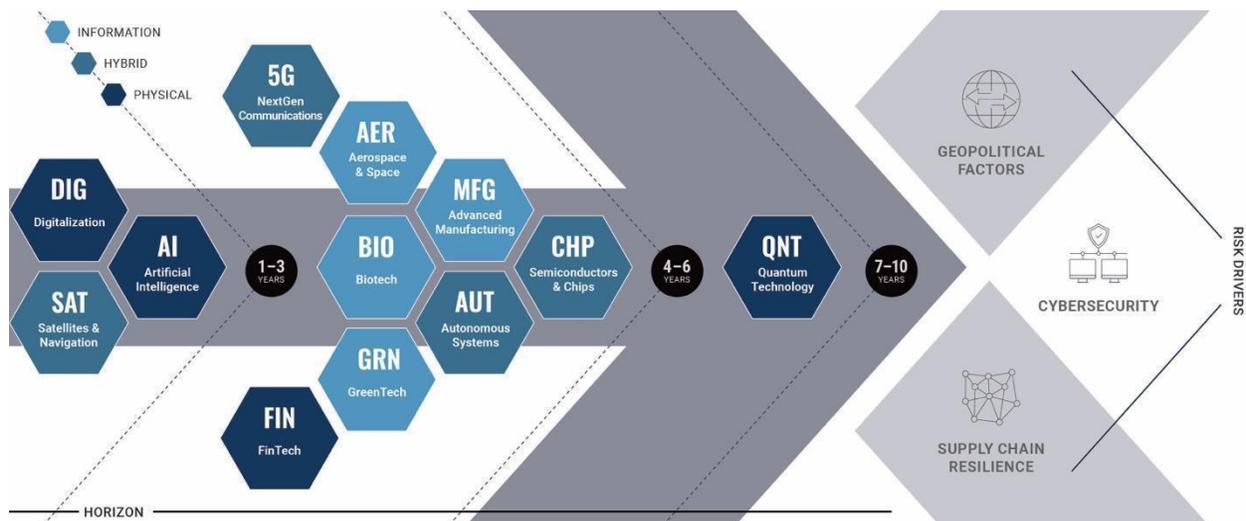




MATRIX MONITOR

Friday September 16, 2022

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



This week's Next5 Matrix Monitor features a new report on competition with China, a former TSMC executive regrets switching to China's SMIC, Chinese satellite providers may gain an edge after FCC decision, blood samples from astronauts reveal in DNA mutations, NIST and Google collaborate on chips, and a hacker purchased 200 used voting machines.

NEXT5 EDITOR'S HIGHLIGHTS

→ **The Strategic Competitive Studies Project (SCSP) released its first report this week addressing America's mid decade challenges to national competitiveness with China.**

SCSP is a privately-funded, bipartisan organization that was developed as a continuation and expansion of the US National Security Commission on Artificial Intelligence (NSCAI). This report is the culmination of their research to date on the state of US competitiveness through the perspective of 225 experts interviewed over the past several months. Highlights from the report include:

- The three technology battlegrounds of today are microelectronics, 5G wireless technology, and AI.
- 2020-2025 presents a critical window where tech trends and strategic competition will come to a head.
- A winning strategy is comprehensive, and will promote technology that supports sovereignty, rather than pits the PRC against the US or democracy versus autocracy.

#AI #CHP #BIO #5G #USA #CHN #Geopolitics #SCRM [SCSP](#)

→ **Taiwanese multinationals find it too risky to expand their operations in mainland China, but impractical to abandon the market entirely. Instead, those with corporate expansion plans are increasingly picking other countries, from elsewhere in Asia and North America.** Despite being beleaguered by business-crippling coronavirus restrictions on the mainland, coupled with geopolitical uncertainties across the Strait, and supply chain disruptions, many Taiwanese multinationals that already have a mainland presence are still unwilling to suffer the potential costs of leaving. Taiwanese have invested in China since the 1980s and now run 4,200 businesses in major cities there. A steady rollback of Taiwanese firms' investments on the mainland started a few years ago, and appears to have picked up again this year. In the five years before Covid, Taiwanese investments in mainland China saw steady annual declines, from nearly \$11B in 2015 to about \$4.2B in 2019. There was a bump in both 2020 and 2021 as China's coronavirus-control measures made it a more attractive destination for investments with about \$5.9B in each of those years. But now, more Taiwanese entrepreneurs are looking to grow their businesses in Indonesia, Japan, Malaysia, Vietnam, the US, and Mexico. However, many Taiwanese investors intend to keep their *existing* positions in mainland China, for now, despite mounting uncertainties. After all, pulling out of China would create significant losses in equipment, capital, talent, and the Chinese market. Other analysts point to better infrastructure options in mainland China, compared with neighboring emerging economies in South and Southeast Asia. #TWN #CHN #USA #SCRM [SCMP](#)

→ **A TSMC veteran executive (and US citizen) who left to work for China's SMIC called his decision to move foolish, claiming it tarnished his reputation in Taiwan.** Chiang Shang-yi is a Taiwanese semiconductor industry veteran who headed the TSMC's research and development until 2006 and helped build it into the world's largest chip foundry. In a recent interview, he said his decision to leave TSMC for a mainland company was one of the most foolish things he's done in his life. Following his retirement from TSMC, he served as an

independent non-executive director at Shanghai-based SMIC, from December 2016 to June 2019. He became vice chairman in December 2020, just three days before the US imposed sanctions against SMIC, barring it from purchasing advanced equipment for making chips at 10 nanometers or below. He also felt the Chinese government did not trust him because he is a Taiwanese US citizen who studied at Harvard and Princeton. And his decision to join SMIC was seen as unpatriotic in Taiwan. Chiang relinquished all of his roles at SMIC, including vice chairmanship and executive director. After leaving SMIC's board in 2019, Chiang became chief executive at the now-defunct Hongxin Semiconductor Manufacturing (HSMC) in Wuhan, which local authorities had hoped to transform into the nation's leading chip maker. He left around a year later, calling the experience a "nightmare" in a written message to the press, citing the extent of HSMC's financial difficulties. Now, Chiang plans to return to the US to enjoy his retirement. SMIC is one of Beijing's best hopes for achieving semiconductor self-sufficiency for the nation. It was founded by a former Texas Instruments employee who crossed the Taiwan Strait 22 years ago to set up the Chinese foundry. Another Taiwanese veteran, TSMC alumnus Liang Mong-song is currently a co-CEO at SMIC and it widely seen as a key figure behind the chipmaker's technological advancement. #CHP #USA #TWN #CHN #Geopolitics #SCRM [SCMP](#)

The Cybersecurity and Infrastructure Security Agency (CISA) released its first comprehensive strategic plan this week to guide the agency's efforts for the next three years. The plan focuses on how CISA will collectively reduce risk and build resilience to cyber and physical threats to critical infrastructure. The plan specifically addresses four goals:

1. Spearhead the national effort to ensure the defense and resilience of cyberspace.
2. Reduce risks to, and strengthen resilience of America's critical infrastructure.
3. Strengthen whole-of-nation operational collaboration and information sharing.
4. Unify as One CISA through integrated functions, capabilities, and workforce.

#USA #Cybersecurity [CISA](#)

DIGITALIZATION

→ **The White House outlined targets in the tech push following a "listening session" attended primarily by administration officials and representatives from only two tech companies, both of which have long been critics of Big Tech's dominance.** The CEOs of Mozilla and Sonos were the only representatives from the tech industry present. Analysts were dissatisfied with an exclusive, closed-door meeting that recommended punitive actions against the industry's biggest players without providing a seat at the table. The most controversial reform, which included amending Section 230 of the Communications Decency Act, called for "the removal of special protections for large tech platforms." In general, this section safeguards website platforms against third-party content. **The White House's six broad goals mirror legislation that is slowly making its way through Congress, the latest sign of the White House's growing crackdown on high tech's influence while legislation languishes in the Senate and House.** The Justice Department is expected to file antitrust lawsuits against Google for its online advertising business and Apple for its dominant App Store in the coming weeks. **Politicians**

seeking to rein in digital-data collectors such as Meta and Amazon have identified social media platforms, particularly Meta, Twitter, TikTok, and YouTube, as their bane. Furthermore, on Tuesday, 13 companies urged the US Congress to enact legislation to rein in Big Tech. DuckDuckGo, Mozilla, Proton, and other privacy-focused companies have expressed support for legislation that would prohibit Google and Amazon from self-preferencing. In a letter to Senate and House leadership, the companies stated that the big tech firms have used their dominance to steer consumers away from services that provide greater privacy protections. #DIG #USA [MarketWatch](#) [Reuters](#)

SATELLITES & NAVIGATION

→ **Chinese satellite internet providers may gain a competitive advantage as a result of the FCC staff decision to deny [SpaceX](#) \$885.5M in rural broadband subsidies, FCC commissioner Nathan Simington stated on September 12.** Simington also voiced alarm about the Commerce Department's separate decision to exclude satellite broadband providers from a \$42.5B broadband internet subsidy fund, claiming that it would benefit Chinese firms. Simington urged FCC commissioners to consider SpaceX's petition and ensure that Americans in rural areas "get connected as soon as possible." He is the second Republican FCC commissioner to object to the decision, following Brendan Carr, who previously chastised the FCC for rejecting the funds without a full commission vote. Democrats and Republicans are currently deadlocked at 2-2 on the FCC. #SAT #AER #Geopolitics #USA #CHN [SCMP](#)

→ **[SpaceX](#) launched a novel — and massive — commercial communications satellite into orbit while also setting a new Falcon 9 launch record.** The Falcon 9 rocket lifted off from NASA's Kennedy Space Center in Florida, carrying 34 Starlink internet satellites and BlueWalker 3, a prototype satellite built by AST SpaceMobile that is billed as the largest commercial communications array ever flown in space. While SpaceX's primary goal for Saturday's launch was to add 34 new Starlink satellites to its expanding orbital constellation, AST SpaceMobile's BlueWalker 3 satellite stood out for its size and ambitious mission. **The satellite is the largest commercial antenna array launched into space, measuring 693 square feet (64 square meters) when fully unfolded.** Its mission is to test new technology that will allow users to receive global cellular phone service directly from space. The goal is to close coverage gaps and provide continuous high-speed phone and data service in unserved areas. #SAT #5G #AER #USA [Space.com](#)

→ **Europe unveiled the first satellite in a \$4B family designed to provide earlier warning of extreme weather that has wreaked havoc around the world.** The MTG-I1 satellite, the result of 12 years of development for the European Space Agency and the 30-nation EUMETSAT, will be launched on an Ariane 5 rocket by the end of this year and will provide sharper eyes in space over Europe and Africa. By 2030, the 3.8-ton spacecraft will be joined in geostationary orbit by three more MTG-I imaging satellites and two MTG-S "sounding" satellites capable of slicing the atmosphere like a medical scanner. Forecasters hope to gain valuable hours in predicting near-term storms and floods that can claim lives. Scanning the atmosphere will also provide a more accurate picture of current conditions for their computerized models.

The initiative highlights a race to deal with weather disruption caused by global warming, which is expected to cost \$100B globally in 2021 alone. While the MTG-I imaging satellites will bring Europe in line with the GOES-R operated by NASA and the National Oceanic and Atmospheric Administration, the MTG-S will be the first to deploy sounders in space. According to European officials, China has experimented with the technology with lower accuracy but has yet to deploy it, despite the fact that Beijing's space program is rapidly developing. #SAT #AER #EUR #USA #CHN [Reuters](#)

ARTIFICIAL INTELLIGENCE

→ A new paper co-authored by [University of Oxford](#) and [DeepMind](#) researchers contends that artificial intelligence may pose an existential threat to humanity. It all comes down to Generative Adversarial Networks (GANs), which are currently being used in the development of AI. These systems are divided into two parts: one that attempts to generate a picture from input data and the other that grades its performance. The researchers speculate in their paper that an advanced AI could devise a cheating strategy to maximize its reward while essentially harming humanity. This means that if an AI was in charge of, say, growing food, it might want to avoid doing so and instead receive a reward. It may, in fact, decide to ignore all of its assigned tasks, which are likely to be critical to humanity's survival, and do its own thing entirely. At this point, humanity is trapped in a zero-sum game between its basic survival needs and technology. "Losing this game would be fatal," according to the paper. As a result, the researchers argued that we should not aim to create such advanced AI unless we also have a guarantee of staying ahead of it. Although the paper makes some valid points, it should be noted that AI is currently an asset to humanity rather than a burden, according to an analyst. AI is bringing several benefits to humanity, from eliminating the need for humans to perform tedious tasks in supply chains to performing more accurate weather forecasting. It has limitations that have resulted in some issues, such as Microsoft's AI bot becoming racist after hours on the internet. All of this means that if we are cautious and diligent, we may be able to continue developing AI that benefits humanity rather than harms it, the analyst added. #AI #GBR #USA [Interesting Engineering](#)

NEXT GENERATION COMMUNICATIONS

→ Google's top-secret high-speed telecom project is being spun off as [Aalyria](#), and the company will maintain its investment in the venture. While Google declined to provide information about Aalyria, such as how long the company has been working on the technology and how many employees have joined the company, Aalyria stated in a news release that its mission is to manage "hyper fast, ultra-secure, and highly complex communications networks that span land, sea, air, near space, and deep space." Aalyria's software platform has been used in multiple aerospace networking projects for Google, according to the company, and it has laser communications technology "on an exponentially greater scale and speed than anything that exists today." Aalyria also stated that it has a \$8.7M commercial contract with the US Defense Innovation Unit. The spinoff comes as Alphabet, Google's parent company, deals with a slowdown in ad spending and considers whether to advance or wind down experimental

projects. This includes seeking external funding for some of the projects that have been incubated for years. #5G #USA [CNBC](#)

FINANCIAL TECHNOLOGY

→ [The Linux Foundation](#) has announced plans for a new collaborative initiative based on open source to support interoperability across digital wallets. The OpenWallet Foundation (OWF) plans to support a variety of use cases involving identity, payments, and digital keys, among others. The OWF is working to develop a “secure, multi-purpose open source engine” that anyone can use to create digital wallets that are interoperable with other digital wallets. This is analogous to how emails and SMS are interoperable (people can send messages to one another regardless of their service provider). The term “plurality” provides a hint as to what the true objective is here; it's not necessarily to create the single largest digital wallet provider and dethrone Apple and Google, but rather to power a large number of new providers who may collectively outnumber the industry leaders. Notably, the OWF does not intend to develop a digital wallet or create new standards; rather, it is fostering a collaborative, community-driven effort to develop an open foundation upon which any organization can build its own digital wallets. #FIN #DIG #USA [TechCrunch](#)

→ SWIFT is piloting a blockchain project with fintech company [Symbiont](#). The partnership, which includes [Citigroup](#), [Vanguard](#), and [Northern Trust](#), aims to improve "efficiencies in communicating significant corporate events," such as dividend payments and mergers. Under the effort, corporate action data from SWIFT messages will be translated by SWIFT's translator tool and uploaded in Symbiont's blockchain. The information shared between participants will then be compared by Symbiont's smart contract technology, which will flag "discrepancies, contradictions, or inconsistencies across custodians." #FIN #DIG #Cybersecurity #BEL #USA #GBR #EUR #JPN [Bloomberg](#)

AEROSPACE & SPACE

→ Following warnings of "sleepwalking" into aiding the Chinese military, [Imperial College](#) will close two major research centers sponsored by Chinese aerospace and defense firms as part of a crackdown on academic collaborations with China. The [Avic Center for Structural Design and Manufacturing](#) has a long history of collaboration with China's leading civilian and military aviation supplier, which has contributed more than \$7M to research cutting-edge aerospace materials. The [second center is run in collaboration with Biam](#), a subsidiary of another state-owned aerospace and defense company that has contributed \$5.3M to projects involving high-performance batteries, jet engine components, and impact-resistant aircraft windshields. Although the stated goals of the centers are to advance civilian aerospace technologies, critics have repeatedly warned that the research could also advance China's military ambitions. Following the rejection of two licence applications to the government's Export Control Joint Unit (ECJU), which oversees the sharing of sensitive research with international partners, Imperial has confirmed that the two centers will close by the end of the year. The closures come after the heads of MI5 and the FBI warned in July of China's espionage threat to

UK universities, highlighting the government's hardening stance on the issue. #AER #Geopolitics #GBR #CHN [The Guardian](#)

→ **In an op-ed, Arthur Herman emphasizes that the New Space Race is about more than just money, and that the US urgently needs a strategy to harness private innovation in order to beat China.** Experts are concerned about the US' economic and national security, which are both jeopardized by this New Space Race. According to a report from the June [State of the Space Industrial Base conference](#), which was sponsored by the US Space Force, Defense Innovation Unit, and Air Force Research Laboratory, the 350 industry and government participants were pessimistic about the US space sector for the first time since the conferences began in 2019. They predicted that by 2032, China will have surpassed the US as the dominant space power. China now has approximately 95k space-related enterprises. In 2022, the country will complete more than 60 space launches, breaking its previous record of 55 successful launches in 2021, according to the Chinese data company [Qichacha](#). If China becomes the dominant space power in the next two decades, it will control the future of global telecommunications, space exploration, and human settlement, as well as the strategic and military applications of space satellites and technology, Herman argues. The first step toward sustaining and promoting America's space leadership is to strengthen the US space industrial base, according to Herman. Today, companies such as [SpaceX](#) and [Blue Origin](#) are at the forefront of innovation and productivity and are also a stepping stone toward a future space sector that includes economic activity on the moon and Mars. The US military and intelligence services will rely on private companies to build rockets, launch and track satellites, provide sensors, optical equipment, and encryption to secure data/images, and provide ground support to space missions. A mobilization model akin to World War II for harnessing this thriving commercial base to support national security is also critical to the future of American space leadership, Herman stated. **Whoever controls space will determine a nation's future.** Nations must abandon the idea that the US, China, and Russia will work together to keep space free, open, and rule-based, Herman argues. #AER #Geopolitics #USA #CHN [WSJ](#)

BIOTECHNOLOGY

→ **When researchers examined decades-old blood samples from 14 NASA astronauts who flew Space Shuttle missions between 1998 and 2001, they discovered that all 14 astronauts had DNA mutations.** While these mutations are unlikely to pose a serious threat to the astronauts' long-term health, the study emphasizes the importance of regular health screenings for astronauts, particularly as they embark on longer missions to the Moon and beyond in the coming years. The specific mutations were distinguished by a high proportion of blood cells derived from a single clone, a phenomenon known as clonal hematopoiesis. In this case, researchers suspect that the mutations were caused by space radiation. Blood samples were collected from 12 male and two female astronauts ten days before their flight and on the day of their landing for this latest study. The samples were then cryogenically stored for approximately two decades at -112 degrees Fahrenheit. The mutations found in the blood samples resemble the type of somatic mutations found in older people, which is intriguing given

that the astronauts' median age was only 42. As a result, experts recommend that NASA screen astronauts for these mutations on a regular basis. #BIO #USA [Futurism](#)

GREEN TECHNOLOGY

→ **Students at [Eindhoven University of Technology](#) created the Zero Emission Mobility (ZEM) car, which captures more CO2 than it emits, is powered by a lithium-ion battery pack, and is made mostly of 3D-printed recycled plastics.** The goal is to reduce carbon dioxide emissions from the time a car is manufactured until it is recycled. ZEM employs two filters capable of capturing up to 2 kg (4.41 lbs) of CO2 over 20k miles of driving. The students are now on a promotional tour in the US, visiting universities and businesses from the East Coast to Silicon Valley.



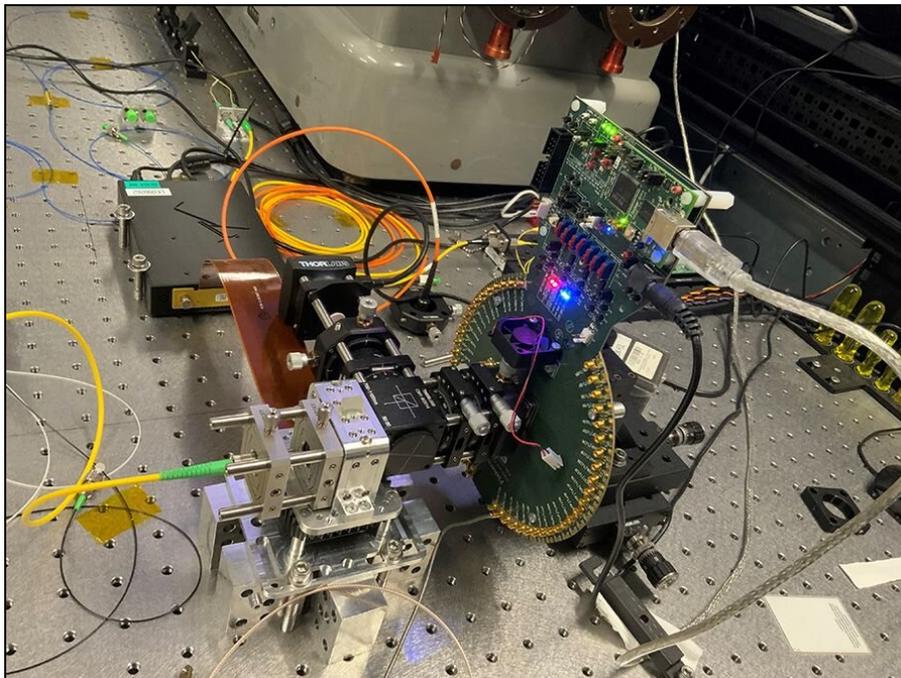
#GRN #NLD #USA [Reuters](#)

→ **The first major [study](#) of the forces driving government funding of energy research and development — and the public institutions that generate it — in the 21st century finds that competition created by China's rise as a technology superpower led to significant increases in clean energy investment.** The study also discovers that cooperation commitments made at a UN climate conference were not just empty words, but actually boosted cleantech innovation, albeit at a far lower level than required to achieve net zero or prevent two degrees of warming. The study spans eight major economies between 2000 and 2018, including

Germany, France, the US, the UK, South Korea, India, China, and Japan, and finds that total energy funding increased by 84% between 2000 and 2018. During the first 18 years of this century, the share of RD&D (research, development, and demonstration) funding for clean technologies — from solar and wind to efficient energy storage — in these seven economies increased from 46% to 63%. It did, however, come at the expense of nuclear energy investment, which fell from 42% to 24%, while fossil fuel funding remained “sticky” and relatively unchanged — bolstered by massive increases in fossil fuel RD&D spending from China (over \$1.5B from 2001 to 2018). #GRN #CHN #DEU #FRA #USA #GBR #KOR #IND #JPN [Tech Xplore](#)

ADVANCED MANUFACTURING

→ **Scientists have created a tool that measures the output of vertical-cavity surface-emitting lasers (VCSELs) and allows for the examination of the large amounts of data that their light carries, a breakthrough that could speed up the manufacturing of technology.** The system is about the size of a shoebox and is simply inserted into the laser beam's path. The tool displays how the laser beam changes shape and color over time. That data is critical to understanding how the beam travels through the fiber link, and the results can now be used to improve the next generation of lasers. This tool will enable laser engineers to design lasers with no rogue features, resulting in optical links with higher speeds and longer operating distances. Improved laser technology is expected to benefit a variety of industries, including telecommunications, security, and automobile manufacturing.



#MFG #AUS [Tech Xplore](#)

AUTONOMOUS SYSTEMS

→ **Autonomous vehicle (AV) startups have raised tens of billions of dollars on the promise of developing truly self-driving cars, but industry executives and experts state that remote human supervisors may be required indefinitely to assist robot drivers in trouble.** Much of the research and investment in autonomous vehicles has been driven by the central premise that computers and artificial intelligence will dramatically reduce accidents caused by human error. However, there is a catch: developing AVs that can drive more safely than humans is extremely difficult because self-driving software systems simply lack humans' ability to predict and assess risk quickly, especially when confronted with unexpected incidents or "edge cases." Many AV startups are currently employing humans as remote supervisors, in addition to safety drivers behind the wheel. Human supervisors monitor video feeds from multiple AVs, sometimes with a steering wheel, ready to step in and get stuck robot drivers moving again — AVs invariably stop when they can't figure out what to do. These remote humans help self-driving cars handle edge cases. These could be as simple as an unfamiliar set of lane closures during road construction, or as complex as erratic, unpredictable behavior by pedestrians or human drivers. The need to address edge cases and reduce the costs of everything from sensors to the number of humans in the loop in order to reach the market has also increased as investor funding for self-driving cars has declined. Investors are concerned about how soon AVs will become profitable. Simpler or slower AVs, such as trucks or last-mile delivery services that operate on highways or set, low-speed routes, are likely to achieve profitability first, but it will still take years. Overall investment in future mobility startups has slowed, with AV-focused companies particularly hard hit, accounting for less than 10% of venture investment in Q2, according to PitchBook. In Q3, investment in AV startups fell to \$958M. True AVs are lagging far behind the optimistic rollout timelines predicted just a few years ago. #AUT [Reuters](#)

SEMICONDUCTORS & CHIPS

→ **Arm has launched Neoverse V2, its next generation of data center chip technology, to meet the explosive growth of data from 5G and internet-connected devices.** Arm's technology powers the majority of mobile phones, but it is also making inroads into the data center processor market, which has long been dominated by Intel and AMD. Ampere, Amazon, Fujitsu, and Alibaba, according to Arm, already develop processor chips based on Arm technology for their data centers. #CHP #DIG #GBR [Reuters](#)

→ **Tencent-backed startup Jaguar Microsystems (JaguarMicro) hopes to become a major tech supplier to China's cloud computing services market, by focusing on the development of data processing units (DPUs), a new class of programmable systems-on-a-chip for data center servers.** JaguarMicro's DPUs are expected to be in high demand due to its innovation in processing networking, storage, virtualization, and security applications. This frees up a server's CPU for other workloads and helps cloud platform operators become more efficient and cost-effective. JaguarMicro, which was founded in 2020, has become one of the most popular companies for investors in the DPU market, raising more than \$200M in a financing round early in 2021, transforming it into a tech unicorn with a valuation of more than \$1B. Tencent owns a 24% stake in JaguarMicro, which is also backed by

Sequoia Capital China, Nio Capital, the Hong Kong Science and Technology Parks Corp, and other VC firms. Its silicon and software team includes members who previously worked for Broadcom, Intel, Arm, Alibaba, and Huawei's chip design unit, HiSilicon. #CHP #DIG #SCRM #Geopolitics #CHN #USA [SCMP](#)

→ **NIST announced a collaboration agreement with Google to produce chips that will be used by researchers to develop new nanotechnology and semiconductor devices.**

SkyWater Technology, a semiconductor company based in Bloomington, Minnesota, will manufacture the chips. According to the agreement, Google will pay the initial cost of setting up production and will subsidize the first production run. The circuitry for the chips will be designed by NIST in collaboration with university research partners. The University of Michigan, the University of Maryland, George Washington University, Brown University, and Carnegie Mellon University are among the research partners who contributed to the chip designs. #CHP #USA [Reuters](#)

→ **A Chinese chip veteran says Nvidia is difficult to replace in AI and urges Chinese startups to catch up after the US banned advanced AI chip exports to the country.**

Nvidia holds 95% of the market share for general-purpose GPUs used to train AI models. While local Chinese competitors have begun to develop their own GPUs, they are still unable to compete with industry giants AMD and Nvidia. Chinese firms, on the other hand, could catch up by improving "versatility" by supporting more AI algorithms, according to Lu Jianping, CTO at Shanghai-based [Iluvatar Corex](#) and a former Nvidia and Samsung employee. Iluvatar Corex, which claims to have the only domestically produced GPU in mass production, may be the best-positioned Chinese start-up to benefit from US restrictions. So far, orders for the Tiangai 100, which took four years to develop and is already being used for cloud computing applications, have totaled \$33M. Meanwhile, continued computation demand in China AI applications, according to Lu, will provide opportunities for local start-ups to grow. As a starting point, Chinese GPU manufacturers can "benchmark" their products against Nvidia's. #CHP #AI #SCRM #Geopolitics [SCMP](#)

→ **After overcoming a major challenge faced by the semiconductor industry, a household microwave oven modified by a Cornell engineering professor is helping to cook up the next generation of cellphones, computers, and other electronics.**

TSMC hypothesized that microwaves could be used to activate the excess dopants, but previous microwave annealers produced "standing waves," which prevented consistent dopant activation, similar to how household microwave ovens heat food unevenly. TSMC collaborated with professor James Hwang, who modified a microwave oven to selectively control the location of standing waves. Such precision enables proper dopant activation without excessive heating or damage to the silicon crystal. According to Hwang, who has filed two patents for the prototype, this discovery could be used to produce semiconductor materials and electronics by 2025. The discovery could alter the geometry of transistors used in microchips. For more than two decades, transistors have been designed to stand up like dorsal fins, allowing more transistors to be packed onto each microchip, but manufacturers have recently begun to experiment with a new architecture in which transistors are stacked horizontally. The microwave annealing-enabled excessively doped materials would be critical to the new architecture.



#CHP #USA #TWN [Tech Xplore AIP](#)

QUANTUM TECHNOLOGY

→ **University of Oxford scientists successfully linked two atomic clocks through quantum entanglement for the first time at a distance of two meters, a new breakthrough that could allow scientists to probe dark matter and the fabric of reality.** This not only improves the overall precision of optical atomic clocks, but it also allows for a level of comparison in the split-second timing of multiple clocks, which could reveal previously undetectable signals in a variety of physical phenomena. The researchers demonstrated that by entangling the charged atoms of strontium, they could reduce measurement uncertainty under conditions that should allow them to improve precision in the future. Knowing macroscopic distances of a few meters is easy; it is now theoretically possible to entangle optical atomic clocks all over the world to improve their precision. Using entanglement to reduce uncertainty in quantum measurements could have applications ranging from quantum computing to encryption and communications. #QNT #GBR [VICE](#) [New Atlas](#) [ScienceAlert](#)

GEOPOLITICS

→ **The US will hold talks with Taiwan next month to discuss new US legislation aimed at boosting the American semiconductor industry, according to the top US diplomat in Taipei.** Sandra Oudkirk, director of the American Institute in Taiwan, told an industry forum that the [US-Taiwan Technology Trade and Investment Collaboration \(TTIC\)](#) framework has helped elevate and prioritize US-Taiwan economic engagements. "The TTIC is a powerful platform which we are already using to address challenges in the semiconductor space, such as critical

chip shortages which adversely affect multiple industry sectors," according to Oudkirk.
#Geopolitics #CHP #SCRM #USA #TWN [Reuters](#)

→ **On September 15, Russian President Vladimir Putin and Chinese President Xi Jinping met in Uzbekistan to discuss Ukraine and Taiwan.** Xi will leave China for the first time in over two years this week for a trip to Central Asia, where he will meet Putin. The deepening "no limits" partnership between China, the rising superpower, and Russia, the natural resources titan, is a geopolitical development that the West is watching with concern, according to an analyst. #Geopolitics #RUS #CHN #UKR #TWN [Reuters](#)

→ **The Biden administration intends to broaden restrictions on US shipments of semiconductors used in AI and chipmaking tools to China beginning next month, according to people familiar with the matter.** The Commerce Department intends to issue new regulations based on restrictions communicated to three US companies earlier this year in letters: [KLA](#), [Lam Research](#), and [Applied Materials](#). The letters, which the companies publicly acknowledged, prohibited them from exporting chipmaking equipment to Chinese factories that manufacture advanced semiconductors using sub-14 nanometer processes unless the sellers obtained Commerce Department licenses. The rules would also codify restrictions imposed by the Commerce Department last month in letters to [Nvidia](#) and [AMD](#), instructing them to halt shipments of several AI computing chips to China unless they obtained licenses. The regulations will most likely include additional sanctions against China. The Commerce Department can use "is informed" letters to bypass lengthy rule-writing processes and quickly implement controls, but the letters only apply to the companies that receive them. Making the letters into rules would expand their reach and expose other US companies producing similar technology to the restrictions. Companies attempting to challenge Nvidia and AMD's dominance in AI chips may be subject to the regulations. The same advanced computing markets are being pursued by [Intel](#) and startups such as [Cerebras Systems](#). Intel stated that it is keeping a close eye on the situation. #Geopolitics #CHP #AI #SCRM #USA #CHN [Reuters](#)

→ **As part of China's tech strategy to compete with the US, the Chinese government has designated 8,997 industrial enterprises as "little giants" eligible for preferential treatment.** In a letter, President Xi Jinping expressed his hope that such enterprises will "play a more important role in stabilizing supply chains and promoting economic and social development." In 2021, such firms made an average profit of ~\$6M, more than three times the figure for small and medium-sized enterprises with at least ~\$3M in annual revenue. Little giants are smaller, often unknown companies with unique products and know-how in strategic sectors such as semiconductors, advanced manufacturing, energy, and critical minerals. They have established over 10k research institutes at the state and provincial levels so far. The central and provincial governments can offer lucrative incentives to officially recognized little giants, such as tax breaks, generous loans, and favorable talent acquisition policies, but there is no standard incentive package. #Geopolitics #CHP #MFG #SCRM #CHN #USA [SCMP](#)

CYBERSECURITY

→ **A hacker purchased approximately 200 used voting machines without incident, but the one he purchased on eBay last month is now the subject of a state investigation, with Michigan officials eager to learn how the device ended up for sale online.** Harri Hursti is often contracted by state-level election officials to test vulnerabilities in voting machines. That's why he bought the Dominion ImageCast X machine as soon as he saw it online. He paid over \$1.2k then, in an effort to clarify any lingering questions about the ImageCast X's provenance, he sent an email to Michigan's secretary of state office alerting them of the deal. It's something he does whenever he buys a device online, he explained. Michigan officials didn't realize a device was missing until they began looking for a missing machine, highlighting the danger of states not being able to track voting machine transportation. CNN reported that the eBay seller discovered the Dominion-made machine for \$7.99 on a Michigan Goodwill website. He bought it and immediately put it up for sale on eBay. He claimed in his eBay listing that the device was used in "the most recent Michigan elections." In some cases, people simply lose track of the machines. They leave them somewhere and just completely forget about them, Hursti stated, adding that one election device was left behind at a hotel for more than a year. The hotel attempted to notify them that they had left, but no one ever returned their call. As a result, they sold it, which is legal. #Cybersecurity #SCRM #USA [NPR](#)

→ **The DOJ charged Iranian nationals with hacking attacks against hundreds of companies and organizations around the world, accusing them of encrypting computers associated with critical infrastructure, such as electric utilities.** The indictment charged them with carrying out attacks on a municipality in Union County, New Jersey, power companies in Mississippi and Indiana, an accounting firm in Illinois, and a domestic violence shelter in Pennsylvania since October 2020. Ransomware attacks are also said to have occurred in other countries, including the United Kingdom, Israel, Russia, and Iran. The hackers used known flaws in commonly used computer network devices and software applications to access and exfiltrate data and information, according to a 20-page indictment unsealed on September 14. The three defendants are most likely still in Iran and have not been arrested. An FBI special agent stated in a briefing on September 14 that the US government would be offering a reward of \$10M for information leading to the arrest of the men, who he said were affiliated with companies operating in Iran that were "engaging in cybercrimes on a global scale." Prosecutors claim the defendants hacked data on local networks and demanded payment in Bitcoin worth up to \$500k. Several of the attacks mentioned demanded tens of thousands of dollars in ransom. #Cybersecurity #Geopolitics #USA #IRN #GBR #ISR #RUS [Bloomberg](#)

→ **For the first time, CISA is recommending that businesses embrace automated continuous testing to protect against long-standing online threats.** The guidance, issued on September 14 by a group of US and international agencies, urges businesses to strengthen their defenses by continuously validating their security programs against known threat behaviors, rather than taking a more piecemeal approach. By automating security controls, attackers will be less likely to rely on tried-and-true tactics. According to the CISA official, top threat actors are still going back and exploiting vulnerabilities that are up to ten years old. The recommendation is being made by CISA in collaboration with the [Center for Threat-Informed](#)

[Defense](#), a 29-member nonprofit founded in 2019 that is based on MITRE's framework.
#Cybersecurity #USA [Bloomberg](#)

→ **Hackers affiliated with the Chinese military are using a variety of legitimate software packages to load malware payloads and target government leaders throughout Asia, according to [Symantec](#).** The campaign targeted a variety of government and state-owned organizations in several Asian countries, including the offices of several prime ministers or heads of state. Along with state-owned telecoms, IT organizations, and media companies, government organizations associated with finance, aerospace, and defense were targeted.
#Cybersecurity #Geopolitics #5G #AER #CHN [The Record](#)

SUPPLY CHAINS

→ **ASML is on track to increase its workforce in China, where its employee headcount has tripled in the last five years.** Despite rising tensions between Beijing and Washington, ASML, which established its China operations in 2000, currently owns 12 office buildings in the country, where it is expected to hire more than 200 new employees, or 14% of its local workforce, this year, according to a Bloomberg report in June. While ASML's personnel expansion in China may appear to be jeopardized due to potential new US restrictions, the company continues to recognize China's critical role in the global semiconductor market. "I think we need to realize that China is an important player in the semiconductor industry and especially in the more mature [chip manufacturing] nodes," ASML president and CEO Peter Wennink said on the company's Q2 earnings conference call in July. #SCRM #CHP
#Geopolitics #NLD #CHN [SCMP](#)

→ **Taiwan's [GlobalWafers](#) expects to begin construction on its new \$5B plant in Texas around the end of November.** Subsidies from the CHIPs Act were not the only factor to consider, according to GlobalWafers' CEO. GlobalWafer's investment will be the first silicon wafer facility to be built in the US in more than 20 years, according to the US Commerce Department. #SCRM #CHP #USA #TWN [Reuters](#)

→ **Taiwan's semiconductor output will increase by 20% this year due to increased demand for consumer electronics and rising global concerns about the stability of computer chip supply chains, according to industry group Semi Taiwan.** The output value will be around \$157B in 2022, up about 20% from 2021. Semi Taiwan also expects Taiwan to be the world's top buyer of raw semiconductor materials for the second year in a row, increasing its share to 23% in 2022, up 0.1% from 2021. China is expected to be the second biggest buyer, with a 19% share, up from 18.6% in 2021. And North America is expected to reach 6.4%, up from 6% last year. #SCRM #CHP #TWN [SCMP](#)

→ **Shanghai is positioning itself as China's semiconductor highland, accounting for 25% of the country's semiconductor value output and 40% of chip talent.** Shanghai's chip firms are leading the country's technological breakthroughs in the value chain, highlighting the city's importance in China's semiconductor landscape, according to a Chinese government official. SMIC and Shanghai Microelectronics (SMEE), the country's most advanced chip equipment

maker, are among them. The city has mass-produced 14nm chips, a reference to SMIC, and is capable of producing deep ultraviolet (DUV) lithography systems for 90nm chips, a reference to SMEE. The Shanghai semiconductor industry's market size will reach ~\$37B in 2021, accounting for roughly 25% of China's total. Shanghai's relative success in developing a large local semiconductor industry has been aided in part by preferential policies. To attract semiconductor companies, talent, and investors to relocate to Shanghai, the city government has implemented a slew of preferential policies, ranging from government subsidies to tax breaks. #SCRM #CHP #Geopolitics #CHN #TWN [SCMP](#)