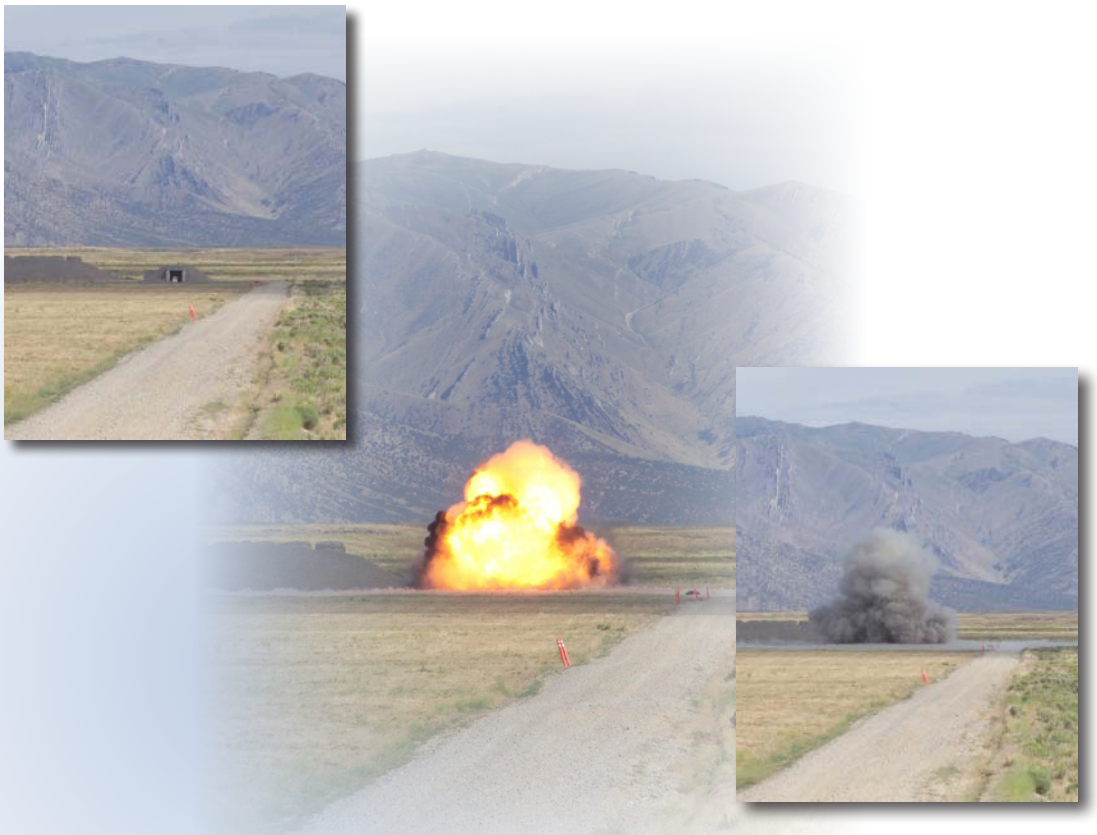

INL's full-scale explosives test range allows scientists to conduct scalable performance testing to measure blast effects, shock and vibration on structures and protective barriers.

Idaho's Explosives Test Range

Safeguarding citizens, soldiers and infrastructure from explosive threats

Terrorist bombings of U.S. military posts and government installations are on the rise throughout the world. Today, many national security experts are concerned that these attacks could spread to various types of U.S. infrastructure, ranging from power distribution stations and dams to shopping malls and sports complexes. Idaho National Laboratory is confronting this threat head-on with comprehensive research, field-ready technologies and facilities and multidisciplinary teams of experts to develop and test materials, systems and solutions against this growing concern.

INL has a long history of explosive effects testing and research to protect Department of Energy critical assets. This research involves identifying vulnerabilities in existing or planned facilities, developing mitigative strategies to correct these vulnerabilities and implementing protective strategies. A combination of high-performance computing and explosive testing is used to design and validate these strategies.

In addition, INL has the capabilities to test a wide range of explosives threats for other federal agencies, law enforcement and private industry. Comprehensive testing allows us to measure explosive effects on structures and protective barriers, and to evaluate

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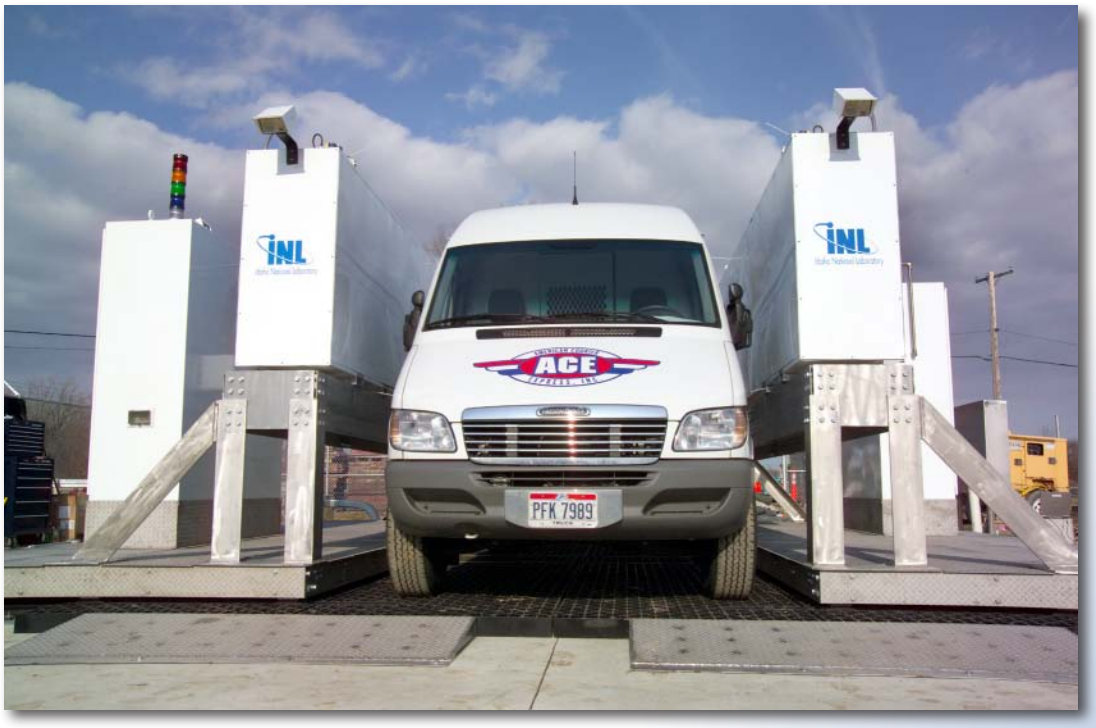
The Energy of Innovation

INL Idaho National Laboratory



The INL-developed Idaho Explosives Detection System scans cargo trucks for smuggled explosives entering military bases, embassies and parking garages.

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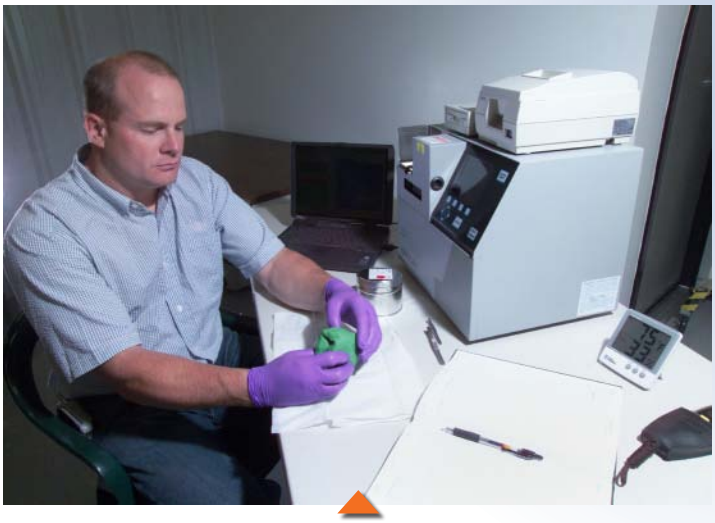
the effectiveness of potential countermeasures. Due to the ever-changing threat posed by terrorist organizations, INL recently developed a new multipurpose research and development explosives range. This range has the capability of handling a variety of energetic experiments, including explosive events with a maximum charge weight of up to 20,000 pounds TNT, inert projectiles with a maximum flight of 8,000 meters and shoulder-fired rockets.

The ability to detonate large explosive charges plays a key role in characterizing explosive threats and validating computer models with realistic results. Most physical barrier design data is untested and relies heavily on empirical calculations. Security designs are based on extrapolations from textbook equations developed for the design of common construction materials. On the other hand, a terrorist bombing – a new tactic confronting national security – challenges the understanding of barrier performance against this threat.



An INL technician performs testing and analysis on a trace explosives detection system as part of a long-running program to evaluate detection technologies for the Federal Aviation Administration.

INL's explosives test range enables our scientists to safely detonate large-scale explosives, record dynamic effects, and measure and record pressure-time histories, crater size, barrier damage and the extent of the debris. This test data is then used to validate blast effects models, enhance the accuracy of vulnerability assessment models and support the development of improved protective structures and materials.

Scientifically validated results from testing provide structural engineers, architects and government agencies with accurate information as they are challenged to develop new defensive measures to protect citizens, soldiers and critical infrastructures from explosive terrorist threats.

INL's test range is staffed by some of the world's most renowned explosives and materials experts who conduct scalable performance testing and develop advanced technologies to protect the United States against threats like vehicle-borne improvised explosive devices and rocket-propelled grenades. INL explosives engineers have more than 250 years of experience in the field, and many have specialized military or doctoral degree educations.

INL also operates the National Nuclear Security Administration Center of Excellence for Vulnerability Analysis. Here, high-qualified vulnerability, protective force and explosives breaching experts work to enhance the security of the nation's nuclear facilities and national laboratories through the development of vulnerability assessments, characterization of threat guidance, performance testing of preventive and mitigative measures, and comprehensive training.

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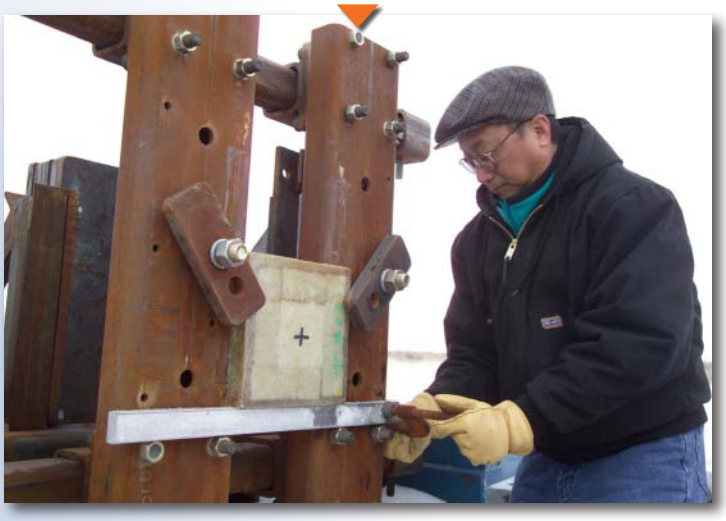
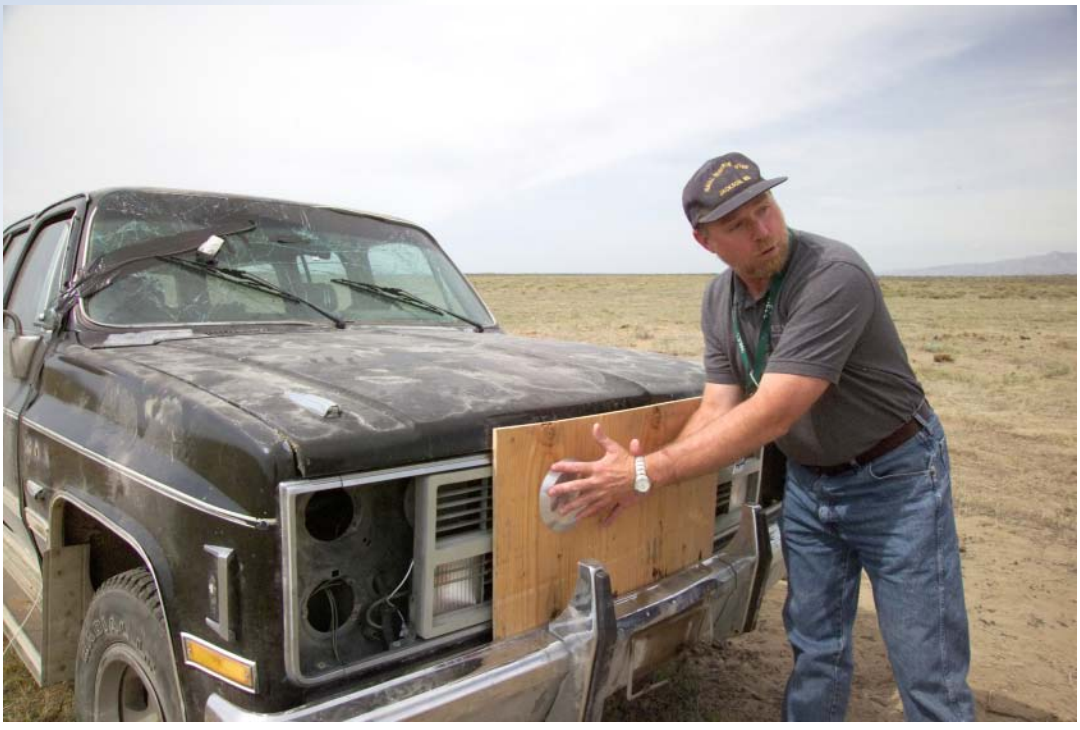
An INL materials scientist prepares a sample of ceramic composite vehicle armor for ballistics testing.





INL explosives engineer John Weathersby explains how blast pressure and heat can impact a vehicle.

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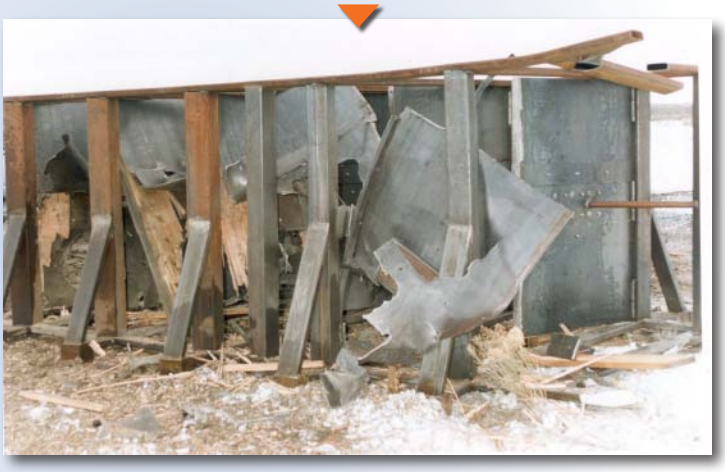
In addition, INL scientists are experts in ion mobility and secondary ion mass spectrometry, and are conducting research and performing testing on trace explosives detection systems for the U.S. Department of Homeland Security and other federal agencies. They perform explosive forensic analysis, design improved sensors and develop detection testing protocols and standards. INL maintains a Class II, Division I Operations Room for explosives assembly and a BATF-certified magazine for explosives storage.

Scientists also have extensive expertise in bulk explosives detection technologies and are involved in the development and deployment of the Idaho Explosives Detection System, which scans cargo trucks for smuggled explosives at entry points to Department of Defense facilities. This system was recently installed at Ohio's Wright-Patterson Air Force Base for field testing.

The laboratory has a long history of developing bulk explosives and chemical detection technologies, including the award-winning portable isotopic neutron spectroscopy system, and an imaging and analysis system to enhance the stand-off detection of explosives concealed under clothing using passive, long-wave infrared sensors. INL researchers are also designing, modeling and fabricating a simultaneous dual-mode ion mobility spectrometer with a unique automated spectral interpretation system to improve detection limits and resolution while enabling simultaneous detection of a greater number of compounds, including explosives and chemical warfare agents.

By combining our technical expertise, capabilities in vulnerability analysis and unparalleled testing facilities with our award-winning technology development, INL is working to increase the safety and security of American citizens, soldiers and law enforcement.

INL's explosives testing capabilities include the ability to analyze the impacts of explosively formed projectiles on common materials.



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