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NewsLetter
Week of July 2, 2007 Vol. 8, No. 14

Inside infrasonics

Studying the sights and sounds of bolides

by Todd Hanson

Los Alamos atmospheric scientist Doug ReVelle has been waiting a long time to capture both visual and audio scientific evidence of a bolide—a meteor exploding in Earth's atmosphere. Good things come to those who wait, and ReVelle's waiting recently came to an end after a two-year long analysis of data from ground-based photographic camera stations.

The stations are being operated as a part of the European Fireball Network in Freyung, Germany, which provided important images of a very high-altitude meteor falling during the Leonid meteor shower that was definitively correlated with the ground-based infrasound arrival.

Like many Los Alamos scientists, ReVelle of Atmospheric, Climate, and Environmental Dynamics (EES-2) has taken what some might consider an arcane field of scientific inquiry and become its master. In ReVelle's case it is the study of the infrasonics of bolides (the study of sound waves below the range of human hearing that are produced by exploding meteors) using an array of highly sensitive microphones that were originally developed to listen for distant clandestine nuclear weapons tests. Over the past several decades, ReVelle and his collaborators have documented the explosions of hundreds of bolides in Earth's atmosphere, as well as other man-made explosions in the atmosphere.

Each year a number of large meteors enter the atmosphere and are detected by the two local Los Alamos arrays and by additional Los Alamos arrays in routine operation (St. George, Utah, Mercury, Nevada on the Nevada Test Site, and in Pinedale, Wyoming). Some of these meteors are as large as tens of meters in diameter. Most burn up fairly high up in the atmosphere or explode in brilliant flashes. ReVelle says that each year over the entire globe about a dozen meteors that are more than two meters in diameter enter the atmosphere and produce an energy equivalent of a one-kiloton blast.

According to ReVelle, the practical value of this research lies in understanding the details of the source itself, including the composition and structure of the bodies and the details of their atmospheric behavior while producing these detected acoustic-gravity waves (of which infrasound is a subset). Many other sources produce such signals such as aurora, volcanic eruptions and earthquakes, storms at sea (microbaroms), weather fronts, turbulence in the wake (leeward) of large mountain chains, etc., all of which make up the many members of the so-called atmospheric wave zoo. The ultimate value of these detections however is in their ability alone or in combination with satellite data to be able to forecast the global influx rate of such bodies (which is where the previous occurrence estimate for a 1 kiloton event originated).

When a meteor enters the atmosphere—or when a large explosion is detonated—it creates a sound or pressure wave that during its propagation eventually falls below the range of human hearing. This infrasonic wave travels through the atmosphere and can be detected by special pressure sensing microphones set up in an array at ground-level. By examining the arrival time of the sounds at different stations and the frequency of the infrasonic boom, researchers are able to precisely pinpoint the location of the explosive source and determine the amount of energy that created it.

Known for its extremely low background noise, the Freyung site in Germany near the Czech border was in many ways perfect for the discovery.

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Laboratory researcher Doug ReVelle of Atmospheric, Climate, and Environmental Dynamics checks one of the infrasonic microphones in the woods near the Wellness Center in Technical Area 3 that were originally developed to listen for distant clandestine nuclear weapons tests. Over the past several decades, ReVelle and his collaborators have documented the explosions of hundreds of bolides in Earth's atmosphere, as well as other man-made explosions in the atmosphere. *Photo by LeRoy N. Sanchez, Records Management/Media Services and Operations*

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For Your Safety

Tornado safety

Yes, we do have tornadoes in New Mexico. Not often, at least, in an average year, but this year seems to be anything but average in the weather department. On June 9, a tornado touched down just south of Santa Fe in the Cochiti/Santa Domingo area near Interstate 25.

Following are some tips if caught around a tornado.

- In a home or building, move to a predesignated shelter, such as a basement.
- If an underground shelter is not available, move to a small interior room or hallway on the lowest floor and get under a sturdy piece of furniture. Put as many walls as possible between you and the outside.
- Stay away from windows.
- Get out of automobiles.
- Do not try to outrun a tornado in your car; instead, leave it immediately for safe shelter.
- If caught outside or in a vehicle, lie flat in a nearby ditch or depression and cover your head with your hands.
- Be aware of flying debris. Flying debris from tornadoes causes most fatalities and injuries.
- Mobile homes, even if tied down, offer little protection from tornadoes. You should leave a mobile home and go to the lowest floor of a sturdy nearby building or a storm shelter.

Occasionally, tornadoes develop so rapidly that advance warning is not possible. Remain alert for signs of an approaching tornado such as a dark, often greenish sky, large hail, or a loud roar similar to a freight train.

Los Alamos NATIONAL LABORATORY
NewsLetter

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Los Alamos National Laboratory is a multidisciplinary research institution engaged in strategic science on behalf of national security. The Laboratory is operated by a team composed of Bechtel National, the University of California, BWX Technologies and Washington Group International for the Department of Energy's National Nuclear Security Administration.

Los Alamos enhances national security by ensuring the safety and reliability of the U.S. nuclear stockpile, developing technologies to reduce threats from weapons of mass destruction, and solving problems related to energy, environment, infrastructure, health and global security concerns.

NNSA National Nuclear Security Administration

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Students meet and chat with Director Anastasio

Mike Anastasio

by Jaclyn Jon Valdez

Students play a vital role at Los Alamos. That's the message Laboratory Director Michael Anastasio imparted at the annual director-student meeting at Duane Smith Auditorium.

"The student program is an essential part of the Lab. Approximately 1,200 students [work] at the Lab and most of our current employees were once students," said Anastasio.

Anastasio reminded students of the many things there are to experience outside the Lab in the local and surrounding communities. "This [New Mexico] is truly a special place. Special things happen here," said Anastasio.

He also spoke about the many beneficial experiences that can happen at the Lab. Networking with mentors and peers can be very beneficial for students. Mentors help steer students in the right path, and it is important to recognize and take advantage of that, he said. Anastasio also encouraged students to get involved in activities such as the Student Association's annual Symposium 2007, other seminars, and colloquiums.

Students asked the director a variety of questions, including those about the Education Assistance Program, students applying for internal positions, the new contract, and the proposed budget cuts.

The Education and Postdoc Program Office (STB-EPDO) coordinates the director-student meeting.

Back in his office, Doug ReVelle discusses the study of the infrasonics of bolides (the study of sound waves below the range of human hearing that are produced by exploding meteors). *Photo by LeRoy N. Sanchez, Records Management/Media Services and Operations*

Studying the sights …

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In two years of data analysis from the site, the researchers found four events that unambiguously correlate with meteor sources photographed by the EFN (consistent in their timing, directional arrival angles—azimuth and elevation, source energy, optical luminosity, etc.). Four very high-velocity and high-altitude meteors (a Leonid, two Perseids, and an additional very high-speed sporadic fireball) were detected at the ground, both optically using precision all-sky automated cameras, and acoustically via infrasound and also through detected seismic signals.

The Laboratory's interest in bolide infrasonics is longstanding. During the late 1960s and early 1970s, before the rise of satellite nuclear nonproliferation monitoring, the United States Air Force operated a network of nuclear test detection listening stations. These listening stations served as the nation's primary means of nuclear explosion detections worldwide. While this network of listening stations has long-since been mothballed, the Laboratory's array, which dates back to 1983, still is used for nuclear nonproliferation work. More often, however, it is used as a means to better understand the nature of bolides that often create brilliant fireballs as they slam into Earth's atmosphere.

In the 1990s, the two arrays of listening stations operated by the Laboratory at Technical Area 3 and the other three mentioned earlier were almost the only infrasonic network left in full-time operation in the world. An additional infrasonic network in Sweden coordinated in Umea as a part of the Swedish Institute of Space Physics also was maintained through the period from 1960 to the present. Left running because it cost very little to operate and maintain but could detect meteors that are as small as a few centimeters in diameter, it became a prototype for a new generation of arrays launched as part of the International Monitoring System infrasound stations.

The International Monitoring System is a network of 321 seismological, hydroacoustic, radionuclide, and infrasound monitoring stations run by the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization and aimed at monitoring the globe for evidence of nuclear explosions. Its future is uncertain because of failure of a number of countries to ratify the Comprehensive Nuclear Test Ban Treaty, but its continued use as a global meteor detection network becomes even more powerful every year as more arrays continue to become operational (currently there are about 30 such arrays operating full time globally). Los Alamos scientists continue to utilize these arrays for the monitoring of the global influx rate of large deep penetrating bolides as well as the smaller high altitude events described earlier in this article.

A capability restored

Los Alamos builds first certified nuclear trigger in 20 years

by Kevin Roark

Almost everything about it is secret. It inspires awe, but not from its outward, unremarkable, and yes, secret, appearance.

Imagining what could result from unleashing the power of its elegant, simple, and yet technologically advanced design oftentimes boggles the minds of those even with detailed knowledge of its form and function.

Last month, the Laboratory made good on a promise from the early 1990s: deliver to the nation's nuclear weapons deterrent a new, certified pit—alternatively called a primary or nuclear trigger—for the W88 warhead. Designed by Los Alamos, it is the most highly optimized weapon in the U.S. stockpile for yield-to-weight ratio, meaning it can unleash an unbelievable amount of energy from a very small package.

It was a promise surprisingly hard to keep and all the more scientifically satisfying because of the difficulty, and completed without the benefit of an underground nuclear test, a feat never before accomplished.

The United States lost its capability to manufacture triggers for its stockpile of nuclear weapons when the Rocky Flats production plant in Colorado closed in 1989.

Then, in 1992, the United States conducted its last underground nuclear test and has no plans to resume testing.

Without the ability to test and to make replacement pits, the nation's weapons complex has been assuring the safety and reliability of the U.S. nuclear deterrent through a program called Stockpile Stewardship. One of the basic functions of this program is stockpile surveillance, the systematic inspection and destructive testing of a small number of weapons systems to monitor how they age and determine if there are serious enough problems to weaken confidence in their safety or reliability.

If problems arise, what they are, and how they are successfully dealt with is a secret.

Until now, the United States has been unable to replace those W88 pits lost to the surveillance program.

"Because Los Alamos has the only plutonium pit manufacturing capability in the United States, it fell to us to figure out how to make a Rocky Flats W88 pit and then guarantee it will work if needed without Rocky Flats and without testing," said Glenn Mara, principal associate director for nuclear weapons programs. "As usual, the Laboratory rose to the task, delivering both a high-quality product and a high-quality, highly efficient process."

The Lab cleared a major hurdle in 2003 with the delivery of "Qual 1," the first of 15 "certifiable" W88 pits that marked an end to a manufacturing process development phase and kicked off the engineering qualification and physics assessment, the two roads traveled on the journey to certification.

Exact engineering specifications for the W88 pit and its detailed physics are secrets.

"It was a monumental challenge," said Laboratory Fellow Gary Wall, leader of the certification team and a fixture in the weapons design community. "We are essentially in the business of putting boundaries around what we don't know," said Wall. "We verify that those 15 Qual pits meet engineering requirements like structural and thermal integrity. At the same time we assess the physics—asking how the differences and similarities between the Rocky Flats pit and

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Literally taking thousands of hours to make, the use of Plutonium in Pit Manufacturing requires the specialized skills of a glovebox worker to cast, shape, inspect, and assemble the needed components into quality product.

Impure plutonium metal (left photo in glove) is purified creating a 99.95 percent pure plutonium feed source (outer ring) which can then be alloyed (right photo) to produce the required chemical composition to make a pit. *Photos courtesy of the Program Management (PM) Division*

'Because Los Alamos has the only plutonium pit manufacturing capability in the United States, it fell to us to figure out how to make a Rocky Flats W88 pit and then guarantee it will work if needed, without Rocky Flats and without testing.'

Los Alamos builds …

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the Los Alamos pit might affect the system's overall performance."

The most glaring difference: Rocky Flats pits are wrought and Los Alamos pits are cast. Because Rocky Flats was a very large facility with essentially one purpose, it could house the large presses and machines used to push, or bend, solid metals into the configurations required for use in a pit. The Laboratory's plutonium facility at Technical Area 55 does not have the characteristics or nearly the size of Rocky Flats and so uses a casting method, where molten plutonium is poured into molds to make the rough shapes required for pits.

The most glaring similarity: the amount of highly skilled workmanship that goes into making a pit. Unlike many manufacturing processes that rely heavily on robotic automation, pits are uniquely hand-made.

The certification plan evolved over the years after its start in the late 1990s. Following the Laboratory's transition to a new operating contract in June 2006, the plan was reviewed and revised one last time with clear, aggressive goals and timelines that employed the practice of QMU, or Quantifying Margins and Uncertainties—a system to evaluate confidence that a weapons system will work within carefully considered boundaries or operating characteristics—and generally adopted the certification methodology of another successful stockpile stewardship program, the W76 warhead Life Extension Program.

Through a "bottoms-up" approach, the certification team relied on small-scale plutonium experiments, legacy test data, groundbreaking materials science, extensive statistical analysis, and tried-and-true computer weapons codes to eventually quantify the margins and uncertainties to such a degree that they are now able to say, "yes, the Los Alamos W88 replacement pit will work with the same performance and reliability as a Rocky Flats pit."

"We used our most reliable hydrodynamic computer code—hydrodynamics being the study of how solids flow and mix like liquids under extreme pressures and temperatures—as our baseline," said Wall. "New physics models were added to the code to better distinguish the new pit from the old one. We accomplished that, better understanding where the two systems differed, validating the physics submodels and propagating that data through the models to determine the performance margins of the new pit."

The computer visualization and other data derived from applying the hydrodynamic code to the W88 pit certification; how the pit performs in a virtual detonation, is secret.

As the certification process progressed, the manufacturing systems were refined.

"Building the 15 Qual pits served to center our manufacturing process well inside the margins for error," said Bob Putnam of the Laboratory's Pit Manufacturing Program Office. "Our goal is repeatability, to make the same pit, with the same strict specifications every time, so that the product meets extremely high quality standards."

The exact size, weight, shape, material quantities, composition, and plutonium chemistry of the pit? All secret.

And at Los Alamos, the science does not stop at manufacturing's doorstep.

"At one point in the process we started to see some unexplained microscopic voids, or bubbles, in the plutonium," said Putnam. "Plutonium is a very weird character with very weird morphology, or structure, and is not an exceptionally well understood material. But because of the Laboratory's broad scientific base, very quickly an interdisciplinary team of actinide chemists, physicists, engineers, and materials scientists went to work and resolved the issue."

Between 2003 and June 2006 the people on the pit manufacturing line at TA-55 honed their skills building Qual pits for the certification process. Shortly after the Laboratory's management and operating contract changed hands, the pit manufacturing program purposely "paused" for three months to fully assess the process and to make small but important adjustments — streamlining by removing excessively complicated, unnecessary, hazardous, or environmentally unfriendly steps — somewhat trivial changes that would paradoxically result in momentous improvements in quality, increased productivity, and better worker safety.

"Our goal is repeatability, to make the same pit, with the same strict specifications every time, so that the product meets extremely high quality standards."

"We've tripled the number of pits we are able to make in a given period of time, while our budget has remained the same," said Putnam. "It's a tangible demonstration of how well everything is working, how well we are meeting, and in some cases, exceeding our customer's expectations."

Supremely confident in the process, the Laboratory began assembly of the first certified pit in early November 2006. By February it was finished and follow-on pits were also in the manufacturing pipeline. After internal quality review the first unit was delivered May 2 to the National Nuclear Security Administration for its quality review. Last month the NNSA accepted the pit, giving it the so-called "Diamond Stamp" of approval, meaning it is accepted for insertion into the U.S. stockpile. The first pit was delivered to the Pantex Plant near Amarillo, Texas, for assembly into a W88 warhead. The Laboratory has committed to the NNSA the ability to continuously deliver 10 identical pits per year and to demonstrate the capacity to deliver 30-50 pits per year by the 2012-14 timeframe.

"There is a growing excitement in the pit manufacturing program," said Putnam. "We're not just seeing the light at the end of the tunnel, we are emerging from the tunnel, and we can see the trees and the mountains—everyone's confidence is growing every day. I've never seen a team work harder, and we're constantly improving.

"It's no secret that this is the best team Los Alamos could have ever put together. It would not have been possible without the great science and technical expertise of the whole Laboratory."

How the W88 works

Modern thermonuclear weapons have two main components, the primary (pit) and the secondary. The primary provides the initial energy that drives the secondary, source of the vast majority of the energy from the weapon. A pit is an assembly of shells of various materials. At its center is a hollow mass of fissile material arranged in a subcritical configuration.

Fissile material in a weapon is usually plutonium or enriched uranium, capable of undergoing a fission reaction when struck by slow neutrons. Subcritical means there isn't sufficient mass—the amount of material in a given space—to sustain an uncontrolled reaction and a nuclear explosion.

High explosives are used to squeeze the subcritical mass into a critical configuration, creating that first fission explosion that in turn squeezes the secondary with enough pressure, heat, and radiation to initiate a fusion reaction, generating tremendous amounts of energy. All of this happens in a very short period of time, just a few millionths of a second.

The W88 is a ballistic missile warhead, typically mounted on submarine launched weapons.

Local company gets Laboratory environmental remediation contract

Accelerated Remediation Co., a local small business with offices in Los Alamos, received a contract from the Laboratory to begin remediation of an historic waste site known as Material Disposal Area B.

Material Disposal Area B (MDA-B), located within Los Alamos's Technical Area 21, was the first common disposal area for radioactive waste generated at the Laboratory and received waste related to Laboratory operations from 1945 until 1948. MDA-B is located in Los Alamos on DP Mesa, on the south side of DP Road across from numerous Los Alamos businesses.

In compliance with the New Mexico Environment Department Consent Order, MDA B is scheduled for complete removal of historical contents. DP Mesa contains land that potentially could be transferred to Los Alamos County for economic development or other purposes. Because of the county's interest, and MDA-B's proximity to a planned commercial development, the Laboratory's goal is to clean the former disposal site to residential standards.

Laboratory officials and Keith Tucker, Accelerated Remediation Co.'s program manager, signed the contract recently at Los Alamos. The contract for $36.4 million is the largest awarded to a minority-owned small business certified by the Small Business Administration since at least 1999.

"Cleanup of MDA-B represents a significant step forward by the Laboratory in continuing to meet our environmental stewardship commitments," said Sue Stiger, associate director for environmental programs.

Acquisition Services Management Division Leader Kevin Chalmers, left, and Keith Tucker of Accelerated Remediation Co. sign the MDA B clean-up contract at the Laboratory. *Photo by Ed Vigil*

"We are pleased that this clean up not only helps further Los Alamos County's economic development goals, but will benefit the regional economy as well."

Based on characterization and other decommissioning work already done, Laboratory teams working on this project know that Material Disposal Area B consists of buried waste, including chemicals and radioactive materials. Research and interviews with former Laboratory personnel familiar with the site and Laboratory operations at the time also provided information on the types of material disposed at MDA-B.

Accelerated Remediation Co., a joint venture of Portage Environmental Inc. and Shaw Environmental Inc., is scheduled to begin work this month with a scheduled completion date of December 31, 2010.

Laboratory program pilots hybrid vehicles

LeRoy Padilla of Property Management shows a photographer the hybrid engine of a new Ford Escape the Lab has leased. The combination gasoline-battery powered vehicle gets more than 30 miles per gallon in city-highway driving, according to the manufacturer. *Photo by Sandra Valdez, Records Management/Media Services and Operations*

by Krista D. Wilde

Property Management (ASM-PM) is doing its part to help the Laboratory save energy and reduce fuel costs: it recently leased two Ford Escape hybrid vehicles as part of a pilot program at the Lab.

The vehicles don't require special fuels and do not have to be plugged in, said John Tapia of Property Management. The manufacturer estimates the hybrid SUVs get 36 miles per gallon in the city and 31 miles per gallon on the highway.

The vehicles are assigned to Acquisition Services Management (ASM) Division Leader Kevin Chalmers and Charles Trujillo of Utilities and Infrastructure (MSS-UI) and can be used in town or for longer trips. Employees who want to try the hybrid vehicles for government use should e-mail the Fleet Management Team at *fleet@lanl.gov* to make arrangements.

This program is a response to Executive Order 13423, Strengthening Federal Environmental, Energy, and Transportation Management, issued in January. The order requires all federal agencies and their subcontractors to reduce dependence on petroleum products.

The Fleet Management Team will document and analyze fuel efficiency, maintenance requirements, warranty and service issues, and driver satisfaction. The data obtained will help determine the feasibility of future acquisition or retention of the pilot vehicles.

Employees can contact the Fleet Management Team at *fleet@lanl.gov* to learn more about the program or about the possibility of replacing an existing government vehicle with a hybrid during fiscal year 2008.

Q: Have you checked your property inventory recently to see if there are items you are not using and can turn in? If so, what did you remove from your list? What items do you think most employees will turn in?

Lisa Harris of the Laboratory Directed Research and Development Program Office (LDRD-PO)

Yes, we are constantly checking our lists on my team. Most employees will turn in old printers and equipment that is cluttering our office space.

Krista Valdez of the HR Service Center (HR-SVSCTR)

I moved offices just this week, and I had to check my property in the process. I didn't have anything that should not have been there. The items most people would be likely to turn in would probably be older equipment, like old printers or laptops that they no longer use.

Julie Ann Martinez of the Communications and Government Affairs (CGA) Division

I checked it about two months ago when I transferred to another group. I added a few items to my property list. I think most employees will turn in printers and laptops.

Peter Gary of Operations Space Science Applications (ISR-1)

Yes, I have checked my property list, and I'm using everything. I only have about five items on my list but I use them all.

Vince Trujillo of B61 Systems Engineering (W-1)

Yes, I have checked my property inventory recently. Since then I turned in my PDA and other computer accessories. Given recent e-mails, I assume employees will turn in laptops.

Nathan Hjelm of Multi Physics (X-3 MP)

Thinking about my inventory, the most likely item I could get rid of would be my laptop. I feel most employees would feel the same way but would be unwilling to give up their laptops.

Deputy and principal associate directors named

Jan A. Van Prooyen has been named deputy director and **Mike Mallory** principal associate director for operations and business services. "These two extraordinarily talented and accomplished people are ideally suited to help achieve our ambitious goals and effect improvements at Los Alamos National Laboratory," said Laboratory Director Mike Anastasio.

Jan Van Prooyen

Jan Van Prooyen

Van Prooyen has been acting deputy director since December of 2006. Before that, he served as principal associate director of operations. "Jan brings a wealth of experience and has demonstrated a deep commitment to the Laboratory's success. He achieves lasting results through rigor and teamwork," Anastasio said.

Previously, Van Prooyen served Bechtel National Inc. in a variety of capacities, most recently as president of the company's Defense and Space business unit. The 5,000 person business unit focused on large, government-sponsored projects. Over the course of his tenure with Bechtel, he has managed many high-hazard operations to include the design, construction, and operation of high-security government installations and programs. These included nuclear storage site security systems in Russia, missile silos in Alaska and California, biological weapons proliferation prevention programs in central Asia, and a large chemical demilitarization facility in Maryland.

"Jan's teams have excelled in safety, environmental stewardship, and continuous improvement," noted Anastasio. "I first met Jan when he was deputy general manager at the Nevada Test Site, where he did outstanding work."

Before joining Bechtel, Van Prooyen tackled a series of U.S. Army leadership assignments focused on chemical-biological defense, missile defense, nuclear weapons, and developmental testing. While in the Army, he led two major research and development centers and a national test center.

Van Prooyen earned a doctorate in nuclear engineering from the University of Virginia, a master's degree in nuclear engineering from the University of Arizona, and a bachelor of science degree in engineering from West Point. He also completed a one-year national security fellowship at Harvard University's Kennedy School of Government.

Mike Mallory

Mike Mallory

Since June 2006, Mallory was associate director for stockpile manufacturing, leading a team that enhances national security by providing nuclear and explosive products in support of the nation's nuclear deterrent. "Mike's great ability to think and act strategically is matched only by his practicality," said Anastasio. "He gets things done and done right. Already, his team has made great strides in manufacturing, including safety, cybersecurity, quality, and pollution prevention."

Mallory has 35 years of experience in the Department of Energy and commercial operations, engineering, and program management, as well as a history of applying best management practices from both environments.

As president and general manager of BWXT Pantex, he was responsible for safe, secure, and environmentally compliant operation of the Pantex Plant—the DOE operation near Amarillo, Texas, that assembles, disassembles, builds, and maintains nuclear weapons. He helped develop, implement, and monitor site production plans that ensured the safety, security, reliability, and performance of the nation's nuclear stockpile.

Mallory holds a master's degree in business administration from Rockhurst College and a bachelor of science degree in metallurgical engineering from the University of Missouri.

Bashyam is 2007 Postdoctoral Publication Prize winner

by Jaclyn J. Valdez

Rajesh Bashyam, a postdoc in Sensors and Electrochemical Devices (MPA-11) is the 2007 winner of the Postdoctoral Publication Prize in Experimental Sciences.

Bashyam was nominated by his mentor, Piotr Zelenay of MPA-11, who co-authored the award winning paper titled, "A Class on Non-precious Metal Composite Catalysts for Fuel Cells." The paper was published in *Nature* in September 2006.

According to Zelenay, "the paper reports on the development of a new class of oxygen reduction catalysts for the polymer electrolyte fuel cell that exhibits promising activity and stability."

Bashyam's paper was selected by a panel of Laboratory technical staff members, and the research represents a seminal contribution to the field. He will receive a certificate, monetary award, and be given the opportunity to discuss his research at an upcoming Physics/Theoretical Division colloquium this fall.

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Bashyam …

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Houtong Chen of the Center for Integrated Nanotechnologies (MPA-CINT), and Trevor Hayton formerly of Materials Chemistry (MPA-MC) and now an assistant professor in the chemistry and biochemistry department at University of California, Santa Barbara, received honorable mention. Chen and Hayton will be presented with a certificate at the colloquium as well.

Chen was nominated by his mentor Antoinette Taylor of MPA-CINT, for his paper titled, "Active Terahertz Metamaterial Devices" written in collaboration with Willie Padilla, Joshua Zide, Arthur Gossard, Richard Averitt, and Taylor.

Hayton was nominated by his mentor, James Boncella, for his paper titled, "Synthesis of Imido Analogs of the Urayl Ion" written in collaboration with Brian Scott, Phillip Palmer, Enrique Batista, P. Jeffrey Hay, and Boncella.

This biennial prize is sponsored by Damon Giovanielli (former Physics (P) Division leader, now retired) and the Laboratory and is awarded for the best article in experimental sciences in the past three years.

In Memoriam

Robert Fitzhugh

Manhattan Project pioneer Robert Fitzhugh passed away January 7. He was 85.

Fitzhugh joined the Laboratory in 1946 as a junior scientist in the former Experimental and Pit Division. In 1951, Fitzhugh joined the former Field Testing Division (J) to take over the high-speed camera work on weapon tests at the Nevada Proving Ground. He later became a mentor for the engineers of the Field Testing Division (J-8) and retired from the Lab in 1991.

He returned to Los Alamos in January 1992 as a associate staff member and remained at the Laboratory through September 1993.

His key contribution to the atmospheric test program was the use of high-speed photography as an indispensable tool for understanding nuclear detonations. With the move to underground testing, Fitzhugh became an expert on data acquisition and analysis of ground motion effects.

Fitzhugh earned a bachelor's degree in electrical engineering from Michigan State University in June 1943. He enlisted in the United States Army in May 1943 and attended the University of Iowa as part of the Army Specialized Training Program.

When the ASTP program was disbanded in early 1944, Fitzhugh attended Columbia University as a laboratory technician, and then moved to Oak Ridge National Laboratory, where he worked on the thermal diffusion program.

Juanita Lawrence

Laboratory retiree Juanita Lawrence recently died. She was 69.

Lawrence joined the Laboratory in 1968 in the former Health (H) Division. She worked as a chemical technician for 22 years, retiring from the Lab in 1990 while working in the former Health, Safety, and Environment (HSE) Division.

She is survived by her husband Thomas Lawrence; son Chris; daughter Cathy; sisters Janice Peterson of Albuquerque and Margaret Corkran of Snyder, Texas; stepfather Carter Ward of Los Alamos; and numerous grandchildren.

June service anniversaries

35 years
Jeffry Casados, AOT-MDE
Allen Gauler, MQ-3
Joseph Scarpino, LANS-LLC
David Vieira, C-NR

30 years
Henry Anaya Jr., W-1
Yvonne Armijo, CCS-6
Henry Atencio, MSS-TA55FO
Joseph Brown, SAFE-S7
Lee Collins, T-4
Cynthia Gallegos, ASM-PUR
Francisco Guerra, WT-1
Margie Moore, SEC-DSS9
Edward Roemer, DE-1
David Stahl, DE-9
Joseph Stone, P-22
Lorenzo Trujillo, WS-FWS
Roland Valdez, ASM-MM
Brenda Valdez Ortega, IRM-RMMSO

25 years
Fernando Algarra, PF-TDI
Michelle Brewer, C-ADI
Jay Carnes, W-7
Louis Carrillo, N-1
Marion Cohen, WS-WA
Catherine Hammock, SEC-DSS9
Olaf Lubeck, CCS-1
Sylvia Maestas, RP-1
Mathew Maltrud, T-3
Denise Pelowitz, D-5
Gerald Schotik, DHS
E. Duane Verley, CM-CMGRS

20 years
Denise Bjarke, CGA-CO
Becky Cordova, ISR-4
Eduardo Garcia, PMT-1
Brett Kettering, HPC-5
Jody Martinez, PMT-3
Loretta Martinez, HR-SYS
Pamela Reass, N-1
Thomas Ricketts, PMT-2
Lawrence Rybarcyk, AOT-ABS

15 years
Elizabeth Abeyta, IST-IS13
Henry Alvestad Jr., AOT-ABS
Monica Andersen, HX-3
Cheryl Atencio, IRM-CAS
Linda Baker, LFO-DO
David Clark, P-23
Robin Dominguez, PADWP
Nina Gallegos, IHS-OS
Pamela Garcia, ASM-AO
Tonya Grace, PADOPS
Alan Gurevitch, ES-SE
Larry Hill, DE-9
Christopher James, PADWP
James Kamm, X-1-MV
Kathryn Karns, IHS-OS
John Kennison, MPA-STC
Suzanne Kitten, EFO-WETF
Frances Knudson, STBPO-RL
David Langlois, MST-7
Diana Lovato, CTN-2
Douglas Mayo, N-1
Evelyn Mullen, IAT-DO
Donna Osborn, SEC-DSS9
Sam Padilla, IAT-2
Lori Primas, HX-3
Deborah Quintana, TT-DO
Louie Salazar, OS-PT
Billie Shull, CMRR-DO
Alice Skehan, CS-OCS-1
Garrick Snider, CFO-3
Gary Sundby, N-2
Timothy Wallstrom, T-13

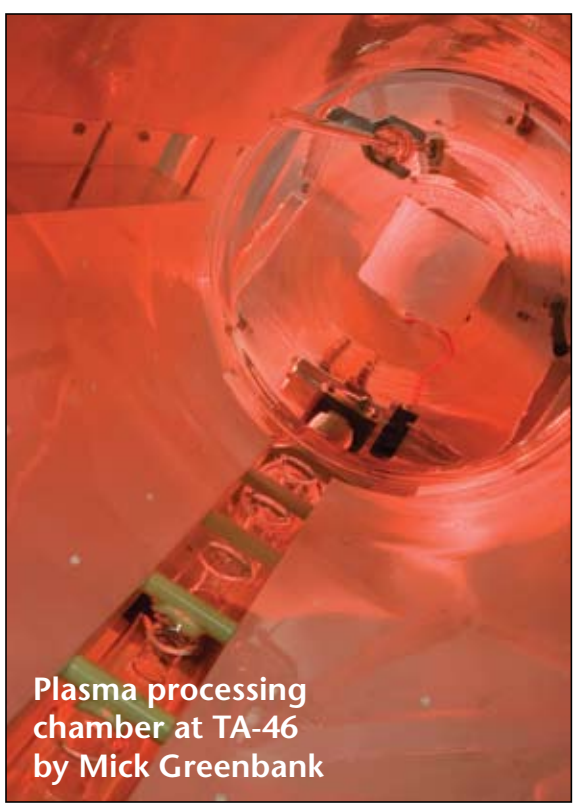
10 years
Julio Aguilar-Chang, EES-11
Jennifer Alwin, SB-CS
Rose Andrade, PMT-3
Jonathan Betts, MPA-NHMFL
Paul Brown III, CTN-2
Rebecca Burnell, EES-DO
Lawrence Castellano, WT-4
Robert Clanton, ISR-4
Catherine Cleland, D-3
Fawn Coriz, WCM-1
David Dooley, WCM-1
Manvendra Dubey, EES-6
Mitchell Frank, MC-PC
Sonja Gallegos, PMT-3
Brian Gaschen, T-10
Chris Gossein, HX-3
David Gubernatis, WCM-2
Carol Haertling, MST-6
Stacy Howze, MSS-EFO
Michael James, D-5
Angela Jaramillo, HR-DO
Gina Lujan, ISR-1
Andrea Maestas, EES-2
Marcelina Martinez, WT-6
Peter Moller, T-16
Murray Moore, RP-2
Anthony Nelson, ISR-4
Donna O'Donnell, MC-PC
Pavlo Quintana, OMBUDS
Jan Redding, W-8
Joseph Richardson, QA-OA
Karen Rodney, CTN-2
Guadalupe Romero, ISR-2
Roberta Salazar, ISR-1
Elisha Salazar-DeHerrera, SEC-DSS9
Randy Sandoval, ADESHQ
Benjamin Sapp, N-2
Robert Steiner, C-NR
Holly Trellue, X-1-NAD
James Vervilos, CS-PCS-4
Luciana Vigil-Holterman, ENV-RCRA

5 years
Lillian Anaya, IRM-CAS
Matthew Anderson, SAFE-S3
Thomas Bargeloh, QA-DO
Thomas Beckman, MC-TDA
Terra Berning, SAFE-MCAS4
Karen Bintz, IAT-2
Edmond Brown, IST-IS11
Victoria Bustos, RP-2
Eva Campos, WCM-3
Roland Cardenas, CTN-4
Marquita Ceballes, SB-CS
Bryan Chance, TA55-OPS
Katharine Chartrand, HPC-4
Georgia Chavez, MQ-2
Hsing-Bung Chen, HPC-5
Wendy Conley, EFO-OS
Robert Conley, MQ-3
Joseph Dabney III, LFO-DO
Melissa Day, N-1
Michael Delano, IST-APPS2
Elaine Deschamp, STBPO-RL
David Dooling, X-1-SMMP
Ahmad Douglas, X-DO
Jeffery Erickson, IHS-OS
Stephen Glick, P-21
John Gower, PMT-5
Nicolas Hengartner, CCS-3
Steven Honig, IAT-2
Kimberly Israel, C-NR
Kevin Jakubenas, TT-DO
Dennis Jaramillo, W-6
Scotty Jones, ADCLES
Paul Keiter, P-24
Serena Keith, SEC-DSS9
Kristen Kern, D-5
Susan Kinkead, IST-APPS3
Lorraine Kinzer, OS-BSI
Karl Krenek, PMT-5
Cynthia Larson, CS-PCS-1
Joseph Longo, N-1
Susan Lopez, EES-9
Sue Malec, CMR-DO
Leroy Martinez, WS-FWS
Laurie Martinez, CFO-2
Kim Meyer, PMT-4
Nicolas Miller, CTN-2
Jonathan Morgan, IAT-3
Morgane Ollivault-Shiflett, B-3
Martina Padilla, PADWP
Kathie Pavlovsky, MSS-EWMFO
Bradley Plohr, T-13
Deidre Plumlee, IRM-CAS
Rudolph Polaco, HPC-2
Tony Rodriguez, MSS-IFCS
Michael Rogers, AET-3
Margaret Salazar, IST-APPS1
Jacob Sandoval, AOT-RFE
Kenneth Shelley, W-2
Cheslan Simpson, N-2
Michael Stoll, PMT-4
Christopher Thorn, MSS-TA55FO
Bernadette Trujillo, MQ-2
John Urban, IHS-OS
Scott Valdez, C-NR
Andrea Valdez, N-2
Diane Vaughan, X-3-PC
Antonio Villegas, AET-2
Jacob Waltz, X-3-LGRN
Peter Wanco, LFO-DO
Lydia Winsemius, IST-APPS1

Go to http://int.lanl.gov/news/links/ online.


Glovebox maintenance
by Mick Greenbank

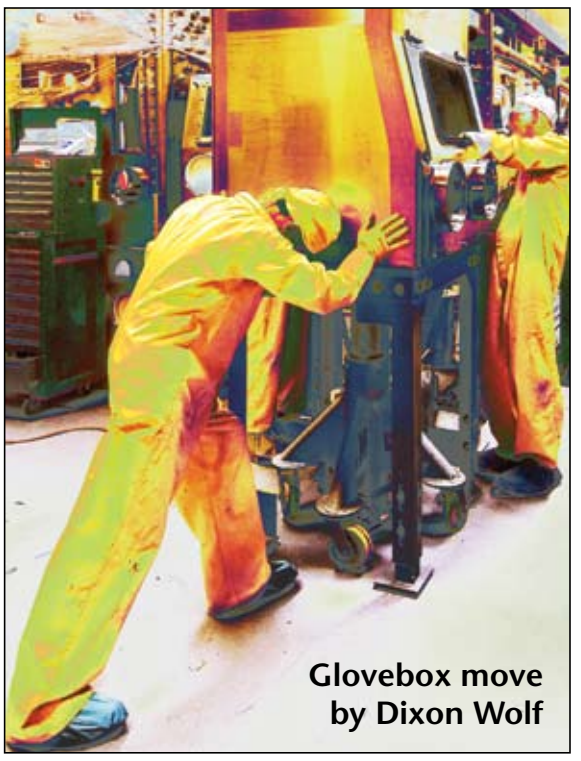

CMRR construction by Dixon Wolf


Plasma processing
chamber at TA-46
by Mick Greenbank

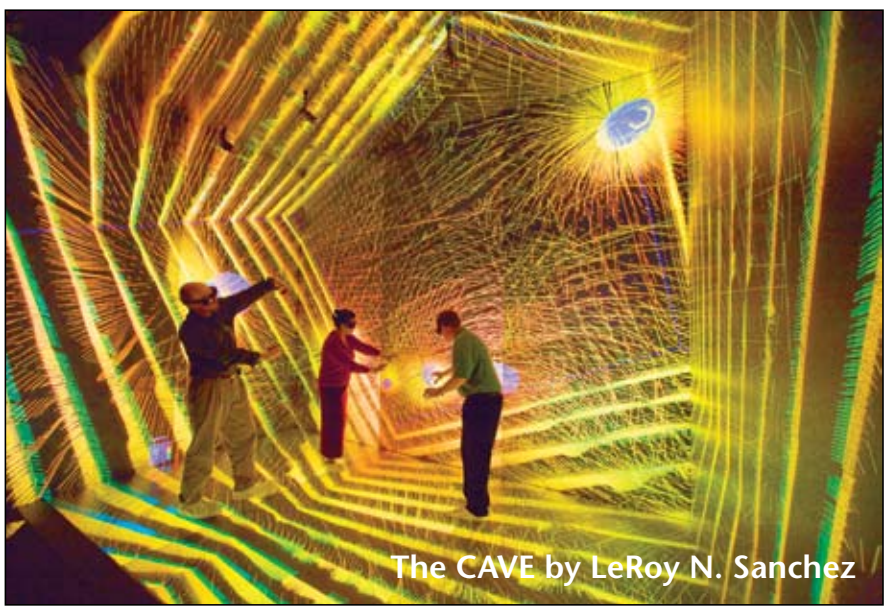
Lab snapshots

Throughout the year, the photographers in Records Management/Media Services and Operations (IRM-RMMSO) take photos around the Laboratory for various Laboratory customers. Shown on this page are just a few of the photos they snapped for the *Los Alamos NewsLetter* and *Daily NewsBulletin*.


Crane to crane by LeRoy N. Sanchez


Glovebox move
by Dixon Wolf


Golden morning at TA-55
by Mick Greenbank


The CAVE by LeRoy N. Sanchez