INL Resilience Optimization Center

A national center for systems resilience and risk management

With impacts from natural disasters and human-caused incidents on the rise, resiliency — the ability to withstand impacts and rapidly recover from different degrees of disruption — has become a top priority.

Idaho National Laboratory established the INL Resilience Optimization Center (IROC) as an innovation center for system resilience and risk management. The center draws from INL's extensive track record as a world leader in critical infrastructure systems analysis and security, as well as its unique, large-scale test ranges.

National defense, economic prosperity and quality of life have long depended on critical infrastructures such as energy, water, transportation and telecommunications. The rapid proliferation of connected systems has created new dimensions of vulnerability and risk to every organization. INL has long focused on this situation in exceptional ways, and the IROC is the lab's commitment to offer resilience solutions.

WHY THE IROC IS NEEDED
There is no one-size-fits-all approach to resiliency. National resilience requires asset owners to consider the infrastructure within their direct control and be conscious of dependence upon infrastructure out of their direct control. Resilience planning should be scaled and bound to an operation's criticality, risk profile and budget.

Forming a plan to enhance the resilience of critical infrastructures requires owners/operators to determine the ability of the system to withstand specific threats and then return to normal operations following degradation. Thus, a resilience methodology requires comprehensive consideration of all parts of critical infrastructure systems — from threats to consequences. The methodology must generate reproducible results that can support decision-making in risk management, disaster response and business continuity.

WHAT THE IROC DOES
The IROC can organize multi-disciplinary teams and labwide lifeline-infrastructure capabilities that are scalable to any asset, system or network, regardless of function or geography. Its experts also can analyze the resilience impacts posed by cyber-physical relationships and infrastructure dependencies and interdependencies.

In short, the IROC is a highly collaborative center that employs tools and resources

from across the federal government, along with commercially available resources. By leveraging existing expertise, tools, test infrastructures and other partner capabilities, the IROC can comprehensively analyze the state of stakeholder resilience and provide optimized solutions that will yield observable results.

WHO THE IROC SERVES

With the ability to provide personal attention to individual challenges posed by resilience gaps, the IROC can optimize a broad range of solutions to fit distinctive situations for federal agencies and private companies.

Example entities include: the U.S. Departments of Defense, Homeland Security, Energy, Transportation, Commerce and State; FBI; EPA; state and municipal agencies; Native American tribes; private companies critical to the U.S. economy and defense; critical manufacturing; power utilities; emergency services; energy companies; financial services and banks; food production; health care providers; transportation and freight.

What the IROC offers

INL has extensive capabilities, differentiating environments and large-scale test ranges to take a national leadership position in infrastructure resilience. Strengths include:

CYBER SYSTEMS
- Forerunner in cyber-physical dependencies analysis and visualization
- Operational Technology expertise in malware, resilient systems, engineering design

FULL SCALE INFRASTRUCTURE TESTING
- Full-scale test range for power, wireless, water and control systems

INTELLIGENT INSTRUMENTATION AND CONTROL
- Cyber State Awareness

EMERGENCY PLANNING AND RESPONSE
- Continuity of operations
- Prevention, protection, mitigation, response and recovery

VULNERABILITY/RISK ANALYSIS
- Natural, technological and human-caused threats and hazards analysis

INTEGRATED ENERGY SOLUTIONS
- Integration of variable energy sources with advanced nuclear energy

MODELING/SIMULATION
- Nuclear sector digital resiliency and digital twins,
- Functional critical infrastructure interactions and interdependencies
- Real-time data ingestion for mission planning and analysis

VISUALIZATION/SCIENTIFIC COMPUTING
- High Performance Computing

OTHER
- Training expertise and accreditation certification in infrastructure analysis

The IROC leverages capabilities in cyber systems, full-scale infrastructure testing, integrated energy solutions, modeling and simulation, scientific computing, and cyber-physical-dependencies analysis.