



NNSA Expands Nuclear Security Cooperation With Russia

In response to nuclear security commitments made at the February 2005 Bratislava Summit between the Presidents of the United States and Russia, NNSA has made dramatic progress in securing sites with weapons-usable material and nuclear warheads.

Secretary of Energy Samuel Bodman and Russia's Federal Agency of Atomic Energy (Rosatom) Director Alexander Rumyansev were charged with jointly developing the plan to expand and deepen cooperation on nuclear security and will provide routine reports to the U.S.

and Russian presidents on progress achieved under these cooperative efforts.

To date, there has been more than 85% completion of security improvements at the 39 Russian Navy warhead sites containing hundreds of warheads. By the end of fiscal year (FY) 2005 the improvements will be 95% complete. Additionally, within the 51 sites containing weapons-usable nuclear materials, a total of 114 buildings have received security upgrades. Security enhancements at these sites are over 75% complete and more than 80% will be complete by

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Atlas Resumes Experimental Work At Nevada Test Site

NNSA scientists have successfully generated a powerful current — roughly four times all the electrical power on Earth — to create pressures in materials millions of times greater than normal to better understand the conditions in nuclear weapons.

Using the Atlas Pulsed Power Facility at the Nevada Test Site (NTS), scientists from the Los Alamos National Laboratory (LANL), working with the staff of NTS management and operating contractor Bechtel Nevada (BN), performed their first physics experiment to prove that Atlas is ready to support

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NANOFOIL: Reactive NanoTechnologies' NanoFoil is a nanoengineered heat source developed with Lawrence Livermore National Laboratory and Johns Hopkins University. An electrical pulse applied to the foil initiates a chemical reaction to produce high temperatures. The invention won an R&D 100 Award for 2004. See page 5 for a description of all the R&D 100 awards won by NNSA laboratories.

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the end of FY 2005. Nearly half of all the nuclear materials within these sites have been secured.

NNSA's security efforts over the last ten years have focused on securing the most vulnerable sites, many of which were smaller sites. Now that these smaller sites have largely been secured, the focus has shifted to securing the remaining larger sites. Meeting the objective of securing all of the nuclear materials by 2008 is feasible because the large sites are fewer in number but contain significant amounts of nuclear material.

Current NNSA projections indicate the potential to secure more material in FY 2005 than in FY 2004. NNSA began a pilot program with the Russian Strategic Rocket Forces (SRF) two years ago and is now working at 19 of the SRF sites. NNSA has also expanded the scope of its programs to include cooperation with Russia's 12th Main Directorate nuclear warhead sites. Discussions to perform upgrade work at these sites are underway.

The U.S. and Russia have pledged to continue cooperation on security upgrades of Russian nuclear facilities and develop a plan of work through and beyond 2008. At the Bratislava Summit the Presidents also agreed to focus increased attention on "security culture," to include fostering disciplined, well-trained and responsible nuclear material custodians.

NNSA Administrator's 2005 Small Business Awards Recognize Excellence and Progress

Five individuals, three businesses, one NNSA Headquarters office and two NNSA plants have won the Administrator's Small Business Awards for 2005 for promoting small business advocacy, supplier excellence, achievement and innovation.

NNSA Senior Procurement Executive Robert Braden said, "I congratulate this year's awards recipients. Their impressive contributions and innovations will continue to further opportunities for NNSA to use small businesses for the procurement of products and services."

This year's recipients are:

NNSA Small Business Advocate Awards — Federal: Robert (Dino) Herrera, Office of Infrastructure and Environment, Facilities Infrastructure and Recapitalization Program; M&O: Clinton L. Atwood, Sandia National Laboratories

NNSA Small Business Suppliers of Excellence — Prime Contractor: DC-Strategic & Learning Services, Inc.; Subcontractor: MS Technology, Inc., ARES Corporation

NNSA Small Business Achievement — Federal: Office of Infrastructure and Environment (NA-50); M&O: BWXT Y-12, L.L.C.; BWXT Pantex

NNSA Small Business Innovation — Federal: James R. Martin, Assistant Manager for Administration, Y-12 Site Office; M&O: Theresa Carson/Victor Chavez, Sandia National Laboratories; Ed Cunniffe, Lawrence Livermore National Laboratory

FUTURE CRIME SCENE INVESTIGATORS: Devyn McConachie (left) and Danielle Arnold analyze an unknown substance as part of Lawrence Livermore National Laboratory's Science Adventure Institute in Livermore (SAIL) educational program for 6th and 7th graders. The program was co-sponsored by the Livermore School District and included presentations by the Livermore Police and Fire Departments and laboratory forensic scientists.



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Atlas Resumes Experimental Work At Nevada Test Site

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research for the certification of the nation's nuclear weapons stockpile. Atlas was designed and built at LANL and recently relocated to the NTS.

The goal of the inaugural NTS experiment was to demonstrate that Atlas remains capable of the implosion quality obtained in experiments conducted three years ago in Los Alamos.



During the interim period, LANL and BN staff have made significant improvements in the design tools used to create the implosion, the fabrication tools used to build the hardware, and the diagnostic tools used to measure the results, making this one of the best-predicted and best-understood high-precision implosion experiments ever.

The predictability and quality of Atlas implosions enable scientists to characterize the behavior of materials at the extreme conditions in an exploding nuclear weapon. Such detailed data is needed to validate the sophisticated computer codes upon which scientists rely to certify U.S. nuclear weapons in the absence of underground nuclear testing.

In operation, the 650-ton Atlas pulsed-power generator successfully discharged nearly 19 million amperes of electrical current through an aluminum cylindrical shell, or liner, about the size and shape of a tuna can. The current caused the liner to implode at extreme speeds, with unrivaled symmetry, precision and reproducibility.

ATLAS BACK AT WORK: The pulsed-power generator was relocated from Los Alamos to the Nevada Test Site.

At the direction of Congress, BN began to relocate Atlas to the NTS in October 2002, where it was installed in a new, 14,000-square-foot high-bay building in an industrial research environment in Area 6. Construction work for the relocation project was completed in April 2004, and electrical testing was completed in July 2005.

COMPUTE THIS: Tours and demonstrations were part of the summer Computational Science Applied Technology (CSAT) experience for 15 local high schools students at the Kansas City Plant. CSAT helps students understand how math and science are applied in the real world and where future careers in these fields may lead them.



Livermore Lab Develops Armor For Iraq Gun Trucks

With funding from the Defense Advanced Research Projects Agency (DARPA) and in collaboration with the U.S. Army, gun truck armor kits developed by Lawrence Livermore National Laboratory researchers are now providing convoy protection for American troops on the roads of Iraq.

To date, 31 trucks have been outfitted with the armor protection kits and are being used in convoys on Iraqi roads. Plans call for assembly of dozens more gun truck kits in the near future.

The armor kits are mounted on five-ton supply trucks outfitted with several machine guns that convert them into gun trucks used to protect convoys. Easy to assemble, the modular kits consist of readily available and low-cost armor steel and ballistic fiberglass panels that provide a wall of protection around the back of the truck and the cab. Each side wall is topped by two-foot by two-foot sections of transparent armor to protect machine gun operators.



IRAQ GUN TRUCKS: A gun truck in Iraq outfitted with an armor kit developed by Lawrence Livermore National Laboratory researchers and engineers.

One of the gun trucks was struck by an improvised explosive device on March 23, southwest of Fallujah, Iraq. All seven U.S. soldiers in the vehicle at the time of the attack walked away unharmed.

Future Leaders Class Gets Job Assignments

The first 29 future leaders of NNSA are now a step closer to working at one of the eight Site Offices, the Service Center and NNSA HQ Program Offices.

The recent college graduates are the first class of the NNSA Future Leaders Program (FLP). They completed two weeks of orientation and training at the NNSA Nevada Site Office.

Recruited from 14 different universities, these future leaders represent such institutions as the University of California, Berkeley; Georgia Institute of Technology; University of Maryland; Texas A&M University; Howard University and Southern University.

Their introductory classes included the History of the Nuclear Weapons Complex, Exceptional Leaders in an Exceptional Organization, Writing for Results and Effective Presentation Skills.

The Inaugural Class of the NNSA Future Leaders Program



With this basic background, the Future Leaders Program participants will now go to their first NNSA job assignment. The future leaders will reassemble two to three times each year to receive core and

discipline-specific training as a group.

The FLP is a two-year program which provides for core training in project management, leadership, human resources management, federal appropriations law, contracting and security. Each

participant will complete at least two rotational assignments to learn first hand about the work performed in other organizations. Participants are placed as facility representatives, general engineers, physical scientists, business management specialists, and information technology specialists.

NNSA Labs Each Receive Four R&D 100 Awards

Scientists at NNSA's three national laboratories have captured a total of 12 R&D Magazine 2005 R&D 100 Awards for developing advanced technologies with commercial potential. Some of the awards are for activities conducted in partnership with private companies, other labs, or universities.

Sandia National Laboratories (SNL)

Sandia's computational mechanics software was extensively applied by Goodyear Tire & Rubber Company in the development of its new Assurance™ line of tires, particularly the TripleTred Technology™ tire.

For another award, Sandia used innovative data compression techniques to help physicians consult in real-time over MRI. Global-Link allows rapid transmission of complex data so that a doctor in the U.S. can confer with a doctor halfway around the world. Results were achieved in collaboration with Logical Solutions, Inc., which is marketing the product.

Sandia earned a third R&D 100 award for the invention of a patented exploratory ion beam microscope system. Joint winner Quantar Technologies is marketing this invention. The multidimensional, high-resolution analysis system is called the Ion-Photon Emission Microscope (IPEM).

TEPIC is a rigid structural foam developed at Sandia/California. It meets processing requirements to be used as forms for molding advanced composite materials that cure at high temperatures. Also included on this award is Scion Industries, one of two licensees of TEPIC.

Lawrence Livermore National Laboratory (LLNL)

The Biological Aerosol Mass Spectrometry system, designed to rapidly detect the airborne release of biological threat agents, is one of LLNL's winners.

A team of LLNL researchers shared another award with Innovative Survivability Technologies of Goleta, Calif. for development of the Adaptable Radiation Area Monitor, used for protecting the nation from radiological or nuclear attack.

LLNL, Reactive NanoTechnologies of Hunt Valley, Md. and Johns Hopkins University shared another award for developing a heat source that enables lead-free soldering and brazing of materials at room temperature. The nanoengineered heat source, dubbed NanoFoil, acts as a rapid and local heat source that replaces the furnaces and torches used in conventional soldering or brazing operations.

The fourth LLNL R&D 100 award went to computer scientists for developing a visualization software called VisIt. This free tool, geared toward the parallel processing of large amounts of data, visualizes and displays within seconds calculations that require running for days or weeks on the world's most powerful supercomputers.

Los Alamos National Laboratory (LANL)

An object-oriented simulation software package called CartaBlanca is poised to offer next-generation modeling and simulation capabilities to scientists across disciplines. CartaBlanca has applications in weapons/target interactions, aerospace engineering, automotive design, pharmaceutical processing and homeland defense.

A low-cost assay for detecting the binding of drugs to proteins has applications in personalized medicine and assists in treating currently incurable diseases through identification of new protein targets for drug therapies. The Los Alamos team partnered with Caldera Pharmaceuticals, Inc. on this effort.

Another LANL team developed the nanoFOAM technique to produce self-supporting, nanoporous metal foams. Nanofoams can be used to improve oil-refining processes and electrical generation from fuel cells that run on hydrocarbons, remediate chlorohydrocarbons in the environment and increase the sensitivity of biomedical detectors.

The fourth LANL winner is NESSUS, a general-purpose tool for computing the reliability of engineered systems. Recently, a team consisting of members from Los Alamos National Laboratory and SwRI enhanced and applied NESSUS to the laboratory's weapon reliability assessments for the Stockpile Stewardship Program.

Brooks Salutes Trinity Veterans

“The nature of deterrence is that you can never prove that it worked, only that it failed,” NNSA Administrator Linton Brooks said at a recent National Academy of Sciences observance of the sixtieth anniversary of the Trinity test. “But I believe that the American nuclear deterrent — forged in part by those who we are honoring today — made global war unthinkable.”

Speaking to an audience that included eleven veterans of Trinity and post-Trinity activities, Brooks recalled his own career in the Navy during which he said he spent thirty years anticipating a war with the Soviet Union. “I was at one time something of an expert on the Soviet Navy and it is my clear professional judgment that had the Cold War become a shooting war, many of my friends — and perhaps I — would not have survived.”

But the hot global war didn’t come even though the West was faced with an expansionist power with a messianic ideology, he said.

“We can debate whether the long era of peace in Europe that nuclear weapons gave us was worth the horrible risk,” Brooks said. “We can argue about the future relevance of those weapons. But we should be conscious of the fact that many of us are alive to conduct those arguments as a direct result of the accomplishments of the scientists and engineers and technicians represented by the eleven extraordinary individuals before us today. And so both on behalf of those like me who know how much they owe and on behalf of those who have forgotten it, let me simply say thank you.”

But now we are past the Cold War, Brooks said, and those who gave birth to the U.S. nuclear deterrent have a right to ask what is being done with their legacy.

“Are nuclear weapons still relevant to our security,” he asked. “The answer is yes, although with a reduced emphasis, as the Administration’s Nuclear Posture Review has made clear. Nuclear forces are an insurance policy for an uncertain future. Who would have predicted even twenty years ago today’s changed security posture? Who, today, is willing to claim to see the future well enough to say that nuclear weapons will not be relevant to our security twenty years hence?”

Brooks said remarkable progress has been made over the past two decades in reducing nuclear threats. In 1995, when the Non-Proliferation Treaty

was indefinitely extended, the United States reiterated its commitment under Article VI to work toward the long-range goal of eliminating nuclear weapons and to general and complete disarmament.

“The nuclear arms race has, in fact, been

halted,” he said. “While nuclear deterrence remains necessary, even after the Cold War, the United States has been reducing its nuclear forces and nuclear weapons stockpile in a consistent fashion through both unilateral and bilateral initiatives.”

He listed recent accomplishments:

The Administration’s 2001 Nuclear Posture Review (NPR), mandated reduced reliance on nuclear forces

PAST AND PRESENT: NNSA Administrator Linton F. Brooks (right) talks to former Los Alamos Director Harold Agnew at the National Academy of Sciences building in Washington, D.C.



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Administrator Linton F. Brooks

in achieving U.S. national security objectives in light of a growing ability to achieve these objectives with conventional capabilities and missile defenses.

The 2001 NPR also articulated a vision, embodied in the Moscow Treaty, for additional deep reductions to a level of 1,700-2,200 operationally-deployed strategic nuclear warheads by 2012, down from about 5,300 as

of the beginning of last year. These levels are far lower than many of us thought possible just a few years ago.

Under the START Treaty and the Moscow Treaty, the United States will have decommissioned, over the period of two decades, more than three-quarters of the strategic nuclear warheads attributed to its delivery vehicles.

In May 2004, President Bush decided on a major reduction in the total U.S. nuclear stockpile, including both operationally-deployed and non-deployed warheads. By 2012, the nuclear stockpile will be reduced by nearly one-half from the 2001 level, resulting in the smallest stockpile since the Eisenhower administration.

The tactical weapons of the past — nuclear mines, anti-submarine weapons, nuclear artillery — are gone. The only nuclear weapons available for deployment today are those carried by our strategic triad of ICBMs, SLBMs, and heavy bombers, as well as a few non-strategic bombs and currently non-deployed nuclear-tipped sea-launched cruise missiles.

The U.S. has no development programs underway for new or modified nuclear warheads. Indeed, we have not developed and fielded a new warhead for nearly 20 years. The last time we modified an existing warhead —

the B-61-11 earth penetrator (to provide a safer way to achieve existing military capabilities) — was during the Clinton administration.

“These accomplishments are helping to realize the President’s vision of achieving the lowest possible number of nuclear weapons consistent

with our need to deter current and future threats to the United States and its allies and friends,”

Brooks said. “Moreover, this record, coupled with the great progress the U.S. has made in reducing

nuclear threats in other areas, demonstrates strong U.S. adherence to its own nonproliferation commitments and U.S. leadership in support of other countries’ nonproliferation interests and commitments.”



TRINITY VETERANS: The National Academy of Sciences Trinity test symposium panel.

Trinity Veterans Panel

Harold Agnew, who witnessed the first controlled nuclear chain reaction and also flew on the Hiroshima mission as a scientific observer.

Hugh Bradner, who helped plan the new laboratory at Los Alamos.

Robert Christy, who helped design the core of the plutonium bomb.

Val Fitch, who participated in the technical work at Trinity and later won the Nobel Prize in physics.

Don Hornig, who designed the firing set for “Fat Man” and who was the last man to leave the top of the tower that fateful New Mexico morning.

Lawrence Johnston, who helped achieve uniform implosion in the plutonium bomb by inventing the exploding bridgewire detonator, and who later flew over Hiroshima and Nagasaki as a scientific observer.

Arnold Kramish, who was responsible for detonator simultaneity in the plutonium bomb.

Pief Panofsky, who helped design instruments to measure explosive yields from Trinity, Hiroshima and Nagasaki.

Louis Rosen, who worked to solve the neutron pre-initiation problem and developed nuclear test diagnostics.

Maurice Shapiro, who was a group leader at Los Alamos and worked on weapons hydrodynamics.

Rubby Sherr, who made important contributions to developing the initiator for the plutonium bomb.

Interns Provide Unique Insight to NNSA

In the personal statement section of her Student Diversity Partnership Program (SDPP) summer internship application, Crystal Francis wrote, *“I believe that national security is truly an important factor. This experience will strongly influence the field of law I will pursue. Participation in this program will have a positive impact on my decisions as a future American leader.”*

Francis, a University of Maryland-Eastern Shore junior is currently preparing for her future and helping to bolster our nation’s security as she works with the Office of Counterterrorism this summer at NNSA. Francis is helping to develop and facilitate counterterrorism exercises, jointly sponsored by NNSA and the FBI. As a recipient of numerous academic achievement awards, Francis is just one of the gifted students who are strong assets dedicated to helping the agency this summer through the SDPP.

SDPP is an NNSA Office of Diversity and Outreach sponsored internship program designed to allow students from a wide variety of cultural backgrounds an opportunity to offer their unique ideas and skills to various offices within NNSA. Kevin Bass, Marshelle Brooks, Chantee Nelson, and Odessa Waquiu are other students participating in the program.

Bass, a senior at Jackson State University, is among the top students enrolled at his school. A Business Management major, Bass is working with the Office of Diversity and Outreach to develop a diversity brochure, attending planning meetings and participating in various activities for an upcoming symposium.

Brooks is an outstanding student at Fisk University. She is a senior who has made the National and Fisk University Dean’s Lists. She is also active in the Fisk University Student Government Association as the newly elected Student Government President. Brooks is currently preparing for her future by working with the Office of Diversity and Outreach.

Nelson, a sophomore at the City University of New York’s John Jay College of Criminal Justice, is not only academically gifted, but artistically as well. As a member of the Brooklyn Borough Chorus while attending June High School, she earned the right to perform at the prestigious and historic Carnegie Hall. Since entering college, Nelson has participated in a stock market club sponsored by Morgan Stanley among other activities. She is helping the Office of Defense Nuclear Security.

Odessa Waquiu, a senior at the University of New Mexico, was nominated by the tribal members of her Native American Jemez Pueblo to work for NNSA this summer. As a Communications/Journalism Major with an emphasis on intercultural studies, Waquiu’s placement in the Office of Congressional, Intergovernmental, and Public Affairs is ideal. She is able to learn a great deal of information related to her major as she observes the staff communicating with the press, writing news releases, and producing publications.

U.S. And Philippines To Cooperate On Detecting Illicit Shipments of Nuclear Material

The United States and the Philippines have signed an agreement to install special equipment at one of the busiest seaports in the Philippines to detect hidden shipments of nuclear and other radioactive material. The agreement will expand the two countries’ cooperation in the war on terrorism.

The effort is part of the Second Line of Defense Program, an NNSA nonproliferation program that works with foreign partners to detect, deter, and interdict illicit trafficking in nuclear and other radioactive materials.

“The United States and the Philippines recognize the importance of joining forces to stem the threat posed by the trafficking of nuclear and other radioactive materials,” NNSA Deputy Administrator Paul Longworth said. “This agreement represents a significant step forward in the effort to improve the security of the global maritime shipping network.”

Under the Second Line of Defense Program, NNSA works with foreign partners to equip border crossings, airports, and seaports with radiation detection equipment and to provide training to appropriate law enforcement officials. The specialized radiation detection technology deployed under this program is based on technologies originally developed by NNSA laboratories as part of overall U.S. government efforts to guard against proliferation of weapons materials.