

**REMARKS OF FCC CHAIRMAN AJIT PAI  
AT THE HAWAII INTERNATIONAL CONFERENCE ON SCIENCE SYSTEMS**

**MAUI, HAWAII**

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Thank you, President Lassner, for that introduction. And more importantly, thank you for inviting me. It's clichéd for speakers to say they are "happy to be here," but when you're at a conference like this, you really, really mean it. How happy am I? Three days ago, the FCC's headquarters closed early for a snowstorm. Today, I'm here in Hawaii celebrating my birthday with all of you.

Hawaii is famously known as the 50<sup>th</sup> state. But, for me personally, Hawaii is the 49<sup>th</sup> state. Let me explain. Ever since I became an FCC Commissioner in 2012, I've made it a point to get out of Washington, DC, whenever I can. And after my appointment as Chairman in January 2017, I decided to take it up a notch. Over the past three years, I've visited all 48 states in the continental United States, not to mention trips to two U.S. territories. You might be wondering: how does the FCC Chairman crisscross the country like that? Does he have special access to government aircraft? I wish. My secret to air travel is perhaps best characterized as Seat 38E, with a healthy dose of TSA PreCheck. And on the roads, I've logged about 15,000 miles in some hard-working rental cars. For context, it's about 5,000 miles from here to our nation's capital. So, imagine driving that distance, then back, and then back again.

After a trip to Nebraska in September, I'd checked the first 48 states off my list, leaving Hawaii and Alaska to go. Now, here I am in the 49<sup>th</sup> state I've visited as FCC Chairman, and I couldn't be more delighted.

You might be wondering, why did I go to all this trouble? My wife has been known to ask the same question. My travel schedule has certainly been atypical of FCC chairmen. Traditionally, most ventures outside the Beltway for my predecessors have been to major technology and media hubs like New York, Los Angeles, and Silicon Valley, or to attend conferences in cities like Las Vegas. My travels have certainly carried me to these same places. But I'm pretty sure I'm the first FCC Chairman whose work has taken him through Ellsworth, Wisconsin, the Cheese Curd Capital of America.

There's a method to this madness.

On planes, trains, and automobiles, I've held two messages in mind. First, I want to shine a light on how high-speed Internet access, and what I call "digital opportunity," can open up new possibilities for American consumers, one community at a time. And at the same time, I want to explore how the lack of high-speed Internet access is causing problems for the people and places being bypassed by the broadband revolution.

These are more than messages. They inform the Commission's two core missions and motivate me to keep pushing forward.

The FCC's first and foremost mission is to help ensure that every American can access advanced communications. On my first full day in this job in January 2017, I convened a meeting of the FCC's staff. I told them that our number one priority would be closing the digital divide and bringing the benefits of the Internet age to all Americans. And for good reason. The FCC's founding statute, the Communications Act of 1934, explicitly directs the FCC to make wire and radio communication "available . . . to all the people of the United States."

And second, the FCC aims to promote innovation and investment across the communications sector. With each new breakthrough, we increase the value of being connected and unlock opportunities to improve the lives of our citizens.

These two missions are more important than ever before.

Think about it. In 1934, the U.S. government thought it was so important that every American have access to the telephone network that they created a new agency dedicated to that purpose. Back then, enabling everyone to make a voice call, primarily on Ma Bell's network, was a cutting-edge notion. One company, one service, one focus. But now imagine the countless ways that we rely on high-speed broadband connectivity today. Telemedicine, precision agriculture, education, gaming, so many other applications—and, yes, the occasional voice call.

The Internet has become an indispensable platform for innovation, job creation, and free expression. It is critical to our quality of life and our global competitiveness.

And we are on the cusp of major new advances. I came here from the Consumer Electronics Show in Las Vegas. For those of you who are unfamiliar with this annual ritual, every January, about 175,000 tech enthusiasts gather in Las Vegas to get a look at the latest gadgets, products, and services. Some of the innovations on display may never make it to market—I'm not sure there's strong demand for a robot that brings you toilet paper on demand—but the show gives you a good sense of industry trends.

And one trend is beyond doubt. To take advantage of the major innovations that will be introduced in the coming years, Americans will need to be connected. And that, of course, only serves to underscore why the FCC's top priority must be to expand the deployment of high-speed broadband networks to all Americans.

This isn't an easy priority to meet. Much has to go right for wired and wireless connectivity to be delivered to millions of unserved and underserved Americans. For one thing, it requires tens of billions of dollars each year in private investment. Also, America is a large place, and geography and sparse population density can undermine any business case. Work crews can be hard to find; not every American is willing to climb a 2,000-foot tower to place an antenna or dig through the muck to lay an optical fiber line. And, closer to my bailiwick, bureaucratic red tape at all levels of government can slow the pace and increase the cost of network deployment, or even prevent new deployments altogether.

This last factor is why, across the board, the FCC has been working hard to modernize its regulations and clear unnecessary roadblocks to network investment.

For example, to promote the deployment of wired infrastructure like fiber, the FCC has made it easier and cheaper for broadband providers to access utility poles—a critical input into building a broadband network. We've also made it easier for companies to transition away from yesterday's copper lines toward tomorrow's fiber networks. We recognize that every dollar that's spent propping up copper can't be spent installing fiber.

On the wireless side, we've established a more consistent and certain regulatory framework for installing wireless infrastructure. For instance, we've set a reasonable timeline for cities to review and act upon small-cell siting applications. And we've adopted reasonable limits on siting fees charged by municipalities that still ensure that they can cover their costs.

In addition to encouraging private investment, we also want new competitors to enter the market. There are a lot of promising developments on this front. One of the most exciting has been the emergence of new space-based broadband technologies. With the approval of the FCC, multiple companies are pursuing plans to send thousands of small satellites into low-Earth orbit to provide high-speed broadband, including to remote areas of the country and the world. These new networks promise much faster and more reliable satellite broadband services than we've seen previously and could help us reach our nation's hardest-to-serve areas. Just this week, SpaceX launched a rocket carrying 60 of these satellites. OneWeb will launch 34 satellites of its own in February. And there are reports that these companies could begin offering residential Internet access service by the end of the year.

And beyond residential service, even more satellite companies are pursuing innovative ideas. For instance, the FCC recently licensed a small company named Swarm Technologies to provide non-

geostationary mobile satellite service, via 150 small satellites operating in low-Earth orbit. This satellite connectivity will enable farmers to have sensors where there is no cellular coverage, supporting new precision agriculture applications. We've now entered an era in which innovation in the heavens is changing how our farmers work the earth.

Stepping back, I'm pleased to report that our strategy of encouraging investment and innovation is working. After falling in 2015 and 2016, broadband investment in the United States increased in 2017 and 2018. And by almost every meaningful metric, America's broadband networks have been expanding and improving.

For example, 2018 was a record-setting year for fiber deployment in the United States, with buildout to nearly six million additional homes. Well, I should say that was the record—until it was broken in 2019 with the deployment of even more fiber. We've also seen significant increases in broadband speeds. Since December 2017, the average fixed broadband download speed in the United States has increased by about 70%.

But for all this progress, we recognize that there are certain high-cost, low-population areas where the economic incentives for stand-alone private investment just don't exist. So, to connect those areas, the FCC runs a subsidy program called the Universal Service Fund. Under this program, we provide direct funding that leverages—not displaces—investments by private carriers.

One of those private carriers is Hawaiian Telcom. As part of what we called our Connect America Fund Phase II auction, the FCC recently awarded the company \$18.1 million in funding over the next decade to bring high-speed broadband to more than 3,900 unserved homes and small businesses in rural Hawaii. Earlier today, I got to see some of these homes in the small community of Huelo on Maui. The company is providing gigabit fiber service to these homes—places that previously had no service at all. That is the digital divide closing in a big way.

We want to see more progress like this. And so earlier this week, I announced that at the FCC's January 30 public meeting, we'll vote on our most ambitious initiative yet to close the digital divide. Specifically, we'll aim to establish the Rural Digital Opportunity Fund. This Fund would provide up to \$20.4 billion over the next decade to support the deployment of high-speed broadband networks in those parts of rural America that currently lack fixed broadband service that meets the Commission's baseline speed standards. And based on our initial estimates, which I must caution are subject to change, approximately six million homes and small businesses in the United States are located in areas that would be eligible for the auction's first phase. Around 17,000 of them are located in rural Hawaii.

To maximize the impact of our investments, we would use a multi-round, descending-clock reverse auction. The Commission used this same reverse-auction approach for our 2018 Connect America Fund Phase II auction, and it helped us fund the deployment of high-speed broadband to 713,000 unserved rural homes and businesses for just 30% of our projected cost.

But I'm proposing that the Rural Digital Opportunity Fund also include some important improvements to what we did in 2018. I want to make these changes in order to encourage the deployment of networks that will stand the test of time and support the applications of tomorrow, as well as those of today. In particular, I'm proposing that we increase the chances that bidders committing to deploying faster broadband service will win subsidies in the auction. And that we more than double the minimum speed that bidders must provide.

If my colleagues join me in supporting this proposal in three weeks, the Rural Digital Opportunity Fund could transform the lives of millions of our fellow citizens in rural America and revitalize parts of our country that are currently being left out of our digital economy.

By expanding access to high-speed broadband, we will expand access to jobs, expand access to education, expand access to entertainment and culture, expand access to civic participation, and expand access to healthcare.

I'd like to take some time to elaborate on that last one.

When we talk about the digital revolution, no area has greater potential for transformative change in the coming years than healthcare. Strong, low-latency connectivity can accelerate the shift in care delivery from the "point of care," like a clinic or hospital, to the "point of need," such as the home. With wireless sensors and ubiquitous connectivity, healthcare professionals can remotely monitor your health, and data can be transmitted to your doctor before problems become emergencies.

This vision of modernized digital care is already coming to life through an initiative launched by the Department of Veterans Affairs. They have an ambitious goal of being able to provide care to any VA beneficiary "from anywhere to anywhere." I've seen this approach in action during visits to VA medical centers all across this country, from Providence to Boise to Lecanto, Florida. A little over a year ago, I spoke to a veteran living in Paradise, Texas, population 441. He told me the mental health treatment he received from the VA has helped him lose 80 pounds and get off blood pressure medication for the first time in 15 years. The thing is, I was speaking to him from the VA National Tele-Mental Health Hub in Salt Lake City—more than a thousand miles away. I can't say that his life is perfect—he told me he was a Dallas Cowboys fan, and, well, they've been having problems. But it's much better than before.

In Eastern Kentucky's Appalachian region, a new demo of connected cancer care offers yet another innovative model of broadband-enabled healthcare. This collaboration is unique. It's a multi-stakeholder, public-private partnership. It would bring Internet-enabled specialty care closer to patients who live far away from the nearest cancer treatment center. And it aims to deliver services differently—by gathering detailed information about symptoms from the patient between visits, connecting the patient to real-time interventions and local resources, and better engaging caregivers in supporting the patient. This potential is one reason why I was proud to pioneer a working relationship between the FCC and the National Cancer Institute, focusing on how Internet access and adoption in rural areas can help address the burden of symptom management for cancer patients.

Recently, the concept of connected care anywhere "boldly went where no man has gone before." A few months ago, an astronaut on the International Space Station discovered that he had a potentially fatal blood clot. Using telemedicine, the astronaut was evaluated by a specialist at the University of North Carolina at Chapel Hill and put on a treatment regimen that solved the problem. So, when we say telehealth makes it possible to reach patients anywhere, we mean *anywhere*.

At the FCC, we believe that broadband-enabled innovation represents a sea change in healthcare delivery—one that will broadly impact the field of healthcare. We want to encourage that innovation, which means ensuring that broadband is as ubiquitous as possible. We don't want connectivity gaps that could hold back digital medicine.

The FCC's biggest initiative in this regard is the Rural Health Care program, a stand-alone program that is part of the Universal Service Fund and is dedicated to meeting the connectivity needs of rural hospitals and clinics. Under my leadership in 2018, the FCC raised the budget for the Rural Health Care program for the first time in the program's two-decade history. Since 1997, annual funding was set at \$400 million, even as the population increased and connected care demand expanded. We increased that funding by more than 40%, to \$571 million, and going forward, that budget will now be adjusted for inflation.

Now, the Rural Health Care program involves connectivity at healthcare facilities. But as I mentioned, we recognize that the model of healthcare delivery is being inverted, with patients being monitored outside these facilities. So, we've proposed a three-year, \$100 million Connected Care Pilot

Program. This pilot would aim to boost health care providers' connected care efforts and would give us valuable data as we consider future policy initiatives.

Another way the Commission is working to promote digital health solutions is our work to realize the promise of 5G, the fifth generation of wireless connectivity. 5G networks will be 100 times faster, maybe even more, than the 4G networks we use today. They will have lag times that are one-tenth of what they are today. And they'll have much more capacity, being able to connect as many as one million devices per square kilometer.

These networks will be able to support the real-time, high-quality video needed for the most advanced forms of telemedicine. They will fuel exponential growth in the Internet of Things, which will support remote patient monitoring and foster device innovation. And who knows? Maybe in the future, they'll even make remote surgery commonplace.

To promote U.S. leadership in 5G, the FCC has been pursuing a strategy to Facilitate America's Superiority in 5G Technology. The 5G FAST plan includes three key components: freeing up spectrum, promoting wireless infrastructure, and modernizing regulations to encourage fiber deployment. Many of these infrastructure policies overlap with our efforts to bridge the digital divide, so I won't repeat it again here.

But on the spectrum front, we've been very aggressive in pushing airwaves into the commercial marketplace. Last year, the FCC successfully concluded the United States' first two auctions of millimeter-wave spectrum for 5G services, in the 28 GHz and 24 GHz bands, respectively. We're currently holding an auction of the upper 37 GHz, 39 GHz, and 47 GHz spectrum bands. All told, we are making available almost five gigahertz of high-band spectrum for commercial use. To put that in perspective, that is more spectrum than is currently used for terrestrial mobile broadband by all wireless service providers in the United States combined.

We're also pursuing additional opportunities to free up mid-band spectrum for next-generation wireless networks. We have a 3.5 GHz auction coming up in June, and I intend to start an auction of spectrum in the 3.7 GHz band later this year. We also have been making progress on the 2.5 GHz band, which hasn't reached its full potential since it was first targeted by the FCC in 1963. Through all these efforts, we could make more than 600 megahertz of mid-band spectrum available for 5G deployments.

I'd like to close where I began, with my 15,000-mile tour across America. When I first started taking these road trips, we were calling them part of my "Digital Divide" tour. But the more I traveled the country, the more I realized that didn't quite capture what I was seeing. Yes, I heard many stories of people and places being left behind by the digital revolution, some of which were heartbreaking. But the overwhelming majority of the interactions that I had on the road left me more hopeful than discouraged. I would hear stories of entrepreneurs who were using technology to open or grow their businesses, like small businesswomen in Sioux Falls, South Dakota. I would meet students who were pursuing learning opportunities that were only available because of a broadband connection, like an 8<sup>th</sup> grade student in the Jemez Pueblo, a New Mexico Indian reservation. I would meet people who were managing their diabetes more effectively thanks to remote monitoring, saving them time and money, like former NBA star Dominique Wilkins in Atlanta.

Even in those places I visited that were offline, I was inspired by the determination of the people in those places to aspire to something better and to fight to make it possible. That's why we stopped calling it a "Digital Divide" tour and started calling it "Digital Opportunity" tour. Because for all the challenges we face, the opportunities are so much greater. It's been the greatest honor of my life to help the American people seize those opportunities. I hope to do that with you, too, in the time to come.