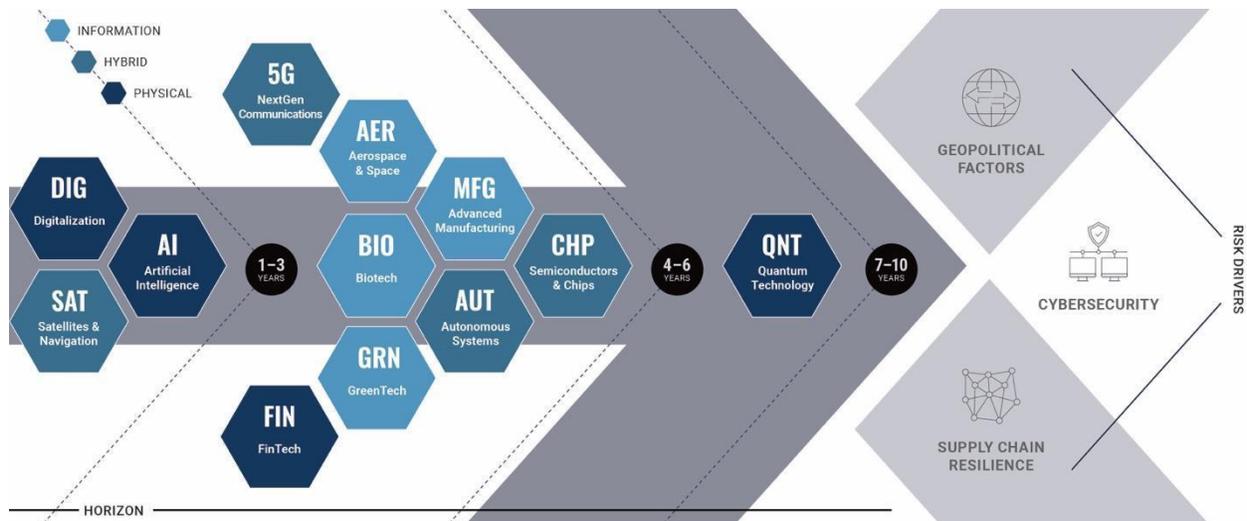




MATRIX MONITOR

Friday July 23, 2021

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 Monitor features newly released details of a Chinese campaign a decade ago to hold US pipelines at risk, the latest on China's tightening of data controls on its internet companies, the restoration of the Hubble Space Telescope, the Pentagon's race to stay ahead of China's AI, Nokia's 5G radio contract in China, the emergence of national cryptocurrencies, an experimental brain implant that translates brain signals into words on a computer screen, a technology that assists the early detection of colon cancer, China's ongoing developments in quantum computing, and the ongoing economic implications of the global chip shortage.

NEXT5

→ **The chip shortage is persisting even as governments and companies throw billions at the industry.** And as analysts predict the shortage to last for the next 18-24 months, many of the products we rely on to drive our economy remain at risk. Next5 dives into the systemic risks to the semiconductor supply, geopolitical factors shaping future risk, and recommendations for the USG and industry in this short [paper](#). #CHP #SCRM [Next5](#)

Next5 makes the following recommendations:

1. Analyze our semiconductor supply chains with a focus on geopolitical risk and geographic concentration.
2. Prioritize alliances with like-minded nations.
3. Ensure that USG investments are matched with private investors.
4. Encourage US innovation and domestic manufacturing.

DIGITALIZATION

→ **Google Cloud unveiled three security products for governments to expand its public-sector business and shore up systems that are increasingly vulnerable to cyberattacks.** Google's new software offerings are based on a zero-trust framework and will help governments be in compliance with U.S. President Joe Biden's executive order on improving cybersecurity. Recent months have brought a wave of high-profile ransomware and other cyberattacks to U.S. businesses, and government agencies have also been targeted in recent years. Google Cloud, the world's No. 3 cloud provider, is trying to use Biden's security push to expand the number and size of its government contracts in an effort to catch up to Amazon and Microsoft. #DIG #USA [Bloomberg](#)

→ **Didi became the dominant ride-hailing company in China with its wide swath of data on users, mapping, and traffic—and that is turning into a liability.** On Friday, China sent officials and regulators into the company's offices as the government zeroes in on its cybersecurity practices and collection of personal information. The visit was part of a review ordered just days after shares sold in Didi's \$4.4B IPO started trading publicly in New York. The IPO bolsters anxiety by the Chinese government that adversaries may gain access to data on Didi's platform. As we previously reported, after the IPO, the Cyberspace Administration of China blocked the company from accepting new users and ordered mobile app stores to pull Didi from circulation. Didi's case is unfolding as China tightens its grip on the data collected by its powerful internet companies. #DIG #CHN [WSJ](#)

→ **Zoom turned to Cooley for advice in acquiring cloud-based call center operator Five9.** Five9 has tapped a team from Latham & Watkins for the \$14.7B all-stock deal. For Cooley, which has 144 global deals worth \$101B so far this year, Zoom is a familiar client. The firm previously represented the video conferencing platform in its acquisition of secure messaging startup Keybase last May and its \$864M initial public offering in 2019. Under the terms of the deal, Five9 will become an operating unit of Zoom and its chief executive, Rowan Trollope, will

become a president while staying on as chief of the unit after the deal, which is expected to close in the first half of 2022. #DIG #USA [Reuters](#)

SATELLITES & NAVIGATION

→ **The National Reconnaissance Office has decided not to purchase commercial imagery from companies outside the United States.** The NRO informed senators earlier this year that it would only buy images and other geospatial products from U.S. companies. The NRO says the decision is intended to comply with language in last year's defense authorization bill to "leverage, to the maximum extent practicable, the capabilities of United States industry" when buying commercial satellite imagery and other data. Some in Congress and elsewhere in the national security community disagree with that interpretation, saying it goes counter to efforts by other agencies to buy commercial data more broadly, including from companies in allied nations. #SAT #SCRM #USA [Breaking Defense](#)

→ **After a month of frantic tinkering, NASA said Friday that its aging Hubble Space Telescope was on the mend, recovering from a computer problem that crippled what many astronomers call the most productive scientific instrument ever built.** As the bus-size observatory circled Earth, space agency engineers worked by remote control to switch Hubble from its vintage electronics to backup hardware. Hubble data has been used in more than 18,000 scientific papers. On June 13, Hubble faced technical problems that threatened to end the mission. Similar issues have plagued the telescope since the moment it reached its orbital perch some 340 miles above the Earth's surface on April 25, 1990. The latest trouble began when a voltage overload in an onboard payload computer built in the 1980s tripped a circuit breaker and shut down the telescope. It was the most serious technical failure that NASA project engineers had encountered in the 11 years since the last shuttle repair. #SAT #USA [WSJ](#)



ARTIFICIAL INTELLIGENCE

→ **The Pentagon's self-described sprint to put together a more effective plan to confront and counter a rising China may be over, but the race to stay ahead of Beijing's aggressive advancements in AI is far from done.** That initial sprint culminated in June, months after the DOD's China Task Force recommended a series of internal, structural changes to ensure potential Chinese military threats did not escape notice or go unanswered. SECDEF Lloyd Austin emphasized that Beijing seeks to use AI for an array of missions including

surveillance, cyberattacks, and autonomous systems, and that China's leaders seek to be globally dominant in AI by 2030. Recent intelligence assessments have sounded alarms that, increasingly, the U.S. is confronting "a more level playing field," with China doing the most to close the AI gap. When it comes to AI, in particular, Austin warned that the U.S. cannot afford to lose more ground. While emphasizing that the US must maintain its technological edge, Austin also said, the way the military, and the country, maintains superiority as it confronts China will be equally important: "Our use of AI must reinforce our democratic values, protect our rights, ensure our safety and defend our privacy," he said. #AI #CHN #USA #Geopolitics [VOA](#)

→ **A recent CSET study, *National Power After AI*, assesses that Artificial intelligence, as a major innovation, can permanently change the dynamic of international relations.** AI's effects on national power fall into three categories: new elements of power, changed factors, and altered goals. Exploring new elements required for successful AI adoption, such as compute and organizational adaptations, helps us understand when, how, and why some societies may be better positioned than others to benefit from major innovations. Similarly, the idea of changed factors helps focus on how existing elements of national power may have changing importance, such as population size and industrious researchers. Finally, thinking about altered goals of states in competition shows how major innovations can reshape the ways that states engage in competition, such as enacting new domestic political and economic controls and leveraging AI-enabled information attacks on other states' social and economic systems. It is useful to begin thinking about how AI technologies can create new elements of power, change the importance of existing elements of power, and alter the goals of states in competition. AI technologies may change not only what states can do, but also what they want. #AI #Geopolitics [CSET](#)

→ **In May, Sony CEO Kenichiro Yoshida announced that the company's AI research division, Sony AI, would be collaborating with PlayStation developers to create intelligent computer-controlled characters by "leveraging reinforcement learning."** Reinforcement learning is an area of machine learning in which an AI effectively teaches itself how to act through trial and error. Game AI agents can be a player's in-game opponents or collaboration partners—in short, these characters will mimic human players, and to some extent, they will think. As developers begin to understand and exploit the greater computing power of current consoles and high-end PCs, the complexity of AI systems will increase in parallel. Developers will explore elements such as natural language processing, player modeling, and machine learning to develop imaginative, reactive AI characters. #AI #JPN #USA [The Guardian](#)

NEXT GENERATION COMMUNICATIONS

→ **The Australian government plans to provide most of the financing for the acquisition of mobile networks in six Pacific nations, a move that foreign-policy experts say is designed to block China from buying the strategically important assets.** Telstra, Australia's biggest communications provider, said Monday it is considering buying the mobile networks in Papua New Guinea, Fiji, Nauru, Samoa, Tonga and Vanuatu, and that the Australian

government would help pay for the acquisition. The networks, currently owned by Jamaica-based Digicel Group, are adjacent to subsea cables that carry communications between Australia and its neighbors. A deal would be the latest move by the Australian government seeking to limit Chinese influence in the region, particularly in the telecommunications sector. Australia's move to head off China as a potential buyer was allegedly driven by security concerns. If China acquired the Pacific mobile networks, it could monitor Australian communications to and from the region and use its control of the assets as leverage. #5G #CHN #AUS #PNG #FJI #NRU #WSM #TON #VUT [WSJ](#)

→ **Nokia won its first 5G radio contract in China, securing a share in one of China Mobile's three new 5G contracts.** Chinese companies took the lion's share of the order; Huawei took a majority share in all three contracts, followed by ZTE, according to a document published by China Mobile. China has been ahead of all other countries in deploying 5G networks, making it one of the biggest markets for telecom infrastructure companies. China's other major telecom operators, China Telecom and China Unicom, will soon announce winners of the second phase of 5G contracts. #5G [Reuters](#)

→ **Ericsson announced a multi-year agreement with Verizon to provide its 5G solutions to accelerate the deployment of Verizon's next-generation 5G network in the U.S.** Under this \$8.3B agreement, Verizon will deploy Ericsson's 5G Massive MIMO C-band, low-band and millimeter wave (mmWave) solutions to enhance and expand Verizon's 5G Ultra Wideband coverage, network performance, and user experience. #5G #USA #SWD [Ericsson](#)

FINANCIAL TECHNOLOGY

→ **Digitalization presents cryptocurrency enthusiasts with an opportunity to create virtual money for a nation.** Israeli crypto consultant Barak Ben-Ezer visited the Marshall Islands in 2018 to propose the adoption of a national currency he designed. The Marshall Islands represented a clean slate for financial innovation: A U.S.-supported nation of 59,000 people spread over more than a thousand islands, with no currency of its own and no central bank. The Marshall Islands Parliament passed a law adopting Mr. Ben-Ezer's creation as legal tender, but the digital currency hasn't been issued yet because of concerns that it could be used for nefarious purposes. Also, the International Monetary Fund said in a March report that the currency "could disrupt external aid and other important financial flows, resulting in a significant drag on the economy." The Marshall Islands politician, Mr. Paul, said the worries are misplaced. He believes the currency's use of blockchain ledgers will make it secure and transparent. Elsewhere, demand for digital-currency strategies has been supercharged by China's digital yuan. And, as we previously reported, the U.S. Federal Reserve has teamed up with MIT for the creation of a possible digital dollar. #FIN #ISR #MHL #CHN #USA [WSJ](#)

→ **Global scrutiny of the cryptocurrency sector has grown amid worries over lax consumer protection and the use of digital coins for money laundering, with authorities in recent months zeroing in on Binance, one of the world's biggest platforms.** Binance said on Friday it had stopped selling digital tokens linked to shares, as Hong Kong's financial

watchdog became the latest in a string of regulators to crack down on the cryptocurrency exchange platform's "stock tokens" offerings. Stock tokens are digital versions of equities pegged to the value of the relevant share. They are usually bought and sold in fractional units, unlike traditional equities. Hong Kong's Securities and Futures Commission (SFC) said after Binance's move that the exchange was not licensed to carry out regulated activities in the city. Offering stock tokens to the Hong Kong public without authorisation could be an offense, it added. It was not immediately clear whether global regulators have coordinated their moves, which have created unprecedented global pressure on a major cryptocurrency firm. #FIN #HKG #CHN #EUR [Reuters](#)

→ **Janet Yellen and Jerome Powell are focusing on stablecoins** - tokens designed to keep their value and have price swings that are far smaller than those of Bitcoin. The most popular, Tether, for instance, always trades for about \$1. Both Yellen and Powell fear stablecoins could create risks for consumers and the financial system. Yellen wants regulators to act quickly to draft rules. Others see stablecoins as the trigger that will force central banks to dive into the digital coin business themselves. Stablecoins can be a bridge between two worlds that weren't designed with mixing in mind—cryptocurrencies and traditional finance. That makes them useful as a way to lock in gains from crypto trading or as a safe harbor if investors think a downturn is coming. They also make it easier to move funds on to crypto exchanges. #FIN #USA [Bloomberg](#)

→ **India is gearing up for tech IPOs, including two worth more than \$1B, as startups look to tap a stock market that has proved resilient despite Covid-19.** The IPOs reflect the maturing of a generation of e-commerce and digital-economy companies, bankers say. On July 16, the operator of the Paytm digital-finance app, One97 Communications, filed a prospectus for what would be India's largest IPO in local-currency terms. The group offers services such as a mobile wallet, loans, and stock-trading. One97 aims to issue new and existing shares worth a total of up to 166B rupees, the equivalent of \$2.23B. Also, last week investors placed orders worth 38 times the shares being offered by Zomato, India's answer to DoorDash. The food-delivery group raised around 94B rupees, the equivalent of \$1.26B. The deals already underway show how India's financial sector has been swept up in an international boom. #FIN #IND [WSJ](#)

AEROSPACE & SPACE

→ **NASA is seeking proposals for a program to support the development of commercial space stations**, even as funding for that effort is in jeopardy in Congress. NASA published a request for proposals July 12 for its Commercial Low Earth Orbit Development, or CLD, program. The effort, announced earlier this year, will provide funding for initial studies of commercial space stations that could ultimately be used by NASA and other customers. Proposals are due to the agency Aug. 26. NASA expects to award between two and four Space Act Agreements to support those studies, with up to \$400M available from fiscal years 2022 through 2025. NASA anticipates a second phase of the program to start in 2026, where the

agency would certify commercial space stations for use by both NASA payloads and astronauts.
#AER [SpaceNews](#)

→ **The DoD endorsed the creation of norms of behavior in space.** In a formal memo earlier this month, Secretary of Defense Lloyd Austin outlined five "Tenets of Responsible Behavior" for military space activities, from avoiding the creation of long-lived debris to operating with due regard to others. Space security experts saw the memo as a positive first step towards more detailed guidelines for space operations, but cautioned that opposing only the creation of "long-lived" debris could allow some kinds of ASAT tests to continue. #AER [Breaking Defense](#)

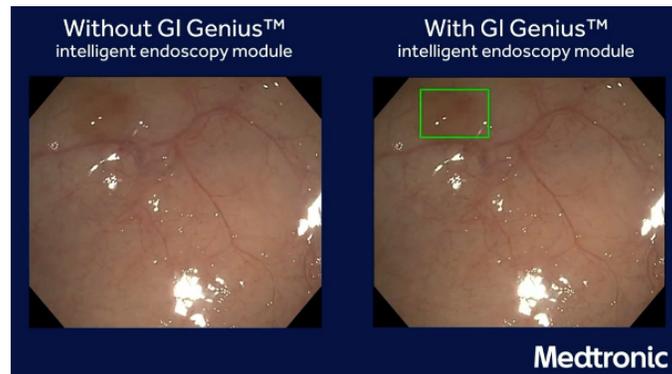
→ **Nearly \$10B was invested into space companies during a record-breaking second quarter of 2021,** according to research from early-stage investor Space Capital. The fourth-largest total it has ever recorded over three months followed four consecutive quarters of declining deal volume, as the pandemic dragged on investors. OneWeb, Blue Origin and other companies it defines as space infrastructure raised a combined \$4.5B in the second quarter of 2021 — its largest total for the group on record. This is despite only two SPAC mergers closing in the quarter, AST SpaceMobile and Astra, underlining a broader trend toward larger, later-stage deals in the space industry. Some \$199.8B of equity investments have flowed into 1,553 companies in the space economy over the past decade, according to Space Capital.
#AER [Space Capital](#)

BIOTECHNOLOGY

→ **Researchers reported Wednesday that they had developed and tested an experimental brain implant that translates brain signals into words on a computer screen.** The achievement marks a step toward technology that may one day help people speak by thinking, offering hope for people who lose the ability to speak as a result of injury or illness. University of California, San Francisco researchers enlisted the help of a man in his 30s who had lost the ability to speak due to paralysis caused by a stroke suffered more than 15 years ago. Over the course of 81 weeks and in 50 separate sessions, the researchers recorded the man's brain activity by using a computer attached to a small rectangular array of electrodes surgically attached to the outer surface of his brain. Throughout the process, the man observed individual words displayed on a screen and imagined uttering them aloud. Purportedly, the researchers could identify the word the man was saying 47% of the time. The accuracy rose to 76% when the scientists incorporated word-prediction algorithms similar to the auto-suggest feature of email and word-processing programs. #BIO #USA [WSJ](#)

→ **Largo Medical Center in Tampa Bay is now the first hospital in the country to offer a newly FDA approved technology to help doctors detect colon cancer early.** The technology is an artificial intelligence that aids doctors during colonoscopies. Currently, there is approximately a 20-25% miss rate for polyps during colonoscopies. The AI system will reduce this percentage by recognizing a polyp and placing a green square around it, allowing the doctor to go back and take a closer look. A recent study found that GI Genius was able to identify

precancerous or cancerous tumors at a 13 percent higher rate than a standard colonoscopy.
 #BIO #AI [ABC](#)



GREEN TECHNOLOGY

→ **Researchers from the University of Texas at Dallas describe a real-time method for potentially helping turbine farms realize additional power from the clustering of their turbines.** Wind farms consist of multiple turbines built close together, each converting kinetic energy into electricity. Optimizing power production from an individual turbine depends on many factors (e.g., stratification, temperature, turbulence, topography, etc.), but optimizing production of the farm as a whole also involves interactions between turbines. A downstream turbine in the wake of another encounters decreased wind, reducing turbine power production up to 60%. **The researchers identified how to create clusters or links between turbines by identifying correlations in data currently collected by turbine sensors.** Wind farm owners can then use this automated information to guide employment of a standard procedure for yaw control, based on the past decade of studies about yaw optimization. Each 1% increase in energy production would represent 3 billion kilowatts per year. #GRN #USA [Techxplore](#)

→ **Suzuki and Daihatsu are investing in a Toyota entity to bring electrification and autonomous driving to commercial vehicles, deepening ties between the automakers.** They will join Isuzu and Hino Motors, Toyota's truck and bus unit, which formed the venture earlier this year. Commercial Japan Partnership Technologies is the name of the commercial-vehicle joint venture, which now includes Suzuki, Daihatsu, Isuzu, Hino and Toyota. A key challenge of bringing electrification and autonomous technology to smaller cars is keeping costs under control so they remain affordable. That's part of the mission of the Toyota-led partnership, which was forged in April. #GRN #JPN [Bloomberg](#)

ADVANCED MANUFACTURING

→ **Automation Anywhere named software industry veteran Sumit Johar as its new chief information officer, as the startup employs its own automation tools to improve internal operations.** Automation Anywhere develops bots designed to automate manual and repetitive tasks. It has deployed nearly 3M bots for its customers in 90 countries, the company said. Demand for bots took off during the pandemic as offices shut down and hiring slowed. Mr. Johar said he plans to automate at least 40% of all the company's manual repetitive business processes in information technology, security, human resources, legal and finance operations. The company currently uses about 500 of its own bots, covering around 135 business processes. The remote process automation software market is expected to reach \$2.4B in 2021, up 37.2% from 2020, according to IDC. #MFG #USA [WSJ](#)

AUTONOMOUS SYSTEMS

→ **Self-driving technology company Aurora plans to go public through a special-purpose acquisition company** backed by founders from LinkedIn and Zynga, in a transaction that values the startup at \$11B. The combined company will be named Aurora Innovation, and will be listed on the Nasdaq under the ticker symbol AUR. The SPAC behind the deal, Reinvent Technology Partners Y, is led by LinkedIn co-founder Reid Hoffman and Zynga founder Mark Pincus. Aurora develops technology for both the trucking and passenger markets, and it is one of the latest self-driving companies to tap the public markets as startups look for funding to build out their products and reach commercial scale. #AUT [WSJ](#)

→ **Ford Motor and its autonomous-driving affiliate, Argo AI, have formed an alliance with Lyft in an effort to begin offering rides in self-driving cars.** Ford expects to begin operating self-driving cars in Miami through Lyft's ride-hailing service this year. The vehicles will be outfitted with Argo's self-driving technology but will still have someone at the steering wheel for safety. The three companies hope to have self-driving cars operating in Austin, Texas, next year. They aim to have a few dozen cars operating in Miami and Austin and hope to have about 1,000 on the road across multiple cities within five years. #AUT #USA [NYT](#)

SEMICONDUCTORS & CHIPS

→ **The metal Gallium Nitride (GaN), while not as well-known as silicon, is taking over in many of the places that silicon once reigned supreme.** In the process, it's enabling a surprising array of new technologies, from faster-charging cell phones, to lighter electric vehicles, to more power-efficient data centers that run services and apps. In contrast to silicon, GaN can handle relatively large amounts of electricity. It has the unusual property of being both very good at moving electrons about and very good at not allowing them to go where you wouldn't want them to be, which makes it both useful and relatively safe, says Dr. Rachel Oliver, a professor of materials science and director of the Centre for Gallium Nitride at Cambridge University. So far, GaN can't handle the electric-current flows needed to run the kind of computations carried out by traditional silicon logic chips. But recent findings suggest that may be changing. #MFG #CHP #GRN [WSJ](#)

→ **The semiconductor research organization, Interuniversity Microelectronics Centre (imec), is in global demand for its work on the future of computer chips.** It's also increasingly in the sights of governments as chips become political weapons in the U.S.-China tech conflict. Crippling industry shortages during the pandemic have meanwhile set off a scramble for access to advanced research as the U.S., China, Japan, and Europe all seek greater self-reliance in semiconductor production. The European Commission is consulting with imec on its plans to build out the continent's chip capacity and a South Korean ministerial delegation visited this month. Chinese politicians, too. Imec had previously joined with Huawei and Qualcomm to help China's biggest chipmaker, SMIC set up an R&D company. The Biden administration is likely focusing on imec in discussions with the European Union about broadening the U.S. alliance in the tech standoff with China. #CHP #BEL #CHN #USA #JPN #KOR #Geopolitics #SCRM [Bloomberg](#)

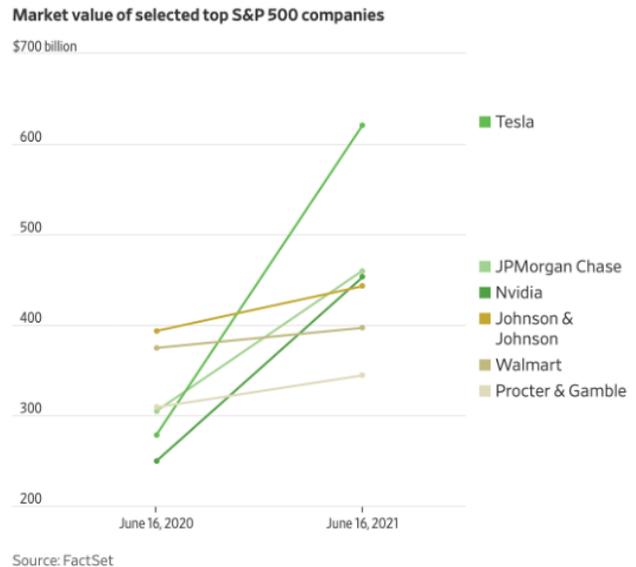
→ **British ministers have cut off taxpayer-funded payments to Britain's biggest microchip factory after its sale to a Chinese-owned technology company.** UK Research and Investment (UKRI) has suspended grants to Newport Wafer Fab under government instructions after its sale to Nexperia. Earlier this month, when asked whether the sale of the semiconductor producer would go ahead to Chinese-owned Nexperia, Prime Minister Boris Johnson said he did not want to drive Chinese investment away from Britain because of "anti-China spirit." #CHP #GBR #Geopolitics [Reuters](#)

→ **Some of the tech industry's most important machines are made in the Netherlands; the U.S. government is trying to make sure they don't end up in China.** Beijing has been pressuring the Dutch government to allow its companies to buy ASML Holding NV's marquee product: a machine called an extreme ultraviolet lithography system that is essential to making advanced microprocessors. The 180-ton machines are used by companies including Intel, South Korea's Samsung, and leading Apple supplier TSMC to make the chips in everything from cutting-edge smartphones and 5G cellular equipment to computers used for AI. China wants the \$150M machines for domestic chip makers so Huawei and other Chinese companies can be less reliant on foreign suppliers. But ASML hasn't exported their most sophisticated technology to China because the Netherlands, under pressure from the U.S., is withholding the export license. The Biden administration's stance is a holdover from the Trump White House; an estimate that China is at least 10 years away from matching ASML's technology prompted the Trump administration to begin lobbying the Dutch for an export ban. #CHP #Geopolitics #NLD #CHN #USA #TWN #KOR [WSJ](#)

→ **Intel is exploring a deal to buy GlobalFoundries, one of the largest specialist chip-production companies.** The move would turbocharge the semiconductor giant's plans to make more chips for other tech companies and rate as its largest acquisition ever. A deal could value GlobalFoundries at around \$30B, although it isn't guaranteed one will come together; GlobalFoundries may proceed with a planned initial public offering. Intel CEO, Pat Gelsinger, in March said the company would launch a major push to become a chip manufacturer. Intel, with a market value of around \$225B, this year pledged more than \$20B in investments to expand

chip-making facilities in the U.S. Like Intel and TSMC, GlobalFoundries is expanding its manufacturing footprint amid a global shortage of semiconductors. #CHP #USA #TWN [WSJ](#)

→ **The post-pandemic boom in the semiconductor business has powered Nvidia into the top 10 U.S. public companies.** Shares of the firm, which makes processors that power gaming and cryptocurrency mining, have risen nearly 80% over the past year, giving it a market value of around \$453B—more than rivals Intel and Broadband combined. One reason for Nvidia’s outperformance, analysts say, is that its chips’ parallel-computing capabilities make them better than rivals’ for artificial-intelligence performance and mining cryptocurrencies. #CHP [WSJ](#)



QUANTUM TECHNOLOGY

→ **New research suggests that China has extended its lead from quantum communications to quantum computing as well.** In three preprint papers, physicists at the University of Science and Technology of China (USTC) reported advances in both quantum communication and quantum computing. In one study, researchers used nanometer-scale semiconductors called quantum dots to reliably transmit single photons—an essential resource for any quantum network—over 300 kilometers of fiber, well over 100 times farther than previous attempts. In another, scientists improved their photonic quantum computer from 76 detected photons to 113, a dramatic upgrade to its “quantum advantage,” or how much faster it is than classical computers at one specific task. The third paper introduced Zuchongzi, made of 66 superconducting qubits, and performed a problem with 56 of them—a figure similar to the 53 qubits used in Google’s quantum computer Sycamore, which set a performance record in 2019. Is China ahead of the U.S. in quantum information technology? The answer depends on how you measure it. While estimates vary, both countries appear to fund the research to the tune of more than \$100M per year. China has more total patents across the full spectrum of quantum technology, but U.S. companies have a dramatic lead in quantum computing patents. And of course, China has a more sophisticated quantum network and now claims the top two quantum computers. #QNT #CHN #USA #Geopolitics [Scientific American](#)

→ **This week Honeywell and Cambridge Quantum disclosed the achievement of three major milestones advancing quantum computing:** 1) The successful demonstration of repeated rounds of real-time quantum error correction (QEC) by Honeywell. 2) Achieving a

quantum volume of 1,024 - doubling Honeywell's own record set just four months ago. 3) The discovery and validation by Cambridge Quantum of a new quantum algorithm that uses fewer audits to solve optimization and implemented on Honeywell's H1 quantum processors. #QNT #USA #GBR [Honeywell](#)

→ **Germany and Austria have revealed key moves to establishing a strong quantum ecosystem.** Germany welcomed IBM and their quantum computer while just a little over a week later, "Quantum Austria" and its €100M-plus financial stimulus was announced. Europe's largest application-oriented research organization Fraunhofer-Gesellschaft received an IBM Quantum System One, which until now had only existed in IBM's New York-based data center. Fraunhofer-Gesellschaft will use Quantum System One to investigate future industrial applications of quantum computing and improve quantum education. Moreover, the Austrian federal government is providing €107M for quantum research and quantum technologies. This is most likely the beginning of such investments, with billions of euros more expected. #QNT #DEU #AUT [The Quantum Daily](#)

GEOPOLITICS

→ **The United States has imposed sanctions on seven Chinese officials over Beijing's crackdown on democracy in Hong Kong.** This is Washington's latest effort to hold China accountable for what it calls an erosion of rule of law in Hong Kong. The sanctions, posted by the US Treasury Department, are aimed at individuals from China's Hong Kong liaison office, used by Beijing to orchestrate its policies in the Chinese territory. US Secretary of State Antony Blinken said that Chinese officials over the past year had "systematically undermined" Hong Kong's democratic institutions, delayed elections, disqualified elected legislators from office, and arrested thousands for disagreeing with government policies. #Geopolitics #USA #CHN #HKG [Al Jazeera](#)

→ **Further, last week, the Biden Administration issued an advisory warning investors about the risks of doing business in Hong Kong.** The advisory, blaming China, said Hong Kong's new legal landscape poses particular risks for businesses, investors, and academic institutions operating in the city. The threats cited in the advisory fall into four areas: risks for businesses following China's imposition of last year's National Security Law; data privacy risks; risks regarding transparency and access to critical business information; and risks for businesses with exposure to Hong Kong or People's Republic of China entities or individuals that are under U.S. sanctions. Hong Kong's government lashed out at the US advisory calling it hypocritical and driven by ideological hegemony and said US businesses and citizens in Hong Kong will be the main victims of this latest fallout. #Geopolitics #HKG #CHN #USA [Bloomberg](#)

→ **China's actions against Didi raised the possibility that China may initiate new rules for "variable interest entities," which could make VCs wary of investing in Chinese companies.** VIEs are created by Chinese companies in regulated sectors to get around Chinese laws that prohibit foreign ownership. In essence, a company sets up a listed shell

company offshore with no actual business dealings. While that shell company has no real business, it does have a claim to assets and profits from the actual Chinese company through a legal framework. So, when the company goes public and foreign investors (such as those in the US) buy in, they are not buying actual ownership of the company - just claims to its assets. China could very well be on the way for the best year it has seen in funding since 2019, though the numbers still don't measure up to the billions invested in US startups so far this year. Nevertheless, China is displaying a maturing market with growing venture interest. And new Chinese regulation could affect liquidity and therefore deter foreign investors; however, many say the market opportunity is too great to pass up and the dollars will likely continue flowing into Chinese companies for the foreseeable future. #Geopolitics #CHN [Crunchbase](#)

CYBERSECURITY

→ **The U.S. on Friday has placed sanctions on four Russian information technology firms and two other entities over "aggressive and harmful" activities - including digital espionage - that Washington blames on the Russian government.** A Commerce Department posting said the six entities were sanctioned by the U.S. Treasury Department in April, which targeted companies in the technology sector that support Russian intelligence services. The announcement follows April's sanctions, which were aimed at punishing Moscow for hacking, interfering in last year's U.S. election, poisoning Kremlin critic Alexei Navalny and other alleged malign actions - allegations the Kremlin denies. One of those entities, Positive Technologies, serves customers in many Western countries. #Cybersecurity #Geopolitics #RUS #USA [Reuters](#)

→ **Hackers working for the Chinese government compromised more than a dozen U.S. pipeline operators nearly a decade ago, the Biden administration revealed Tuesday while also issuing first-of-its-kind cybersecurity requirements on the pipeline industry.** The disclosure of previously classified information about the aggressive Chinese hacking campaign, though dated, underscored the severity of foreign cyber threats to the nation's infrastructure. In some cases, the hackers possessed the ability to physically damage or disrupt compromised pipelines, a new cybersecurity alert said, though it doesn't appear they did so. Chinese state-sponsored hackers between 2011 and 2013 had targeted nearly two dozen U.S. oil and natural gas pipeline operators with the specific goal of "holding U.S. pipeline infrastructure at risk," the FBI and the DHS said in Tuesday's joint alert. Biden administration officials didn't make the text of the directive immediately available. #Cybersecurity#Geopolitics #CHN #USA [WSJ](#)

→ **Here is a round up of the many public moves the US and allies made against nefarious Chinese cyber actors this past week:**

- The US released a [White House Statement](#) blaming China for the Microsoft Exchange Server breach. For more information see: [Background Press Call](#)
- CISA/FBI/NSA [Published a Product](#) highlighting the TTPs of APT 40.
- The [FBI Unsealed Indictments](#) against several Chinese APT40 actors.

- Agencies released a [Joint Cyber Advisory](#) on Chinese cyber activity against US pipelines from 2011-2013.
- [TSA Released a Second Security Directive](#) with security guidance for pipeline operators.

SUPPLY CHAINS

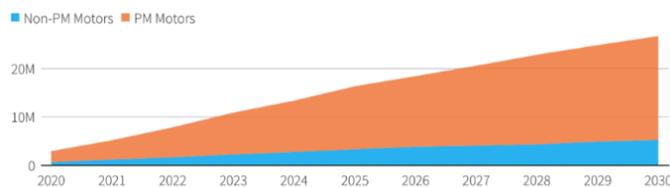
→ **The smartphone industry is the latest to suffer from the world-wide chip crunch.**

Shipments are slowing and customers are seeing their first significant price increases in years—some companies have had to scale back production and delay new releases. Phone manufacturers purchase key parts roughly a half a year in advance, but now those stockpiles have shrunk. Higher component prices brought on by the chip shortages are getting passed through for now by raising device prices; the average wholesale price for phones world-wide went up 5% in the April-to-June quarter, according to market researcher Strategy Analytics. That is a break from recent years when prices didn't increase by more than 2%. As of June, the average lead time for semiconductors stood at 19 weeks, longer than 16 weeks, which is considered a supply-chain danger zone, said Duksan Jang, a research associate at Susquehanna Financial Group. A healthy lead time is considered to be between 12 to 14 weeks. #SCRM [WSJ](#)

→ **As tensions mount between China and the United States, automakers in the West are trying to reduce their reliance on permanent magnets that power electric engines.** The metals in the magnets are abundant, but can be dirty and difficult to produce. China has grown to dominate production, and with demand for the magnets on the rise for all forms of renewable energy, analysts say a genuine shortage may lie ahead. Rare earth magnets, mostly made of neodymium, are widely seen as the most efficient way to power EVs, and China controls 90% of their supply. Electric cars with these require less battery power than those with ordinary magnets, so vehicles can go longer distances before recharging. They were the no-brainer choice for EV motors until about 2010 when China threatened to cut rare earth supply during a dispute with Japan. Prices boomed. Now, supply concerns are opening a divide between Chinese EV producers and their Western rivals. #SCRM #USA #CHN [Reuters](#)

Rare earth magnets in electric vehicles

Carmakers' use of motors without rare earth permanent magnets is due to jump nearly eightfold by 2030, but those with the magnets will grow even faster.



Note: Estimates of motors used in battery and fuel cell electric vehicles. PM motors are: axial flux permanent magnet, interior permanent magnet and surface-mounted permanent magnet. Non-PM motors are: current-excited wound synchronous and induction.
Source: IHS Markit