January 27, 2021

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Associate Laboratory Director

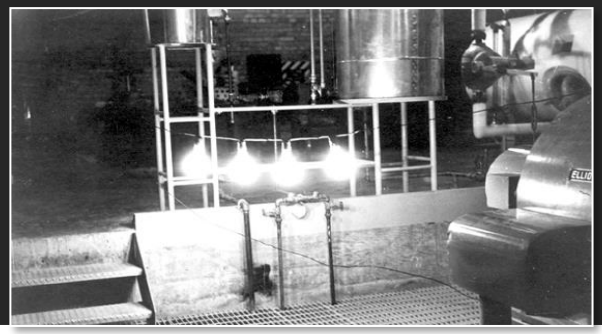
Overview of Idaho National Laboratory, National & Homeland Security

Idaho National Laboratory

INL - The History of Supporting National Security

- Testing naval large caliber guns
- National Reactor Testing Station 1949, INEL 1974, INEEL 1994, INL 2005
- Fuel cycle development and demonstration – reprocessing
- Design construction testing and operation of 52 unique nuclear reactors, including Navy's Nautilus Submarine Prototype (S1W) Reactor
- Specific Manufacturing Capability (SMC) 1982

Research – Development – **Demonstration** – Deployment



Engaged Around the World

Secure industrial control systems across critical infrastructure sectors

Secure and resilient electric grid

Wireless security and spectrum crunch

Nuclear nonproliferation safeguards and security

Global security against nuclear and radiological threats

Enabling the warfighter and supporting first responders

INL is positioned to address the worldwide issues in:
Critical Infrastructure Protection and Resiliency, Nuclear/Radiological Security, Defense Systems

Unique National Security Infrastructure & Capabilities

Electric Grid Test Bed

Commercial Feeds,
Test Loops/Spurs

Water Security Test Bed

Municipal Water System

Radiological Ranges

First Responder Training

Specific Manufacturing

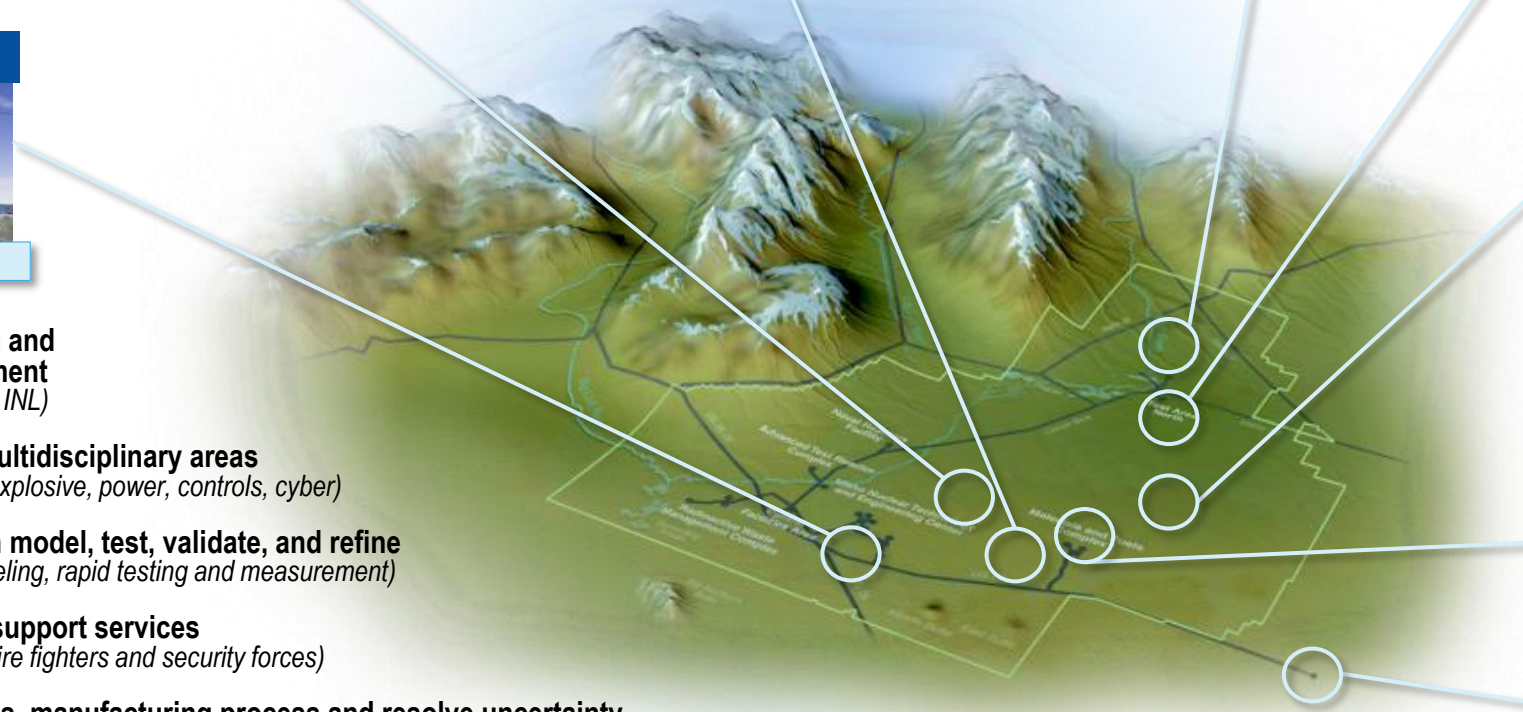
100% Quality Product

Wireless Test Bed

Agile Spectrum

National Security Test Range

~20k TNT, VA Center

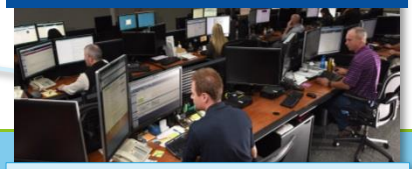


- **Full-scale real-world testing and demonstrations for deployment**
  (designed, built and operated by INL)
- **Integrated testing across multidisciplinary areas**
  (radiological, physical security, explosive, power, controls, cyber)
- **Rapid development through model, test, validate, and refine**
  (high fidelity, effects-based modeling, rapid testing and measurement)
- **Access to the full range of support services**
  (lineman, engineers, rad techs, fire fighters and security forces)
- **Ability to develop prototypes, manufacturing process and resolve uncertainty**

Nuclear Materials R&D

Electro-refining, SNM for Test/R&D

Research and Education Campus



Controls & Energy Security Labs

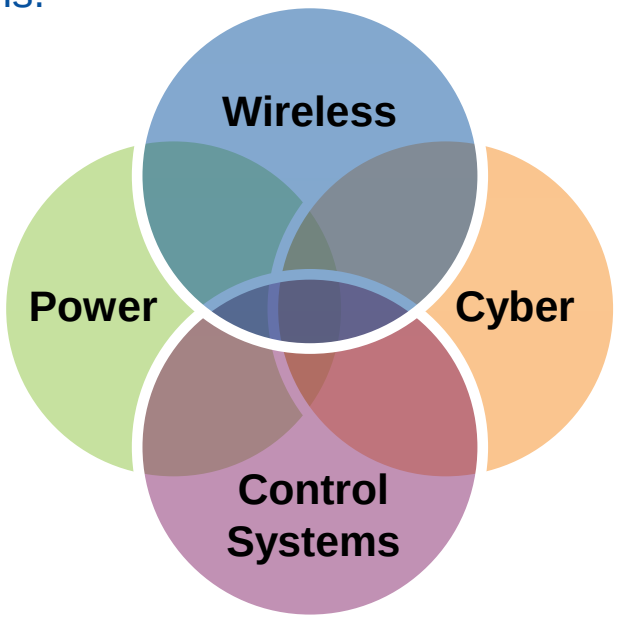
Innovation in nuclear, control systems, power grid, wireless and physical security

Mission: Critical Infrastructure Protection

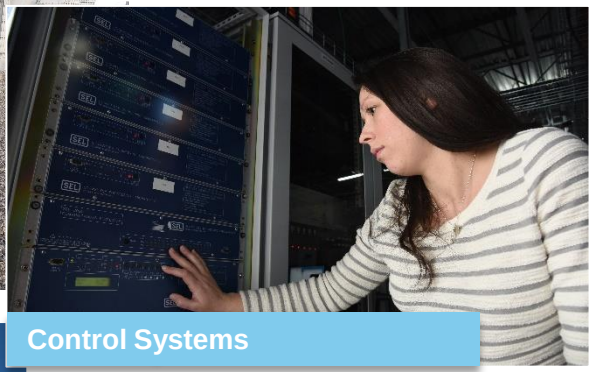
Develop solutions to the nation's complex critical infrastructure challenges

Develop solutions to the nation's complex critical infrastructure challenges

- INL's unique ability to demonstrate the attributes of critical power and control infrastructures interdependencies.
- INL's reconfigurable attributes and infrastructure are similar to what is found in a small city enabling holistic solutions.




Power Grid Testing


Control Systems


Wireless

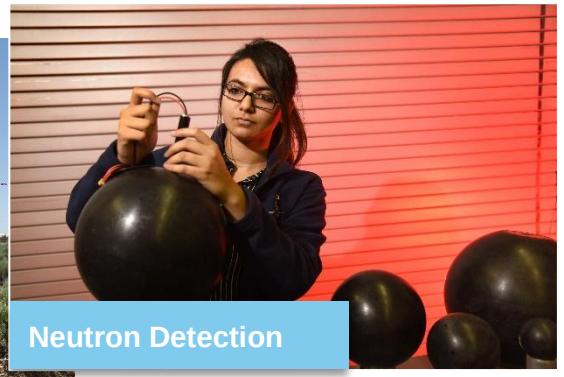

Cybersecurity

Mission: Nuclear Security

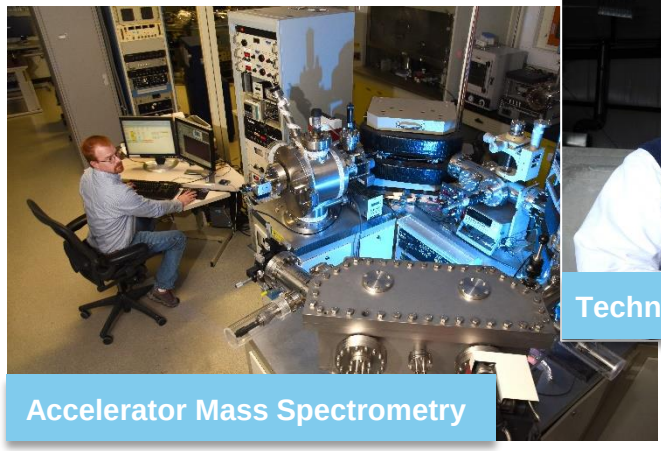
Advance nonproliferation technologies to enable the expansion of nuclear energy

- **Nonproliferation**
  - Reactor conversions
  - Nuclear fuels safeguards R&D
- **Counterproliferation**
  - Nuclear forensics
  - Nuclear materials disposition
- **Emergency Response**
  - Radiological dispersion device training
  - IAEA safeguards inspector training

Radiological Response Training



Neutron Detection



Accelerator Mass Spectrometry

Technology Development

IAEA International Atomic Energy Agency

National Nuclear Security Administration

Mission: Nuclear Security

Advance nonproliferation technologies to enable the expansion of nuclear energy

Recent Highlights

- With seed funding from Idaho IGEM program, INL, CAES and Idaho State University are developing a Disaster Response Complex in Pocatello.
- In collaboration with the University of Utah, INL researchers are developing a new capability to safely encapsulate nuclear materials for first responder training.
- In collaboration with the University of Hawaii, INL researchers are testing acoustic and optical sensors for counterproliferation missions.
- INL's award-winning PINS detection technology – used by military units worldwide – has been retrofitted into a backpack version.
- INL nuclear forensics researchers are advancing certain isotope separation methods that could improve the treatment of cancer.

Mission: Materials for National Defense

Ensure superiority in materials science and armor-related defense systems

- **Materials Science**
  - Designated U.S. Army Abrams Armor Center of Excellence
  - Large scale explosives and ballistics test range
- **Modeling and Simulation**
  - Advanced equipment and expertise to model explosives effects
- **Vulnerability Assessments**
  - Transformer Protection Barrier

Advanced Armor Development

Ballistic Protection for Substations

Specific Manufacturing Capability

Explosives Testing and Validation

Mission: Materials for National Defense

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Recent Highlights

- In collaboration with Michigan-based Waltonen Engineering, INL is in the process of licensing the Transformer Protection Barrier technology to private industry.
- Following completion of DOE-led public scoping process in 2019, INL is in the process of expanding its explosives and ballistics testing capabilities consistent with new and emerging threats.
- In collaboration with the National Nuclear Security Administration, INL operates a Vulnerability Center of Excellence providing physical security expertise to Department of Energy facilities nationwide.

Idaho National Laboratory