September 2009

National Nuclear Security Administration Monthly News

Administrator Thomas D'Agostino Participates in White House Briefing

NNSA Administrator Thomas D'Agostino joined other senior Obama Administration officials for a recent White House briefing to discuss the national security implications of global warming.

Highlighting the interconnected nature of the threats to our national security, D'Agostino explained how some NNSA nuclear security assets and expertise are also being applied to address global climate change.

For example, the Administrator cited the use of NNSA supercomputers, which were first developed to ensure the safety, security and effectiveness of the U.S. nuclear weapons stockpile without underground testing, but are also now being used to model the impact of climate change, identify solutions and bring cutting-edge technologies to market faster.

"At Los Alamos National Laboratory, our Climate, Ocean and Sea Ice Modeling Project is using advanced supercomputing to model changes in sea levels. At Sandia National Laboratories, our researchers developed a new wind turbine blade design that promises to be more

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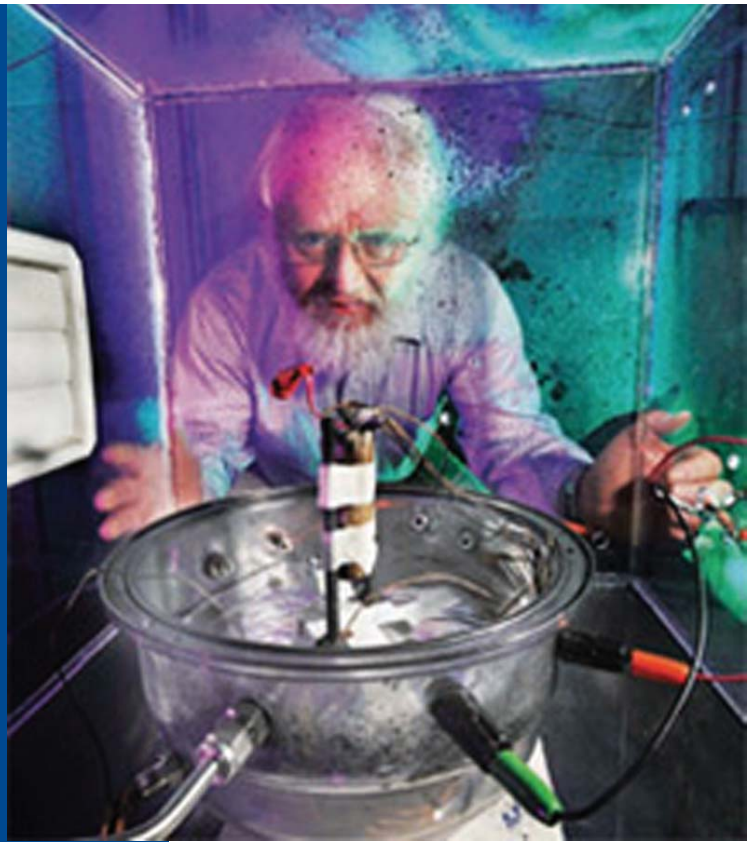

SNL LDRD: Sandia National Laboratories researchers, such as Peter Roth pictured here, work on developing lithium-ion batteries for automobiles as part of their Laboratory Directed Research and Development (LDRD). To read about the 2009 NNSA LDRD Symposium, see pages 4 and 5.

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NNSA Highlights Efforts to Secure Rad Materials

In September, NNSA highlighted its efforts to secure radiological materials throughout the U.S. in a special Congressional hearing in Brooklyn and a table-top exercise in Houston, Texas.

During a field hearing of the House Homeland Security Subcommittee on Emerging Threats at the Downstate Medical Center in Brooklyn, N.Y., Associate Assistant Deputy Administrator for Global Threat Reduction Kenneth Sheely discussed NNSA's role in providing security upgrades at civilian facilities with radiological sources.

Sheely testified that NNSA has initiated a number of voluntary security efforts to further mitigate potential threats, including eliminating unwanted sources, hardening kits for specific irradiators, installing facility-wide voluntary security enhancements,

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Administrator's Corner

It's my pleasure to launch a new Administrator's Corner feature in the *NNSA News*. As part of Secretary Chu's commitment to making the department more open and transparent, I look forward to using this space to communicate directly with you about our vision and priorities.

September was an exciting month for NNSA, one that highlighted the depth of expertise across the nuclear security enterprise and the central role we are playing in some of the defining debates of the day. Day in and day out, the men and women working across the nuclear security enterprise are doing their part to keep the American people safe and to leverage the best science and research in the world to tackle some of our greatest challenges.

You'll read in this issue about a successful counterterrorism exercise at Baylor University, a symposium in Washington, D.C. where experts from across our enterprise shared their research, and about new technology at Y-12 that will make it safer and easier to dismantle nuclear weapons.

Personally, I was privileged to be invited to address a group of veterans at the White House on the national security implications of climate change and about how our investment in nuclear security is providing the tools to tackle this challenge.

I was also honored to be a member of the delegation Secretary Chu led to the 53rd International Atomic Energy Agency General Conference in Vienna, Austria, where we worked with our international partners to help implement the unprecedented nuclear security agenda President Obama outlined earlier this year.

In keeping with our renewed commitment to openness and transparency, we launched our first ever travel blog on the NNSA website to help keep you in the loop about an important international conference that affects work across our enterprise. I look forward to similar efforts in the future.

In the meantime, I want you to know that I appreciate the work you do and that I am proud to serve with you during a critical time in the history of our enterprise. Our enterprise is only as strong as our people, which is why I have such tremendous confidence in the future of the NNSA. I hope you enjoy reading about our successes across the enterprise.

Sincerely, Tom D'Agostino

STAFFERS VISIT ICECAP: Congressional staffers pose in front of the ICECAP rack at the NNSA's Nevada Test Site. ICECAP was slated to be the last underground nuclear test conducted by the United States in late 1992. The rack is now used to explain how an underground nuclear test was assembled and fielded. The last underground nuclear test conducted by the United States was *Divider* on Sept. 23, 1992. Pictured left to right are: Jennifer Wagner, deputy director of public affairs, NNSA; James Lambert, deputy associate administrator for Management and Administration, NNSA; Kari Bingen, House Armed Services Committee; Tim Morrison, military legislative assistant, Senator Jon Kyl; Bob DeGrasse, House Armed Services Committee; Dr. Steve Younger, president, National Security Technologies, Inc.; Ginger Wierzbanowski, Office Of the Joint Chiefs of Staff; Jim Holt, National Security Technologies, Inc.; Major Jeff Carter, Air Force Legislative Fellow, NNSA; Steve Mellington, NNSA Nevada Site Office manager.

Administrator Thomas D'Agostino Participates in White House Briefing

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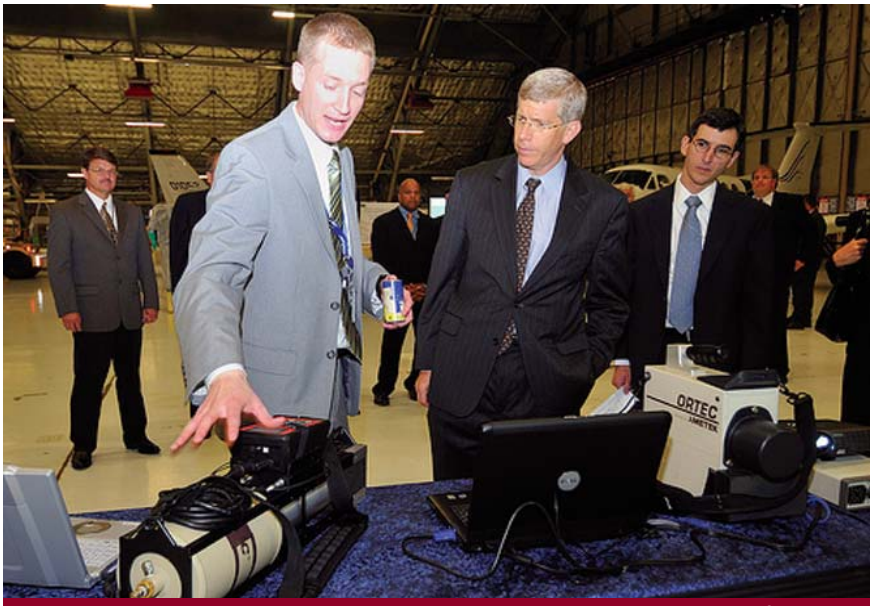
efficient than current designs and should significantly reduce the cost-of-energy of wind turbines at low-wind-speed sites. At Lawrence Livermore National Laboratory, researchers are mapping the impact of climate change on agriculture. These are examples of our nation's investment in nuclear security over the last 60 years helping provide solutions to other critical challenges," said D'Agostino.

During the briefing, D'Agostino also mentioned the potential of the recently completed National Ignition Facility – the world's largest, most powerful laser – to help scientists better understand fusion power and its applications in a clean energy future.

NNSA Emergency Operations Teams Enhance Radiological Security for G-20 Summit

NNSA deployed emergency operations personnel to support the United States Secret Service and the Federal Bureau of Investigation with nuclear and radiological security for the G-20 Summit in Pittsburgh in late September. As the nation's premier responder to nuclear or radiological incidents within the United States or abroad, NNSA works collaboratively with federal, state and local agencies to enhance security for major national security events.



NNSA EMERGENCY OPERATIONS TECHNOLOGY: Deputy Secretary of Energy Daniel Poneman (center) reviews Leading Nuclear Counterterrorism Assets at Andrews Air Force Base similar to the equipment used by emergency operations teams at the G-20 Summit, including the NNSA's portable gamma/neutron detector.

NNSA deployed members of its Radiological Assistance Program, which provides teams of nuclear scientists and health physicists equipped to conduct radiological search, monitoring and assessment activities. The Nuclear Radiological Advisory Team, with nuclear and radiological subject matter expertise, was also deployed to assist with the detection and identification of radiological materials.

One part of NNSA's mission is to protect the public, environment and emergency responders from both terrorist and non-terrorist radiological events by providing a responsive, flexible, efficient, and effective emergency response framework and capability for the nation. This mission is accomplished by applying NNSA's unique technical expertise coupled with resources at the Department of Energy's national laboratories.

"Because of our expertise in handling, securing and detecting nuclear material over the last sixty years, NNSA is uniquely equipped to share our expertise for major national security events," said NNSA Associate Administrator for Emergency Operations Joseph Krol. "We were proud to do our part, putting that expertise to work protecting leaders from around the world."

NNSA Highlights Efforts to Secure Rad Materials

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crafting specialized training courses for security and law enforcement personnel, and conducting table-top exercises for first responders.

NNSA and the FBI recently hosted one such table-top exercise at Baylor College of Medicine in Houston. Federal, state and local officials examined security alarm response and crisis and consequence management capabilities in the event of a terrorist incident involving the kind of medical radiological materials that Baylor regularly uses.

"These exercises illustrate how our investment in nuclear security has provided the technical knowledge and ability to protect our country against terrorist attacks," said Deputy Under Secretary of Energy for Counterterrorism Steven Aoki. "Institutions like Baylor College of Medicine understand that along with the benefits of using radiological materials comes the responsibility to protect this material."

Known as Space City Thunder, the exercise is one of many events routinely held by NNSA, U.S. Department of Energy, Nuclear Regulatory Commission, with Agreement States, and other government and civilian sites throughout the country to help evaluate security and emergency response.

"This coordinated effort led by the National Nuclear Security Administration is a great example of how collaboration makes us stronger. Baylor College of Medicine was pleased to host this roundtable exercise, which highlights the cooperation needed by organizations – both public and private – in the event of a serious threat," said Paul Muraca, director of environmental safety at Baylor College of Medicine.

LDRD Symposium Brings Security

The 2009 NNSA Laboratory Directed Research and Development (LDRD) Symposium held Aug.19, in Washington, D.C., explored current and future areas of exciting research throughout the nuclear security enterprise designed to protect the nation's critical infrastructure from terrorism, sabotage, global climate change, and natural disasters.

The theme for this year's symposium was "Innovation for Our Nation: Strengthening America's Infrastructure Security."

Jamileh Soudah, director of the NNSA Office of Institutional and Joint Programs, said that in addition to the core mission of nuclear security, the NNSA and its laboratories have been increasingly called upon to apply their scientific and technological capabilities to help address other issues that impact the nation as well.

"The symposium brought together researchers to share their insights into the national security implications of emerging infrastructure security issues and the impact of LDRD investments in infrastructure security by the national laboratories," she said.

The symposium highlighted various infrastructure security topics including protection of critical information resources and expanded intelligence analysis tools to protect cyber systems, protection against bio- and nuclear threats, enhanced nuclear facility security, restructuring of the electrical energy grid to accommodate renewable energy sources, and improved analysis on climate change factors and their broad potential impacts.

TECHNOLOGICAL SOLUTIONS: Manuel J. Manard, Nevada Test Site (NTS) senior scientist, explains NTS Lab Directed Research and Development (LDRD) work on "Differential Mobility Spectrometry/Mass Spectrometry" at the 2009 NNSA LDRD Symposium in Washington, D.C.

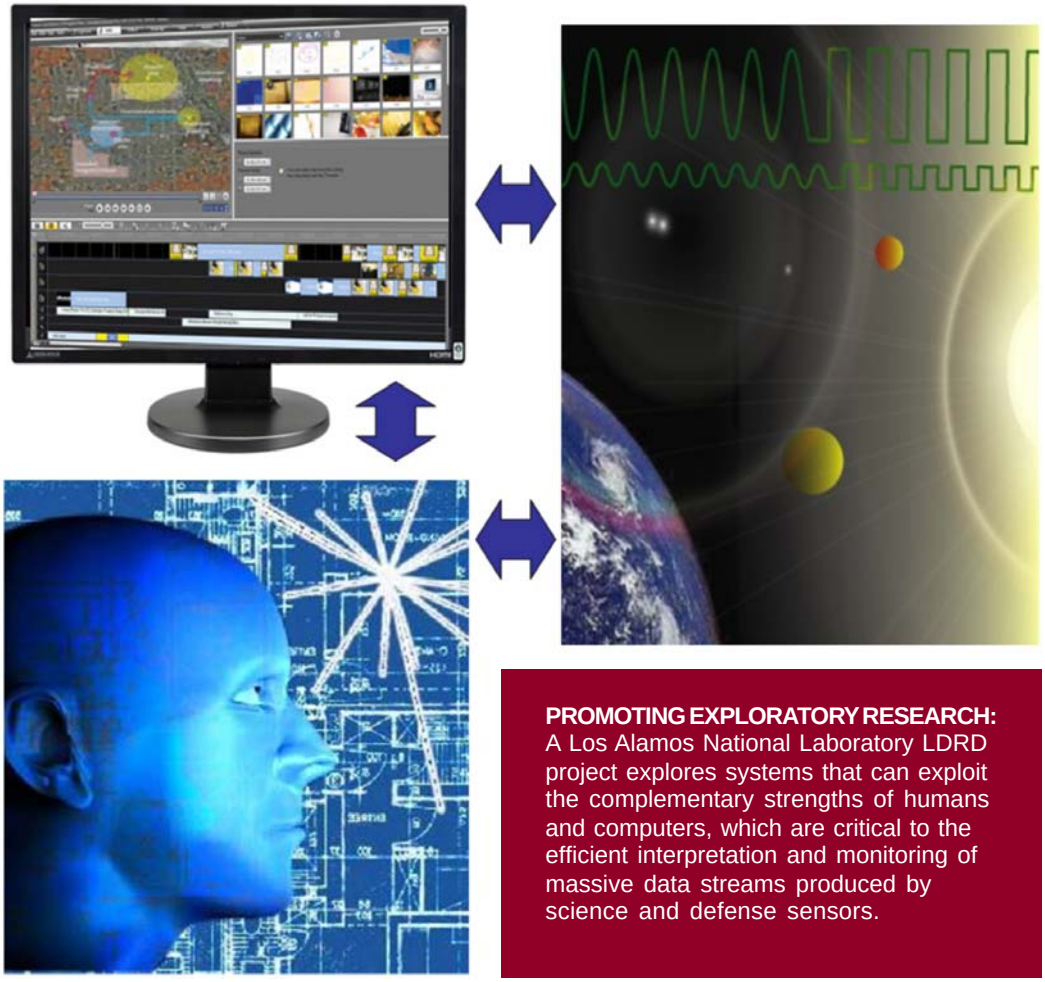
William Brinkman, director of the U.S. Department of Energy's Office of Science, helped set the context for science and technology challenges in infrastructure security. He urged all attendees to continue to work together in the interest of research and development.

John Fischer, director of Defense Laboratory Programs for the Department of Defense, acknowledged that the NNSA LDRD model is a benchmark DoD is trying to institute as a result of DoD decline in R&D capabilities.

Together Nuclear Enterprise Researchers

Two dozen posters were featured by researchers from Sandia National Laboratories, Los Alamos National Laboratory, Lawrence Livermore National Laboratory, Nevada Test Site, Y-12 National Security Complex, the Pantex Plant, the Kansas City Plant, and Savannah River Site.

The focus of the LDRD program is to promote innovative and exploratory research to respond to emerging national security missions and to anticipate future needs. The program funds projects that pursue technological solutions to the most urgent challenges facing the nation or that promote science and engineering foundations that will lead to new research and development.



PROMOTING EXPLORATORY RESEARCH: A Los Alamos National Laboratory LDRD project explores systems that can exploit the complementary strengths of humans and computers, which are critical to the efficient interpretation and monitoring of massive data streams produced by science and defense sensors.

"Innovation for Our Nation: Strengthening America's Infrastructure Security"

RESEARCH AND DEVELOPMENT TECHNOLOGY: Workers are shown at the Visalia (California) Pole Yard, a site that was cleaned and removed from the EPA's Superfund list more than 100 years ahead of schedule using technology developed under an LDRD grant by Lawrence Livermore National Laboratory and University of California Berkeley researchers.

The Science of Nuclear Security

NNSA Develops New Way to Dismantle Weapons

NNSA's Y-12 National Security Complex has developed and implemented a new advanced technology for dismantling nuclear weapons components at its facility in Oak Ridge, Tenn. As a result, the dismantlement schedule of one weapons program is expected to be shortened by five years.

"This is another in a long line of great engineering success stories at Y-12. It is a testament to the expertise and ingenuity of Y-12's R&D program," said Y-12 Site Office Manager Ted Sherry. "Process improvement, by definition, leads to better, more efficient work. To have a method that is also safer and less expensive is extraordinary."

ENGINEERING SUCCESS STORY AT Y-12: NNSA's Y-12 National Security Complex technicians prepare a sample to be separated by the infrared debonding process. The process makes dismantlement work faster, cheaper and safer.

The new infrared debonding technology is used to separate materials held together by adhesives. It was developed entirely at the Y-12 engineering laboratory and scaled up to a full production capability now in use. The new process uses high-flux, unidirectional infrared heating to melt and partially degrade bonding agents. The new technique is faster, safer, cheaper, and better for the environment.

Because it applies a more localized source of heat, the infrared debonding equipment is more energy efficient and reduces utility costs. Also, many of the debonded materials can be recycled, whereas the old method could damage materials or components, rendering them unable for preservation or reuse. The newly developed equipment is also ergonomically designed and eliminates most mechanical processing, thereby greatly minimizing hazards to workers.

"The infrared debonding process improves our schedule response time incredibly," said Darrel Kohlhorst, president and general manager of B&W Y-12, which manages and operates Y-12 for NNSA. "This is a great technical solution to a tough problem, and I am proud of the scientific and engineering contributions that made this high-tech system possible."

Infrared technologies are among the suite of advanced technologies undergoing developmental testing for the proposed Uranium Processing Facility, a modern facility intended to replace Y-12's current enriched uranium operations. Infrared debonding was developed as part of the Plant Directed Research, Development and Demonstration program and the Advanced Design and Production Technologies program and is being deployed by Stockpile Readiness. B&W Y-12 has submitted a patent application for the infrared debonding development.

LANL Explosive Training Helps Prepare Soldiers

Scientists at Los Alamos National Laboratory (LANL)continue to use their expertise in a variety of disciplines to help prepare U.S. military personnel deal with homemade explosives that they might encounter while deployed in Afghanistan. The goal of the three-day course is to help personnel selected by the military learn how to detect, identify and characterize a wide variety of improvised explosive compounds and ingredients.

Brig. Gen. Garrett Harencak, NNSA principal assistant deputy administrator for military application, addressed the September 2009

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EXPLOSIVES TRAINING AT LANL: Brig. Gen. Garrett Harencak (right), with the assistance of Brad Lounsbury of the Los Alamos Bomb Squad, initiates the detonation of a small "homemade" explosive at Los Alamos National Laboratory's hazardous devices/hazardous materials training facility at Technical Area 49. Harencak participated in the laboratory's Improvised Explosive School for soldiers and marines headed to Afghanistan.

KCP Puts Old Equipment to New Use

The Kansas City Plant's (KCP) Arming, Fuzing and Firing (AF&F) Product Realization Team (PRT) has developed an innovative solution using aging equipment to meet product requirements and delivery schedules of a critical component on weapons in the nuclear stockpile.

Tasked with processing the AF&F components on schedule, KCP confronted a peculiar challenge. Unexpectedly, KCP found itself with AF&F's containing launch accelerometers – electrical switches activated by acceleration that help ensure the safety of nuclear weapons – in the unactuated condition that needed to be tested in the latched position. Before testing could begin, the AF&Fs needed to experience a constant acceleration to latch the launch accelerometer.

Because a full-up AF&F is too large for KCP's standard production centrifuges and shipping the parts to another qualified facility would take too long, KCP's environmental test engineers and technologists got to work overhauling a nearly half-century old KCP centrifuge large enough to accommodate AF&F assembly.

In order to use it, the plant's environmental test engineers and technologists reconditioned the equipment and developed a process to monitor speed and vibration while testing and preserve the integrity of the AF&F.

The engineers also took steps to ensure that the acceleration profile on the old centrifuge was consistent with design agency specifications.

After determining that the AF&F testing environment with the reconditioned centrifuge was acceptable, the team ran 20 trials with engineering units to demonstrate the efficacy of the process.

Thirty days after the need was identified by the PRT, the first mark-quality AF&F was latched using the old centrifuge in a new way.

SUCCESSFUL INNOVATION: In 1961, senior lab technologist Don Caffey prepared to run a test on the new Rucker centrifuge. More than 45 years later, ingenuity and the same centrifuge helped the Kansas City Plant meet its ship commitments.

Final Transuranic Waste Shipment Leaves NTS

The final shipment of legacy transuranic waste departed the Nevada Test Site (NTS) in July en route to the Idaho National Laboratory. The shipment wraps up a monumental 35-year management, characterization and repackaging effort by NNSA's Nevada Site Office (NNSA/NSO).

LEGACY TRANSURANIC WASTE: Workers in protective equipment remove a glovebox section after cutting open an oversized box.

The waste, most of which was generated by nuclear research and development, will undergo final characterization in Idaho at the Central Characterization Project and then be shipped for final disposal to the Waste Isolation Pilot Plant near Carlsbad, New Mexico

Prior to shipment offsite, the waste underwent extensive characterization and repackaging activities to ensure it met disposal criteria. This last shipping campaign completed processing and characterization of waste that was previously non-compliant for offsite shipment. Since January 2004, 65 shipments with 1,942 drums and 78 boxes have been safely completed.

"In less than two years, the project team constructed and started up a nuclear facility and safely completed processing of highly radioactive waste generated at a national weapons laboratory. This is an incredible accomplishment," said National Security Technologies President Steve Younger.

NSTec modified the Visual Examination and Repackaging Building (VERB) in 2008 to help facilitate the repackaging of waste containers. It also modified the waste treatment process to further accelerate processing of transuranic waste.

Transuranic waste contains man-made radioactive elements heavier than uranium, hence the name "trans" or "beyond" uranium. Most of the transuranic waste managed at the NTS was generated as part of a U.S. nuclear weapons research and development program at Lawrence Livermore National Laboratory near Oakland, Calif. This legacy waste, which was shipped to the NTS for temporary storage between 1974 and 1990, includes protective clothing and miscellaneous equipment contaminated with transuranic elements.

LANL Explosive Training Helps Prepare Soldiers

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class and thanked the attendees for serving their country. He praised LANL staff for their help in protecting the lives of U.S. military overseas.

"This remarkable course uses our core capabilities to do really good things and to help save lives," Harencak said. "What is truly impressive is the reports scientists get back from soldiers who have been deployed and provide feedback to the instructors.
The students provide valuable information to help develop scenarios for future courses."

The LANL scientists teach the attendees how to use all their senses, along with state-of-the-art technology, to enhance their awareness of colors, textures and odors typical of explosive materials or ingredients, as well as how to recognize human indicators that are common among would-be perpetrators who have handled these materials or ingredients.

In addition to classroom and laboratory settings, the trainees get hands-on training in the field where they witness a variety of both improvised and conventional explosive detonations. Additional courses will be offered to military personnel throughout the year.

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