



NOVEMBER 2020

Recommendations for a National Advanced Wireless Strategy

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Recommendation: Establish the Biden Advanced Wireless Strategy to accelerate 5G deployment while developing next generation wireless technologies across the country. Invest \$20 billion over four years to focus government efforts to realize 5G communications and jump start next generation wireless in an interagency “Manhattan Project” effort to develop and deploy.

THE CHALLENGE

The U.S. is currently in an intense global competition to advance 5G and next generation wireless technologies. At stake is the distinction of being able to lead numerous emerging billion-dollar industries such as smart city technologies, autonomous vehicles, and augmented and virtual reality (AR/VR). U.S. national security is also at stake, given the ubiquity and importance of wireless communications in current and future military strategies. The nation’s peer competitor in this race, China, has made great strides with its telecommunications companies, Huawei and ZTE, attempting to deploy 5G networks across the globe. The national security community has noted that due to Chinese national security laws, these companies may be compelled to share information with Chinese intelligence agencies, putting U.S. communications across the world at risk. Given this national security challenge, the potential to lead in critical industries of the future, and the ability to connect all of America into the digital world, it is imperative that the U.S. lead in 5G and beyond.

The current national 5G strategy¹ is focused on securing the communication infrastructure from the onset to ensure that identifying core security principles and mitigating cybersecurity risks are integral to 5G capabilities and infrastructure, which was not done when the internet was deployed in the 1990s. However, achieving the goal of broadly developing and deploying 5G and next generation wireless across the country has both technical and policy challenges that have yet to be addressed in a whole-of-government approach. The well documented challenges include:

- Operating in the electromagnetic spectrum below 6 GHz, a significant portion of which is utilized by DOD for national security purposes, as well as the lack of domestic hardware supply to operate in this part of the spectrum;
- Ensuring domestic supply of trusted microelectronics and supply chain vulnerabilities; and
- Coordinating disparate federal efforts based on missions, such as DOD trying to manage spectrum rights; VA 5G-enabled hospitals; and DHS working to ensure the security and integrity of 5G technology.

In addition, NSF and companies across the telecommunications industry have invested \$100 million to support the Platforms for Advanced Wireless Research (PAWR) program. DOD has also [invested](#) \$600 million for the deployment of 5G testbeds for experimentation of military-relevant applications while

¹ <https://www.whitehouse.gov/wp-content/uploads/2020/03/National-Strategy-5G-Final.pdf>

other agencies such as NIST and DHS have also made investments. However, developing and deploying advanced wireless technologies at scale to benefit communities, including underserved communities, across the country requires a coordinated and comprehensive whole-of-government and whole-of-nation approach. More action and investments are needed to take advantage of the economic opportunities and national security benefits that 5G can achieve.

PROPOSED ACTIONS

To address these challenges, the U.S. should announce **the Biden Advanced Wireless Strategy** to develop and deploy 5G and next generation wireless technologies. This strategy should address the following challenges:

- **Challenge 1:** There are no large U.S. vendors in the marketplace to provide at-scale deployment of 5G networks globally. This has left U.S. major carriers, and the federal agencies they serve, reliant on just two European vendors for equipment and professional services to deploy their 5G networks. As a result, this has led to widespread concerns over supply chain risk, with no easy solution of creating a new national vendor. Despite these challenges, there are dozens of smaller domestic vendors that are leveraging Open Radio Access Networks (Open RAN) technologies to serve U.S. carriers. These smaller companies need support for prototyping, scale-up, and hardening of their solutions to ensure products qualify as “carrier-grade.”
- **Solution:** Establish a public-private partnership to promote a dynamic, competitive market of trusted suppliers of 5G and advanced connectivity equipment and services. A coordinated strategy will play to U.S. strengths of innovative, diverse entrepreneurship in countering increasingly dominant companies.
- **Challenge 2:** The U.S. needs the ability to rapidly evaluate domestic technology developments from government, academia, and private sector in relevant settings.
- **Solution:** Expand and develop an interagency coordination of 5G next generation wireless R&D efforts and testbeds:
 - Establish federal interagency task force to audit and expand existing public and private sector 5G testbeds to bring greater interagency and cross-sector collaboration in developing and testing real-world 5G deployments. Multiple testbeds should allow a diversity of parties to explore use cases of particular interest to their community. Opportunities include industrial, enterprise, transportation, municipal services, public health, emergency response focused testbeds.
 - The task force should be coordinated from the White House OSTP (in coordination with NSC and NEC) and through NTIA as the designated executive agency. Participating agencies include DoD, DOE, NSF, DHS, Commerce/NIST, HHS, and DOT in coordination with FCC. External stakeholders will include National Labs, state/local officials, equipment/networking vendors, carriers, cloud providers, and other companies.
 - Testbeds should have a particular focus on COVID-19-era needs such as emergency response, hospital operation, telehealth, telework, and online education.
 - As a component of the testbeds, the White House should coordinate R&D throughout government on 5G and related technologies such as radio access network equipment with openly-defined interfaces and protocols (or Open RAN), virtual networks, and advanced beamforming, as well as test houses and standards organizations that enable disaggregation of 5G supply chains.
 - Establish an NSF-funded next generation wireless research challenge, in order to convene academic and industry researchers to advance fundamental research in future wireless technologies.

- Expand export finance activities at DFC, EXIM Bank, and USAID that promote trusted suppliers of 5G and organizations that enable related technologies worldwide.
- To complement expanding FCC's USF support, leverage R&D initiatives and funding from USDA/NIFA and NSF to develop and support innovative solutions for rural broadband.
- Activate the Defense Production Act and Manufacturing USA program to fund pilot and proof-of-concept projects leveraging Open RAN and virtual networks provided by trusted suppliers.
- **Challenge 3:** The efforts of China's telecommunications giants, such as Huawei and ZTE, to expand their own 5G networks internationally not only will impact U.S. industry's leadership in 5G, but also pose a threat to U.S. national security. If Huawei and other companies are able to deploy networks globally, the U.S. military will be forced to operate in untrusted network environments vulnerable to espionage by the Chinese government.
- **Solution:** Design and announce an aggressive international promotion of current U.S. 5G technologies, especially those focused on Open RAN, and those in development to help support product uptake internationally.
 - This will actively help drive innovation domestically and should be undertaken as a counterpoise to Chinese suppliers' positions, especially in developing country markets.
 - It is imperative that the US ensure that international buyers are provided actual options for 5G network deployment. These efforts should incentivize buyers to delay procurements of non-U.S. built equipment until the full scope of upcoming U.S. technologies is understood, even if they cannot find US-built equipment today.

PROPOSED YEAR ONE INVESTMENTS

Under the proposed National Strategy, U.S. Ignite proposes the following investments to be made annually over four years as part of a "Made in America" plan:

- **\$2 billion for 5G Pilot Funding:** Expanding funding that targets industry researchers and startups to pilot and test a wide variety of other 5G technology applications that can address the needs of U.S. carriers, federal agencies, underserved populations, and other use cases.
- **\$500 million for Defense Production Act Title III:** For the ecosystem of domestic vendors, this effort would offer grants, competitive procurement, loans and loan guarantees of \$20 to \$100 million that are matched by the vendor. This does not include grants for research or development, which would be offered to these vendors through other 5G and next generation wireless R&D programs. These grants would support efforts to: Modernize manufacturing facilities; build sample products for government and carrier customers; further commercialize Open RAN technology; spend on capital improvements to reduce costs or enhance yield performance, and develop go-to-market strategies.
- **\$600 million for 5G and Next Generation Wireless Research Testbeds:** Piloting 5G projects for wireless technologies to support a wide range of use cases across education, public health, infrastructure resiliency, and public safety applications. Funding through DoD, DOE, NSF, Commerce, and other agencies and coordinated by OSTP.
- **\$1 billion for 5G and Next Generation Wireless R&D Funding:** Establishing a next generation wireless research initiative at NSF, and targeting academic and other researchers on 5G and beyond would ensure that the U.S. continues to lead the world in innovating wireless networks. This should also support efforts to accelerate domestic microelectronics development and production.
- **\$1 billion to Rural Carriers:** A number of rural carriers have deployed Chinese equipment to save costs for deploying wireless networks to underserved communities. This fund would

help these small carriers to replace their Huawei and ZTE equipment with domestic vendors. These funds would also support these carriers as they expand 5G access within their rural network footprint.

BENEFITS

Leading the world in 5G and next generation wireless technologies is critical for U.S. economic prosperity and national security. In addition, the strategy above will allow the U.S. to bring affordable, high-speed broadband as well as smart city services to underserved areas including communities of color, rural communities, and tribal areas that will allow these communities to achieve their economic potential. Potential domestic impact that can be enabled by 5G R&D and deployment include:

- **Supporting Domestic 5G Suppliers:** Ensure wireless networking equipment manufacturing meets standards for carrier-grade production. This program would ensure small and mid-sized wireless vendors can meet both large carriers and DoD networks. These vendors will not be reliant on government support for the long-term, but need DPA-funding today to accelerate the development of new Open RAN and other wireless technologies.
- **Solving the “Homework Gap”:** The barriers students face when working on homework assignments without a reliable Internet source at home affects both low-income and low-density areas. As distance education becomes a tool of resilience, these capacities must be extended to previously unconnected areas.
- **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 (less than 10 percent of practitioners choose to practice in rural areas) and increasingly poor health outcomes as the rural populations age, but also experience significantly lower broadband access rates. This means that innovative tools, such as digital telemedicine remain inaccessible to rural Americans.
- **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 underserved communities where response times are significantly longer.
- **Supporting a Resilient Workforce:** As telework becomes not only a response to the current public health crisis but a large 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. 5G testbeds combined with 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 Startups in Underserved Communities:** Most underserved communities lack the robust innovation infrastructure found in urban settings including venture capital funding, accelerators, incubators, and other programs to foster startups. Training and mentoring entrepreneurial teams to improve their chances for success in the marketplace, including commercializing ag-tech products, will serve rural America and strengthen their innovation infrastructure.