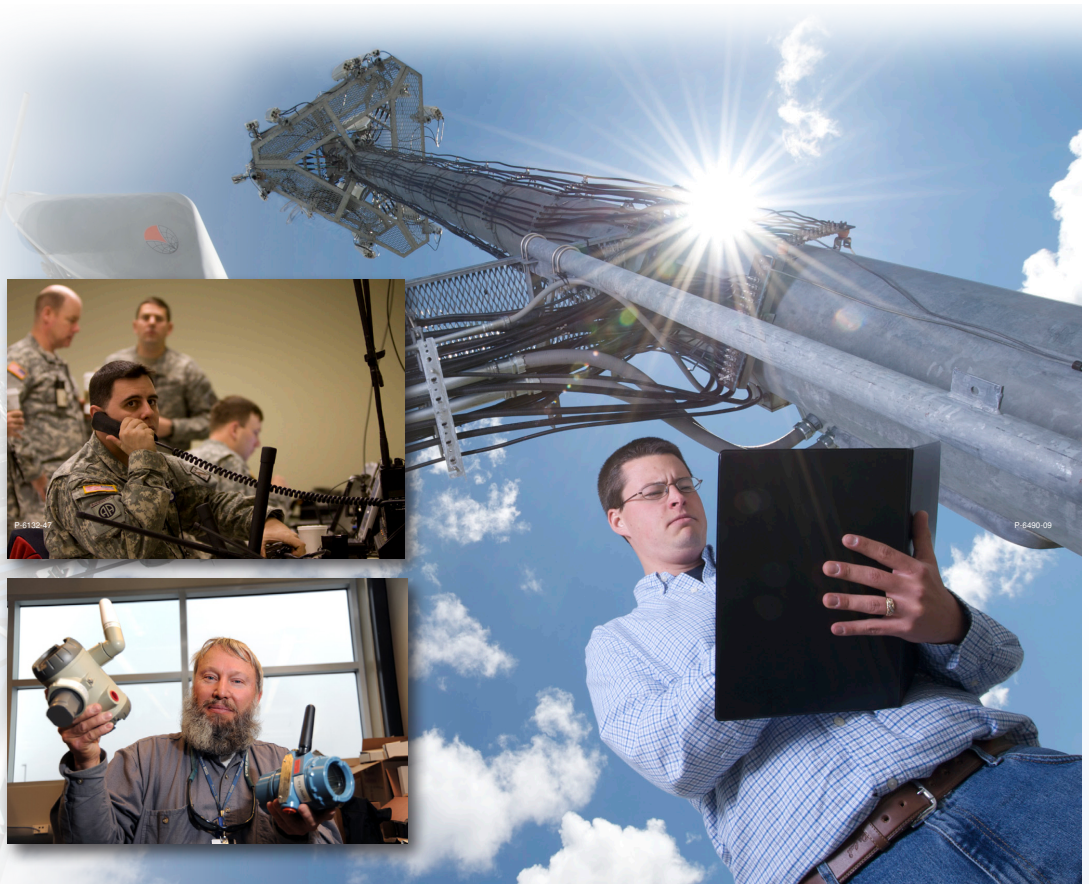


INL wireless communications experts design, install, and test next-generation communications systems.



The Energy of Innovation



Wireless Research Center

From social networks to location-based services, and from mesh grids to digital routers, the options are endless for high-speed wireless connectivity. Today, nearly all information sharing uses mobile technology and the wireless spectrum to stream information from one location to the next. This invisible but critical network is important to commerce, safety, and increasingly national security.

Understanding this complex system, its associated interdependencies, security implications, and the future of digital transmission is essential. At Idaho National Laboratory,

our engineers study, research, and test wireless technology and communication systems to ensure effective operations, compatibility, and secure operations.

Today, we're applying this expertise toward the protection of our nation's critical infrastructures while simultaneously studying and testing experimental systems and emerging communications concepts.

Wireless Capabilities

Idaho's isolated, high-desert landscape provides an ideal location for open-air experimentation with wireless technology. Since 2003, INL has operated a comprehensive

wireless test bed spread across 890-square miles of federally owned land.

Situated in a low-noise environment, this spectrum allows our engineers to test devices and hardware ranging from high-frequency (HF), ultra-high-frequency (UHF), cellular, satellite, microwave, and everything in between. Our capabilities include Tier 1, end-to-end second and third generation cellular networks with fixed and mobile towers, stand alone WIMAX (mobile and fixed) WiFi, Zigbee, and Bluetooth networks as well as miles of microwave and optical fiber backhaul.

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Wireless devices, sensors, and communications systems are rapidly being incorporated into privately-owned critical infrastructure systems. As an internationally recognized leader in control systems cybersecurity and grid reliability, the laboratory has the ability to study, model, and perform unbiased, full-scale tests that illustrate the impacts of wireless failures in industrial processes.

Our research and testing environment allows us to mimic real deployed systems and provide analysis. Vulnerabilities, consequences, and solutions can be created, explored, and tested in a full-scale, open-air environment. This data can also be incorporated into training or used to support the development of science-based policy that prevents cascading failures across multiple infrastructures.

Emerging Research

As wireless communication systems expand, usage will continue to increase and available bandwidth will continue to limit the amount and speed of data available. At INL, our



INL can test 2G and 3G handsets and systems on a real world, full-scale network at international GSM / UMTS frequencies.



researchers are already working on cutting-edge ideas to increase network efficiency, improve security, make more effective use of available bandwidth, and give users more options.

The laboratory's experienced scientists are working in areas such as cognitive communications and dynamic spectrum allocation that could lead to more efficiency within the wireless spectrum by improving how bandwidth is utilized.

We're also exploring emerging communications concepts such as multiband systems and location-based services.

Additional research efforts are exploring emerging security protocols. These ideas have the potential to provide consumers, soldiers, and others with high-speed access to robust, jam-resistant, guaranteed delivery, and highly-specific tailored mobile connectivity.

For more information

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 National Laboratory**



Quick Facts

- INL's open space and infrastructure networks allow the us to function like a small city with a series of telecommunications and Internet service providers.
- Our capabilities include telecommunications design, systems deployment and integration, simulation research, high-performance computing, cybersecurity, and process control systems.
- INL has experienced communications engineers working across the cellular, WiMax, HF UHF, radar, antenna, and satellite fields.
- INL is authorized by the NTIA to operate as an experimental radio station enabling local authority and management of frequency on a noninterference basis with local spectrum users.