

# ADVANCED COMMUNICATIONS AT NIST

## BY THE NUMBERS

**10 billion**

Estimated number of connected mobile devices in use by 2018



**2.5 billion**

Number of worldwide smartphone subscriptions by the third quarter of 2014



*(Ericsson Mobility Report)*

**4.5 trillion**

Projected global economic impact by 2020 of connected cars, home and building security, and other wireless-enabled projects  
*(GSMA)*



## The Challenge

Wireless systems are becoming essential to our daily lives and for the development of new technologies in areas as diverse as public safety communications, electric power grid management, medical devices, and advanced manufacturing. The available spectrum for wireless communications is a limiting factor that must be addressed through innovations in technology and spectrum sharing to drive economic growth and support infrastructure, public safety, and defense.

## What NIST Does

- Provides the measurements and standards to support the development of high-performance wireless components to improve spectrum efficiency.
- Partners with other federal agencies to provide opportunities for collaborative R&D and access to test bed resources.
- Operates a multipurpose test facility to replicate complex electromagnetic environments for testing of wireless devices.
- Develops accurate channel propagation models necessary for the next generation of products.
- Provides the standards for voice, data, image, and video communications to support the nation's first responders.
- Develops higher-frequency antennas to support growing demand for current and future telecommunications and imaging applications.

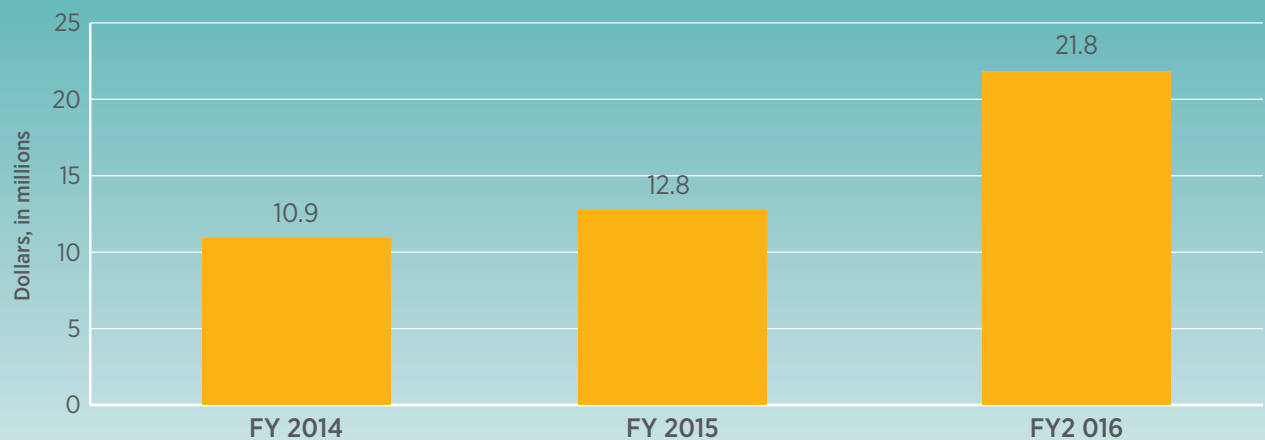
## Program Goals

- Pioneer new technology platforms for advanced communications.
- Support the adoption of standard technologies into commercial networks.
- Provide research, development, testing, and evaluation to foster nationwide first-responder communications interoperability.
- Promote interdisciplinary research, development, and testing in advanced communications.

## Recent Program Highlights

- Created the NIST Communications Technology Laboratory and launched the Center for Advanced Communications, in partnership with the National Telecommunications and Information Administration (NTIA), to coordinate the research, standards development, and testing that support advanced communications technology.
- Working to establish the National Advanced Spectrum and Communications Test Network (NASCTN) involving federal, academic, and commercial test facilities that provide the testing, modeling, and analysis necessary to develop and deploy spectrum-sharing technologies and inform future spectrum policy and regulations.

## Budget



The Middle Class Tax Relief and Job Creation Act of 2012 authorized auctions of communications spectrum, providing NIST \$300 million to conduct an R&D program to help public safety overcome critical technical barriers, spur innovation and investment in public safety broadband, and realize the full potential of wireless broadband capabilities. This funding will be available from FY 2015 through FY 2022.

## New for FY 2016

NIST requested an additional \$9 million to accelerate the development of the measurement tools and capabilities necessary to support advanced 5G networks.

With the requested funds, NIST will focus on:

- Developing the measurement and test platforms to support the testing and evaluation of new advanced communication technologies for both existing and future frequency spectrum bands allocated for wireless communication systems. A major step will be the design and construction of a multipurpose test facility to characterize next-generation antenna technologies such as frequency agile, beam-steering, etc.
- Developing the measurements and characterization technologies necessary to enable industry to take advantage of millimeter-wave frequencies that lie well outside current cell phone bands.