

## White House Unveils Wireless Research Initiative with an Eye Toward 5G

The Obama administration unveiled a public-private partnership Friday it's calling the Advanced Wireless Research Initiative (AWRI). White House officials say this builds off the FCC's Thursday spectrum frontiers vote (see 1607140052) and to expect an investment of \$400 million spearheaded by the National Science Foundation, with new steps announced among other parts of the federal government and for telecom companies and associations. Industry stakeholders also praised the spectrum frontiers order (see 1607150026).

NSF "and more than twenty technology companies and private-sector associations will invest \$85 million in four city-scale, public-private testing platforms to support fundamental research on advanced wireless technologies," said White House Office of Science and Technology Policy Deputy Director-Policy Thomas Kalil in a joint blog post with Aadil Ginwala, assistant director for education and telecom innovation at OSTP, and Jim Kurose, director of the NSF's Computer, Information Science and Engineering Division. "The fundamental research supported on these platforms-including \$350 million in NSF academic research over the next seven years that can utilize the testing platforms-will allow academics, entrepreneurs, and the wireless industry to test and develop advanced wireless technology ideas at-scale, some of which may translate into key future innovations for next-generation, 5G networks and beyond."

Both the blog post and an administration fact sheet hail the spectrum frontiers order and vote. It's a "critical step" that will "open up vast amounts of spectrum for new uses and offer additional spectrum flexibility, while preserving a path forward for continued and expanding Federal and satellite deployments," the fact sheet said. "The FCC also proposed opening up even more spectrum in the future, to ensure that the United States remains a leader in wireless technology." The FCC vote combined with the White House initiative "will help usher the arrival of a similarly incredible future by supporting the development of next-generation wireless technologies that will pay dividends for many years to come," the officials said in the blog post.

"What we at the Commission have just put in place with spectrum, what the Advanced Wireless Initiative will put in place with research and development, will help determine those [network] secondary effects that will transform individual lives and our economy," said FCC Chairman Tom Wheeler Friday at the launch of the initiative in Washington, according to prepared remarks. "We want to tum innovation loose, and, again, that's the kind of thing that the Advanced Wireless Research Initiative is going to be stim- ulating. As well-intentioned and hard-working as the folks at the FCC and OSTP are, we don't think that they can be as smart as the advances in technology in determining what the applications of 5G will be. So we will stay out of the way. But we will also exercise our responsibility at the FCC to make sure there is a competitive environment that furnishes the incentive to drive that innovation and bring it to market."

NSF detailed the partnership in its own news release and identified three program solicitations: one on an NSF/Intel partnership on information-centric networking in wireless edge networks; one on establishing a Platforms for Advanced Wireless Research project office; and another on wireless innovation between the U.S. and Finland. All three have fall deadlines.

"Working with other agencies and industry partner , NSF's support of fundamental research on advanced wireless will be transformative and take us beyond the current and next generation of wireless-beyond what has been envisioned thus far," NSF's Kurose said. "Many promising areas of research, including millimeter-wave networks, dynamic spectrum sharing and network virtualization, are maturing after years of federal investment but require additional experimentation and testing at scale."

The Defense Advanced Research Projects Agency "plans to demonstrate the viability of the technologies being developed for its latest Grand Challenge, the Spectrum Collaboration Challenge (SC2), within the testing platforms" announced Friday, the administration said. The National Institute of Standards and Technology created a multidisciplinary working group called the Future Generation Communications Roadmap "focused on identifying key gaps and R&D opportunities related to future-generation communications systems and standards," the fact sheet noted. "A coordinated channel measurement, verification, and comparison campaign within indoor environments by the NIST-supported 5G mmWave Channel Model Alliance. The Alliance will discuss the preliminary results of this study at the First International Workshop on 5G Millimeter Wave Channel Models scheduled for December 4, 2016 at IEEE's GLOBECOM conference." NTIA's Institute for Telecommunications Sciences "will be sponsoring undergraduate and graduate student wireless spectrum research that will utilize the spectrum test bed that ITS is developing in collaboration with the University of Colorado-Boulder (CO-Boulder) to span the Federal and university campuses," a test bed that "will facilitate research to explore campus-scale wireless networking, spectrum sharing, and mobile applications, and enable collaborations between ITS, CU-Boulder, and the City of Boulder," the administration said.

The White House also cited contributing efforts from various companies, including AT&T, Nokia, Oracle, Qualcomm, Sprint, T-Mobile and Verizon, plus the Alliance for Telecommunications Industry Solutions (ATIS), CTIA and the Telecommunications Industry Association. US Ignite is working with NSF on what it's calling the Advanced Wireless Research Consortium, including all of those companies and associations as members. "With end-to-end, low-latency, gigabit networks supporting end-user and IoT devices, US Ignite [will] be in an even better position to help its community, company and university partners leverage these networks to solve vexing challenges in health care, education, public safety, transportation and clean energy," said US Ignite Executive Director Bill Wallace.

"Enabled by the FCC's order to make high band spectrum available for next generation wireless, today's rollout by the White House and National Science Foundation will be key to America remaining the world's wireless leader as we move to 5G and beyond," said CTIA Chief Technology Officer Tom Sawanobori. "CTIA and its members are pleased to contribute engineering and technical guidance to develop next-generation wireless networks, devices and applications so that Americans benefit and continue to enjoy their mobile-first lifestyles." ATIS is "well-positioned and excited to seize the opportunities the [Advanced Wireless Research] Consortium's groundbreaking research will deliver," said President Susan Miller.

Samsung said Friday its contribution to the AWRI will be expertise in wireless network architecture and millimeter wave (mmWave) radio access technologies for research and testing of next-generation mobile networks. It will help develop with the AWRI new wireless test beds for examining and validating 5G technologies, spectrum usage paradigms, application performance and service behavior, it said. As a board member, Samsung also will provide direction on future research initiatives, it said. Samsung cited company achievements leading up to its participation in the AWRI: It recorded the first gigabit-per-second throughput at a distance of two kilometers using prototype mmWave technologies; it was the first to demonstrate stable and uninterrupted mobile connections at 1.2 Gbps from a vehicle traveling at over 100 kilometers per hour; it announced in March the first multicell handover maintaining a gigabit data transmission while moving between three transmitters; and it recently developed 5G-ready antenna and power amplifier technologies enabling energy-efficient 5G equipment and devices using 28 GHz mmWave spectrum. **-John Hendel**

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