

Forget 5G, the US and China are already fighting for 6G dominance

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Most of the world is yet to experience the benefits of a 5G network, but the geopolitical race for the next big thing in telecommunications technology is already heating up.

For companies and governments, the stakes couldn't be higher. The first to develop and patent 6G will be the biggest winners in what some call the next industrial revolution. Though still at least a decade away from becoming reality, 6G—which could be up to 100 times faster than the peak speed of 5G—could deliver the kind of technology that's long been the stuff of science fiction, from real-time holograms to flying taxis and internet-connected human bodies and brains.

The scrum for 6G is already intensifying even as it remains a theoretical proposition, and underscores how geopolitics is fueling technological rivalries, particularly between the U.S. and China.

"This endeavor is so important that it's become an arms race to some extent," said Peter Vetter, head of access and devices at Nokia Oyj's research arm Bell Labs. "It will require an army of researchers on

it to remain competitive."

Years of acrimony under the Trump administration have hit Chinese technology companies hard, but that hasn't stopped the country from emerging as the leader in 5G. It has the world's largest 5G footprint, and—despite multiple attempts by the U.S. to take it on—Huawei Technologies Co. towers over rival 5G vendors globally, mostly by offering attractive prices.

The development of 6G could give the U.S. the opportunity to regain lost ground in [wireless technology](#).

"Unlike 5G, North America will not let the opportunity for a generational leadership slide by so easily this time," said Vikrant Gandhi, senior industry director of information and communications technologies at consultancy firm Frost & Sullivan in the U.S. "It is likely that the competition for 6G leadership will be fiercer than that for 5G."

It's clear that 6G is already on the minds of policy makers in both Washington and Beijing. Former President Donald Trump tweeted in early 2019, for example, that he wanted 6G "as soon as possible."

China is already moving ahead. The country launched a satellite in November to test airwaves for potential 6G transmission, and Huawei has a 6G research center in Canada, according to Canadian media reports. Telecommunications equipment manufacturer ZTE Corp. has also teamed up with China Unicom Hong Kong Ltd. to develop the technology.

The U.S. has demonstrated that it has the ability to seriously handicap Chinese companies, as in the case of ZTE, which almost collapsed after the Commerce Department banned it for three months in 2018 from buying American technology. Similar moves could hamper Huawei's 6G ambitions.

Washington has already started to sketch out the 6G battle lines. The Alliance for Telecommunications Industry Solutions, a U.S. telecom standards developer known as ATIS, launched the Next G Alliance in October to "advance North American leadership in 6G." The alliance's members include technology giants like Apple Inc., AT&T Inc., Qualcomm Inc., Google and Samsung Electronics Co., but not Huawei.

The alliance mirrors the way that the world has been fractured into opposing camps as a result of 5G rivalry. Led by the U.S, which identified Huawei as an espionage risk—an allegation the Chinese giant denies—countries including Japan, Australia, Sweden and the U.K. have shut the firm out of their 5G networks. However, Huawei is welcomed in Russia, the Philippines, Thailand, and other countries in Africa and the Middle East.

The European Union in December also unveiled a 6G wireless project led by Nokia, which includes companies like Ericsson AB and Telefonica SA, as well as universities.

The lack of trust in Chinese companies like Huawei is unlikely to abate with 6G. Democracies are growing increasingly worried about how 5G technology is being used by authoritarian regimes, with fears that 6G could enable technologies such as mass drone surveillance. China is already using surveillance cameras, AI, facial recognition and biometrics such as voice samples and DNA to track and control citizens.

"Currently China seems to be doing everything in terms of surveillance and suppression to make sure that they lose future markets in the U.S. and Europe," said Paul Timmers, a senior adviser at Brussels-based think tank European Policy Centre and former director of digital society and cybersecurity at the European Commission. "This indicates that the technical approach to 6G cannot be trusted to be decoupled from state ideological objectives."

While commercial 5G was introduced around 2019, countries are still rolling out networks and developing applications that could attract businesses and turn the technology profitable.

Likewise, 6G may not reach its potential at least 15 years from now, said Gandhi of Frost & Sullivan. Only about 100 wireless carriers worldwide offer 5G services in limited areas right now.

But researchers have an ambitious vision for what the next-generation network could offer. At a potential rate of 1 terabyte per second, 6G is not only much faster, but also promises a latency—which causes lags—of 0.1 millisecond, compared to 1 millisecond, or the minimum for 5G. To achieve that, scientists are focusing on the super high frequency terahertz waves that could meet those speed and latency requirements, though there is not yet a chip capable of transmitting so much data in a second.

It still remains too early to tell whether the envisioned futuristic world defined by 6G will eventually materialize. In that theoretical world, everything in our environment will be connected to the 6G networks—not only can people communicate with things like furniture and clothes, but those gadgets can also communicate among themselves.

Major scientific obstacles abound—for example, researchers must solve the question of how airwaves traveling extremely short distances can easily penetrate materials such as water vapor or even a sheet of paper. Networks may need to be ultra-dense, with multiple [base stations](#) installed not only on every street, but also in each building or even each device people use to receive and transmit signals. That's set to raise serious questions over health, privacy and urban design.

"Technological advances, especially those as futuristic and complex such as 6G radio communication should be developed carefully," said Gandhi. "We believe that countries cannot start soon enough. The private sector cannot start soon enough. And that is why we already have initiatives such as the Next G Alliance.

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