## Innovation to Connect Americans

As Americans find themselves increasingly engaging in social distancing, rural communities are experiencing the true consequences of the digital divide. Residential and business users **in low-density areas of the country have not received the same low-latency, high-speed services offered to urban users** due in part to the cost of deploying fiber and existing wireless technologies across long distances. Despite reductions in the cost of fiber backhaul and wireless equipment, high deployment, operations, and maintenance costs to reach low-density areas continue to present higher "cost per bit" for broadband services.

Though service providers are doing the best they can with currently available infrastructure, this lack of access to broadband and connectivity undermines the ability of rural communities to effectively access critical activities vital to resilience such as:

**Emergency Response | Telemedicine | Distance Education | Telework**

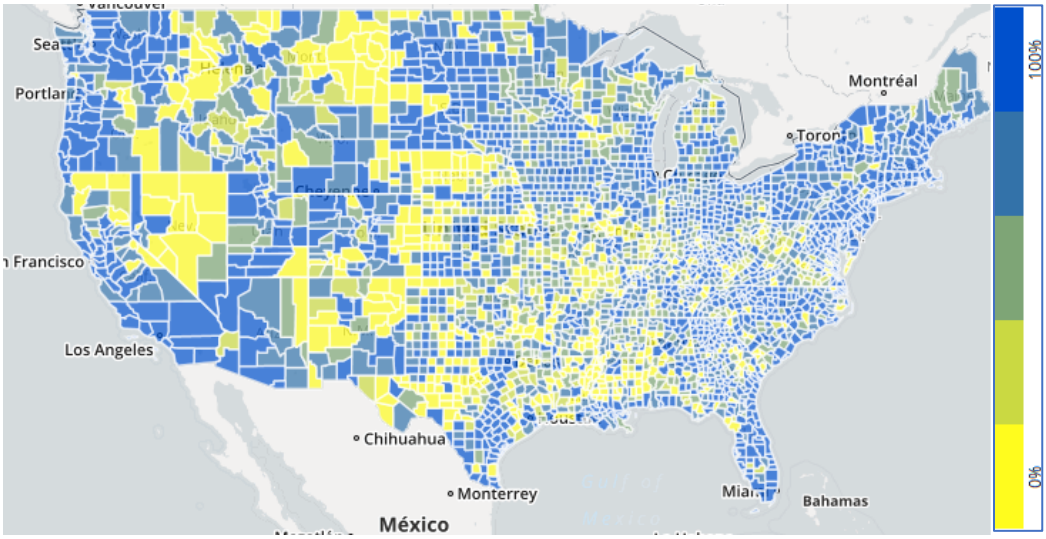


*Figure 1-Broadband Access by County (Source: FCC)*

With the support of the National Science Foundation (NSF), US Ignite and Northeastern University lead the Platforms for Advanced Wireless Research (PAWR) program. The PAWR program aims to enable experimental wireless communications research across devices, communication techniques, networks, systems, and services conceived by the US academic and industrial wireless research community and deployed in partnership with local communities. PAWR seeks to accelerate the Nation's wireless innovation ecosystem, thereby enhancing broadband connectivity; enabling the emerging Internet of Things (IoT), next-generation cellular xG standards and heterogeneous wireless connectivity technologies; and strengthening the resilience of rural communities to future disasters, pandemics, and other public health threats while sustaining US leadership and economic competitiveness for decades to come. Each research platform conceived under the PAWR program will enable at-scale experimentation by supporting the geographic size, technical diversity, and user density representative of a small city/community.

The PAWR Program is currently in the process of standing up a new testbed to enable the quick advancement of advanced wireless technology and connectivity in rural communities. The PAWR initiative is complemented by another US Ignite project funded by NSF called Smart Gigabit Communities. This program includes a network of over 30 communities working together to accelerate the creation of innovative services that drive startups, jobs, and innovation investments.

For COVID-19 support and response, additional funding from Congress would allow US Ignite to expedite and expand the deployment of additional rural wireless testbeds. This would enable US Ignite to undertake additional efforts to strengthen the resiliency and improve the quality of life for rural communities, including:

- Piloting community projects for wireless technologies to support education, public health, infrastructure resiliency, and public safety applications within rural communities
- Expanding funding for both industry and academic researchers to develop and test a wide variety of other technology applications that can address the needs of underserved rural populations
- Implementing mentoring and prototype support for rural startups

Additional examples of these potential applications can be found below.

***Solving the "Homework Gap"***

The "homework gap," or the barriers students face when working on homework assignments without a reliable Internet source at home affects both low-income and low-density areas[1]. As distance education becomes a tool of resilience, these capacities must be extended to previously unconnected areas. US Ignite's efforts will expedite the development of new technologies to better enable connectivity for these areas and ensure that no student is without access to an education while at distance.

***Enabling Access to Telemedicine***

While digital telemedicine holds the promise of increased access to care, these advances continue to leave rural counties behind. Rural counties not only experience provider shortages, as less than 10 percent of practitioners choose to practice in rural areas[2], and increasingly poor health outcomes as the rural populations age, but also experience significantly lower broadband access rates meaning that innovative tools, such as digital telemedicine remain inaccessible. Telemedicine is a vitally important resource to monitoring, mitigating and responding to public health crises; however, without proper wireless connectivity, these communities lack the resources necessary to leverage this capability. PAWR's testbeds can accelerate research and development of wireless technology that, once deployed can increase access and improve health outcomes.

***Enhancing First-Responders and Next-Gen 911***

Next Generation 9-1-1 systems leverage internet connectivity and wireless networks to augment the situational awareness of first responders and dispatchers. This technology allows first responders to leverage a range of information from responders and the public, including text, images, video, and voice calls. This technology has the capacity to increase responsiveness to public health and safety concerns, especially in rural communities where response times are significantly longer than in non-rural settings.

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[1] http://neatoday.org/2016/04/20/the-homework-gap/

[2] https://annals.org/aim/article-abstract/2734029/limitations-poor-broadband-internet-access-telemedicine-use-rural-america-observational

That said, this life-saving technology cannot be leveraged without increased access and connectivity. PAWR's testbeds give developers the opportunity to deploy and test this technology to speed development and help first-responders leverage technology that can help them protect and serve our citizens.

***Supporting a Resilient Rural Workforce***

As telework becomes not only a response to public health crisis but a great element of the workforce as a whole, unconnected communities are left with limited opportunities to continue to earn wages. While telework could offer new wage-earning opportunities to populations left behind by automation and shifts in the energy industry, the technology necessary to enable these opportunities is not deployed well enough to enable wage earners to pursue remote work[3]. PAWR's testbeds combined with US Ignite's innovation activities can support the development and deployment of advanced wireless technology that can provide the necessary bandwidth for rural and disconnected communities to thrive in the economy of tomorrow.

***Accelerating Rural Startups***

Most rural communities lack the robust innovation infrastructure found in urban settings including venture capital funding, accelerators, incubators, and other programs to foster startups. In partnership with the Kauffman Foundation's FastTrac TechVenture program, US Ignite has trained and mentored over 60 entrepreneurial teams to improve their chances for success in the marketplace. One team in rural Minnesota called Poultry Patrol recently won a US Ignite-sponsored competition to develop and commercialize a product that will serve rural America. The team's artificial intelligence-based robot keeps flocks moving to improve their health and alerts keepers to downed or sick birds, both of which lead to higher yields.

[3] https://www.mckinsey.com/featured-insights/future-of-work/the-future-of-work-in-america-people-and-places-today-and-tomorrow