzi. Start-ups involved in semiconductors raised 143.2B yuan last year across 501 deals in China, compared with 181B yuan for 339 deals in 2020. Although the total amount was down, the money was spread across a larger number of companies. Healthcare was another industry that saw strong growth in funding, up 27% year on year to 330.9B yuan in 2021. Over the past year, regulators have cracked down on China's Big Tech sector by punishing internet giants for abuse of monopoly power, imposing restrictions on offshore initial public offerings over data security concerns, and suspending license approvals for new video game titles.



#DIG #BIO #CHP [SCMP](#) [WSJ](#)

## SATELLITES & NAVIGATION

→ **The Pentagon is looking into nuclear-powered propulsion for satellites as a method to dodge incoming adversary fire in potential future space wars**, according to a new Mitchell Institute [report](#). Nuclear propulsion has some big advantages over hydrazine - conventional liquid satellite fuel. It has longer endurance and is nearly twice as efficient, so it requires half as much mass to generate the same amount of thrust. This capability could help key satellites, that perform critical functions like navigation or spotting missile launches, move to other orbits in order to avoid space weapons. This isn't a new concept. NASA and the Atomic Energy Agency originally looked into this idea in the 1960s and 70s, but its program's funding was sapped by the Vietnam War and safety concerns. #SAT #GRN #USA #CHN #RUS #Geopolitics [Defense One](#)

→ **In fact, the Defense Advanced Research Projects Agency is planning to send a spacecraft powered by a nuclear propulsion system into orbit.** DARPA last year announced it will invest nearly \$30M in a project called Demonstration Rocket for Agile Cislunar Operations (DRACO), a spacecraft powered by a nuclear thermal propulsion system. If successful, the project could pave the way for the development of nuclear propulsion systems for military satellites—a capability that could give the US military an advantage over enemies by making satellites more maneuverable and less vulnerable to attack. #SAT #USA [Space News](#)

→ **A Long March 2D carried the classified Shiyao-13 test satellite into orbit late Sunday, January 16 – the first of many planned launches by China in 2022.** The China Aerospace Science and Technology Corp. (CASC), the country's state-owned main space contractor, announced launch success within 20 minutes of liftoff. The Long March 2D is scheduled to launch more than 15 times during the year, according to CASC. And CASC is planning more than 40 launches for 2022, following up on its 48 Long March launches last year. The main task will be six launches to complete the country's three-module, T-shaped Tiangong space station. Sunday's launch was the fourth orbital mission of 2022, following three launches by the United States. Further launches are expected from China before a break for Chinese New Year, falling February 1. #SAT #USA #CHN [Space News](#)

## ARTIFICIAL INTELLIGENCE

→ **According to a new CSIS report, the IC needs to change the way it defines intelligence and adopt cloud computing to stay ahead of adversaries, private interests, and the public.** The [report](#) looks at a hypothetical “open-source, cloud-based, AI-enabled reporting,” or OSCAR, tool for the IC, a tool that could help the community more rapidly detect and act on clues about major geopolitical or security events. The report argues that over the last several years, the Intelligence Community's efforts to adapt to the arrival of large, publicly-available datasets are small in comparison to how much data is out there. It emphasizes how quickly and effectively such datasets can be analyzed with machine learning in massive cloud environments. Moreover, the report argues that instead of using closed, bespoke networks for storing and analyzing data and old-fashioned classification processes for keeping information secret, the community should move away from reflexive over-classification and toward non-classified cloud capabilities that can be more secure than classified networks. This is because they have more people watching them for intrusions at any given time. The product also recommends a number of cultural changes for agencies and a broader acquisition authority for ODNI to procure cloud and machine learning products for the government. #AI #DIG #USA [Defense One](#)

→ **The US Chamber of Commerce on Tuesday, January 18 announced the launch of its AI Commission on Competition, Inclusion, and Innovation to advance US leadership in AI**



**technology.** The Chamber's AI Commission will convene thought leaders with experience in government, industry, and civil society to address the advancement and challenges of adopting AI in communities across the country. The Commission will request input from all relevant stakeholders, meet with top researchers, and conduct field hearings to see AI issues firsthand. The Commission is established in part to recommend durable, bipartisan AI policy solutions to ensure the US continues to lead in innovation while fostering fairness in deploying AI. #AI #USA [US Chamber of Commerce](#)

→ **Website [tl;dr papers](#) leverages recent advances in AI language processing to simplify science to a second-grade level.** Work on the site began two years ago, but the service went viral on Twitter over the weekend when academics started [sharing AI summaries of their research](#). The AI-generated results are sometimes inaccurate or oversimplified. But just as often, they are valuable and concise, cutting through academic jargon to deliver simplified knowledge. The project only analyzes the abstract of a scientific paper, which is itself a condensed version of a researcher's argument. The ability to condense an entire paper is a much greater challenge, but machine learning researchers are working on it. AI summarizers could be used by students as a way into complex papers, or they could be incorporated into online journals, automatically producing simplified abstracts for public consumption. #AI [The Verge](#)

## NEXT GENERATION COMMUNICATIONS

→ **AT&T and Verizon agreed to not turn on some 5G signals near airport runways, a temporary concession to address air-safety concerns that have already prompted international airlines to cancel some US-bound flights.** The companies on Tuesday, January 18 accepted the new limits after a months-long standoff between the cellular operators and aviation officials, who had promised to limit flights over concerns about the 5G signals' effect on aircraft instruments. According to aviation-safety officials, the wireless carriers' agreement will avert many—but likely not all—flight cancellations and delays. Delta Air Lines said Tuesday evening that it was planning for the possibility of flight cancellations in certain weather conditions as soon as Wednesday, even after the agreement by Verizon and AT&T. A handful of international airlines said Tuesday they planned to suspend some US flights starting Wednesday, citing operational concerns stemming from 5G deployment and the FAA restrictions, as well Boeing's guidance to not operate the 777 wide-body jet. #5G #AER #USA [WSJ](#) [Bloomberg](#)

→ **AT&T and Dish Network walked away with the bulk of spectrum licenses up for grabs in the FCC's latest spectrum auction - and Verizon went empty-handed.** According to the FCC on Friday, January 14, AT&T spent \$9.1B and Dish spent \$7.3B to secure rights to use the airwaves, which sit above 3.45 gigahertz on the radio spectrum. T-Mobile spent 2.9B, while Verizon spent nothing. That's noteworthy considering Verizon spent more than \$50B on licenses in the FCC's previous auction of C-band spectrum that ended last year. Such midrange

frequencies are considered ideal for carrying wireless companies' faster 5G signals across urban and suburban areas. The pace of recent auctions shows how US government officials consider wireless network enhancements a national priority akin to strategic technologies such as AI and chip manufacturing. The FCC called its agenda to promote next-generation wireless technologies its 5G FAST plan. Lawmakers originally named the legislation that authorized the most recent auction the "Beat CHINA for 5G Act." #5G #USA #CHN [WSJ Light Reading](#)

→ **In less than a decade, Microsoft, Alphabet, Meta, and Amazon have become the dominant users of undersea-cable capacity by far.** Before 2012, the share of the world's undersea fiber-optic capacity being used by those companies was less than 10%. Now, that figure is about 66%. Industry analysts have raised concerns over the world's most powerful providers of internet services and marketplaces also owning the infrastructure on which they are all delivered. But the involvement of these companies in the cable-laying industry also has driven down the cost of transmitting data across oceans and increased the global capacity to transmit data internationally by 41% in 2020 alone, according to TeleGeography's [annual report](#) on submarine cable infrastructure. Sharing bandwidth among competitors helps ensure that each company has capacity on more cables, a redundancy that is essential for keeping the world's internet functioning when a cable is severed or damaged. The ability of these companies to vertically integrate down to the level of the physical infrastructure of the internet itself reduces their cost for delivering services. It also increases the gap between themselves and any potential competitors. #5G #USA [WSJ](#)

→ **China's president has outlined his vision of a digital economy with 5G connectivity and nationwide data management at its core.** President Xi Jinping wrote of the significance of China's developing digital economy on Saturday, January 15 in the *Qiushi Journal* - the mouthpiece publication of the Communist Party's Central Committee. The presidential edict was followed last week by a blueprint on the digital economy issued by the Chinese government's cabinet, which pushed for such technological developments as 6G telecommunications and big data centers. The plan was in line with China's 14th five-year plan from 2021 to 2025, reinforcing a similar directive issued by the Cyberspace Administration of China. In 2020, China's digital economy expanded by 9.7% to 39.2T yuan (US\$6.17T) in value, or 38.6% of China's economic output, becoming a key driver for stabilizing economic growth, according to official figures. #5G #DIG #CHN [SCMP](#)

## FINANCIAL TECHNOLOGY

→ **Washington has moved slowly in regulating cryptocurrency – Beijing recently banned it outright in favor of a state-led version under direct government control.** Washington has adopted a wait-and-see approach, allowing cryptocurrencies to proliferate and tolerating more free-market chaos until its promise and pitfalls are better understood. Beijing has considered retail cryptocurrency a potential threat to social order and law enforcement. Since 2013, the central government has successively tightened restrictions on launching, hosting, and "mining"



cryptocurrency, leading to September's ban. As we previously reported, it has instead promoted its official digital currency, e-CNY, that analysts say would strengthen its ability to monitor users, spending patterns, location, and connections. According to analysts, China's longer-term goals for e-CNY include efforts to strengthen the nation as a top financial center, weaken the US dollar's role as the global reserve currency, and gain access to valuable overseas data – seen in its bid to make “connectivity” a linchpin of its Belt and Road Initiative. Weakening Washington's financial grip would allow Beijing to circumvent US financial sanctions that target Chinese and Hong Kong officials, state-owned companies, and allies. But global adoption depends on the trust that a currency is freely traded and faces limited political manipulation, a challenge given Beijing's state-directed capital markets, economy, and opaque statistics. #FIN #USA #CHN [SCMP](#)

→ **Walmart appears to be venturing into the metaverse with plans to create its own cryptocurrency and collection of non-fungible tokens, or NFTs.** The big-box retailer filed several new trademarks late last month that indicate its intent to make and sell virtual goods, including electronics, home decorations, toys, sporting goods, and personal care products. In a separate filing, Walmart said it would offer users a virtual currency, as well as NFTs. A [report](#) from CB Insights outlined some of the reasons why retailers and brands might want to make such ventures, which can potentially offer new revenue streams. Launching NFTs makes it possible for businesses to “tokenize” physical products and services to help reduce online transaction costs, it said. And for luxury brands like Gucci and Louis Vuitton, NFTs can serve as a form of authentication for tangible and more expensive goods, CB Insights noted. #FIN #DIG #USA [CNBC](#) [SCMP](#)

→ **According to a tweet by Elon Musk, Tesla is accepting payment for some merchandise with dogecoin, a return for the electric-vehicle maker to the acceptance of digital currencies.** Dogecoin surged more than 10% early Friday, January 14 after Musk's tweet before returning those gains. Musk has a record of commenting on cryptocurrencies – Dogecoin's value jumped late last year when he indicated Tesla would make some merchandise available for purchase using the payment form. Also last year, Tesla bought \$1.5B of bitcoin. Musk said at the time that the company would begin accepting payments in the cryptocurrency, but the company suspended those purchases after Musk expressed concerns about high levels of fossil-fuel use for bitcoin mining. #FIN #USA [WSJ](#)

## AEROSPACE & SPACE

→ **NASA on Wednesday, January 12 embarked on a months-long process of bringing its newly launched James Webb Space Telescope into focus.** If all goes as planned, the telescope should be ready to capture its first science images in May. The \$9B telescope, described by NASA as the



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premier space-science observatory of the next decade, will mainly view the cosmos in the infrared spectrum, allowing it to gaze through clouds of gas and dust where stars are being born. Webb is about 100 times more powerful than its predecessor, the 30-year-old Hubble Space Telescope. Astronomers say the telescope will be equipped to bring into view a glimpse of the cosmos never previously seen – dating to just 100M years after the Big Bang, the theoretical flashpoint that set in motion the expansion of the observable universe an estimated 13.8B years ago. The telescope is an international collaboration led by NASA in partnership with the European and Canadian space agencies. [Northrop Grumman](#) was the primary contractor. #AER #USA #CAN [Reuters](#)

## BIOTECHNOLOGY

→ **In a new intelligence assessment, the CIA has ruled out that Havana Syndrome is the result of a sustained global campaign by a hostile power aimed at hundreds of US officials, and still has not found a single root cause of symptoms.** As we previously reported: starting in late 2016, US diplomats and spies serving in Cuba began reporting bizarre sounds and sensations followed by unexplained illnesses and symptoms, including hearing and vision loss, memory and balance problems, headache and nausea. Over the years many hundreds of US officials have reported suspected incidents in more than a dozen countries, to include incidents in Washington DC near the White House. One of the leading suspects has reportedly been Russia, but in the past few years, the IC has not uncovered enough evidence to pinpoint the cause or culprit of the incidents. The National Academies of Sciences, Engineering and Medicine in a 2020 report said some of the observed brain injuries were consistent with the effects of directed microwave energy, which Russia has long studied. And Russia has consistently denied any involvement. This week, the CIA reportedly assessed it cannot rule out foreign involvement in about two dozen cases. But in hundreds of other cases of possible symptoms, the agency has found plausible alternative explanations. Some critics say the CIA did not consult with enough IC partners in making this assessment, and it was pretty loose about which symptoms qualified as possible cases of Havana Syndrome, which was all but guaranteed to skew the results. #BIO #USA #RUS #Geopolitics [NBC News](#)

→ **American researchers have discovered a technique to use nanoparticles to boost immunosuppression, which could improve diabetes treatment.** In a recently published [paper](#), researchers uncovered how to make immunomodulation more effective by using nanocarriers to re-engineer the commonly used immunosuppressant rapamycin. Instead of directly modulating T cells—the most common therapeutic target of rapamycin—the nanoparticle was designed to target and modify antigen-presenting cells (APCs) that allow for more targeted, controlled immunosuppression. This research could help solve some of the problems that have arisen with emerging technologies, like [Vertex](#)'s stem-cell derived pancreatic islets for diabetes treatment. #BIO #USA [GenEng](#)

→ **Scientists at Stanford Medicine have completed the fastest DNA sequencing technique in the world.** The team set out to sequence the genomes of 12 patients, in which one of the

cases took only five hours and two minutes to sequence a patient's genome, setting the first Guinness World Records title for fastest DNA sequencing technique. Stanford scientists completed genome sequencing in an average of eight hours, achieving a diagnostic rate of roughly 42%, which is about 12% higher than the average for diagnosing unknown diseases. The researchers used an [Oxford Nanopore Technologies](#)-built machine with 48 sequencing units (aka flow cells), which allowed scientists to sequence one person's genome using all flow cells simultaneously. The researchers say they think the genome sequencing time can be crunched down even further. #BIO #USA [The Hill](#)

## GREEN TECHNOLOGY

→ **A less-expensive battery technology backed by Elon Musk rose to dominate China's auto market last year, pointing to challenges for Tesla's US and European rivals.** Official Chinese figures showed that batteries using lithium iron phosphate or LFP technology accounted for 57% of total battery production for vehicles in China during 2021, up from less than half the previous year. The LFP batteries have stormed into the lead in China because they use relatively inexpensive iron in the battery's cathode in place of costlier metals such as nickel. Their rise has coincided with the emergence of electric vehicles as a mass-market product in China. In 2021, new-energy vehicles, a category that mostly consists of EVs, accounted for nearly one in six-passenger cars sold in China, the world's top auto market by number of vehicles sold. As Chinese car dealers sell more EVs and a greater proportion of those EVs carry LFP batteries, production of the iron batteries is surging. #GRN #USA #CHN [WSJ](#)

→ **[NineDot Energy](#) is developing a dozen basketball court-sized electric battery sites in New York City with a recent investment from Carlyle Group.** Carlyle bought a stake in NineDot Energy, as it expands into the market for large-scale electricity storage, a growing area of interest for money managers. The private-equity giant spent over \$100M in December on separate investments in NineDot and [Fermata Energy](#), a supplier of technology for parked electric vehicles to pump power from their batteries into local electricity grids. NineDot plans to complete its first New York City battery installation in May. The company's projects qualify for government subsidies and contribute to New York state's plan to build up electricity storage so it can reach a 100% clean-energy target by 2040. NineDot buys small lots of land in New York's outer boroughs, then works with the local utility to connect batteries on the sites to the grid and find local buildings or companies to purchase the power. It is also working with Fermata on a project for all-electric ride-share company Revel Transit that would allow its fleet to sell power to the local grid when not in use. #GRN #USA [WSJ](#)

## ADVANCED MANUFACTURING

→ **A study published in [Materials](#) provides an analysis of collaborative robotics' implementation in the manufacturing assembly process.** Collaborative robotics improve safety, cost savings, and overall production processes. Human operators can be freed from

mundane, repetitive tasks to concentrate on more high-level, creative, and value-added tasks. Analyzing the results of the experimental sections and case studies, the study's authors concluded that the economic justification of collaborative robotics implementation relies on achieving moderate time savings to become a feasible investment for companies. Wages have a non-linear influence on the cost of replacing operators with collaborative robotics and the cost savings of their use are both short- and long-term. In low labor cost markets, the implementation of collaborative robots may be largely dependent on long-term strategic decision-making criteria. In terms of social impact, whilst the use of collaborative robotics vastly improves worker safety, it also leads to worker displacement and reduced employment availability. Welfare systems in high-income economies can mitigate this impact, but in poorer countries, this is less achievable. The productivity threshold in terms of a social impact compared to economic savings is, therefore, higher in low-wage, low-welfare societies. #MFG [Azom](#)

## AUTONOMOUS SYSTEMS

→ **The US Defense Department agency's Air Combat Evolution (ACE) program is developing autonomous systems and incorporating them into warfare technology.**

According to a new report, the Pentagon plans to spend close to \$1B on AI-related technology. While the agency continues to create autonomous systems, they are concentrating on partially autonomous systems, keeping in mind the objective of the ACE program, to transform a pilot's role, not to remove it entirely. The DoD's position on lethal autonomous weapons, established in 2012, requires a human decision-maker to remain in the loop to an "appropriate" degree. Some see the development of autonomous weapons as a matter of deterrence, particularly against large-scale acts of aggression, such as Russia invading NATO territory or China invading Taiwan. #AUT #AI #Geopolitics #USA #RUS #CHN #TWN [The New Yorker](#)

→ **Japanese companies [Nippon Foundation](#), [Mitsubishi Shipbuilding](#), and [Shin Nihonkai Ferry Co.](#) claim that they have completed a demonstration test of the world's first fully autonomous ship navigation systems on a coastal ferry.** According to the press release, the fully autonomous operation system includes sensors to detect other ships using infrared cameras, a remote engine monitoring system, and a sophisticated cybersecurity system. The SOLEIL ferry project began navigating with an onboard crew on July 1, 2021, compiling data for the development of a fully autonomous ship navigation system. This run was the first one handled solely by the system, which took the ferry up to a top speed of 26 knots (30 mph or 48 km/h). Mitsubishi Heavy Industries (MHI) stated that the development of such technologies should help increase maritime safety, reduce crew labor requirements, and reduce operating costs. #AUT #AI #Cybersecurity #JPN [Marine Link](#) [New Atlas](#)

## SEMICONDUCTORS & CHIPS

→ **Chinese semiconductor production achieves new highs as the US-China tech competition heats up and Beijing pushes for technology self-sufficiency.** According to

figures issued by China's National Bureau of Statistics, China produced 359.4B integrated circuits (ICs) in 2021, up 33.3% from 2020. This demonstrates the country's efforts to increase production in the face of a long-running chip shortage. The Semiconductor Industry Association (SIA) stated that China's semiconductor industry could account for 17.4% of global sales by 2024. That would make China the world's third-largest chip vendor, trailing behind the US and South Korea in terms of industrial output. However, Chinese companies are still small players on the global stage. In 2021, 17 semiconductor firms generated more than \$10B in total revenue, but none were Chinese. Samsung, Intel and TSMC were at the top of the list, while China's largest chip maker, Semiconductor Manufacturing International Corp ranked 25th, according to [IC Insights](#). #CHP #SCRM #CHN #USA #KOR #TWN [SCMP](#)

→ [Cadence Design Systems](#), a microchip design software manufacturer, is banking on increased demand from automakers and other chip users who are experiencing supply constraints around the world. Cadence and its rivals [Synopsys](#) and [Siemens EDA](#) are at the forefront of a microchip industry revolution. Cloud computing providers, software developers, and others that purchased semiconductors from large businesses, are now seeking to design their own chips in-house. Executives across industries have taken note of how custom chips help set products apart like Tesla, Apple, and Google who dominate in-house chip design. Cadence creates electronic design automation (EDA) software and turns conceptual designs for chips into the physical layout of tens of billions of transistors jammed onto a few millimeters of silicon. The resulting chips are manufactured by third parties like TSMC. With the advancement of autonomous cars, automakers and other chip-design newcomers will face stiff competition for chip architects, who are among the most sought-after professionals in the tech world. #CHP #AUT #SCRM #USA [Reuters](#)

## QUANTUM TECHNOLOGY

→ As quantum technology advances and quantum computing approaches commercial viability, here are the top trends to watch:

1. Quantum key distribution (QKD) is intended to revolutionize quantum-based encryption by incorporating QKD technology into microchips to be placed anywhere.
2. The **quantum computing as a service (QCaaS)** market is set to expand as providers like AWS and Microsoft Azure step into the space.
3. As research into developing quantum memory and quantum repeaters progresses, the development of a Quantum Internet is starting to become a reality.
4. **Critical infrastructure grids will be early adopters of quantum security** due to the surge in cyberattacks over the past few years amid the Covid-19 pandemic.
5. Companies developing quantum technology are poised for growth and investment as they begin to go public for investments.

#QNT #Cybersecurity #USA [Forbes](#)



→ [Quantum eMotion](#)'s patented solution for Quantum Random Number Generator (QRNG) hopes to offer state-of-the-art security that shields critical systems and valuable assets. Quantum Random Number Generators (QRNGs) are optimized to provide more speed, scalability and true randomness at a fraction of the cost of other devices in the market. Montreal-based advanced developer, Quantum eMotion is pioneering a new generation of quantum-safe encryption for the quantum computing era. Their QNG2 solution is the world's first QRNG the size of an integrated circuit, claiming to be more powerful than any other product on the market. QNG2's main features include low power dissipation of about <1mW, easy integration into existing electronics, demonstrated speed of 1B bps per device, and more. Its randomness has been certified by NIST and Diehard tests. QNG2 is expected to have applications in security for mobile and internet transactions, IoT communication, machine-to-machine connections, networking equipment and cloud-based applications. #QNT #Cybersecurity #CAN [Quantum Insider](#)

## GEOPOLITICS

→ In its first year, the Biden administration continued a similar US sanctions strategy to the previous administration, including the issuance of over 1,500 sanctions actions. The Biden administration has issued 765 designations and 787 delistings pursuant to 50 different sanctions programs (totaling 1,552 sanctions actions). Out of the total, 51% of the designations are pursuant to country-specific sanctions programs and 49% are thematic sanctions programs. While Biden's administration utilized 34 country-specific sanctions programs, the majority of related designations targeted Belarus (100), Burma (76), China (70), and Russia (54). Additionally, the Biden administration issued 411 designations pursuant to thematic sanctions programs related to human rights (173), global terrorism (90), cybercrime (39), narcotics trafficking (36), election interference (33), proliferation of WMDs (23), global illicit drug trade (8), transnational crime organizations (6), and general terrorism activities (3). The [GLOMAG](#) and [SDGT](#) sanctions programs account for about 64% of the thematic-based designations, indicating a strong intention to use sanctioning authorities as part of the US national strategy against human rights violations and global terrorism. When accounting for both country-specific and thematic sanctions programs in 2021, the total number of US sanctions against Chinese and Russian targets increased at a comparable rate as it did during the previous administration in 2019. #Geopolitics #USA #CHN #RUS #BLR #MMR [CNAS](#) [Gibson Dunn](#)

→ The Justice Department has been advised by federal prosecutors to drop criminal charges against an MIT professor accused of concealing his ties to China. Gang Chen was arrested last January on charges of lying to the US Department of Energy about positions he held in China in a grant application he submitted in 2017. Justice Department officials have decided to drop the indictment against Mr. Chen, according to an Energy Department official after acknowledging that Chen did not have an obligation to disclose his foreign exposure at the time. Energy has since begun asking researchers for more information about their foreign connections. Government investigators pursued Mr. Chen on suspicions that he had forged a collaboration between MIT and a university in Shenzhen to benefit China, though the



collaboration had the support of MIT. In a January 2021 indictment, prosecutors accused Mr. Chen of wire fraud, false statements, and failing to report a foreign bank account. Mr. Chen was one of roughly two dozen academics accused by the Justice Department in high-profile instances in 2019 for allegedly lying about their affiliations in response to fears that the Chinese government was using academic ties to engage in technological espionage. #Geopolitics #USA #CHN [WSJ](#)

→ **A Chinese think tank has issued a warning to Beijing about geopolitical dangers in 2022, emphasizing a possible turnaround in Manila's South China Sea policy.** The Center for International Security and Strategy (CISS) at Tsinghua University said threats on China's borders and in surrounding waterways were of greatest importance in its assessment of China's external security risks. The risks included "a new leader of the Philippines drastically adjusting its South China Sea policy after taking office, leading to emergencies in the disputed waters between the two countries". Vice President and presidential candidate Leni Robredo stated that China's presence in Philippine waters is the "most significant external threat" the country has faced since World War II. Furthermore, the CSIS report warns of risks of border stand-offs between China and India in 2022. The development of political changes in international economic and trade battles involving China; changes in international relations in Northeast Asia, particularly China-Japan relations; cybersecurity; pandemic-related chain reactions; and financial concerns in the world's main economies were among the other threats. #Geopolitics #CHN #PHL #IND #JPN [SCMP](#)

## CYBERSECURITY

→ **Members of the Russia-based cyber gang REvil, which was responsible for many significant ransomware assaults against US companies last year, have been arrested by the SVR.** On January 14, 2022, Russia informed the US of the arrest, including an individual responsible for the Colonial Pipeline hack, the largest cyberattack on an oil infrastructure target in US history. According to Russia's Federal Security Service, the arrests were conducted in response to a request from the US, marking a rare instance of cybersecurity cooperation between the two countries. The Russian security agency said that it seized \$600,000, €500,000, 426M rubles, computer equipment, crypto wallets that were used to commit cybercrimes, and 20 cars purchased with illegally obtained money. Although the United States and Russia do not have an extradition treaty, a senior US official said the administration's "expectation" is that Russia will "pursue legal action within its own system" to hold the individuals accountable. #Cybersecurity #USA #RUS [Axios](#)

→ **Newly unredacted allegations state that Google misled publishers and advertisers for years about the pricing and processes of its ad auctions.** On the report of the allegations and new details in a lawsuit by state attorneys general, Google created secret programs that diminished sales for some companies while raising prices for buyers. The [lawsuit](#), first filed in December 2020, alleges that Google suppresses competition from rival exchanges and limits websites' options for ad delivery. The newly unredacted details provide more information about

Google's programs that contributed to rigs in pricing and auctions, including Project Bernanke, Reserve Price Optimization and Dynamic Revenue Share. In addition to describing some of Google's programs, the new complaint claims that Alphabet and Google CEO Sundar Pichai and Meta Platforms Inc. CEO Mark Zuckerberg signed a 2018 business agreement that allegedly guaranteed that Meta subsidiary Facebook would bid in—and win—a fixed percentage of ad auctions. #Cybersecurity #USA [WSJ](#)

→ **NSO Group's Pegasus spyware was used to target members of the press and civil society in El Salvador.** A joint investigation between the Citizen Lab, Access Now, Frontline Defenders, SocialTIC, and Fundación Acceso revealed that 35 Pegasus-infected individuals (37 devices) were targeted. The team discovered a Pegasus operator, naming it TOROGOZ, through their continued Internet monitoring and DNS cache probing. Following the Citizen Lab's research and technical protocols, the investigators obtained forensic artifacts, including logs, from each target's device. Through detailed analysis, investigators conclude that at least 35 individuals from media organizations, two independent journalists, and civil society organizations were hacked with Pegasus. Moreover, the team assesses that at least two zero-click exploits were deployed against the journalists: [KISMET](#) and [FORCEDENTRY](#). #Cybersecurity #SLV [The Citizen Lab](#)

→ **A mobile app that is mandatory for all participants in next month's Winter Olympics in Beijing contains security flaws that could make it easy for a hacker to steal sensitive personal information**, according to Canadian researchers. The China-built app, My 2022, will be used to monitor attendees' health, and share information throughout the 2022 Games. But Technicians at Citizen Lab and the University of Toronto said they found the app failed to validate SSL certificates which are used to authenticate the identity of certain websites, and it didn't properly encrypt sensitive metadata transmitted through the messaging function. Researchers have found these vulnerabilities exist in both Apple iOS and Android versions of the app. Citizen Lab said the vulnerabilities found in this app are commonly found in other Chinese apps, which led it to believe they are more likely to be the result of China's lax enforcement of cybersecurity standards, rather than part of an intentional government effort to steal data. However, the researchers also found lists inside the app of politically sensitive terms like "Tiananmen Square" and "Xi Jinping" that was inactive, but could potentially be used to censor messages in the app. The Beijing Olympic Committee said the Canadian report was "lacking in facts and evidence" and said it encrypts personal data involved and has taken other steps to ensure information is safe. #CAN #CHN #Cybersecurity #Geopolitics [WSJ](#)

## SUPPLY CHAINS

→ **As global markets become more uncertain, China's supply lines are becoming increasingly stressed, posing a danger to supply chain security and competitiveness.** A Chinese government think tank listed "targeted decoupling of supply chains among the [top 10 global risks in 2022](#). Liu Guiping, deputy governor of the People's Bank of China stated that aside from geopolitical competition, China's industrial sectors are under double pressure from

businesses migrating to Southeast Asia and returning to developed countries. Chip shortages, supply chain stoppages, and other identified threats could have an impact on international trade. Amid concerns about supply chain security, industrialized countries such as the US and Japan have attempted to reduce their reliance on Chinese manufacturing and bring employment back home. Liu also emphasized the importance of energizing the domestic market, which is a key component of China's dual circulation strategy, in order to prepare for an increasingly hostile global climate. Along with proper monetary policies, this policy may help China prepare for shrinking demand and supply shocks. #SCRM #Geopolitics #CHP #CHN #USA #JPN [SCMP](#)

→ **In a race to become self-sufficient, China tries to ensure supplies and focus on domestic production as tensions with the US and its allies rise.** Chinese authorities are pledging to secure supplies of everything from grains to energy and raw materials, as well as the processes involved in production and distribution of industrial parts. Self-sufficiency, on the other hand, will be difficult for a country that has earned enormous benefits from its integration with the rest of the world, becoming both the world's manufacturing powerhouse and its most demanding consumer of commodities. Last year, China's growth was fueled by exports, which remained strong throughout the pandemic, as demand for made-in-China protective gear and work-from-home devices soared. However, business and consumer confidence have been weakened by a mix of low domestic spending and uncertainty concerning pandemic restrictions. [A two-year trade agreement](#) with the US ended last month with neither side budging, leaving in place most of the tariffs imposed on Chinese products. China's stockpiling is already pushing up global prices for grains and other commodities. Analysts doubt China's capacity to develop its own sources of oil, coal, iron ore, and other commodities without relying on imports. The security emphasis reflects China's worsening ties with some of its major trading partners. #SCRM #Geopolitics #CHN #USA [WSJ](#)

→ [Compal Electronics](#), the world's second-largest contract notebook computer manufacturer and a supplier to Dell and Amazon, has halted production at its factory in northern Taiwan. After several employees tested positive for Covid-19, the manufacturer said it will suspend manufacturing activities at its plant in Pingzhen in Taoyuan City, one of Taiwan's key industrial hubs. The week-long production halt will impact full-year revenue by less than 0.1%. This is the first time in months that a major Taiwanese technology company has halted production due to Covid-19 concerns. Compal is a key manufacturer of the iPad and Apple Watch, Google's Pixel phone and Amazon's Echo smart device. Its Taoyuan plant counts Dell as one of its major clients that hold government contracts to supply notebook computers. As the latest wave of the omicron variant spreads in Taiwan, tech manufacturers, such as TSMC, Foxconn, and Quanta Computer continue to step up Covid-19 preventative measures. #SCRM #TWN #USA [Nikkei](#)