July 2005

National Nuclear Security Administration • Washington, DC 20585

Intern Roles Help Prepare For Future

Most college students look forward to their summer vacations as much needed and well deserved breaks from the intense demands of laborious reading assignments, less-than-exciting lectures, and seemingly never-ending periods of final exams. As they plan how they would like to spend their summers, rest and relaxation are (no doubt) top priorities. However, many college students also look forward to the summer months as a chance to participate in new learning experiences that will allow them to practice the skills that they have studied throughout the semester in the "real world." NNSA's summer internship program is one that gives students an excellent opportunity to do just that. Janell Johnson, Kristin Powers, and Nathaniel Mazzeo are three of the participating students and all are quite pleased

(continued on page 3)

In This Issue

RUSSIAN LAB DIRECTORS CEREMONY: NNSA Administrator Linton F. Brooks (standing in the center of the photo) watches as Bruce Goodwin of Lawrence Livermore National Laboratory (at podium) comments during a gifts presentation at a ceremony marking the 50th anniversary of the All-Russian Institute of Technical Physics in Siberia. To the left of Brooks are: Joe Saloio, Sandia National Laboratories; Tom Hunter, the Sandia Director; Paul White and Don Cobb, Los Alamos National Laboratories. At the microphone on the far right is Steve Seymour, a U.S. interpreter. Seated to his right are regional Russian officials.

U.S., Russian Lab Directors Meet

Administrator Linton Brooks joined directors of the U.S. and Russian weapons laboratories at their June biennial meeting in Siberia at the All-Russian Institute of Technical Physics (VNIITF).

The meeting coincided with the 50th anniversary of the founding of Russia's second nuclear weapons lab, which is located in Snezhinsk near the Ural Mountains, about 1,000 miles east of Moscow. (During the Cold War, VNIITF was known as Chelyabinsk-70).

NNSA lab representatives included Bruce Goodwin, Lawrence Livermore National Laboratory associate director for Defense and Nuclear Technologies; Don Cobb, the deputy director of Los Alamos National Laboratory; and Tom Hunter, the president of Sandia National Laboratories.

Russian laboratory directors who attended were G.N. Rykovanov, the director of VNIITF, R.I. Ilkaev, the director of All-Russian Institute of Experimental Physics (or VNIIEF-- this laboratory was known as Arzamas-16 during the Cold War), and Yu.N. Barmakov, the director of the Institute of Automatics or VNIIA. L. Ryabev represented Rosatom.

During the director's session, the U.S. and Russian laboratory

(continued on page 2)

U.S., Russian Lab Directors Meet In Siberia

(continued from page 1)

leaders discussed cooperative work in basic science and joint threat reduction efforts. Participants said they recognize the value of this work and want it to continue.

Prior to the afternoon meeting of the U.S. and Russian laboratory directors, an international conference was held with directors from the nuclear laboratories of the five original declared nuclear weapons states-- the United States, Great Britain, Russia, China and France.

The meeting largely consisted of a discussion of nuclear weapons policy in the 21st century and representatives of several of the nations offered their views.

Lawrence Livermore National Laboratory Community Leader Day

COMMUNITY LEADERS: From left: San Ramon Mayor H. Abram Wilson; Eileen Vergino, Lawrence Livermore National Laboratory (LLNL) deputy director for the Center for Global Security Research; Mark Tarte of Las Positas College; and Jan Tulk, LLNL associate director for Administration and Human Resources.

More than 150 community leaders from local government, businesses, and civic organizations around Lawrence Livermore National Laboratory (LLNL) visited the lab on Community Leader Day in June to meet with senior lab managers, receive an update on lab programs, and learn about expectations for the year ahead.

The annual event was created to allow the community to become more familiar with LLNL activities and as a way for laboratory management to hear more about important community issues.

The day included tours of LLNL programs and facilities, as well as a poster session of cutting-edge science and technology. NNSA Principal Deputy Administrator Jerry Paul, who participated in the day's events, said, "We're very much aware that community support is critical to the success of the laboratory."

Pantex Installs State-Of-The-Art Radio Digital System

BWXT Pantex recently completed a $10.6 million dollar project to replace its outdated VHF radio system with a state-of-the art digitally encrypted UHF system complying with a National Telecommunications and Information Agency (NTIA) mandate.

Partnering with Motorola, BWXT Pantex designed and installed new fiber optic communication networks as well as a master tower site and two back-up locations. The new UHF system was operational six weeks ahead of the NTIA deadline.

In 1992, the NTIA (Public Law 102-538) required all federal agencies using VHF radio systems to upgrade and migrate to digital UHF systems by December 31, 2004. This project was completed with funding from the NNSA Facility and Infrastructure Recapitalization Program (FIRP). FIRP is a direct-funded program initiated in 2002 for the specific purpose of addressing maintenance backlog and aging systems such as the radio system.

The new UHF system vastly improves capability, reliability, range, and security. The digitally encrypted system and other security features also enhance functionality and performance. The new system is compatible with all federal, state and local law enforcement and emergency response agencies.

NNSA News is published monthly by the Office of Congressional, Intergovernmental and Public Affairs, C. Anson Franklin, Director. ***Editors:*** Al Stotts and Kim Krueger. ***Layout:*** Barbara L. Courtney. ***Contributors include:*** Wess Hudelson, Kansas City Plant; Janell Johnson, NNSA HQ; Erin Ritter, Pantex Plant; Neal Singer, Sandia Labs; Bryan Wilkes, NNSA HQ; Steve Wyatt, Y-12 Site Office; Gordon Yano, Lawrence Livermore Lab; Jay Zucca, Lawrence Livermore Lab

Summer Interns Say Jobs Help Prepare For Future

(continued from page 1)

to take advantage of the chance to work at the agency's headquarters in Washington, DC.

"I am really excited to be working for the Office of Congressional, Intergovernmental, and Public Affairs. I am being given many great opportunities to hone and practice my editing and writing skills which will be essential to any future career of mine," said Janell Johnson, a Howard University senior who plans to pursue a career in journalism or teaching. Johnson, who is majoring in English, is working alongside public affairs specialists to help release vital NNSA news and announcements to Congress, the press, and the public. "This experience is priceless as it allows me a behind-the-scenes look at how news stories are written, how the press communicates with the government, and what it takes to produce publications," said Johnson.

SUMMER INTERN: Janell Johnson, an intern with the NNSA Headquarters Office of Congresssional, Intergovernmental and Public Affairs discusses copy for the NNSA newsletter with Bryan Wilkes, director of public affairs.

Kristin Powers, a senior at the University of Southern California, said that her work with the Budgeting Office will be of great use to her in the future as she plans to help establish businesses and ensure their prosperity through work as a cultural consultant. Powers, who was recently involved in reviewing the Fiscal Year 2006 Budget, said, "Everything that I learn here is a great supplement to the information I have learned as a Business minor." One of the features of Powers' major, East Asian Language and Culture, is fluency in Japanese. With knowledge of this language, Powers hopes to bridge cultural gaps between American and Japanese companies that may hinder harmonious business relations. Powers is also considering continuing to work for NNSA or the State Department after graduation as a cultural liaison.

On the other hand, intern Nathaniel Mazzeo is absolutely certain that he would like to make a career at NNSA a part of his future. Mazzeo, a sophomore Business major, attending Shepherd University in Shepherdstown, West Virginia, is currently working for the Office of Emergency Operations. This office provides emergency response to nuclear disasters and other nuclear related events. "My particular office handles the administrative duties of the Office of Emergency Operations. Right now, I am helping the staff by working as a liaison with human resources personnel, and various other supply and resources offices," said Mazzeo. Naturally, as he aspires to work for NNSA full time after graduation, Mazzeo believes that the experience he is gaining this summer is invaluable to his education.

When asked, all three students admitted that their DOE/NNSA internships definitely rank high on their lists of the best summer employment opportunities available.

They unanimously agreed that summer jobs that actually prepare for them for their future careers are great finds and that the knowledge they gain this summer will prove useful not only in the classroom this fall, but in the workplace after graduation as well. Other students participating in the internship program are: Lauryn Alleva, Erin Armstrong, Brandon Bowles, Ethen Braden, Kathleen Burder, Jamon Clayton, Kathleen Donaldson, Aaram Gavoor, Anne Jamison, Brian Knight, Kaitlin Lambert, Glenn Loveless, Nikitea Martin, Julieanne Part, Brett Pusateri, Randy Ransom, Kristin Collins, and Katherine Sylvester.

Got an article for the NNSA Newsletter?
Submit it for consideration to Astotts@doeal.gov

Sandia's Z Machine Fires Objects Faster Than The Earth Moves Through Space

Sandia National Laboratories has accelerated a small plate from zero to 76,000 mph in less than a second.

The speed of the thrust was a new record for Sandia's Z Machine--sometimes referred to as the fastest gun in the West. Actually the fastest in the world, it is now able to propel small plates at 34 kilometers a second, faster than the 30 km/sec that Earth travels through space in its orbit about the sun, 50 times faster than a rifle bullet, and three times the velocity needed to escape Earth's gravitational field.

The immediate purpose of these very rapid flights is to help provide more information about the condition of the U.S. nuclear stockpile without having to explode a nuclear weapon; to help understand the extreme conditions found within the interiors of the giant planets Saturn and Jupiter; to hasten the achievement of virtually unlimited energy through peacetime atomic fusion.

"This is one of the few ways on earth to get hard information on problems at the outer reaches of science, rather than having to rely on complex speculations that may or may not be correct," said Marcus Knudson, lead scientist on the effort.

An upgrade of Z planned for next year is expected to achieve plate velocities of 45 to 50 km/sec, driving targeted materials further into their plasma regime.

Z's hurled plates strike a target after traveling only five millimeters. The impact generates a shock wave -- in some cases, reaching 15 million times atmospheric pressure -- that passes through the target material. The waves are so powerful that they turn solids into liquids, liquids into gases, and gases into plasmas in the same way that heat melts ice to water or boils water into steam.

The difference is that the process takes place at far higher

ARE YOU GOOD FOR ANOTHER 15 KM/SEC?: Sandia researcher Knudson considers his favorite apparatus: the Z insert that sends flyer plates hurling at phenomenal speeds.

Technical Details

The plates are small -- 30 mm by 15 mm in cross-section, and 850 microns thick. The trick in accelerating the fragile aluminum plates at 10-to-the-10th Gs (force of Earth's gravity) without vaporizing them lies in the finer control now achievable of the magnetic field pulse driving the flight.

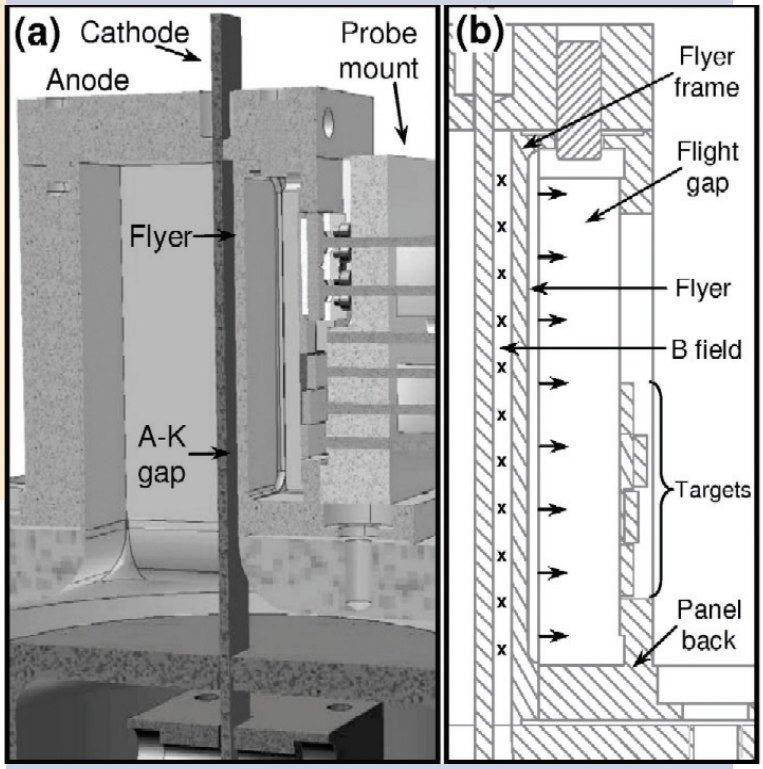
The arrival of energy at the target is staggered over three hundred nanoseconds, so that the amperage arrives less like a brick wall that would vaporize the plate and in more controllable increments.

temperatures and in much shorter times than the kitchen stove could ever approach. The pressures produce states of materials rarely seen or measured in the laboratory. Yogi Gupta, a professor known for his work in shock physics at Washington State University in Pullman said, "If you had asked me a few years ago if we could send something this fast, I would have said you were joking. But mankind is always trying to create conditions in the laboratory that imitate extreme conditions [found elsewhere]."

When shock waves penetrate a capsule containing deuterium (an isotope of hydrogen), researchers learn more about how hydrogen behaves under extreme conditions, providing more information for humanity's effort to eventually achieve controlled nuclear fusion, the process that drives the sun. Harnessed in a power plant, this potentially low-environmental-impact method could achieve virtually unlimited energy from seawater.

By creating states of matter extremely difficult to achieve on Earth, the flyer plates also provide hard data to astrophysicists speculating on the structure and even the formation of planets like Jupiter and Saturn.

An upgrade of Z planned for next year is expected to achieve plate velocities of 45 to 50 km/sec, said Knudson, driving targeted materials further into their plasma regime.



Schematic of the experimental configuration used to launch flyer plates on Z. Part A is the section view of the coaxial short circuit. Part B details the flyer plate and its targets.

This requirement was better achieved by a recent upgrade that removed a single laser formerly used to trigger current in Z's thirty-six cables simultaneously. In its place, 36 laser switches were installed -- one for each cable. This change permits researchers to shape the electrical pulse that arrives at the target, with a corresponding modulation in the magnetic field driving the plate.

An upgrade of Z planned for next year is expected to achieve plate velocities of 45 to 50 km/sec, says Marcus, driving targeted materials further into their plasma regime.

Z's former record in propelling plates was 21 km/sec, set two years ago.

On The Road Or In An Office, OST Delivers

Although it's called the Office of Secure Transportation (OST), NNSA's transportation assets and staff are more likely to be rolling down a highway somewhere in America at any given hour rather than sitting in an actual office.

OST Liaison Office: Steve Hafner (far left) and Mike Connor (far right) meet with staff members of the Office of Secure Transportation (OST) liaison office in Washington, D.C. Hafner recently left the position of assistant deputy administrator for secure transportation. Connor is the director of the OST liaison office in the Forrestal building. Staff members pictured are Everett Goodman (next to Hafner), Greg Farrar, John Stewart and Jeanne Hill. Not pictured is Shel Wilson.

Still, the administrative and logistical support required for moving the nation's nuclear weapons, components and special nuclear materials does require people in offices who can carry out the many important coordination tasks to fulfill OST's national security mission.

Headquartered in Albuquerque, N.M., OST has three commands from which convoys originate and return. They are located at Sandia National Laboratories on Kirtland Air Force Base in Albuquerque, at the Pantex Plant in Amarillo, Texas, and at the Y-12 National Security Complex in Oak Ridge, Tenn. The organization's training command is located at Ft. Chaffee in Ft. Smith, Ark. Another key location for OST is its NNSA headquarters liaison office at the Forrestal building in Washington, D.C.

Mike Connor, an OST veteran of 20 years, is the office director. He and a staff of six are the Washington eyes and ears for the organization. "OST is a unique organization," said Steve Hafner, who directed OST for more than six years. "It's a hands-on operational mission that primarily occurs in the field. The day-to-day transportation mission is pretty well defined, but the Forrestal office gives OST the capability to work on long-term issues and to deal with the coordination of special missions so the field can concentrate on its daily job without jeopardizing safety or security."

He said it is important to have an office close to where policies, budgets and directives are developed.

"It's also vital to have a headquarters presence to be near our major customers like NNSA's Defense Programs and Nonproliferation Offices, DOE's Nuclear Energy and Environmental Management Offices, the Department of Defense at the Pentagon, Congress, and foreign embassies," Hafner said.

Additionally, 9/11 has meant increased involvement in secure transportation of international nuclear materials.

Explaining the anomalies of a civilian paramilitary operation is one of Connor's challenges as director of the OST Forrestal office. Connor and his staff also spend a lot of time on the planning, programming, budgeting and execution process. Increased workload means budgeting for and deploying more convoys and training more federal agents. Increased security requirements means developing new technologies to help meet current and emerging threats.

Increased security requirements since 9/11 have had a particular impact on OST because, although it has fixed sites, its mission takes place in a mobile environment on public highways across the nation.

"This is the most challenging, yet most interesting position I have held since being with OST," Connor said. "This office functions as a conduit between OST and the headquarters defense programs office and it daily represents the assistant deputy administrator for Secure Transportation."

699 Metric Tons Of Mercury Removed From Y-12

Mercury stored at the Y-12 National Security Complex for the National Defense Stockpile (NDS) since the 1960s has been removed following a decision by the Defense National Stockpile Center (DNSC) to consolidate its stockpile of the material in one location.

The NDS mercury, which is managed by DNSC, was moved from Y-12 to the agency's storage facility in Warren, Ohio, where the mercury will be co-located with other NDS mercury. Y-12 assisted the DNSC in transferring the inventory of 20,000 flasks (more than 699 metric tons). At the Ohio facility, the flasks will be over-packed in 30-gallon drums to provide additional safety and protection.

A supply of mercury owned by DOE will remain in storage at Y-12 awaiting a decision on disposition.

The transfers began in March and were completed in late April. A total of 46 commercial trailer loads (approximately 15 metric tons each) were shipped from Y-12.

DNSC mercury stored at Y-12 accounted for 16 percent of the DNSC's excess inventory. The mercury formerly stored at Y-12 was between 99.5 and 99.9 percent pure, with an estimated current market value of about $16 million ($800 per flask).

MERCURY FLASKS MOVED: Y-12 employee uses forklift to move wooden pallets containing flasks of mercury for shipment to the Defense National Stockpile Center's facility in Warren, Ohio. The mercury was part of the National Defense Stockpile's supply of mercury stored at Y-12 since the 1960s.

A field activity of the Defense Logistics Agency, DNSC is responsible for the disposition of stockpiled materials declared in excess of national defense needs. Congress in the early 1990s determined that the Department of Defense no longer needed to maintain a stockpile of commodity-grade elemental mercury.

OST MILESTONE: Emily Hester is congratulated by Acting Assistant Deputy Administrator for the Office of Secure Transportation (OST) Dennis Reese at the recent OST agent candidate training graduation ceremony at Ft. Chaffee, Ark. Hester is the first female graduate in more than 20 years. At the ceremony she received an award for being the most improved shooter in the class. Federal agents help OST provide safe, secure ground and air transportation for nuclear weapons, weapon components, and strategic nuclear materials.

Desmond Named Security Chief

William J. Desmond has been named the chief of defense nuclear security and NNSA's associate administrator for defense nuclear security. He has been acting in the positions and is now permanently assigned to both. This action makes him a direct report to Administrator Linton Brooks and gives him direct access to the Secretary, other Department of Energy senior officials and DOE contractors on security matters.

On a day-to-day basis, Desmond is responsible for the development, implementation, and oversight of the NNSA-wide security program and management of the annual NNSA security budget of $700 million. He has more than thirty-eight years of field and headquarters security experience, and has held a variety of senior-level positions in the department. His experience outside the department includes service as a senior advisor for security at the Nuclear Regulatory Commission.

Brooks said, "Bill's talents and expertise are a great asset to NNSA and the department. I am delighted that he has accepted these roles on a permanent basis and that he will continue to work with me, Jerry Paul, the entire NNSA management team, and with Glenn Podonsky and his staff on a wide variety of security matters."

KCP, Y-12 Develop Emergency Notification Device

Collaboration between NNSA's Y-12 facility in Tennessee and the Kansas City Plant (KCP) in Missouri has resulted in the development of a device that can immediately notify Y-12 employees if a nuclear criticality accident were to occur.

The Kansas City Plant's Barry Driscoll led the team that built a prototype of the PAD unit in time for a test of Y-12's emergency notification system.

Because of the nature of its work, which includes use of nuclear material, the Y-12 facility operates under very stringent safety guidelines, including a requirement to provide emergency notification in the event of a criticality accident — a mishap that could release a large amount of radiation.

In the event of an emergency such as a radiation leak, it is essential that employees be notified immediately. Y-12 has been challenged by the NNSA to provide a notification system to supplement the Criticality Accident Alarm System (CAAS) currently in use at the facility.

Using Plant Directed Research and Development (PDRD) funding, Y-12 developed a concept for a wireless notification device to alert employees of a radiation incident or a nuclear accident. Y-12 called on Oak Ridge National Laboratory to create a design using commercially available components; and the Kansas City Plant was asked to do a manufacturability design review, design the device housing, and manufacture the Gen I prototypes for field trials.

The result of the collaboration is the personal annunciation device (PAD) that will operate when triggered by Y-12's CAAS. Everyone entering a CAAS-controlled area at Y-12 will be required to wear the device to ensure emergency notification. The PAD notifies wearers in four ways: it emits a noise that is louder than a typical pager; it vibrates; an LED flashes; and an LCD display provides the wearer with instructions. Self-checking or "intelligence" is embedded in the PAD for enhanced reliability, giving the user information on battery usage and signals.

The Gen I PAD is about the size of a thin pager and is designed to be worn on the DOE badge holder. "This is an excellent example of a successful multi-site project, driven by an NNSA need, and facilitated by the willingness to seek solutions from other DOE and NNSA resources," said Kansas City Plant divisional specialist Alan Updike, who coordinated the business relationship between the Kansas City Plant and two other sites. "Y-12 had the problem and came up with the conceptual solution. Oak Ridge assisted with the initial circuit design and selection of commercial components. And the Kansas City Plant investigated improvements for manufacturability and packaging and built the prototypes."

Significant miniaturization and additional product features will be explored during the second phase of the program, after which the miniaturized devices could be deployed. The technology could prove useful at other sites as well, including Los Alamos, Savannah River, INEL, and Pantex.

Ron Bentley Remembered

Ron Bentley, a senior engineer with Sandia National Laboratories assigned to the NNSA Office of Policy and Planning, served the nation in a career that spanned a significant part of the Cold War. A key figure in bringing the concept of stockpile stewardship to reality, he died in June after a sudden illness.

Most of his 39 years of experience in national security programs dealt with the test and evaluation of nuclear weapons. Prior to his work in Washington, he served as the range manager for NNSA's Tonopah Test Range in Nevada.

Tim Pflaum, an NNSA colleague, said, "Ron Bentley was a remarkable man, a talented electrical engineer, a superb manager, a dedicated public servant and a wonderful husband, father and grandfather."