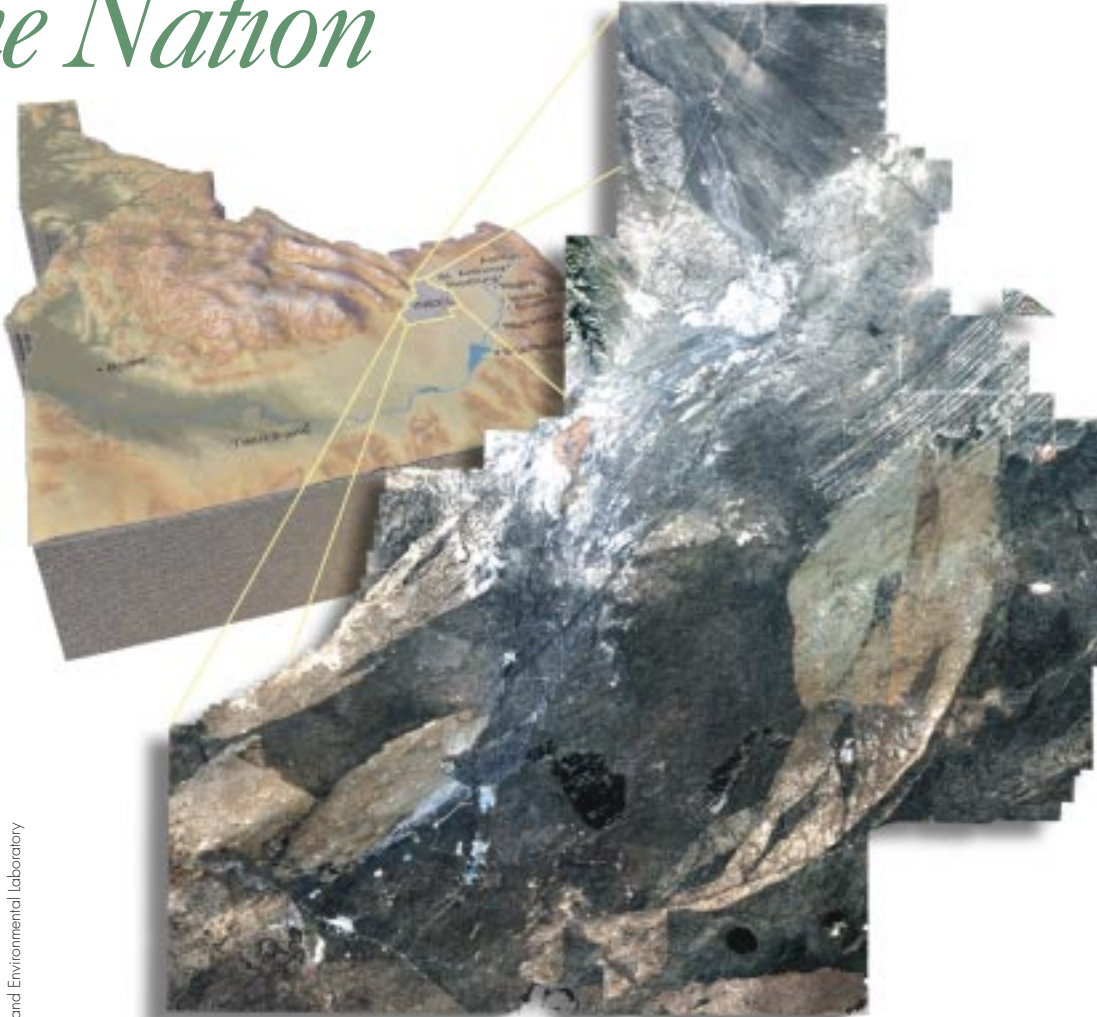


Protecting and Securing the Nation



Idaho National Engineering and Environmental Laboratory



Critical Infrastructure Test Range

Where technologies, systems and policies that protect the nation's critical infrastructure are developed, tested and validated under real-world conditions

The attacks of September 11 opened the nation's eyes to a vulnerable United States. Not only our people, but also the very infrastructure that supports our society and our values is now recognized as vulnerable to threats.

The vast INEEL Test Range is a secure, isolated microcosm of much of the nation's critical infrastructure

Given the increasing interconnections and interdependencies of our critical infrastructure systems, it is absolutely essential that we understand their vulnerabilities, so we can correct or compensate for them. By understanding vulnerabilities – from the pieces and parts

INEEL's facility complexes contain many of the critical infrastructure systems that are representative of those important to the operation of our country.



level to the total system level – we can develop engineered systems that will ensure the survivability of our critical infrastructures when they are challenged by natural disasters, aging or terrorism.

The complexity of the systems that make up our critical infrastructures requires actual systems be tested as part of an integrated infrastructure. These tests will give us an understanding of the complex interaction of a real integrated infrastructure. A test range provides that capability and will complement current efforts to model equipment and systems with numerical simulations.

INEEL has the Existing Infrastructure and the Engineering Discipline to Support a Premier Critical Infrastructure Test Range

The INEEL site and infrastructure provide a superb location for a Critical Infrastructure Test Range. The site contains many of the critical infrastructure systems that are representative of those important to the operation of our country: power, transportation, and communication. All of these systems are operated by a single entity under the oversight of the U.S. Department of Energy's Idaho Operations Office.

The INEEL infrastructure that exists today includes complex SCADA-controlled power systems, numerous communications systems including a developing wireless test bed, command



and control capabilities, information systems including a site-wide fiber system, numerous safeguards and security systems, transportation systems, power plants and supporting facilities, and medical and emergency response facilities. These systems are not only maintained and operated by INEEL engineers and technicians; most were designed and built by INEEL engineers as well.

The 890-square-mile INEEL site is a high-tech model of much of our nation's critical infrastructure. This laboratory site – almost 75 percent the size of Rhode Island – has historically been a state-of-the-art test site. From its beginnings as a test bed for commercial and Naval reactors to newer test bed missions of establishing the safety basis for commercial nuclear power and waste treatment technologies, the INEEL is unique in its existing critical infrastructure and its engineering approach to testing complex systems. The INEEL's expertise in the energy production and transportation systems used in the United States today makes it a superb location to test – on a systems level – the security of our current

systems. The INEEL site also includes numerous locations to design and build contained testing facilities within existing structures.

INEEL Expertise

INEEL engineers have designed, built and operated the complex critical infrastructures supporting operations on the 890-square-mile site. They work with customers on numerous projects that support industry and Department of Defense critical infrastructures. INEEL scientific expertise ranges from chemical agent work done for the Army to nuclear, chemical and biological agent detection and decontamination efforts. INEEL used its disaster response expertise in Olympic exercise support, energy industry exercise support and response to the New York City 9/11 attacks. INEEL understands plume patterns, environmental interactions, and containment methods. The INEEL's Critical Infrastructure Test Range allows customers to do full-system tests on a complex, integrated infrastructure to develop data for actual infrastructure attacks.



Facilities

The INEEL has operated research and development, manufacturing, and waste management programs for more than 50 years, resulting in a complex internal infrastructure containing facilities representative of the nation's critical infrastructure. Many of these facilities – active and inactive – are available for isolatable tests.

- 6 INEEL-controlled autonomous research and operational complexes
- 526 buildings
- 5,024,980 square feet
- Nuclear Reactors
- Material Production
- Chemical processing and treatment
- Waste management
- Analytical and research laboratories
- Inactive coal-fired plant
- Live-fire weapons and test range
- Fire training facility
- Support Facilities – fire, medical, emergency response

Natural Attributes

The INEEL location – 32 miles west of Idaho Falls, Idaho – is remote and secure yet still convenient to airport, interstate and rail. The Site contains six clusters of facilities – similar to

six small cities. The remainder of the land is native rolling sagebrush.

- High desert plain
- 5000' elevation, arid
- 890 square miles
- Subsurface aquifer
- Relatively flat
- River beds
- -30° to 100 °F
- Grasses, sagebrush, desert vegetation
- 94% undeveloped
- National Environmental Research Park

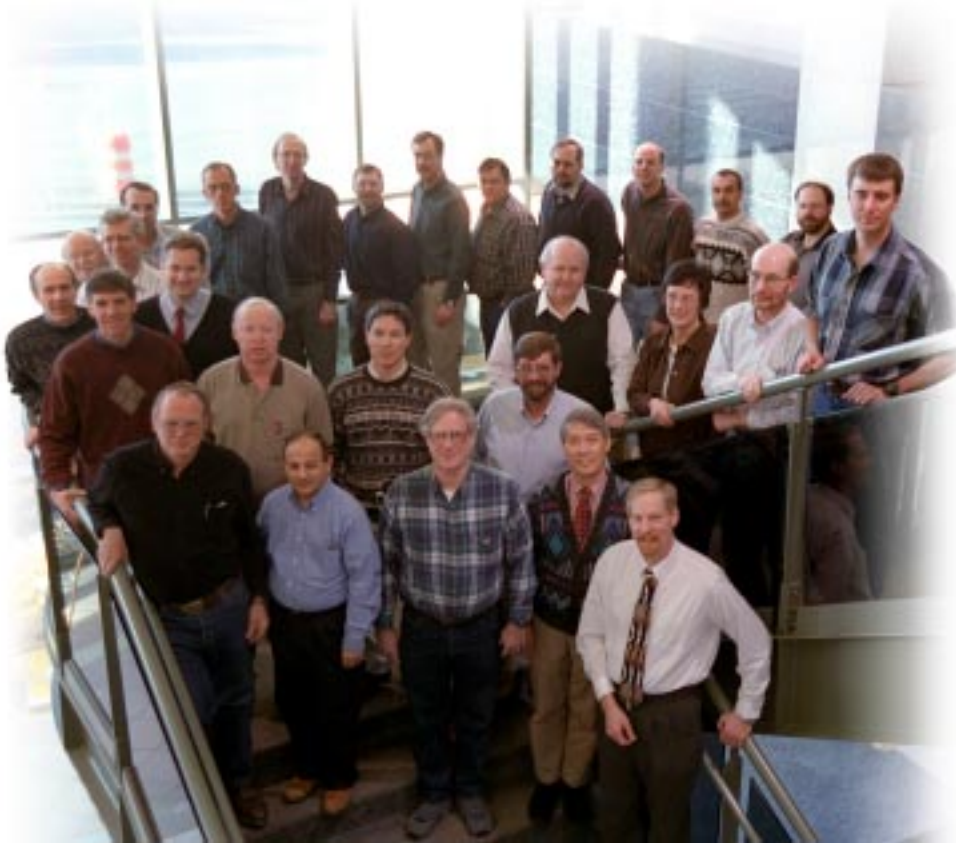
Telecommunications

As a National Telecommunications and Information Administration (NTIA) certified experimental station, INEEL can test communications systems under real-world conditions. The INEEL is – partnered with Bechtel Telecommunications – a National Wireless Test Bed.

- 2-way radio systems
- Cell phone systems
- Hard-wired systems
- Intranet systems
- Intrusion detection systems/firewalls/secure communications

The INEEL – located 32 miles west of Idaho Falls, Idaho – is both remote and secure yet still convenient to airport, interstate and rail.





INEEL's scientist and engineers annually receive patents and prestigious awards for their innovative scientific achievements.

- 170 miles fiber – OC-3, OC-12 fiber links over an SONET/ATM backbone

People

The INEEL has long been recognized as the premier engineering laboratory in the DOE Complex. INEEL staff has developed an excellent engineering discipline that results in test performance on schedule, within budget and meeting all client requirements. The INEEL's scientific achievements are

internationally known, annually receiving prestigious awards such as R&D 100s.

- Engineering disciplines – electrical, chemical, mechanical, civil, nuclear
- Scientific disciplines – chemistry, physics, biology, geosciences, materials, environmental
- Computer sciences – advanced computing, visualization, modeling, simulation, cyber security
- Security forces
- Emergency response, medical, fire
- Technical support/craft – design, welding, hoisting/rigging, safety, health physics, construction, project management

Utilities

The INEEL infrastructure was developed over a half-century to support multiple missions in reactor research,

national security, environmental management and technology development. The SCADA systems are designed, built and operated by INEEL engineers.

- Power – 50 megawatt, 61 mile grid
- Water – domestic, fire
- Communications – wired, wireless, radio, internet, emergency
- SCADA systems
- Roads – 977 miles
- Rail – 14 miles

Mesoscale meteorological monitoring network – spatially dense array of 33 towers

Refuse collections and disposal

Activities

INEEL test engineers have developed test scenarios depicting contemporary problematic issues involving cyber attacks to SCADA systems leading to failure and loss of power, the use of a radiological dispersal device in an urban setting, detecting smuggled nuclear material in cargo containers, and experiments to demonstrate pipeline vulnerabilities to adversarial attack on pipelines, compressor systems, and auxiliary systems.

Engineers are currently conducting critical infrastructure testing for government agencies and military customers. A SCADA systems test bed is being established at the INEEL and a range control center for the test range is under development.



For more information:

Kenneth Watts
(208)526-9628
kdw@inel.gov