LANL
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Lab recognizes distinguished performance

Laboratory employees recognized this year as distinguished performers sparkled in many ways and in many areas — from proton radiography to creating a Web site following the Cerro Grande Fire, from fissile material storage to a bridge employment program.

Nine individuals, eight small teams and six large teams received 2000 Distinguished Performance Awards.

Individuals and small teams are recognized for contributing to the Lab's programmatic efforts or its status in the scientific community, displaying unusual creativity or dedication and performing well beyond normal expectations. Large teams are honored for performing at levels far above normal job assignments, completing projects that bring distinction to the Laboratory and demonstrating exceptional teamwork and dedication.

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Photos by LeRoy N. Sanchez, Public Affairs (CER-20)

Text by Jennifer Graham and Eilleen Patterson Communications, Arts and Services (IM-1)

Distinguished Performers

Laboratory Director John Browne, front row center, shares the enthusiasm of some of the 2000 Distinguished Performance Award recipients outside the Los Alamos Research Park. Individual and small team recipients were recognized at a reception at the Research Park.

Below: Ed Borrego of Communications Arts and Services (IM-1) hangs photographs of the Distinguished Performance Award recipients on display panels. The photographs were taken by LeRoy N. Sanchez of Public Affairs (CER-20) and accompanying text was written by Jennifer Graham and Eileen Patterson of IM-1. The panels are on display on the first floor of the Administration Building. *Photos by LeRoy N. Sanchez*

Los Alamos
NATIONAL LABORATORY

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National Nuclear Security Administration

Individual Awards

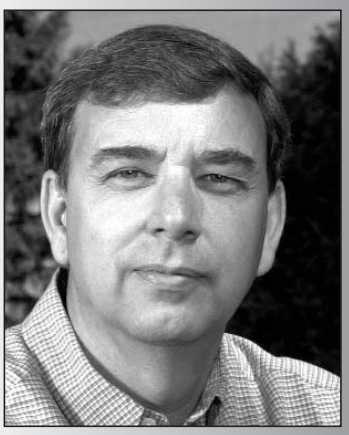
Wallace Harbin, ESA-TSE

Loading the targets used in nuclear weapon components is a vital Laboratory production mission. This work — the Neutron Tube Target Loading project — involves hydriding an erbium film on a small molybdenum target surface by exposing it to tritium.

In addition to shouldering the responsibility for loading almost 1,000 targets this last year, NTTL's lead operator, Wallace Harbin, made exceptional innovative contributions to the project. NTTL targets must meet exacting cleanliness and stringent war reserve quality requirements. To protect targets from even the slightest contamination, Harbin developed custom handling tools for target manipulation inside the glovebox. For storage and shipment, he also invented stainless-steel handling clips and all-metal storage trays to replace inadequate polypropylene containers.

In addition, Harbin created a "developmental" target loader, the Loader Test Stand. NTTL development work can now be performed without interfering with war reserve production. The test stand's digital video capture system observes and records how varying process parameters affect the science of target hydriding.

Harbin's efforts have propelled NTTL well beyond meeting programmatic deliverables and have enhanced the Laboratory's scientific capabilities and reputation within the Department of Energy complex.



Wallace Harbin

Candace Holmes, ALDNW

During the trying times of the Wen Ho Lee case and the missing hard drives, Candace Holmes, the associate Laboratory director for Nuclear Weapons (ALDNW) directorate's security officer, shaped and integrated ALDNW and Laboratory responses to the resultant security issues.

Holmes championed initiatives to formalize classified work area procedures, enhanced protective measures for classified removable electronic media and developed a computer-based system for monitoring vault access. Her efforts allowed the Laboratory to meet the milestones and deliverables for the U.S. president's annual certification process in 2000.

Holmes also was the Laboratory's principal point of contact for security issues during a joint DOE-Department of State project to demonstrate to Russia a one-of-a-kind transparency technology for special nuclear materials. She served in the same capacity for the U.S. Strategic Command's nationally visible, top-secret Stockpile Assessment Conference held during the Cerro Grande Fire recovery. And she was the Laboratory's trusted agent and liaison with the FBI during the missing hard drives investigation.

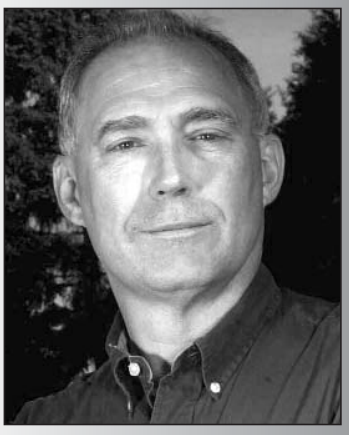
Holmes' security expertise, poise under stress and attention to detail created a stronger ALDNW security program and contributed significantly to the resolution of institutional safeguards and security issues.

Candace Holmes

Thomas D. Kunkle, EES-11

Nuclear analysts and policy makers in Washington must make force-modernization, strategic-arms-control and treaty-ratification/renewal decisions based on the analysis of often ambiguous and fragmentary intelligence data.

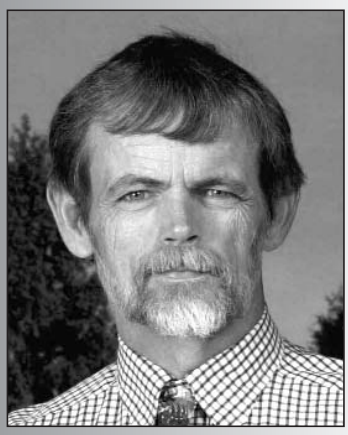
While analyzing one of the Intelligence Community's most difficult and enigmatic targets, Tom Kunkle of Geophysics (EES-11) applied his in-depth knowledge of technical practices to the development of a new approach to intelligence data analysis. By collecting all available data; paying heed to seemingly insignificant, often overlooked details; and repeatedly analyzing the many details using quantitative tools in innovative ways, Kunkle was able to draw conclusions that provide an increasingly coherent and meaningful picture to senior U.S. decision-makers. The president, members of his



Thomas Kunkle

administration, the Foreign Intelligence Advisory Board and the academic study group advising the U.S. government on national security issues (the JASONS) all have been briefed on Kunkle's results.

An articulate and persuasive writer and speaker, Kunkle has achieved a leading role in the nuclear analysis arena. His cutting-edge work is highly regarded in Washington, D.C., and throughout the DOE laboratory complex. It significantly enhances the reputation of Los Alamos.



Tom Locke

Thomas P. Locke, ESH-2

Psychologist Thomas Locke of Occupational Medicine (ESH-2) is the chief architect and team leader for the Laboratory's Employee Assistance Program and Critical Incident Stress Management Team, which provide targeted support and counseling to organizations and individual employees working through difficult or traumatic events. With quiet professionalism, clinical talent, sensitivity, leadership skills and heart that have earned him Laboratory and community respect, Locke coordinates and actively participates in his teams' efforts.

The Cerro Grande Fire and its aftermath added extraordinary challenges. Locke instantly mobilized his own staff, interviewed and screened volunteer professionals, recruited University of California stress-management personnel and carefully allocated these resources to meet the highest needs. Locke and his team provided real-time, on-site individual counseling and defusing sessions to hundreds of firefighters as they came off shift. They also provided more than 100 defusing and debriefing sessions to groups such as statewide firefighting teams, local firefighters and police officers (along with their spouses), Laboratory management and staff and Los Alamos County administrators.

Locke's professional and personal contributions have strengthened the health and resilience of many hundreds of Laboratory employees and members of the surrounding community.

Kathy Jo Lovell

Kathy Jo Lovell, LANSCE-12

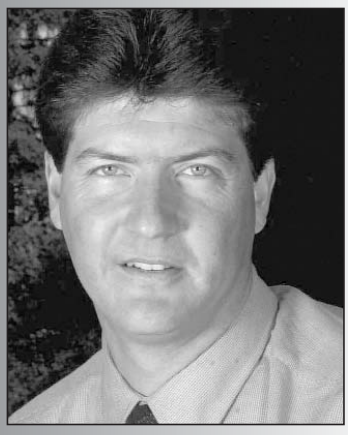
Kathy Lovell contributed significantly to the development and implementation of three spectrometers in the short-pulse spallation source upgrade at the Los Alamos Neutron Science Center. A member of the Manuel Lujan Jr. Neutron Scattering Center (LANSCE-12) design team, Lovell worked on the shielding packages of the Spectrometer for Materials Research at Temperature and Stress (SMARTS); High Pressure, Preferred Orientation Spectrometer (HIPPO); and the Protein Crystallography Station, all three at the Lujan Neutron Scattering Center.

Her efforts were key to completion of the Protein Crystallography Station in time for scientists to take its first neutron beam on sample in December 2000 — a highly visible DOE project milestone. The station, unique in North America, will support the bioscience community's research into the structure of thousands of proteins sequenced in genome projects. Through neutron studies, structural biologists will collect data from small protein crystals.

Lovell, who has been with the Lujan Center since its beginning, produced designs to the rigid specifications of researchers; supervised the design work of others; and handled component and material purchases, often at great financial savings.

She also worked concurrently on DANCE, an experimental nuclear physics flight path.

Lovell's mix of skill and dedication, coupled with her detailed knowledge of the Lujan Center's experimental areas and instruments, were key to project success.



Timothy Pierce

Timothy H. Pierce, MST-7

A materials technician with Polymers and Coatings (MST-7), Timothy Pierce works on the Target Fabrication Assembly Team. The team supplies experimental Physics (P) Division assemblies for the X-ray machine at Sandia National Laboratories (the

Z-machine) and laser fusion targets for the University of Rochester's Omega laser, where work is done for the Laboratory's Inertial Confinement Fusion program.

In 2000, under a tight fall deadline, Pierce assumed primary responsibility for the design and fabrication of physics packages for two Z-machine campaigns. To do that, he quickly learned a new 3-D computer-aided design software that allowed him to show machinists exploded views clearly illustrating the packages' complicated components. He also coordinated the many processing steps, many with submicron tolerances. His efforts reduced assembly mistakes to a negligible level and cut assembly time by about two-thirds.

Pierce also contributed significantly to concurrent campaigns at the Omega laser. He produced detailed drawings, assisted with the machining and assembly and even designed special fixtures for use in shipping the targets.

Pierce's initiative, foresight and diligence, along with his refusal to accept less than his best, helped the fabrication team support complete success in all the experimental campaigns.

Lorraine M. Segura, ESH-3

Lorraine Segura of Integrated Risk Analysis, Management and Communication (ESH-3) made the 2000 Safety Analysis Workshop an unprecedented success. The workshop is sponsored annually by the Safety Analysis Working Group of the Energy Facility Contractors Group. The Laboratory hosted the 2000 meeting in Santa Fe.

Segura, workshop co-chair and the working group's training coordinator, filled a training need faced by the workshop's attendees. Although DOE safety analysts need nuclear facility authorization-basis training, that training is unavailable at most sites and difficult to obtain affordably anywhere. Segura put together a program of 17 technical training courses, and through her network of industry and DOE contacts, got them at no cost to DOE, the Laboratory, the workshop sponsors or the attendees. She also made sure the courses had certification maintenance points from the American Board of Industrial Hygiene. It was $150,000 worth of board-certified training — free.

The result was a predictable 50-percent increase in the number of people trained over the previous year's workshop and raves from attendees, who called the workshop the "best ever."

Segura provided a unique service to the entire DOE community.

Lorraine Segura

Sandra E. Wagner, C-INC

Many people gave an extra level of service after the Cerro Grande Fire, and Sandra Wagner of the Chemistry Division's Isotope and Nuclear Chemistry Group was one of those people.

The fire severely damaged the Clean Chemistry and Mass Spectrometry facility (RC-45) at TA-48 — a real problem for the Laboratory. RC-45 supports, among others, vital Threat Reduction programs and the plutonium and americium bioassay program, a necessity for work at TA-55. And RC-45's mass spectrometry capabilities were needed for analyses of the fire's environmental effects. RC-45 simply could not be out of commission.

Wagner, RC-45's bioassay program manager and mass spectrometry team leader, took charge of reconstruction. She opened emergency capabilities; organized the recovery project; assembled the needed team and resources; budgeted for the needed funds; and once work began, spent nights and weekends overseeing the effort. On top of this, she also contributed to two other C Division fire recovery projects and served as the Strategic and Supporting Research Directorate's representative to the Labwide recovery program.

In a high-pressure situation spanning many months, Wagner moved the RC-45 reconstruction project along smoothly and, through other recovery work, served the Laboratory as a whole.

Sandra Wagner

Margaret White

40mm Launcher Team

Margaret L. White, ESA-EPE

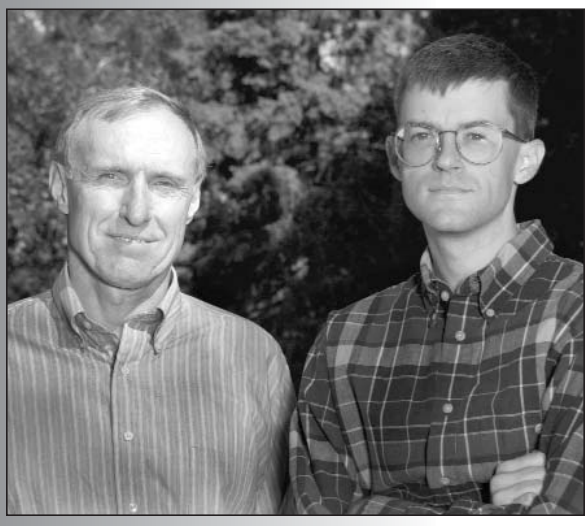
Energy and Process Engineering (EPE) in the Engineering Sciences and Application Division is a multidisciplinary engineering group with a wide variety of projects. To say that activities in the group office are hectic is an understatement.

In March 2000, EPE's group office administrator accepted another job, and Margaret White, group secretary and assistant to the office administrator, stepped in to fill the gap. For almost a year thereafter, she performed the duties of two people.

During that time, White provided all of EPE's general administrative support and fulfilled several special functions, including serving as classified document and computer/media custodian, entering all group time and effort, and making travel arrangements. During the Cerro Grande Fire evacuation, she became the group's point of contact, locating scattered employees and providing needed information. After the fire, she initiated group help for members who had lost their homes while continuing her other office duties.

In White's position, language may pose the greatest challenge. Serving the needs of diverse engineering disciplines requires a massive technical vocabulary. But she mastered the challenge, making communication between staff members and customers seamless. In fact, she maintained all office operations at the highest level.

Small Team Awards



B61-11 Probabilistic Structural Reliability Analysis Team

The 40-mm Launcher Team

To assess stockpile weapon performance, scientists need unique data provided by a Los Alamos team that performs fundamental experiments on plutonium metal and alloys on TA-55's 40-mm launcher, a shock-wave-physics apparatus installed in a glovebox. The launcher is used to probe material behavior at temperature and pressure extremes. The work requires exact alignment of a target with the launcher tube, which is hard to achieve inside a glovebox. Even moving materials and equipment into the glovebox takes great patience and care.

Team members overcame special challenges during the past year. They had performed 13 experiments from October 1999 through April 2000 when the Cerro Grande Fire shut down TA-55 until October 2000. Restart activities consumed much of October and November, and a late-November inventory required another shut-down. Yet the team completed six more experiments before year's end, even performing two in one week.

The team's high-quality data are now being used by theoreticians from the Laboratory, Lawrence Livermore and the United Kingdom's Atomic Weapons Establishment. The team's superb performance has enhanced its international reputation and brought Los Alamos positive recognition.

Team members are Benjamin Lopez, Paul Contreras, Arthur Herrera, and Johnny Montoya of Nuclear Materials Science (NMT-16) and Dennis Shampine and John Vorthman of Detonation Science and Technology (DX-1).

B61-11 Probabilistic Structural Reliability Analysis Team

Recently, the Laboratory's reputation for delivering certifiable weapon systems to the military has rested on approval of the Probablistic Structural Reliability Analysis Team (B61-11). Using a new approach to weapon certification, a two-man team from Engineering Analysis (ESA-EA) completed an analysis crucial to that approval.

Traditional certification of the B61-11 system's structural reliability would require tests representing every possible new impact environment, but team members envisioned a new probabilistic method based on Accelerated Strategic Computing Initiative (ASCI) computing power. They constructed and validated a 3-D finite-element model to simulate all probable impact events and validated it with data from 30 full-scale system field tests, 20 scale-model tests, and dozens of subassembly and component tests. They then ran 23,328 10-hour simulations on the ASCI Blue Mountain computer. The work resulted in a predicted reliability distribution that was accepted by the Laboratory, the National Nuclear Security Administration communities and military targeting strategists. Weapon system approval was complete by September 2000.

The team's method was overwhelmingly successful, and it stands as a premier example of the application of ASCI technology. Future weapon delivery evaluations will follow similar procedures.

Team members are Rickard Macek and Lance Hill of ESA-EA.

Cerro Grande Web Site Team

Cerro Grande Web Site Team

Fleeing from the Cerro Grande Fire, the scattered citizens of Los Alamos faced the potential loss of homes and jobs and an overwhelming sense of disorientation. Inconsistent, unreliable and incomplete television, newspaper and radio updates left both Laboratory managers and families unable to anticipate outcomes and make basic decisions about surviving the crisis.

In the midst of this chaos, five Web designers/programmers from the Communication Arts and Services (IM-1) developed a Web site devoted to collecting and disseminating information related to the fire and rebuilding communication links between dispersed community members. Operating from remote, sometimes temporary, Santa Fe locations, they set up the Laboratory's home page as a fire information page.

Within four days, the team developed a graphically pleasing site, including a managers-only page. Beyond staffing the site around the clock, team members improved two-way communications for the Laboratory's Emergency Operations Center (EOC), published real-time EOC releases online, consolidated three existing evacuee registration databases and established and staffed an e-mail address to respond to questions.

Team members Jim Cruz, Chad Kieffer, Chris Lindberg, Katherine Norskog and Ann Peterson looked beyond their personal needs to creatively and aggressively help contain the emotional damage caused by the fire.

Kazakhstan Facility, Unattended- and Remote-Monitoring and Spent-Fuel Measurements Team

Kazakhstan Facility, Unattended- and Remote-Monitoring and Spent-Fuel Measurements Team

Before being shut down, Kazakhstan's BN-350, a fast-breeder reactor, produced plutonium for Soviet nuclear weapons. Its spent fuel is now kept temporarily in an on-site storage pond. Without careful monitoring, this material would be a significant proliferation threat. BN-350's weapons-grade plutonium is enough for hundreds of nuclear explosive devices.

Los Alamos Science Team

A team from Safeguards Science and Technology (NIS-5) has helped to safeguard that material. The team designed and installed two separate monitoring systems, one for the facility operators and one for International Atomic Energy Agency inspectors, and provided training in the systems' use and maintenance. Each system is an integrated array of video cameras and radiation sensors. In the storage pond, team members installed an underwater spent-fuel coincidence counter to measure the amount of plutonium and give the IAEA its first-ever quantitative plutonium measurements taken directly of spent fuel.

In Kazakhstan, team members endured unreliable power and heating, poor food and intermittent running water but completed systems that will safeguard BN-350's nuclear materials and ensure that the site complies with international treaty regulations.

Team members are James Halbig, Shirley Klosterbuer, Pamela Reass, Robert Parker, Parrish Staples and John Lestone of NIS-5.

Los Alamos Science Team

Los Alamos Science, a serial publication from the Science and Technology Base Program Office, communicates the Laboratory's best science to an international audience. The publication team surpassed itself in 2000 with a special two-volume, 500-page issue on the challenging and programmatically important field of plutonium science.

Issue #26, "Challenges in Plutonium Science," covers condensed-matter physics, metallurgy, chemistry, environmental issues and aging and also contains unique articles on the history of plutonium, health risks and programmatic challenges for the future.

Plutonium studies are characterized by multiple approaches and points of view, so team members had to fill in gaps, work through controversial points, translate different technical languages and help find the connections between different points of view. They even had to learn the science well enough to write many of the pedagogical sections that make this publication so valuable.

The final product has been hailed as a landmark issue and described by a contributor to the Plutonium Handbook, the standard reference work, as one of the finest contributions to plutonium science he has seen.

Team members are Nikki Cooper, Ileana Buican, Jay Schecker and Donna Spitzmiller of Science and Technology Base Program (STB), Gloria Sharp of Communication Arts and Services (IM-1), and Andrea Kron of Geophysics (EES-11).

LANSCE-7 Experimental Areas Support Team

LANSCE-7 Experimental Areas Support Team

At the Lujan Neutron Scattering Center, installation of three new instruments for LANSCE's Short-Pulse Spallation Source (SPSS) Enhancement project stalled when a 1999 contamination incident closed the Lujan experimental areas for a year. By the September 2000 reopening, work on the three beamlines — High Pressure, Preferred Orientation Spectrometer (HIPPO), Spectrometer for Materials Research at Temperature and Stress (SMARTS) and the Protein Crystallography Station —was behind schedule. In addition, the assigned installation coordinator had left the Lab, and the resident mechanical team was preparing for user operations.
The Experimental Areas Support Team's (LANSCE-7) Experimental Areas Support Team took over construction. The new time frame required team members to work while the LANSCE beam was on, so they had to schedule work on the beamlines according to a special ALARA plan. They solved several design and assembly problems along the way. For example, because a multi-ton SMARTS roof piece, once in place, could not be

removed for inserting large samples into the experimental cave, they custom designed a lifting fixture and procedure that enabled both installation and later removal. Likewise, when the facility crane could not reach part of the crystallography station, they devised a combination of procedures to finish the work.

The SPSS project is an important, highly visible project. This team — Steven Cushing (now retired), James Abernathey, Julian Garcia, and Joseph Medina — brought it to successful completion.

Russian Fissile Material Storage Facility Safety Evaluation Team

Russia's fissile material storage facility (under construction) will hold tons of weapons-grade plutonium derived from Russian Federation nuclear weapons. The facility, vital to U.S.–Russian nonproliferation goals, needed to be proved safe, secure and ecologically sound. With Bechtel technical support, this team developed and performed the design-phase safety evaluation for the Department of Defense's Cooperative Threat Reduction program.

The work was both politically and technically complex. Russian design data were initially difficult to obtain and unreliable. In addition, differing Russian design, construction and operational practices meant that U.S. and other Western standards were not directly applicable.

Team members overcame the information deficit by involving Russian designers directly in a bilateral collaboration. They then developed their own evaluation methods based on combined U.S. and International Atomic Energy Agency standards and Nuclear Regulatory Commission risk goals. They evaluated all potential sources of hazards, identifying effective control measures. Their efforts eliminated essentially all safety issues and confirmed that the design meets safety requirements if the facility is constructed and operated properly.

The team's approach accommodated differing Russian nuclear practices while preserving the integrity of safety performance expectations. It has set a high standard for other bilateral programs in nuclear nonproliferation.

The Nuclear Systems Design and Analysis (D-10) team members are F. Jeffrey Martin, Charles Bell, William Kubic Jr., Andrei Beloussov, and Jay Boudreau.

Russian Fissile Material Storage Facility Safety Evaluation Team

Welfare-to-Work Bridge to Employment Program Team

Materials Management (BUS-4) employs two people colleagues call "unsung heroes" because of the work they do moving Rio Arriba County residents from the welfare rolls to jobs. Their two-year-old Welfare-to-Work program, Bridge to Employment, has an 89-percent success rate, one of the highest in the country.

The program's sponsor, BUS-4 Group Leader Carol Smith, and Mary Van Eeckhout, who helps coordinate it, developed Bridge to Employment because they believe in people helping people. They elicited support from Laboratory and DOE officials and won a New Mexico Department of Labor grant, the first ever awarded to the Lab. The resultant program has trained and placed more than 70 participants in Northern New Mexico jobs with average salaries of $10.00 an hour. Including children and other family members, more than 300 people are touched by this success.

Gov. Gary Johnson named Bridge to Employment a "Best Practice Model" and shared its story at the national Governors' Conference in Washington, D.C. A program blueprint has since been distributed to more than 100 businesses and government agencies around the country.

The Bridge to Employment Team has helped the Laboratory become a better neighbor and improved lives in Northern New Mexico.

Welfare-to-Work Bridge to Employment Program

Large Team Awards

Crestone Secondary Milepost Calculation Team

Crestone Secondary Milepost Calculation Team

An important goal of the Accelerated Strategic Computing Initiative (ASCI) is the 3-D simulation of an entire nuclear explosion, both the primary and secondary events. The Laboratory's Crestone project had the task of simulating a 3-D secondary milepost calculation.

On April 30, 2000, the Crestone calculation team completed that milestone a full eight months ahead of deadline. To accomplish their task, team members worked extremely long days and weekends developing multiple new computational methods. The milestone calculation required both the Blue Mountain supercomputer at Los Alamos and the Intel Teraflops computers at Sandia. It ran for 42 days, using an average of 2,000 processors. Total processor time was more than two million hours.

The result has been described as the most detailed simulation of a nuclear weapon ever. The team's work has demonstrated that designers can include real 3-D features in their calculations and has helped put the ASCI program on track to advance toward high-fidelity, full-physics 3-D simulations for stockpile stewardship by the year 2004.

The Crestone Secondary Milepost Calculation Team has had a pronounced favorable impact on the Laboratory's scientific prestige. Its success places it in a clear leadership role in the national ASCI program.

Fissile Material Transparency Technology Demonstration Project Team

The U.S. Department of Defense's Cooperative Threat Reduction program is funding construction of a fissile-material storage facility in Russia. Continued congressional approval depended on Russia agreeing to allow U.S. and International Atomic Energy Agency radiation measurements of the stored materials. However, Russia feared that the physics measurements would reveal secret information about its weapons-grade plutonium.

The answer to the problem is the Attribute Measurement System with Information Barrier (AMS/IB), a technology that takes radiation measurements from potentially classified samples without revealing sensitive information. This team built a prototype AMS/IB apparatus and demonstrated it on a U.S. nuclear weapon component for a delegation of

Fissile Material Transparency Technology Demonstration Project

Russian scientists and officials on Aug. 16, 2000.

Showing the Russians how the apparatus works without compromising our own classified information required close collaboration between security professionals and technology developers. To complete the assignment, the team worked extended hours and made personal sacrifices, but the result was a successful demonstration.

This team showed the Laboratory in its best light — as the preeminent national technical center of expertise supporting U.S. threat-reduction policy.

Proton Radiography at AGS

Proton Radiography Alternating Gradient Synchrotron Experiment E955 Team

The proposed Advanced Hydrotest Facility (AHF) — a Department of Energy and National Nuclear Security Administration strategic goal — would provide the stockpile stewardship program with its foremost experimental diagnostic capability. The technology eventually chosen for the AHF must meet exacting performance criteria. Through a suite of experiments (E995) at the Brookhaven National Laboratory's Alternating Gradient Synchrotron (AGS), this team unequivocally demonstrated that proton radiography meets or exceeds those requirements.

Although proton radiography at Los Alamos Neutron Science Center (LANSCE) has already provided quantitative information relevant to stockpile stewardship, Brookhaven was chosen for E955 because the AGS 24-gigaelectronvolt beam allows experiments on thick objects, so it could accommodate a prototype-level demonstration of AHF capabilities.

AGS beam availability was extremely limited, however, so the experiments had to work the first time — sno second chances. In addition, the team worked with uncertain funding and with complicated safety and security requirements that had to satisfy team members' different institutions — Los Alamos, Livermore, Brookhaven, Bechtel Nevada and the United Kingdom's Atomic Weapons Establishment.

The team made E955 a complete success. The experimental results demonstrated the strength of protons as a diagnostic probe and paved the way for proton radiography to be the technology of choice for the AHF.

Maverick Program Special Project Team

Maverick Program Special Project Team

The Maverick Program, a collaboration between the Bioscience and Nonproliferation and International Security divisions, is devoted to classified biotechnological research that has a significant impact on national security contributing to the Laboratory's mission.

Within that program, this team's unique combination of expertise and people has yielded significant advances in analytical sensitivity, successes that have resulted in the Laboratory being recognized as a national resource and leader in this field.

Multispectral Thermal Imager Team

The goal of the Multispectral Thermal Imager (MTI) project is to develop and evaluate space-based multispectral and thermal-imaging technology for civilian and national security applications. MTI is the Department of Energy's largest, most ambitious satellite project and the flagship of its nonproliferation research and development program.

As part of this DOE project, the Laboratory's MTI Team played an outstanding role. In pursuit of MTI's goal, the team established a world-class radiometric calibration facility in Los Alamos, developing a source that has been accepted as a new National Institute of Standards and Technology standard. Team members developed new techniques for modeling and analyzing atmospheric radiative transport, for example delivering new capabilities for water-vapor corrections. Their techniques for analyzing multispectral data and obtaining physical understanding constitute a pathfinder for the national security community. Team members also invented new end-to-end modeling techniques to solve engineering issues such as the development of an innovative focal-plane array and the satellite's cryogenic cooler.

The MTI Team has developed a new national capability in remote sensing; changed the perception of the national security community in favor of radiometric, multispectral remote sensing; and established itself as a leader in the field.

Multipectral Thermal Imager Team

Ultra-Cold Neutron Team

The unusual properties of ultra-cold neutrons (UCNs) make them ideal for fundamental physics experiments. They may provide a window into "new physics." A stumbling block has been the limited achievable density of stored UCNs. The previous record, set in Grenoble, France, was 40 UCNs per cubic centimeter. By designing and implementing the first UCN source based on solid deuterium, this Los Alamos team has set a new world's record — 100 UCNs per cubic centimeter.

The breakthrough came when team members discovered that the primary limiting factor in UCN production was the presence of para-deuterium. Using only the ortho-deuterium form of solid deuterium as the source made the difference and may eventually result in 400 UCNs per cubic centimeter, achieved with a superbly efficient three kilowatts of beam.

A full-scale version of this source is now under construction at Los Alamos Neutron Science Center (LANSCE), and efforts to construct solid-deuterium UCN sources are also under way in Switzerland and Germany. Members of the Laboratory team will advise on the European projects.

With its success, this team has made Los Alamos the new leader in UCN research and development, an area that previously was utterly dominated by European institutions.

Ultra Cold Neutron

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