

In A 5G Future, Physical Work Won't Require Your Physical Presence



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Innovation

An industrial site in central China has all the ingredients an observer would expect to see in an active surface mine. Giant scarred areas show where machines have clawed out ore. Excavators are in motion, dumping the ore into giant trucks that take it to a processing facility.



GETTY

What's striking about this scene, though, is just how few people appear to be involved. **There are no people in any of the cabs.** The machines are all robots. Tucked away in the quiet comfort and safety of a nearby office, a heavy equipment operator sits in a replica of an excavator's cab, which is outfitted with a wall of monitors. It's from here that the operator remotely pilots the machine via a 5G connection—protected from the dirty, dangerous work outside.

The scene showcases one of the many industries that are changing as a result of technology that no longer requires physically present workers. It's happening in so many industries that the phenomenon now has a name: Tele-Everything, or Tele-X.

“We are increasingly at the point where ultra-fast networks—and drone machines that have artificial intelligence and machine vision embedded within them—are letting us do new things,” said Matthew Griffin, a futurist, speaker and author who runs the U.K.-based 311 Institute.

Griffin said Tele-X took the limelight in his own country when people needed it most. “These capabilities really were supercharged by the Covid-19 pandemic,” he said.

Pre-vaccine control measures put surgeons out of service if they were potentially exposed to the virus. Required self-isolation could have created an even more significant ripple effect through the healthcare system if their medical expertise were also quarantined.

But the widespread adoption of telemedicine allowed them to watch surgeries over the shoulders of less-experienced doctors and guide them to success.

“If we can find ways for miners, construction workers and surgeons to work remotely via Tele-X, we can do that in almost any industry,” Griffin said.

Three Ways To Reach Out

Tele-X comprises three forms of remote connectivity. The first is video **teleconferencing**, which office workers and students worldwide know so well.

The second is **telepresence**. That's when technology allows people to feel as if they are in a different physical location. This is the next generation of teleconferencing being ushered in by innovations like virtual, augmented or mixed reality. The global telepresence market [was valued](#) at more than \$1 billion in 2018 and was expected to grow to more than \$5 billion by 2026. Innovators like [Omnivor](#), a graduate of [T-Mobile's 5G Open Innovation Lab](#), are developing holographic telepresence to make three-dimensional collaboration a reality.

The third kind of Tele-X involves **teleoperations**. That's when a person connects to a robot to perform physical actions remotely, like the clean and

comfortable miner in China. A research report by Mind Commerce estimates that the [global teleoperations and telerobotics market will reach \\$76.5 billion](#) by 2026.

As 5G becomes more prevalent, the opportunities for remote operations are about to explode. Scientists and engineers can slip into their 3D avatars to collaborate across continents. Technicians on Earth can be digitally present on the International Space Station to help repair complicated systems. A construction company can erect a building that's in another country.

The network's high bandwidth and low latency mean a human pilot can see everything and remotely control a dextrous robot to perform complex operations in dangerous environments like the site of Japan's Fukushima Daiichi nuclear disaster. That's the idea behind a recently announced [collaboration between T-Mobile and Sarcos Robotics](#).

Reliable, fast and low-latency 5G also puts the burgeoning world of telesurgery on the table for many more potential uses.

Blurring The Lines Between Real And Digital

But the 9-to-5 grind is only part of the Tele-X story. Griffin said the potential of 5G-enabled Tele-X goes far beyond work. The biggest use case for it might turn out to be very personal, which translates to an ample business opportunity.

The key to a user experiencing true telepresence is going beyond sights and sounds like those offered by current versions of VR/AR. It's also about minimizing lag time across user connections and increasing bandwidth for photorealistic environments that will make every interaction true to life—as if remote users were in the same room together.

5G will open up a more immersive multisensory reality to stream across the internet, including touch and even taste and smell experiences. This capability opens a portal into a fully realized shared world for users, a robust mix of physical and digital realities that some are calling “the metaverse.”

“You could have users playing rugby together, tackling each other off their feet and high-fiving each other, but they're all living in different parts of the world,” Griffin said. “You could deposit an audience in a movie that was shot in VR. 5G is very important for us moving to the metaverse with ultra-realistic virtual worlds.”

Like in the Chinese mining example, researchers see 5G as the key to teleoperations in dirty, dangerous environments. Members of a [research lab in Zurich](#) recently won a competition by successfully operating a remote walking excavator. The key was connecting the machine to a control booth over a 5G connection so the four high-definition cameras, a laser scanner and other sensors on the vehicle could transmit data at 50 megabits per second to give the operator a clear view from the robot's perspective.

As people adopt 5G and the technologies that exploit all that it offers, a new Tele-X world is coming into view. Physical presence will continue to lose its importance in many professional and personal applications, even after the Covid-19 pandemic becomes a memory.

Regardless of industry, nationwide 5G lays the foundation for businesses to build what's next. From more efficient field operations to smarter cities, [see what the 5G future could look like—and why choosing the right network provider matters.](#)

5G: Capable device req'd; coverage not available in some areas. Some uses may require certain plan or feature; see T-Mobile.com. Ultra Capacity 5G includes dedicated mid- and/or high-band 5G signals. T-Mobile's Ultra Capacity 5G covers hundreds of cities and millions of people, with more added all the time; see [T-Mobile.com/5Glayers](https://www.t-mobile.com/5Glayers).



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