Reflections

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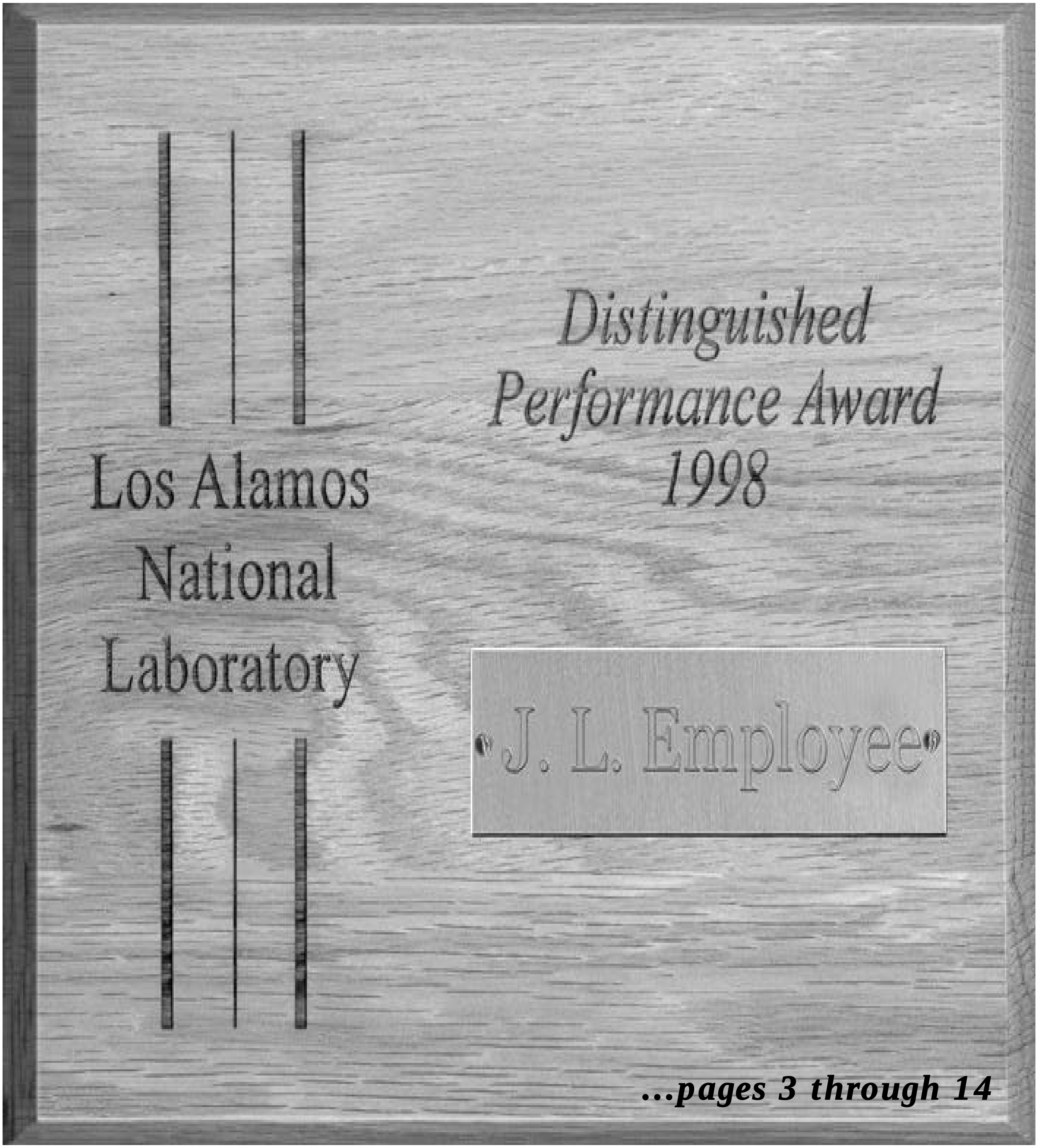

...pages 3 through 14

Inside this issue ...

Cover by Edwin Vigil

editor's journal

Looking at the positive side ...

I've been spoiled … or lucky. For the past several years, I've been driving to work and parking in the large parking lot on Pajarito Road in Technical Area 3 near the back gate to the Administration Building. Unless something big was taking place in the Administration Building Auditorium, I had little or no problem finding a parking space. Even in the summers when students working at the Lab added to the vehicle population, I didn't have to drive around the lot too long before I'd find a spot.

Walking from the parking lot to my work site in the Public Affairs Office, directly across the street from the parking lot, took no more than two or three minutes, tops. I rarely carried an umbrella to work or wore a heavy coat during the winter months. Regardless of the weather conditions, I could make the quick dash comfortably across the parking lot to my office building. Well, all of that has changed.

I now have to park in a lot a couple of blocks away. And I'm pretty sure I'll carry an umbrella if it looks like rain or wear a warm coat and gloves in cold weather because my walk from the parking lot to the office is now about 10 to 12 minutes, depending on how fast I walk. While I obviously prefer my old routine, I always knew it was too good to last. Like many others at the Lab, I've had to give up my convenient parking so that the Lab's new Strategic Computing Complex can be built. For those who may not know, TA-3's main parking lot on Pajarito Road across from the Public Affairs Office will be the site of a facility that will house high-speed computers, multiprocessors and associated infrastructure. The Strategic Computing Complex will be the center of the Lab's efforts to develop a computer system able to perform 100 trillion operations — 100 TeraOps — per second. The complex will have nearly 44,000 square feet of computer floor space and will house offices, simulational laboratories, visualization centers and a 200-seat auditorium. The parking lot has been partially closed and will close completely in February 2000. The complex is scheduled for completion by 2002.

Working so close to the construction site, I'm personally not looking forward to the coming months when the noisy, dusty, nuts-and-bolts construction will take place. But there is a positive side to all this. The Lab will get a three-story, approximately 291,000-square-foot complex that is integral to its stockpile stewardship program, which is tasked with maintaining and certifying the safety and reliability of nuclear weapons in the absence of nuclear testing. And I — and others — will benefit from a few more minutes of walking (a.k.a. exercising) each day. To find out more about the Strategic Computing Complex construction project and related parking information, check out articles that have run in the Daily Newsbulletin. The Newsbulletin archives are available at *http://www.lanl.gov/orgs/pa/News/newsarchive.html*.

And speaking of positive sides, the Strategic Computing Complex Support Team recently won a 1998 Distinguished Performance Award for its efforts in helping get the project off the ground. All the Lab's Distinguished Performance Award recipients were announced in the Daily Newsbulletin several weeks ago and are highlighted in this month's issue of "Reflections" (see pages 3 through 14). There are 14 individuals, eight small teams and 10 large teams. Hearty congratulations go out to all.

Reflections

Reflections, the Laboratory monthly publication for employees and retirees, is published by the Public Affairs (PA) Office. The staff is located at TA-3, Building 100, and can be reached by e-mail at *newsbulletin@lanl.gov*, by telephone at 7-6103, by fax at 5-5552 or by regular Lab mail at Mail Stop C318. The individual telephone numbers are listed below.

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Distinguished performers dazzle

Laboratory employees recognized this year as distinguished performers sparkled in many ways and in many areas — from proton radiography to creating a scholarship fund, from high-performance computing codes to manufacturing pits, from quantum cryptography to serving as a liaison to industry.

Fourteen individuals, eight small teams and 10 large teams received 1998 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.

Photos by LeRoy N. Sanchez assisted by Liz Padilla, Public Affairs (PA)

Text by Jennifer Graham and Eileen Patterson, Communication Arts and Services (CIC-1)

Individual awards

Anthony Balmes, NMT-9

Anthony Balmes, NMT-9

As the only mechanical-electronics technician for Power Source Technologies (NMT-9), Anthony Balmes repairs, designs, fabricates and installs equipment for more than 50 group members.

As soon as Balmes joined NMT-9 in March 1998, he was asked to repair three computerized welding controllers with a multitude of deficiencies that already had defeated the manufacturer's field technician. After only two days of reviewing the manuals, Balmes found and solved the problems.

He has gone on to satisfy every electrical need presented to him. In just a year, his achievements have included providing the necessary support for a new process using only spare or fabricated parts; working with industry representatives to bring vital equipment on line; rebuilding existing systems for which little documentation existed; and designing, fabricating or adjusting new systems that consistently outstrip expectations.

In short, Balmes' technical expertise has made him indispensable to NMT-9. He has become a major contributor to the group's success.

Rochelle Follmer, BUS-8

Rochelle Follmer, BUS-8

A fiscal analyst from Business Support Services (BUS-8), Rochelle Follmer became the Physics (P) Division's full-time budget team leader in June 1995. The position presented her with a rich mix of Department of Energy-funded programs, Laboratory Directed Research and Development projects and reimbursable projects from sponsors such as DOE, the National Institutes of Health, private industry and the intelligence community. The result? An equally rich mix of rules, regulations, reporting requirements and accounting standards.

Follmer accepted the challenge, closely monitoring costs and commitments and developing financial problem-solving strategies and training sessions. Her work ultimately helped the division close fiscal year 1998 in its best financial position in more than six years.

Not content to stop there, Follmer took on many of the division chief-of-staff responsibilities in 1998 and managed the $4 million division office budget. She also became an exceptional mentor for her team, inspiring professional and interpersonal growth that led to significant promotions for several team members.

Distinguished performers

Trudi Foreman, CST-18

Trudi Foreman, CST-18

Enzymes are important catalysts for chemical reactions but lack the stability for many industrial purposes. A chemistry project funded in fiscal year 1998 by the LDRD program was established to stabilize enzymes with water-soluble polymers.

Before funding could be granted, however, the validity of the concept had to be proved. Trudi Foreman, a chemical technician in Chemical and Environmental Research and Development (CST-18), accepted that challenge. Working on her own time before funding existed, Foreman taught herself enzyme kinetics and assays. She then screened numerous polymers, synthesizing and purifying those not commercially available, and both designed and implemented all necessary experiments.

In the end, she identified a polymer that increases a crucial enzyme's life 250 times. Her studies helped win the project its LDRD funding and set the stage for extending the versatility of enzymes. Foreman's success is significant for both the scientific and industrial communities.

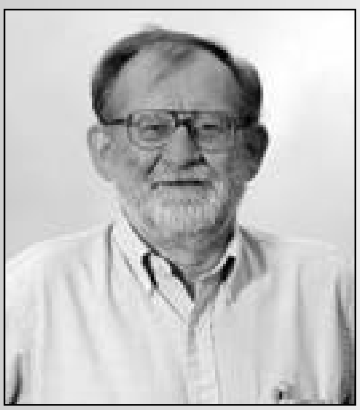
Charles Lebeda, X-TA

Charles Lebeda, X-TA

Charles Lebeda of Thermonuclear Applications (X-TA) has served the Stockpile Stewardship program as the physics co-project leader for an Accelerated Strategic Computing Initiative code and as the source of most of the diagnostic calculations supporting the Dual-Axis Radiographic Hydrotest facility (DARHT).

Lebeda developed his expertise performing calculations for 20 nuclear events before turning to the problems of radiography. Using a coupling of the Monte Carlo method with the Blue Mountain ASCI machine, he was able to simulate experiments that would have taken years to field. His work with researchers outside the Laboratory has led to new ways of obtaining radiographic images. In addition, his collaboration with other Laboratory personnel has revolutionized shielding for X-ray radiography and reduced the scatter background by factors of hundreds.

Because of Lebeda's work, DARHT will be useful for all primaries in the stockpile and will have a previously unexpected clarity.



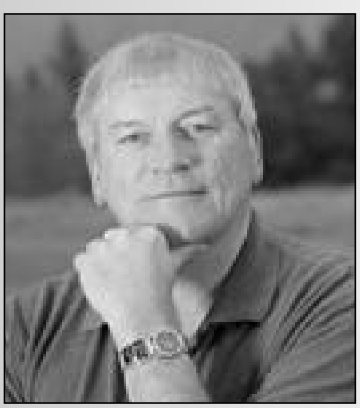
Eldon Linnebur, X-CI

Eldon Linnebur, X-CI

Eldon Linnebur of Code Integration (X-CI) has enabled the Laboratory to meet vital ASCI requirements. Linnebur works on the SHAVANO code project, the goal of which is to develop predictive codes for the performance of nuclear weapon primaries.

By December 1999, ASCI's primary codes must be proved capable of providing the required three-dimensional simulations. That requires the development and implementation of numerous physics models in parallel. For SHAVANO, however, parallelization was behind schedule until Linnebur assumed the task. Using his own approach, he completed a parallelization effort in less than a month. In addition, when on-time development of one critical physics package seemed in jeopardy, he wrote and implemented his own algorithm for the package, once again completing it in a month.

By January 1999, Linnebur had demonstrated the first calculations of all the necessary physics packages, all in parallel and all but one in three dimensions. While much work remains, Linnebur's contributions put the December milestone within reach.



Michael MacInnes, X-TA

Michael MacInnes, X-TA

Michael MacInnes of Thermonuclear Applications (X-TA) undertook a systematic reanalysis of key underground nuclear test data, taking into account physical considerations that had previously been neglected. His results are more consistent than previously possible, and they significantly affect the interpretation of the test data.

MacInnes's work on this classified project has contributed to a clearer understanding of nuclear weapon performance and to the development of predictive calculational capability in the absence of nuclear testing.

Mary Meyer, TSA-1

The end of nuclear testing necessitated a new way of ensuring stockpile safety and performance. Mary Meyer of Statistical Sciences (TSA-1) realized that future reliability assessment required the expert knowledge of Laboratory weapons designers. This knowledge — already used, for example, for identifying relevant information and setting code parameters — must now be formally documented and quantified.

Meyer's vision led to the development and implementation of Enhanced Reliability Methodology, a framework for integrating expert knowledge with other sources of information about weapon performance and reliability. As principal investigator and technical lead, Meyer established a significant role for ERM in the Enhanced Surveillance Program for stockpile stewardship. Meyer's colleagues credit her dedication and gentle, professional manner with enabling this success.

That same dedication and professionalism took ERM into the private sector, where it has been embraced by Delphi Automotive Systems. Under the name PREDICT, ERM is one of the Laboratory's 1999 R&D 100 Award winners.

Mary Meyer, TSA-1

Peter "Danny" Olivas, LANSCE-7

When the Accelerator Production of Tritium experimental irradiation project needed two new cooling water systems, Danny Olivas of High Intensity Beam Lines, Accelerator Experimental Areas and Remote Handling (LANSCE-7) volunteered to design the control system.

Olivas believed that only the flexibility of the Programmable Logic Controller language would allow him to meet the schedule and satisfy final requirements. Despite the group's concerns about PLC's reliability, Olivas gained permission to proceed. He independently forged ahead with structuring the system, learning to use it, doing a demonstration, proposing an operational plan and specifying the remotely actuated valves and other hardware he would be controlling in the radioactive area.

He delivered a control and interlock system that was essentially flawless and performed remarkably well. The flexibility he built into the system proved critical to APT success because requirements changed as operations evolved. Olivas's work marks a new chapter in the control and safety of proton beams.

Peter "Danny" Olivas, LANSCE-7

Michael Paciotti, APT-TPO

Michael Paciotti of APT's Technical Project Office was indispensable to the complex APT experimental irradiation project. He brought dedication, vast knowledge of the LANSCE accelerator and expertise in physics and chemistry to bear on almost every aspect of the project, making significant contributions and solving difficult problems that were impeding the project's smooth progress.

A significant example of Paciotti's creativity was his development of a first-of-its-kind, in situ, aluminum electrochemical impedance spectroscopy corrosion probe with a "lock-taper" design. This instrument allowed measurement of aluminum's corrosion rate in a high-energy, high-intensity proton beam. The system for measuring the corrosion of other materials involved sealing the probes behind glass by means of temperatures so high that they melted the aluminum.

The project's five experimental modules abound with myriad ideas and solutions that Paciotti developed in response to impediments. He was perhaps the one person most responsible for the success of the APT irradiation experiments.

Michael Paciotti, APT-TPO

Elmer Salazar, IBD-RBD

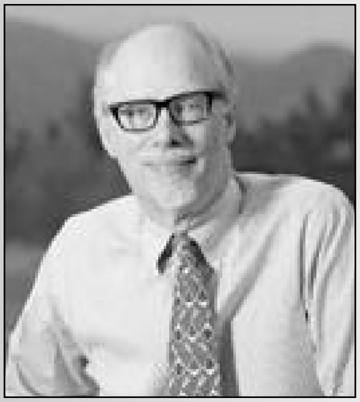
Elmer Salazar of Regional Business Development in the Industrial Business Development Program Office (IBD-RBD) works to stimulate technology business growth in Northern New Mexico.

Salazar coordinated a Lab/DOE/Los Alamos County team that developed a precedent-setting lease of DOE land to the Los Alamos Commerce and Development Corp., which is responsible for the upcoming Los Alamos Research Park. Salazar helped the diverse team resolve differences and arrive at the necessary lease approvals and LACDC/Lab/County Partnership Agreement.

Salazar has long worked to better link the Laboratory with its neighbors. For example, he facilitated a contractual agreement with the DOE-funded Regional Development Corp. to establish an enhanced fiber-optics and Internet backbone infrastructure that will connect Santa Fe, Taos, Pojoaque, Española and Los Alamos. Salazar also facilitated a US West Communications support service call center in Los Alamos. The Rio Arriba County "Computers for Kids" program is another of his contributions, further evidence of his commitment to Northern New Mexico.

Elmer Salazar, IBD-RBD

Distinguished performers



David Schiferl, CST-6

Dustie Stephens, ESH-19

Robert Von Dreele, LANSCE-12

Dianne Wilburn, E/ESO

David Schiferl, CST-6

David Schiferl of Chemical Reactions, Kinetics and Dynamics (CST-6) has spent three years as an Industrial Fellow, a liaison between industry and the Laboratory. In that role, he initiated dialogues between the Laboratory and his host — PPG Industries Inc. — that solved problems for both organizations.

For PPG, Schiferl found a Laboratory excimer laser expert who helped the company develop an oxygen-detection system for its glass-production procedures. For the Lab, Schiferl involved PPG in a collaboration to study polymer aging and paved the way for the company to provide a special electro-deposition process for coating complicated surfaces.

For the Laboratory, these collaborations have generated, to date, $4 million in funds that would not otherwise have reached the Lab. And the collaborations will continue, according to PPG representatives, who say that Schiferl "has helped us appreciate the technical capabilities of the national laboratories, especially Los Alamos." Schiferl's work serves as a role model for future Laboratory-industry interactions.

Dustie Stephens, ESH-19

Dustie Stephens of Hazardous and Solid Waste (ESH-19) was a significant player in the Laboratory's Legacy Materials Cleanup project. In nine months, she had to sample, manage and ensure careful analysis of all Laboratory chemicals whose content, origins, stability, radioactive status and shelf-life were unknown. This work included packaging all samples, submitting gallon-size or larger samples to an outside laboratory for analysis, performing hazard categorization of samples under one gallon, and reviewing and analyzing the results, all on schedule and in compliance with Resource Conservation and Recovery Act regulations.

Stephens' work included having about 12,000 radiological analyses performed. In addition, she completed about 1,000 analytical hazard categorizations "in house," thereby saving the project approximately $1 million. She also played an important role in an all-managers meeting presentation whose intention was to increase awareness of the Laboratory's need to better track and manage hazardous materials — a vital step in preventing a return to preproject conditions.

Robert Von Dreele, LANSCE-12

To understand a protein's biological function, researchers must first determine its structure, most commonly by growing large crystals and studying them with X-rays and neutrons. For each protein studied, the crystal growth process requires several weeks and thousands of dollars. Robert Von Dreele of the Manuel Lujan Jr. Neutron Scattering Center (LANSCE-12) has found a way to bypass the time and expense by characterizing protein with data drawn from an easily prepared polycrystalline powder.

Von Dreele's breakthrough, an extension of a method known as the Rietveld refinement, shatters textbook wisdom that structural determination for molecules as complex as proteins can only be accomplished with large single crystals. His new technique promises to greatly accelerate the study of biomolecules and, generally speaking, should open up new avenues for structural studies of materials with tens or hundreds of atoms per unit cell. His work should have an enormous impact on the scientific community as word of his accomplishment spreads.

Dianne Wilburn, E/ESO

Dianne Wilburn of the Environmental Stewardship Office (E/ESO) was alarmed to discover that rising solid sanitary waste amounts (dumpster waste) would prevent the Laboratory from meeting the fiscal year 1998 limit — no more than 2,006 metric tons — as spelled out in Appendix F of the DOE/University of California contract.

Wilburn initiated a series of solutions. She arranged for more deskside recycling bins, more-frequent cardboard pickup and extensive awareness campaigns. Her dedication extended to a pilot project for monitoring and sorting dumpster contents. (The pilot project revealed a high percentage of recyclable contents.) Her concern about increasing junk mail amounts led BUS-4's mail service staff to establish a special mail stop (A1000) where Lab personnel can forward junk mail. More than 200 metric tons a year are now recycled.

As a result of Wilburn's extraordinary efforts, the Laboratory surpassed the performance measure and gained experience that will help it meet even more stringent future requirements.

Small team awards

DARHT Beamline Mechanical Team

The Dual-Axis Radiographic Hydrotest facility (DARHT) Beamline Mechanical team from Accelerator Construction (DX-8) completed the assembly and installation of the first-axis accelerator's hardware components. Team members assembled the accelerator's 64 linear induction cells and then installed these units and the associated auxiliary equipment. They also installed the DARHT injector, pulse-forming line and beam-conversion components.

The job was particularly demanding, both mechanically and logistically, because parts of the facility were still under construction. Team members adhered to both Laboratory and construction-site safety requirements while maintaining their aggressive installation schedule. The work was completed, and all accelerator performance objectives were met on time — a testament to team members' extraordinary efforts.

The team's substantial skills and dedication were key to the success of the DARHT mechanical efforts. Members are Barney Cushing, David Honaberger, Joe Sandoval, Leroy Alderete and Frank Abeyta.

DARHT Beamline Mechanical Team

Customs Team

The Property Management (BUS-6) Customs team navigates a labyrinth of federal regulations and policies to manage the Laboratory's import and export needs.

This work requires both tenacity and creativity. For example, the nuclear materials control and accountability program in the former Soviet Union requires the Laboratory to send security and nuclear-measurement equipment to prohibited nuclear end-users like Arzamas-16. It is this team's solutions that allow such shipments.

Most important, the team provides exemplary customer service to meet emergency deadlines. When United Nations inspectors got permission to examine Saddam Hussein's palaces, they notified the Laboratory on a Friday that they needed special equipment in embargoed Iraq within days. Team members obtained the required approvals and sent the equipment out the following Monday.

Successes like these prompted one customer to say, "We could not even begin to do our work without the Customs Office personnel." Team members are Sarah-Jane Maynard, Crystal Johnson, Glenda Rougemont, Joy Torres and Karla Niemi.

Customs Team

LANL-All E-Mail

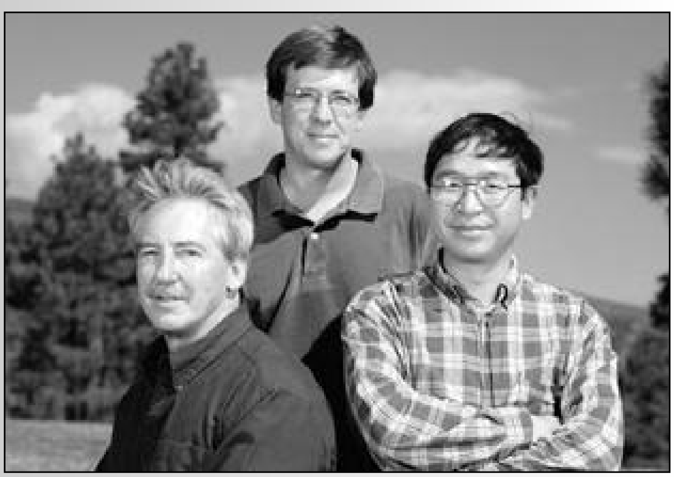
This team designed and implemented the LANL-All e-mail distribution lists, allowing the Director's Office to replace hard-copy memoranda with e-mail messages to all Laboratory employees and contractors. The huge paper savings keep the Laboratory in compliance with UC contract restrictions on trash generation and decrease Laboratory delivery and recycling efforts.

Team members wrote software scripts that nightly build updated e-mail lists from the Employee Information System, with the added benefit that the Laboratory directory information and delivery databases are now more accurate and complete. The biggest concern, aside from impacting the mail servers, was

LANL-All E-Mail

Flash 3-D Computed Tomography Team

Free-Space Quantum Cryptography Team



Optical Biosensor Team

the need to ensure that employees without e-mail would receive messages in another format. The team identified points of contact for every Laboratory organization and notified them of people who would still need hard-copy distribution.

Team members are Mary Gentry of Network Engineering (CIC-5) and Nancy Arendt of Materials Management (BUS-4).

Flash 3-D Computed Tomography Team

Computed tomography (CT), which images objects in sections, has never been used extensively at the Laboratory. That is about to change, however. This team conceived and demonstrated a new form of CT — the first true 3-D CT that can acquire both X-ray and neutron images. The system uses a standard personal computer and unique amorphous silicon detector panels that provide superior resolution and surprising speed, hence the term "flash." Users obtain images in near-real time.

The full-volume imaging provided by this new CT system will allow structural inspection and materials analysis of critical stockpile components. This nondestructive evaluation tool is portable and can be transported by two people. The creation of flash 3-D CT has expanded the scientific and engineering capability of the Laboratory.

Members of this team are Thomas Claytor, Anthony Davis, Martin Jones, Matthew Sheats, David Stupin and Deborah Summa, all of Measurement Technology (ESA-MT).

Free-Space Quantum Cryptography Team

In cryptography, a message is encrypted and deciphered with a random bit sequence known as an encryption key. The trick is to transfer that key between stations while avoiding interception. A solution is quantum cryptography — the transmission of single photons — already demonstrated through optical fiber.

The Free-Space Quantum Cryptography team recognized that transmitting photons through the atmosphere (free space) would enable encrypted communications with satellites, thereby securing them from cyberterrorism. But would the encryption photons be lost in the background of photons present during the day and even at night? The team answered "no" by successfully completing free-space communications over a point-to-point 0.5-kilometer atmospheric path in full daylight, making truly secure satellite communications possible and placing the Laboratory ahead of the world in quantum cryptography.

Members of this team are Richard Hughes, William Buttler, Steve Lamoreaux, George Morgan and Charles Peterson of Neutron Science and Technology (P-23) and Jane Nordholt of Space and Atmospheric Sciences (NIS-1).

Optical Biosensor Team

In a time when terrorist use of biological warfare agents is a real possibility, we lacked a sensor for rapidly and accurately detecting such toxins in the field. The Optical Biosensor Team has conceived of, developed and demonstrated such a technology.

The team's biological sensor exploits changes in fluorescence that occur when highly selective receptor molecules bind with a toxin, producing a uniquely colored light. This biosensor enables field detection at levels equivalent to what is possible in the lab, but unlike existing lab-based sensors, it works in minutes instead of hours and in a single step.

The optical biosensor can be adapted to a wide range of toxins. A prototype that detects cholera is already complete and others are being planned. It also will have domestic applications, for example, in the early diagnosis of infection.

Team members are Basil Swanson and Xuedong Song of Bioscience and Biotechnology (B-2) and John Nolan of Cytometry (B-5).

Proton Radiography Team

The Proton Radiography team designed, constructed and implemented LANSCE's Line-C proton radiography facility, which provides a new technological basis for certifying weapons primaries.

Proton radiography reveals the movements of separate materials during hydrodynamic flow, allowing assessment of modern weapons' insensitive high explosives. X-ray hydrotesting does not distinguish separate materials. Application of proton radiography to weapon components is enabled by the Line-C facility's three magnetic lenses, which counteract the effects of neutron scattering by sharpening the radiographic image.

Tests run with this new system have already highlighted changes needed in the calculational models for our Accelerated Strategic Computing Initiative codes. That success supports a Laboratory initiative to build a multiaxis proton radiography facility to complement PHERMEX and DARHT.

The Line-C project involved many people, but the heart of the effort is this team: John Zumbro and Gary Hogan of Subatomic Physics (P-25), Steven Jaramillo and Peter Pazuchanics of Neutron Science and Technology (P-23) and Eric Ferm of Hydrodynamic Applications (DX-3).

Proton Radiography Team

Strategic Computing Complex Support Team

In 1997, the Laboratory learned that to remain "a player" in the Accelerated Strategic Computing Initiative Program it needed a new facility to house a 100-TeraOps (trillion operations per second) supercomputer, and it needed it by January 2002. In the Department of Energy's opinion, the Laboratory could not meet that deadline.

The Laboratory's Weapons Program Office had a different opinion. It formed the Strategic Computing Complex Support team and jumpstarted the project. Team members immediately began the three essential conceptual components — the conceptual design plan, conceptual design report and National Environmental Protection Act documentation. A little more than a year later, they had successfully completed everything, a feat one colleague has described as "monumental."

Because of this team's efforts, construction on the new computing facility is beginning just over two years after DOE predicted it could not be done.

Team members are Phillip Sena of Deployed Services in Project Management (PM) Division, Steven (Randy) Parks of the Weapons Program Office and Linda Baker of Procurement (BUS-5).

Strategic Computing Complex Support Team

Large team awards

Los Alamos ASCI Blue Mountain Team

In October 1998 Los Alamos received the Accelerated Strategic Computing Initiative Blue Mountain supercomputer hardware, including 48 Silicon Graphics Origin 2000 servers with 6,144 processors, a collection of machines and auxiliary equipment covering 12,000 square feet and requiring over 300 miles of interconnecting fiber-optic cables.

The team's around-the-clock effort had the system complete and tested in two weeks. The validation run clocked Blue Mountain at 1.6 trillion operations per second (1.6 TeraOps), making it, at that time, the world's fastest computer; peak performance is projected at 3.072 TeraOps. Within a month, Blue Mountain was running most of the Los Alamos ASCI application codes, an achievement the Department of Energy described as "spectacular."

Blue Mountain is the only system of such complexity and speed built with off-the-shelf, shared-memory multiprocessors interconnected to behave as a single supercomputer — the future design for ASCI platforms. The team's success is the first significant step in that direction. It puts the Lab on the path to 100-TeraOps capability by 2004.

Los Alamos ASCI Blue Mountain Team

Chalk River Injector Test Stand Radio-Frequency Quadrupole (CRITS RFQ) Accelerator Team

The feasibility of the low-energy part of high-current, high-power proton linear accelerators (linacs) has been investigated for more than a decade. In April 1998 this Accelerator Production of Tritium team demonstrated feasibility by setting a new world record (125 kilowatts) for continuous-wave proton beam power produced by a linac front end.

The team's test stand started with a radio-frequency quadrupole accelerator transferred to the Laboratory from the Chalk River Laboratories in Canada. Team members modified the RFQ structure, equipped it with a new injector, installed and improved the RF power system, installed beam diagnostics and built a novel beamstop for handling the high-power beam.

The results of the test stand significantly advanced the technology of CW high-power proton linacs and provided high confidence in the RFQ design being built at the Laboratory as part of the APT accelerator front-end prototype. Additional direct applications include the testing of fusion reactor materials and the production of medical radioisotopes

Chalk River Injector Test Stand Radio-Frequency Quadrupole (CRITS RFQ) Accelerator Team

Los Alamos Data Visualization Corridor Team

Laboratory-developed large-scale simulations are producing data sets that exceed our traditional ability to move, store, visualize and navigate them. This team has provided the solution. Overcoming unprecedented challenges in architectural hardware and software complexity, it assembled an advanced scientific visualization system: the Los Alamos Data Visualization Corridor.

Consisting of 16 Silicon Graphics Infinite Reality engines, the DVC is a highly-interactive system that provides a tight feedback loop between scientist and simulation. New hypotheses can be explored and validated quickly. It also includes a first-of-its-kind switched analog fabric allowing the 16 engines to be used separately or in parallel for one-billion-cell data sets. Designers and code developers already are using the DVC to see and understand the massive data sets from the ASCI Blue Mountain supercomputing platform.

The DVC is now the premier high-performance visualization system in the nation. In fact, no other system in the world is capable of the same interactive visualization rates.

Los Alamos Data Visualization Corridor Team

Lunar Prospector Team

For the Lunar Prospector, NASA's first competitively selected Discovery-class mission, the Laboratory proposed creating a suite of sensors — gamma-ray, neutron and alpha-particle spectrometers — quickly and cheaply. Most space-qualified sensors take years to prepare, but this team took all three instruments from design to delivery in just 14 months and within budget.

The team's sensors were three of the best spectrometers to fly in space — lightweight but rugged enough for in-space use and versatile enough to meet mission objectives. The groundbreaking results included the first complete compositional maps of the moon and the discovery of water ice at both lunar poles. The latter got significant positive press coverage and received a "Best of What's New" award from Popular Science magazine.

This team's efforts contributed significantly to Lunar Prospector's success and won the Laboratory both scientific and public acclaim. Team members demonstrated that Los Alamos can do breakthrough science even in a cost-capped, fast-development mission.

Unclassified Blue/Green Network Firewall Team

The Laboratory's unclassified network, which supports more than 18,000 devices, has been the target of increased intruder threats. To remedy the situation, the Network Firewall team designed and implemented a restrictive firewall that split the network into two partitions: unclassified-protected (Blue, now Yellow) and unclassified-open (Green).

Lunar Propector Team

Firewall implementation could have been extremely disruptive, cutting off Laboratory users from their typical means of electronic communication, but the team worked hard to avoid such problems. The result is a series of Linux-based proxy servers that, out of users' sight, capture incoming data traffic and check it before forwarding it to the protected partition. Team members wrote the proxy application software and the Linux modifications to achieve speeds of up to 100 megabits per second.

From the first day of operation — March 15, 1999 — the network firewall was completely successful because of the team's exceptional technical and educational outreach efforts. The firewall is now the model for all the Defense Programs laboratories.

Distinguished performers

Unclassified Blue/Green Network Firewall Team

Pit Fabrication Team

The Pit Fabrication team has given us the processes and equipment to reinstate the nation's pit-manufacturing capability, lacking since the Rocky Flats Plant closed.

In 1996, the Department of Energy asked the Laboratory to implement a limited pit-manufacturing mission. This team faced numerous technical challenges stemming from today's enhanced requirements for nuclear materials operations, which prohibited many of the previous Rocky Flats practices. The team called on the scientific strength of 27 Laboratory groups to overcome all challenges. As a result, it produced, in 1998, two pits for the W88 weapon system — an "early development pit" in March to investigate processing parameters and a "development pit" in October. These were the first pits manufactured in the United States since 1989.

Pit Fabrication Team

The Laboratory's long-term goal for this project is to fabricate stockpile pits of war-reserve quality. By functioning flawlessly and safely in perhaps the most-regulated operational environment in the DOE complex, this team has made that a realistic goal.

Los Alamos Employees' Scholarship Fund Advisory Board

Northern New Mexico has limited funding to help its youth realize educational goals, which in turn limits the future Laboratory workforce pool. With this in mind, Gene Farnum of Structure/Property Relations (MST-8) and Robert Romero of Energy and Process Engineering (ESA-EPE) developed the idea for the Los Alamos Employees' Scholarship Fund. Their goal was ambitious: to build Northern New Mexico into a premiere source of science and engineering undergraduates and increase the number of regional and minority applicants qualifying for technical positions at the Laboratory.

The first fund drive, conducted in June 1998, raised $50,000 for 37 awards given to undergraduate students throughout the seven counties of Northern New Mexico, an effort entirely supported by Laboratory and subcontractor employees.

Thanks to its members' enthusiasm and industry in creating, launching and driving this effort, the Scholarship Fund team has played a role in enhancing the Laboratory's outreach efforts and its general reputation in surrounding communities.


Los Alamos Employees' Scholarship Fund Advisory Board

Shared Forest Project Team

The Chemical Science and Technology (CST) Division team that worked on the Shared Forest project accepted a complicated classified assignment on short notice, substantially ahead of expectations. The assignment required team members to operate under intense pressure to resolve an issue with significant national security implications. Their results, of a quality previously thought unachievable, were delivered within the needed time and in compliance with all safety, security and other operational requirements.

The Shared Forest team demonstrated a capability essential to our national interest and unique to the Laboratory. Team member efforts were a manifestation of enduring commitment to excellence, a commitment that led them to assume and successfully complete this time-critical challenge.

Ship-to-WIPP Project

The first transuranic waste left Los Alamos for DOE's Waste Isolation Pilot Plant near Carlsbad, N.M., on March 25, 1999. This event was, in the words of Energy Secretary Bill Richardson, "an historic moment for the DOE, WIPP, Los Alamos National Laboratory and New Mexico." It was possible because of the teams composing the Laboratory's Ship-to-WIPP project.

The Ship-to-WIPP teams met WIPP waste-acceptance criteria and characterized and certified the waste, ensuring its nonmixed (nonhazardous) status in accordance with Environmental Protection Agency and New Mexico Environment Department requirements and Resource Conservation and Recovery Act definitions.

Their efforts required dramatic personal sacrifices — 80-hour weeks, lost holidays, and canceled vacations — but their expertise, detailed reporting, and extensive documentation convinced the courts, NMED and others that WIPP should open.


Shared Forest Project Team

Ship-to-WIPP, TRU Waste Characterization and Certification Team

Los Alamos' TRU waste shipments to WIPP had to be nonmixed, that is, lacking in RCRA-regulated hazardous constituents, and the NMED required proof of that nonhazardous status. So, this team was asked to identify the Laboratory's first WIPP shipment and certify that it was indeed nonhazardous.

Distinguished performers

The team first negotiated with NMED to determine the needed documentation and data. It then examined Laboratory records and interviewed waste generators, finally choosing a Technical Area 55 waste stream contaminated with plutonium-238. For that stream, team members compiled impeccable records on everything introduced during waste generation, actually developing "pedigrees" for all the materials. They also hosted NMED auditors for two weeks. In early summer 1998, they delivered a completed, detailed waste-determination report.

This extraordinary level of documentation, along with the results of a special waste sampling and analysis, gave the NMED what it needed to approve the shipment in mid-December 1998 and to successfully defend that decision.

Ship-to-WIPP, TRU Waste Characterization and Certification Team

Ship-to-WIPP, Nonmixed Waste Sampling and Chemical Analysis Team

In July 1998 the NMED asked the Laboratory to sample and analyze the TRU waste it planned for WIPP. the Laboratory already had a detailed waste-determination report that documented all constituents of the waste, but the NMED knew the report's "nonhazardous" (nonmixed waste) determination would be challenged. After all, this would be the first shipment to the world's first geologic radioactive-waste repository. Confirming the report's conclusions would be crucial.

Members of the Sampling and Chemical Analysis team, in negotiation with the NMED, developed a safe, statistically based plan to obtain samples from the heterogeneous waste stream. The plan won approval in late September, and the work began, sometimes with up to three NMED observers present. Simultaneously, team leaders were deposed by the New Mexico Attorney General about the scientific and technical methods being used.

The team's careful work proved unassailable. It played a significant role in the December 1998 approval for 1999's initial WIPP shipment.

Ship-to-WIPP, Nonmixed Waste Sampling and Chemical Analysis Team

This month in history

November

1620 — Pilgrims from England land at Cape Cod

1800 — Congress convenes for its first session in Washington, D.C.

1870 — The U.S. Weather Bureau begins operations

1916 — Republican Jeannette Rankin of Montana is elected as the first woman representative in the U.S. Congress

1929 — Former Interior Secretary Albert Fall, one-time U.S. senator from New Mexico, is sentenced to one year in prison and fined $100,000 for his bribery conviction in the Teapot Dome Scandal

1940 — The first U.S. air raid shelter is built in Fleetwood, Penn.

1942 — J. Robert Oppenheimer is chosen to build and lead the secret bomb design facility at Los Alamos

1945 — Glenn Seaborg announces the discovery of americium and curium

1960 — The first Polaris missile is launched from a submarine

1974 — Karen Silkwood dies in a car crash near Crescent, Okla.

1990 — A treaty to sharply reduce conventional weapons in Europe is signed at a summit meeting in Paris, signaling an end to the Cold War

1996 — Hazel O'Leary announces her resignation as Secretary of Energy

Syndicated material

Removed at the request of the syndicate

spotlight

Employee wins 100-mile race in record time

by John A. Webster

Blake Wood enjoys running through high mountains at night, despite the obvious hazards of dark, cold and steep terrain. His ability to cover ground at night helped him set a course record in winning this year's Hardrock 100 race in southwestern Colorado.

Competitors in the Hardrock 100 — which is actually just under 102 miles long — run, walk and slide up and down trails that wind through canyons, climb steep slopes, plunge through turbulent rivers and streams, and cross high passes and mountains.

The course ranges from 7,680 feet at Ouray to 14,048 feet on Handies Peak with an average elevation of 11,186 feet. The total elevation gain during the race is 33,000 feet, an average grade of 12 percent. "It's kind of like running up and down the (Los Alamos) Ski Hill road a dozen times," says Wood.

At this year's race, the seventh annual Hardrock 100, 110 runners started at Silverton at 6 a.m. on Friday, July 9, then followed a clockwise loop through Telluride, Ouray, near the ghost town of Sherman, then back to Silverton. Fifty-nine finished the race, one of the highest finishing percentages in Hardrock history.

Wood, a physicist in Plasma Physics (P-24) running in his fifth Hardrock 100, said his goals for the race included bettering his 1997 time of 33 hours, 43 minutes and finishing in the top five, not winning.

"Winning was a real surprise, and it felt terrific," he said. "This is the race of the year for me – the highlight of the summer – and to win it is especially sweet.

"My strategy was to run the first half at about the same pace as I did in 1997, then pick up time during the night. The first half went just about right. I was half an hour faster than 1997, about an hour behind the leaders. Then I had a really good night and picked up about two hours on my 1997 pace. When the sun came up, I felt great, while other runners were beginning to feel the effects of the early fast pace.

"I think going through the night is an attraction. You run through the sunset, then you see all the stars and the sunrise in the morning. It's relatively tough, but seeing the dawn come in the morning is a real rejuvenating experience."

Wood, whose time of 30 hours, 10 minutes, 58 seconds is the fastest ever run on the current Hardrock 100 course, wasn't the only Lab employee to finish the race this year. Charlie Thorn of Operational Integration (ESH-OIO) finished 16th in 35 hours, 2 minutes; Dave Dixson of Operational Support (MST-OPS) finished 28th in 38 hours, 45 minutes; and Steve Pattillo of Polymers and Coatings (MST-7) finished 33rd in 39 hours, 32 minutes.

Blake Wood of Plasma Physics (P-24) crosses the finish line at Siverton, Colo., winning the Hardrock 100 endurance run in record time. *Photo by Andi Kron*

Thorn — who is responsible for marking the course, an endeavor that takes up to 10 days and more than 2,000 three-foot aluminum rods with reflecting tags – helped create the daunting run. "We deliberately set out to push the art," he said, "and the Hardrock 100 is still the most rugged endurance run."

Wood was paced on two sections of the race by Igor Pesenson, a student in P-24, while his parents, wife and two of his three daughters formed his support crew. Aaron Goldman of Los Alamos and Dave Scudder of Atlas Construction (P-26) led a local Boy Scout troop that staffed one of the 11 aid stations set up on the course. Contract employee Susan Gardner and Tom Garrison of Geoanalysis (EES-5) both paced other runners over portions of the course.

"Los Alamos is the greatest place in the world to be a trail runner," Wood said. "It has an incredible set of trails that are easily accessible, and a lot of people here are involved in running. The workouts with friends are fun, and every year during training runs I get to see almost all of Bandelier National Monument."

Reflections
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