The Promises and Perils of 6G Technology

6G is different. While historical advances in the cellular communication standards have changed the way consumers use their mobile devices, the legal ramifications of those advances have largely been cabined to the telecommunications industry. 6G technology will usher in a revolution in innovation, unleashing artificial intelligence, revolutionizing the health care and data-transmission sectors, and creating never-before-seen privacy issues. 6G offers the potential for transmission speeds 100 times greater than 5G, near-zero latency, and connection density as high as 10 million devices per square kilometer. These advances will create a network where almost every device can be simultaneously connected, enabling a range of technologies that are not possible today.

This article addresses some of the many ways 6G will overhaul technological development, highlighting five areas of potential legal interest: Artificial intelligence, spectrum use, health care, infrastructure, and privacy. 6G is only in its infancy—governments and private entities are only now beginning to invest in the technology, and projections suggest commercial availability around 2030.[1] But given 6G's anticipated ubiquity and potential to vastly change the business landscape, everyone would be wise to begin learning about the technology now.

I. Artificial Intelligence

Artificial intelligence ("AI") represents a new frontier in the global economy: Some estimates say it could contribute up to $15.7 trillion worldwide by 2030.[2] 6G promises at least two major developments that will affect our current law: The creation of vast interconnected AI networks, and the growing importance of AI inventors.

Increases in computing power and innovations in computer science have fueled AI innovation since the dawn of the century. From 2002 to 2018, AI patent applications rose by over 100%.[3] This pace shows no sign of slowing: Countries are pouring money into AI research,[4] and major telecommunications firms like Nokia and Huawei have begun investing in 6G-enabled AI technologies.[5]

The Regulatory Vacuum

These AI innovations will affect our commercial and personal lives in ways that our current regulatory frameworks are not prepared to address. For example, 6G-enabled AI technology will

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[1] Jeremy Horwitz, *Keysight Joins 6G Flagship Group to Develop 2030's Cellular Standard*, VENTUREBEAT (Aug. 19, 2019 5:58 AM), https://venturebeat.com/2019/08/19/keysight-joins-6g-flagship-group-to-develop-2030s-cellular-standard/.

[2] *Sizing the Prize: What's the Real Value of AI for Your Business and How Can You Capitalise?*, PWC (2017), https://www.pwc.com/gx/en/issues/data-and-analytics/publications/artificial-intelligence-study.html.

[3] U.S. PAT. & TRADEMARK OFF., INVENTING AI: TRACING THE DIFFUSION OF ARTIFICIAL INTELLIGENCE WITH U.S. PATENTS 2 (2020), https://www.uspto.gov/sites/default/files/documents/OCE-DH-AI.pdf.

[4] Synced, *South Korea Aims High on AI, Pumps $2 Billion into R&D*, MEDIUM (May 16, 2018), https://medium.com/syncedreview/south-korea-aims-high-on-ai-pumps-2-billion-into-r-d-de8e5c0c8ac5.

[5] *Towards 6G Network: Top Companies and Universities Mapping the 6G Technology*, GREYB (last visited Mar. 26, 2021), https://www.greyb.com/6g-companies/.

permit the creation of a "smart application layer" of interconnected devices, from autonomous vehicles to medical implants to geolocation sensors, all of which will communicate with one another in real time.[6] This widespread network of coverage will be undergirded by an "intelligent sensing layer," a web of sensing & detecting technologies that will rapidly collect and analyze huge quantities of relevant data from these interconnected devices.[7] These two technologies in tandem could create a world where every piece of life is connected and every accompanying bit of data is collected.

Public reaction to these technologies will vary. Some will welcome the conveniences and synergies that these technologies offer, others will fear the establishment of a technological Panopticon. Consider the debate over universal facial recognition. San Francisco has banned the use of facial recognition technology by the police and other agencies, fearing intrusion into citizens' private lives.[8] In other parts of the world, from London to Beijing, facial recognition is common, and authorities hail the technology's ability to fight crime.[9] These debates will only grow as 6G expands the risks and rewards of large-scale interconnectivity.

Unfortunately, in the United States, regulators have not kept pace with AI's advances. AI regulation is "in its infancy."[10] Little has happened at the federal level: In 2019, the White House issued an Executive Order creating the "American AI Initiative," and the National Institute of Standards and Technology identified nine "areas of focus" for AI standards, but no binding policies have issued.[11] The United States Congress has introduced many bills to regulate artificial intelligence, but none have passed.[12]

This void has not been filled at the state level either, at least not in a consistent manner. The difficulties in regulating autonomous vehicles demonstrates this: States like Arizona have billed themselves as red-tape-free laboratories for autonomous vehicle innovation.[13] The results, however, have been less than stellar. A fatal accident in Arizona unveiled safety issues with prototypes that were then on the road, as a post-accident report revealed that Uber, the car's manufacturer, had disabled the car's autonomous emergency brakes and standard collision-avoidance system before the

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[6] Helin Yang et al., *Artificial Intelligence-Enabled Intelligent 6G Networks*, 34 IEEE NETWORK 6, 11 (2020), https://arxiv.org/ftp/arxiv/papers/1912/1912.05744.pdf at 11.

[7] *Id.* at 6.

[8] Kate Conger, Richard Fausset & Serge F. Kovaleski, *San Francisco Bans Facial Recognition Technology*, N.Y. TIMES (May 14, 2019), https://www.nytimes.com/2019/05/14/us/facial-recognition-ban-san-francisco.html.

[9] *Met Police to Deploy Facial Recognition Cameras*, BBC (Jan. 30, 2020), https://www.bbc.com/news/uk-51237665; Dave Davies, *Facial Recognition and Beyond: Journalist Ventures Inside China's "Surveillance State,"* NPR (Jan. 5, 2021, 12:50 PM), https://www.npr.org/2021/01/05/953515627/facial-recognition-and-beyond-journalist-ventures-inside-chinas-surveillance-sta.

[10] The LAW LIBRARY OF CONGRESS, REGULATION OF ARTIFICIAL INTELLIGENCE IN SELECTED JURISDICTIONS 1 (2019), https://www.loc.gov/law/help/artificial-intelligence/regulation-artificial-intelligence.pdf.

[11] *AI Standards*, NAT'L INST. OF STANDARDS & TECH. (Feb. 17, 2021), https://www.nist.gov/artificial-intelligence/ai-standards.

[12] *AI Legislation Tracker – United States*, CTR. FOR DATA INNOVATION (last visited Mar. 26, 2021), https://datainnovation.org/ai-policy-leadership/ai-legislation-tracker/.

[13] Cecilia King, *Where Self-Driving Cars Go to Learn*, N.Y. TIMES (Nov. 11, 2017), https://www.nytimes.com/2017/11/11/technology/arizona-tech-industry-favorite-self-driving-hub.html.

accident.[14] Autonomous vehicle manufacturers have openly sought consistent regulatory guidance.[15] This lack of regulatory cohesion among the states is repeated on an international scale, as countries have not coalesced under any sort of international standard.[16] Firms involved with AI technology should monitor the shifting regulatory sands, even potentially delaying large-scale investments until it becomes clear that they will receive the state's blessing.

Adding to these challenges, large-scale AI will take a long time to implement on a 6G network: This AI will require, among other things, an interconnected global network, which means 6G connectivity must be established before AI can really take off.[17] And, while AI could potentially decrease overall energy consumption by increasing network efficiencies, AI technologies require large amounts of energy for computation and communication, which could frustrate plans for energy-efficient implementation.[18] AI innovators must understand both the physical and governmental barriers that could slow the 6G revolution.

AI & IP

Even as AI patents have skyrocketed, a recent decision from the United States Patent and Trademark Office ("USPTO") threatens to curb a new source of AI intellectual property: Patents on products invented by artificial intelligence. In April 2020, the USPTO considered a case involving an AI called DABUS, a system of neural networks trained to independently recognize the novelty & salience of inventions.[19] DABUS "invented" two separate products without human intervention: An improved beverage container, and a "neural flame" device used in search-and-rescue missions.[20] The USPTO ruled that it could not list DABUS as the products' inventor, citing a number of references in the relevant statute to words like "individual," "herself," and "person" to conclude that an AI could not be listed as a patent's inventor.[21]

AI inventorship will only continue to grow. The USPTO says that the term "inventor" must refer to "the individual who invented or discovered the subject matter of the invention."[22] As time

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[14] Ryan Randazzo, *Uber Crash Death in Tempe: A Closer Look*, AZ CENTRAL (Mar. 17, 2019), https://www.azcentral.com/story/news/local/tempe/2019/03/17/uber-crash-death-who-blame-tempe-arizona-rafaela-vasquez-elaine-herzberg/3157481002/.

[15] Mark Albertson, *Death, Technology and Regulatory Uncertainty Keep Self-Driving Cars on the Fringe*, SILICONANGLE (Nov. 15, 2019 5:28 PM), https://siliconangle.com/2019/11/15/death-technology-regulatory-uncertainty-keep-autonomous-vehicles-fringe/.

[16] *See* Macy Bayern, *Autonomous Vehicles: How 7 Countries Are Handling the Regulatory Landscape*, TECHREPUBLIC (Feb. 5, 2020 10:48 AM), https://www.techrepublic.com/article/autonomous-vehicles-how-7-countries-are-handling-the-regulatory-landscape/.

[17] Yang, *supra* note 6, at 3-4.

[18] *AI and 6G Convergence: An Energy-Efficiency Perspective*, IEEE COMSOC (last visited Mar. 26, 2021), https://www.comsoc.org/publications/magazines/ieee-network/cfp/ai-and-6g-convergence-energy-efficiency-perspective.

[19] Application of Application No.: 16/524,350, at 3-4 (2020), https://www.uspto.gov/sites/default/files/documents/16524350_22apr2020.pdf.

[20] Leo Kelion, *AI System "Should Be Recognised as Inventor,"* BBC (Aug. 1 2019), https://www.bbc.com/news/technology-49191645.

[21] Application of Application No.: 16/524,350, *supra* note 19, at 8.

[22] *Id.* at 6.

passes, however, AI will gain an outsized role in creation of patentable devices and processes. Under this opinion, these devices will be unpatentable. If the USPTO stands by its decision, it will lead to enormous ramifications. The owners of AI systems will still want to protect their intellectual property rights, and may end up relying on other forms such as trade secret protection. That would be a massive change to the status quo, where patents dominate the enforcement landscape. Trade secret enforcement comes with its own set of challenges, including, for example, proving misappropriation and in some cases, showing how damages can be directly attributable to the misappropriation of the trade secret. Furthermore, increased reliance on trade secrets will force many companies to shift their IP policies and practices. One major challenge would be meeting trade secret law's requirement that a trade secret exists only as long as it is kept secret.[23] Even an accidental disclosure breaks trade secret protection.[24] A shift from patent to trade secret IP protection may force AI-based tech companies to update their employment agreements, as they would need to ensure that their employees never disclose the secrets underlying their firms' innovations, even after they leave the firm.

AI will play a growing role as 6G technologies advance. Firms should track both the scope of changes that seem likely to materialize, and the inventorship issue that could revolutionize our idea of innovation.

II. Spectrum

The advent of 6G technologies will also require a massive expansion of the regulatory structure around spectrum, the data-bearing frequencies that enable wireless communications.

6G requires frequencies in the 100 GHz to 1 THz range, which will allow for the extreme densification of communications systems, enabling hundreds and even thousands of simultaneous wireless connections with significantly higher capacity than 5G systems and networks.[25] These higher frequencies can support innovations including zero-latency local networks, wireless "fiber-like" data rates between local devices, wireless data center networks (reducing infrastructure cost), on-chip wireless networks, nano-networks (which connect nano-devices), and intersatellite communications, to give some examples.[26]

This spectrum revolution will require competent government regulation. In the current regime, two separate federal agencies in the United States are tasked with regulating frequency: the FCC, which governs private use of spectrum, and the National Telecommunications and Information Administration (NTIA), which manages the federal government's spectrum use.[27] In March 2019, the

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[23] Elizabeth A. Rowe, *Saving Trade Secret Disclosures on the Internet through Sequential Preservation*, 42 WAKE FOREST L. REV. 1, 8 n.17 (2007).

[24] *Id.* at 9.

[25] *UCSB Announces the Center for Converged TeraHertz Communications and Sensing*, SEMICONDUCTOR RSCH. CORP. (Jan. 18, 2018), https://www.src.org/newsroom/press-release/2018/923/.

[26] Ian F. Akyildiz, Ahan Kak, & Shuai Nie, *6G and Beyond: The Future of Wireless Communications Systems*, 8 IEEE ACCESS 133995, 134000 (2020).

[27] *Regulatory Challenges for the New Frontier of Medical Imaging: Terahertz Spectrum*, NAT'L L. REV. (Nov. 15, 2018), https://www.natlawreview.com/article/regulatory-challenges-new-frontier-medical-imaging-terahertz-spectrum; *Office of Spectrum Management (OSM)*, NAT'L TELECOMMS. & INFO. ADMIN. (last visited Mar. 29, 2021), https://www.ntia.doc.gov/office/OSM.

FCC voted to open frequencies up to 3 THz, saying it had "launched the race to 6G."[28] The FCC created "experimental licenses," intended to allow researchers to experiment in this range over the next ten years.[29] Currently, both the FCC and NTIA have jurisdiction over these higher-frequency spectrums, which means these higher spectrums require meaningful coordination between the two agencies.[30]

The presence of two regulatory agencies can have downsides for industry, as agencies can fight over territory, credit, and decision-making authority. For instance, the DOJ's Antitrust Division and the Federal Trade Commission (FTC) have overlapping authority to enforce antitrust laws.[31] This recently became an issue in a case where the FTC sought to impose antitrust liability on telecommunications manufacturer Qualcomm, while DOJ Antitrust argued that the same suit threatened national security because, by disadvantaging Qualcomm, it risked undermining US leadership in 5G technology and boosting Chinese manufacturer and alleged saboteur Huawei.[32] Industry participants should take note of the importance of playing nice with both agencies, and hope that the two do not come to industry-stalling blows.

III. Health Care

Another one of 6G's many revolutions will come in health care. 6G promises fully automated surgery,[33] the rapid transfer of medical data,[34] and fully implantable devices.[35] But where there is medicine, there are medical malpractice suits. 6G-enabled technologies could create a never-before-seen tidal wave of liability. 6G's infrastructure requirements will also pose a problem for medical providers who hope to rely on its interconnected technology.

Medical malpractice liability concerning defective devices is not a new phenomenon. Boundless examples spring to mind—to take just one, Stryker has paid over $2 billion to settle lawsuits stemming from their defective hip-replacement therapy.[36] The potential costs associated with 6G

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[28] Sean Kinney, *Looking Beyond 5G, FXX Opens up Terahertz Spectrum*, RCCWIRELESS NEWS (Mar. 19, 2019), https://www.rcrwireless.com/20190319/policy/fcc-terahertz-spectrum.

[29] *Id.*

[30] Monica Alleven, *FCC Moves to Open Spectrum above 95 GHz for New Technologies*, FIERCE WIRELESS (Mar. 15, 2019 12:32 PM), https://www.fiercewireless.com/wireless/fcc-moves-to-open-spectrum-above-95-ghz-for-new-technologies.

[31] John O. McGinnis & Linda Sun, *Justice-FTC Antitrust Feud Is the Wrong Kind of Competition*, WALL ST. J. (Aug. 13, 2020 12:36 PM), https://www.wsj.com/articles/justice-ftc-antitrust-feud-is-the-wrong-kind-of-competition-11597336577.

[32] *Id.*

[33] Khalida Sarwari, *What Does 6G Technology Hold in Store? Think Remote Surgery, Shared Virtual Spaces, and Robots that Search for Dirty Bombs*, NEWS@NORTHWESTERN (Sept. 3, 2020), https://news.northeastern.edu/2020/09/03/what-does-6g-technology-hold-in-store-think-remote-surgery-shared-virtual-spaces-and-robots-on-the-battlefield/.

[34] Sabuzima Nayak & Ripon Patgiri, *6G Communication Technology: A Vision on Intelligent Healthcare*, IEEE INTERNET OF THINGS J. (2020), https://arxiv.org/pdf/2005.07532.pdf.

[35] Renan C. Moioli et al., *Neurosciences and 6G: Lessons from and Needs of Communicative Brains* (last visited Mar. 26, 2021), https://arxiv.org/pdf/2004.01834.pdf.

[36] *Stryker Hip Replacement Lawsuits*, DRUGWATCH (last visited Mar. 26, 2021), https://www.drugwatch.com/hip-replacement/stryker/lawsuits/#2-billion-settlement.

technologies could make that sum look puny by comparison. Consider the implementation of a 6G-powered brain-computer interface (BCI).[37] The BCI allows individuals to control machines with their brains, offering a host of innovations: Sophisticated prosthetic limbs, improved memory for patients suffering from Alzheimer's, and similar technologies.[38] But the promise and potential profit of these innovations comes with enormous potential liability. Individual brain-damage medical malpractice suits can result in judgments of millions of dollars.[39] A brain-damage class action would threaten manufacturers with crushing liability. And as is common with medical device litigation, the liability would not solely lie on manufacturers: Any party in the distribution chain, from manufacturers, to hospitals, to doctors, needs to beware this potential tidal wave of liability, securing liability insurance at the very least.[40]

IV. Infrastructure

6G will also face numerous challenges around infrastructure. A global 6G network requires a tightly-nested web of transmitters and base stations. Because 6G base stations are anticipated to have a transmission distance below 200 meters, some estimates say full 6G implementation will require 100 billion base stations globally.[41] The placement of 5G towers, which average one per block in many U.S. cities, has sparked fights about local autonomy and property rights, as many states have barred cities from setting the rates they charge companies for the right to erect antennae.[42] The vastly increased scale of 6G base stations poses a greater problem, especially as firms and large data-driven entities advocate for rapid implementation of profitable 6G infrastructure.

These infrastructure battles will not just confine themselves to the planet's surface. Nations have already begun building 6G networks from above, launching satellites that could one day offer worldwide 6G connectivity from the sky.[43] This proliferation of satellites creates a host of issues, from the creation of clouds of "space junk" that increase the risks of satellite collisions,[44] to the stoking of

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[37] *Brain-Computer Interfaces Are Coming. Will We Be Ready?*, RAND CORP. (Aug. 27, 2021), https://www.rand.org/blog/articles/2020/08/brain-computer-interfaces-are-coming-will-we-be-ready.html.

[38] *Id.*

[39] P.J. D'Annunzio & David Gialanella, *Suit over Teen's Brain Injury During Anesthesia Settles for $9.38 Million*, LAW.COM (Sept. 11, 2020 12:27 PM), https://www.law.com/njlawjournal/2020/09/11/suit-over-teens-brain-injury-during-anesthesia-settles-for-9-38-million/.

[40] Lars Noah, *This Is Your Products Liability Restatement on Drugs*, 74 BROOK. L. REV. 839, 917 (2009).

[41] Naoki Watanabe, *Race for 6G: South Korea and China Off to Early Leads*, NIKKEI ASIA (June 3, 2020 9:09 AM), https://asia.nikkei.com/Business/Technology/Race-for-6G-South-Korea-and-China-off-to-early-leads.

[42] Carey L. Biron, *Cities Argue 5G Internet Rollout Laws Violate Property Rights*, CHRISTIAN SCI. MONITOR (Mar. 2, 2018), https://www.csmonitor.com/Technology/2018/0302/Cities-argue-5G-internet-rollout-laws-violate-property-rights.

[43] Casey Tonkin, *China Launched a 6G Satellite – So What?*, INFORMATIONAGE (Nov. 24, 2020 11:45 AM), https://ia.acs.org.au/article/2020/china-launched-a-6g-satellite---so-what-.html.

[44] Arjun Kharpal, *Space Companies Are Racing to Beam Web Access to the Entire Planet. But "Space Junk" Is a Big Worry*, CNBC (Feb. 16, 2020 11:39 PM), https://www.cnbc.com/2020/02/17/space-junk-raise-concerns-as-more-and-more-satellites-are-launched.html.

tensions between world powers over interstellar dominance.[45] These battles could be fought at a lower altitude, as researchers have proposed using unmanned aerial vehicles (drones) to establish 6G networks.[46] But even at this lower altitude, industry participants must remain mindful of impending regulations in this space: The regulatory environment is still developing, with the FAA announcing a set of rules in December 2020.[47]

V. Privacy

Privacy may be the most important legal issue surrounding 6G innovation: When technology promises global connectivity, an individual's entire life risks becoming one data breach away from disclosure. But along with that risk, 6G offers an almost utopian promise of privacy. Quantum computing-based protections that could make 6G systems impossible to compromise. The ultimate role of 6G in society may be determined by whether this promised safety can allay well-grounded fears of a potential breach of the interconnected network that will hold all of society's data.

Current FTC regulations require firms to take "reasonable security" measures.[48] A web of regulators patrol privacy issues: The SEC creates guidelines for cybersecurity in finance,[49] DHS investigates cybercriminals,[50] and Commerce "is tasked with enhancing cybersecurity awareness and protections."[51]

States have implemented their own regulations. To give just one example, New York recently enacted the SHIELD Act, which, among other things, requires companies to carry out "reasonable" security measures, including implementing procedures to train employees and "adjust[ing] the security program in light of business changes or new circumstances."[52] The Act also permits the attorney general to levy a fine of up to $5,000 for each failure to adhere to reasonable security standards under Section 350(d) of the New York General Business Law.[53]

Both federal and state laws use reasonableness as a starting point, but it is impossible to predict what security protocols will be "reasonable" in 6G's new frontier. The difficulty of predicting and adapting to 6G's innovations will have real consequences for industry players due to the harsh

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[45] Jacqueline Feldscher & Liu Zhen, *Are the U.S. and China on a War Footing in Space?*, POLITICO (June 16, 2019), https://www.politico.com/story/2019/06/16/war-in-space-trump-china-1365842.

[46] *See* Mustafa A. Kishk et al., *Aerial Base Stations Deployment in 6G Cellular Networks Using Tethered Drones: The Mobility and Endurance Trade-off* (Aug. 12, 2020), https://ieeexplore.ieee.org/document/9205314.

[47] *Press Release – U.S. Department of Transportation Issues Two Much-Anticipated Drone Rules to Advance Safety and Innovation in the United States*, FED. AVIATION ADMIN. (Dec. 28, 2020), https://www.faa.gov/news/press_releases/news_story.cfm?newsId=25541.

[48] Bailey Sanchez, *The Evolution of the "Reasonable Security" Standard in the US Context*, IAPP (June 4, 2020), https://iapp.org/news/a/the-evolution-of-reasonable-security-derived-from-ftc-orders-and-state-legal-developments/.

[49] *Cybersecurity*, SECS. & EXCH. COMM'N (Feb. 26, 2021), https://www.sec.gov/spotlight/cybersecurity.

[50] *Cyber Crime Cases*, DEP'T OF HOMELAND SEC. (Aug. 18, 2016), https://www.dhs.gov/cyber-crime-cases.

[51] *Cybersecurity*, U.S. DEP'T OF COM. (last visited Mar. 26, 2021), https://www.commerce.gov/issues/cybersecurity.

[52] *The SHIELD Act: How Businesses across the US Can Comply with New York's New Data Security Law*, JDSUPRA (Nov. 4, 2019), https://www.jdsupra.com/legalnews/the-shield-act-how-businesses-across-52381/.

[53] S.5575B Reg. Sess. 2019-2020 (N.Y. May 7, 2019).

penalties imposed by new state-level privacy laws. The California Consumer Privacy Act, enacted in 2018, assesses fines at $750 per breach per consumer per incident, or actual damages. Additionally, plaintiffs in private litigation have struggled in some fora to show harm from data breaches, but that could become easier as 6G networks will likely increase our reliance on data.[54] In an interconnected society, a single data breach could lead to catastrophic legal damages for the victimized firm.

On the other hand, 6G could offer a privacy renaissance, allowing people the data security of the analog age while providing the efficiencies and benefits of a globally connected network. This would come about through quantum computing, an innovative data-protection tool. Quantum computing very generally involves computers that embrace uncertainty in the way they perform computations (as opposed to traditional computers, which reduce calculations to deterministic, binary, on-off switches).[55] Quantum computing can create something called quantum encryption, which is virtually unbreakable. Right now, encryption is accomplished via asymmetric cryptography, a process by which data are encoded with a public key, accessible to all, but can only be decoded with a private key.[56] Modern keys are easy to generate but very difficult to reverse-engineer with current computing technology. That will change with quantum computers, which can solve these problems exponentially more quickly. Quantum computing lets cryptographers create secure keys by leveraging the uncertainty principle, the idea central to quantum encryption that an attempt to measure a piece of information disturbs the system in a way that can be detected.[57] The sending computer transmits the key to decode the encrypted data to the receiving computer, but both can sense a disturbance in the data if there is one, at which point the sending computer sends a different key, and on and on until one finishes transmission without being disturbed.

This increase in encryption technology, however, risks magnifying a separate issue posed by tough encryption locks: The (in)ability of law enforcement officials to access the electronic devices of the accused. The government has clashed with tech firms in the past over this issue—in 2016, the FBI and Apple stalemated over the FBI's request that Apple unlock the phone belonging to the perpetrator of a mass shooting in San Bernardino, a stalemate only broken when the FBI paid a third party over $1 million to hack the device.[58] Once encryption becomes functionally unbreakable, the interest of the government and the world's largest corporations will come to a head. The outcome of such a clash is impossible to predict.

6G technology will change the world in ten years. Companies who hope to change the world alongside it need to begin planning for it now, both by investing in R&D and by considering the legal issues, in this memo and beyond, that will control the battle for 6G dominance.

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[54] *Attias v. CareFirst, Inc.*, EPIC.ORG (last visited Mar. 29, 2021), https://epic.org/amicus/data-breach/carefirst/.

[55] Amit Katwala, *Quantum Computing and Quantum Supremacy, Explained*, WIRED (Mar. 5, 2020), https://www.wired.co.uk/article/quantum-computing-explained.

[56] Sophie Bushwick, *New Encryption System Protects Data from Quantum Computers*, SCI. AM. (Oct. 8, 2019), https://www.scientificamerican.com/article/new-encryption-system-protects-data-from-quantum-computers/.

[57] Cryptography in the Quantum Age, NAT'L INST. OF STANDARDS & TECH. (Mar. 30, 2018), https://www.nist.gov/topics/physics/introduction-new-quantum-revolution/cryptography-quantum-age.

[58] Dan Goodin, *Unable to Unlock Gunman's iPhones, the FBI (Once Again) Asks for Aplpe's Help (Updated)*, ARS TECHNICA (Jan. 13, 2020 5:05 PM), https://arstechnica.com/tech-policy/2020/01/fbi-seeks-apples-help-in-unlocking-iphones-belonging-to-pensacola-gunman/.

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