Los Alamos NATIONAL LABORATORY EST.1943

NewsLetter

Week of Aug. 15, 2005 Vol. 6, No. 17

Q: What is the most recent thing you have done toward your professional development and why?

Pamela Padilla, Office of Equal Opportunity and Diversity (HR-OEOD)
For the past few years, I have been working on a bachelor's degree through the University of New Mexico, Los Alamos. I am grateful to my supervisor and division for the opportunity to work toward this important educational and career goal.

John "Grizz" Deal of the Technology Transfer (TT) Division
I did some post graduate work at the London School of Business. There I learned that you can't change who you are, just what you do.

Lisarae Lattin of Information Materials Management (NMT-3)
I just went on travel for a week to see Edgar Schein — the guru of corporate culture and change management. Because of the atmosphere of eminent change within the Laboratory now, it seemed a good way to develop my skills and help my division through these uncertain times.

Trenton Stoltenberg of Project Controls/Cost Estimating (PM-4)
I applied for my Montgomery G.I. bill and talked to my bosses [about] the University of California Educational benefits.

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2004 Distinguished Performers

Eight individuals, seven small teams and 17 large teams are the Los Alamos National Laboratory 2004 Distinguished Performance Award winners as selected by a screening committee.

Individuals or small teams who receive Distinguished Performance Awards must have made an outstanding and unique contribution that had a positive impact on the Laboratory's programmatic efforts or status in the scientific community, required unusual creativity or dedication of the individual or team and resulted from a level of performance substantially beyond what normally would be expected.

Large teams must have performed scientific, engineering, technical, administrative and/or management activities at a level far above normal job assignments; completed a project that brought distinction to the Laboratory by resolving a problem that has broad impact and/or resulted in the Lab becoming the recognized expert in the field; worked on a project that involved original and innovative thinking, approaches and results; and exhibited an exemplary level of skill, teamwork and dedication well beyond normal expectations that resulted in the successful completion of the project.

Each recipient of an individual award receives a plaque and $1,000. Each member of a small team receives a plaque and $500. The Laboratory Director will present to each large team a plaque and the members of the large teams also will receive a framed certificate and a pin.

To read about this year's winners, go to Page 3.

Text by provided by the Distinguished Performance Awards Screening Committee and edited by Kathleen Herrera McDonald and Frank Smith of Institutional Planning and Evaluation (IPE)

Photos by Presley Salaz of Information, Records and Media Services (IM-9)

Editor's note: Many school districts in Northern New Mexico will begin the 2005-06 school year in the next few weeks. Laboratory personnel are reminded to be alert for school children and reduce speed in school zones. The posted speed limit in school zones when children are present is 15 miles per hour.

Back to school safety tips

According to the American Red Cross, 25 million students ride on school buses. Children riding a bus to school should follow these safety tips to help prevent injury.

- Line up facing the school bus door — not along the side of the school bus.
- Don't play in the street while waiting for the school bus.
- Carry belongings in a backpack or book bag.
- Never reach under a school bus to get anything that has rolled or fallen underneath it.
- After getting off the school bus, move immediately onto the sidewalk, out of traffic.
- Wait for a signal from the bus driver before crossing the street. Walk at least 10 steps away from the front of the bus so that the bus driver can see you.
- Never cross the street behind the school bus.

Following these tips will make the first school day, and every school day, safe and enjoyable.

Motorists also are reminded to use extra caution in and through school zones and to obey posted speed limits in school zones.

Los Alamos NEWSLETTER

The *Los Alamos NewsLetter*, the Laboratory bi-weekly publication for employees and retirees, is published by the Public Affairs Office in the Communications and External Relations (CER) Division. The staff is located in the IT Corp. Building at 135 B Central Park Square and can be reached by e-mail at *newsbulletin@lanl.gov*, by fax at 5-5552, by regular Lab mail at Mail Stop C177 or by calling the individual telephone numbers listed below. For change of address, call 7-3565. To adjust the number of copies received, call the mailroom at 7-4166.

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Los Alamos National Laboratory is operated by the University of California for the National Nuclear Security Administration (NNSA) of the U.S. Department of Energy and works in partnership with NNSA's Sandia and Lawrence Livermore national laboratories to support NNSA in its mission.

Los Alamos enhances global security by ensuring safety and confidence in the U.S. nuclear stockpile, developing technologies to reduce threats from weapons of mass destruction and improving the environmental and nuclear materials legacy of the Cold War. Los Alamos' capabilities assist the nation in addressing energy, environment, infrastructure and biological security problems.

National Nuclear Security Administration

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Editor's note: The following is excerpted from an all-employee memo from Laboratory Director Bob Kuckuck.

Alternative work schedules

Bob Kuckuck

During my first few weeks here at [the Laboratory], I heard from many of you about the benefits of flexible work schedules. I promised to take a close look at the issues and concerns, and I am now very pleased that we are in a position to go forward with a plan for reinstatement of alternative work schedules for all Lab employees.

It is important for us to realize that while the principal purpose is to provide flexibility for people to balance work life issues, the major requirement of alternative work schedules is to allow the Laboratory to deliver programmatic commitments and meet customer needs while continuing to maintain the quality and responsiveness of service and support within the Laboratory. Thus, a fundamental principle is that alternative work schedules must be managed by managers. Work schedules must be based on management-developed and -approved organizational plans that incorporate conditions of supervision.

In general, the program will mirror much of what was previously in place. While the details will be forthcoming and formalized in a Director's Instruction, I want to stress that the guiding principle for implementation of alternative work schedules will be a focus on programmatic and customer concerns. Managers will be required to balance employee work schedules with programmatic deliverables and customer service. It is imperative that both employees and managers plan and manage work schedules to ensure internal and external access to information and services. Managers will be provided with tools and guidance for planning to meet the needs of all stakeholders.

As the largest employer in Northern New Mexico, we recognize that the decisions we make have the potential to affect our neighbors in surrounding communities. We have held informal discussions during the past several months with various community stakeholders and will continue to do so as we proceed through implementation. We have attempted to recognize and balance the needs of those stakeholders with the needs of our employees, this institution and our programmatic requirements.

Employees are the Laboratory's greatest asset — in fact, employees are the Laboratory. I believe in supporting people in balancing the professional and personal aspects of their lives. Our target date for implementation of new work schedules is the pay period beginning Sept. 12. Over the next few weeks, [employees] will receive more information explaining the details of the program to help with [their] planning.

We will continue to take input from our customers and stakeholders, as well as all of you, to assess and evaluate the success and effectiveness of this program.

Allowing performance

by Tom Bowles, chief science officer

The Laboratory is recognizing a number of our outstanding performers as part of our annual Distinguished Performance Awards. Of course, this process is not really indicative of how many outstanding performers we have — I work all the time with many, many people on both the support and technical sides of the Laboratory who I consider outstanding performers. These talented and dedicated people are the Laboratory's greatest strength. However, it is clear that we have put in place impediments to allowing people to perform.

If the Laboratory is going to excel in meeting its mission, it is clear that we need to remove the impediments that hamper us. Following the lead of [Laboratory] Director [Robert] Kuckuck, we are examining which processes we can eliminate or modify to improve our ability to perform. We are looking to see which are tied directly to the National Nuclear Security Administration's requirements and which are actions that the Laboratory has put in place for various reasons. Given how much already is on our plate in meeting our responsibilities in fulfilling the Laboratory's mission, we won't be able to devote as many resources as we would like to working these issues.

Nonetheless, we are committed to making progress in eliminating nonvalue-added work, [in] improving processes by reducing the cost and time burdens they impose on staff, [and] postponing or more slowly phasing in any new activities where possible. We are identifying which actions we will be able to implement in the next few months that will reduce the work load on staff. This is an important part of the actions the Laboratory is taking to allow us to excel in carrying out the science and engineering that underpins our ability to deliver our mission. As part of the director's initiative to improve communication, we will be laying out in future columns other actions we are taking to support science and engineering at the Laboratory.

Diann Bruhn of Actinide, Catalysis and Separations Chemistry (C-SIC)

As project administrator for the Materials Control (MC) project, Diann Bruhn provides support to staff and technicians from multiple groups within five divisions. The MC project supports execution and environmental sampling of dynamic experiments as part of the Laboratory's Hydrotest program. The MC project supports the Lifetime Extension and the Hydrotest programs, two of Los Alamos' highest priority programs. Bruhn undertook additional responsibilities to support a series of significant project-specific tasks such as the implementation of aqueous foam mitigation to reduce hazardous materials released during the shots. Regarded by her managers and peers as essential to the success of the MC project and its support of the hydrotest program were her organizational skills, perseverance, acumen and steadiness during high-stress situations. Within the project, the catch phrase for solving a complicated challenge has become, "Go ask Diann."

Bruhn also served as a key member of the team that started up the Vessel Preparation Facility at Technical Area 15, another component of the Hydrotest program. Team members lauded Bruhn for her procurement efforts that exceeded her normal job duties.

Through her support to the MC project, Bruhn has positively impacted one of the Laboratory's most important and visible projects.

Ileana Buican of the Director of Science and Technology Base Programs (STB-DSTBP) Office

Visitors and staff using the first-floor corridor of the Administration Building see bright display panels describing scientific and technical accomplishments from across the Laboratory. Although many people contributed to this display, Ileana Buican was responsible for gathering a vast amount of information for the panels and ensuring the panels presented that information in a coherent, informative and attractive manner.

Buican engaged with technical divisions to understand the nature of the information they wished to present, guided divisions through a process to isolate the information that could be meaningfully captured in the panel format, and conceptualized the best way to display the information. She was the conduit between technical representatives and her team of designers and editors. Buican identified opportunities to integrate information from separate organizations and negotiated with them for consensus on the approach. She reworked text to present a uniform level of technical content.

The panel project has evolved since its inception in 1996 and Buican's efforts in 2004 brought it to a new level of achievement. It is being reproduced for the Bradbury Science Museum. Technical divisions have asked for duplicate copies of their panels for display elsewhere, including with sponsors in Washington, D.C.

Nathan Bultman of Weapon Design Services (ESA-WDS)

The Spallation Neutron Source (SNS) project is a partnership of six Department of Energy national laboratories to design and construct the world's most powerful source for neutrons used in research. The $1.4 billion project will have three types of linear accelerators. Los Alamos is responsible for the coupled-cavity linac (CCL). Nathan Bultman led the team that performed the successful mechanical design, procurement and installation of the CCL.

His work on the CCL was well-informed by the overall physics, vendor capabilities and sponsor expectations. He engaged directly with the overseas manufacturer of the CCL structure to address problems and make modifications to the process while it was underway.

Bultman's leadership, energy and design innovation brought the CCL project to a successful conclusion with a complete working product delivered within a constrained schedule. A technical system as complicated as the CCL normally requires significant modifications during assembly and testing. However, because of Bultman's expertise and attention to detail, the CCL system worked to specification on the very first try — a milestone that validated Los Alamos' reputation as a premier particle accelerator laboratory.

Roger Byrd of Space Science and Applications (ISR-1)

Roger Byrd's analysis of credible threats convinced the Satellite Systems Review Panel at the Air Force Technical Applications Center to enhance post-Cold War satellite detection capabilities. His contributions address the emerging threat of small weapons testing by potential nuclear powers.

The key concept proposed by Byrd was to use simultaneous coverage from multiple sensors to discover the presence of clandestine weapons testing against the backdrop of potential false triggers. Byrd's dedication to the scientific excellence in the field of space-based nuclear detonation monitoring has led to the successful incorporation of highly coupled neutron, prompt and delayed gamma-ray sensors methods for the SABRS Validation Experiment satellite launch.

Byrd's technical expertise contribute not only to the Laboratory and the scientific community but also to the shaping of the nation's treaty verification and terrorist detection capabilities. He also has been instrumental in the development of the Los Alamos Diversity/Affirmative Action Board; serves as the historian of the Employee Advisory Council; is an active deputy chair of the Los Alamos American Indian Diversity Working Group, and received the American Indian Science and Engineering Society's 2003 Community Service Award for his work in supporting Native Americans to pursue postgraduate degrees with the goal to achieve positions of leadership.

INDIVIDUAL

Baolian Cheng of Primary Design and Assessment (X-4)

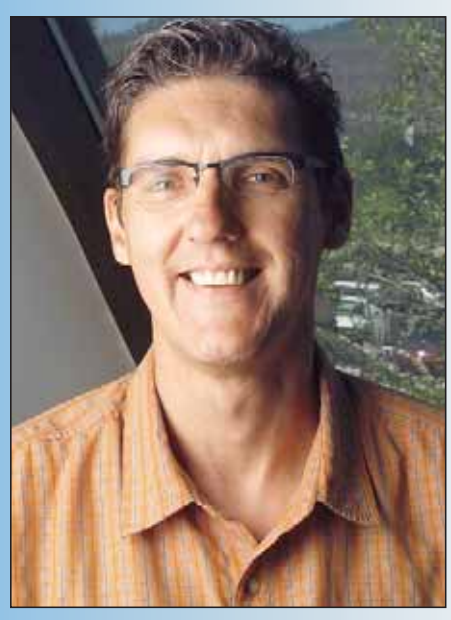
Baolian Cheng has enabled robust and reliable computer simulations of a key set of Nevada Test Site data relevant to evaluating the potential impact of pit aging on stockpile lifetimes. Accurate assessments of pit aging require a statistically significant number of tests to derive viable stockpile lifetimes. Until 2004, the largest available data set could not be easily used for computer simulations due to the specifics of the particular device design. Cheng's breakthrough, using ab-initio (from the beginning) principles, determined that select features of a nuclear device could be evaluated with theoretical data fits, leading to credible assessments of non-aging effects. The results were superior to any previous computer simulation of this class of device, ultimately providing the best and most relevant data set to the team, as well as serving as a new means of analysis for their Lawrence Livermore National Laboratory colleagues.

Cheng's unusual creativity and breakthroughs on the theoretical understanding of a nuclear device, coupled with the advancement in modeling instability, turbulence and mix are impressive examples of, and play a critical role in, the Laboratory's primary physicist capabilities in maintaining the nation's stockpile.

Charles Tesch of Tritium Science Engineering (ESA-TSE)

The Laboratory is consolidating its tritium facilities in the Weapons Engineering Tritium Facility (WETF). Charles Tesch, TSFF Tritium Operations team leader, has worked creatively to see that the scheduled closure of the Tritium Science and Fabrication Facility (TSFF) at Technical Area 21 will be done in the most efficient way possible. Tesch has led the team in meeting 2004 neutron tube target loading production goals before the suspension of operations last year and also developed an innovative approach for waste removal paths for the legacy items, which could also be used by WETF, resulting in an estimated cost savings of more than 50 percent on budget and timeline reduction of a year. Closing the TSFF also required transfer of the NTTL War Reserve Production Project, and all legacy items in storage have been characterized, packaged and shipped to TA-54.

Tesch's perseverance and innovations in the technically challenging environment of TSFF operations demonstrates a significant step with critical cost savings and accelerated schedules toward meeting the Laboratory's strategic goal of consolidating tritium activities at WETF, while meeting all environmental, safety, security and health requirements.



Herbert Van de Sompel of the Research Library (STB-RL)

The Research Library (STB-RL) has gained wide recognition for its innovative efforts to maintain and share information among users and digital repositories. Herbert Van de Sompel has led this effort, and his ideas have positively influenced and motivated the international information community to develop standards for collecting, storing and accessing digital material.

Described as "among the top architects of the 21st century information infrastructure," Van de Sompel is recognized for developing solutions that are as practical as they are creative. His tools make it possible for libraries and archives to increase accessibility to information in a seamless, global context.

The National Academies identified digital information preservation as a "grand challenge" in information science. Van de Sompel has met this challenge directly in many ways. He developed a protocol now used worldwide (and by Google) for sharing metadata and associated content, provided a basis for context-sensitive hyperlinks and devised a scheme for combining legacy and digital information identifiers.

The Laboratory benefits directly because Van de Sompel and his team have made a vast amount of technical information readily accessible to Lab staff on their desktops.

Barry Warthen of Hydrodynamics and X-ray Physics (P-22)

Barry Warthen has developed and successfully demonstrated a critical advancement in the analysis of nuclear weapons reaction history using a new methodology and coupled software analysis package.

The determination of uncertainties in nuclear weapons reaction history data is an essential element in deriving the magnitude of a potential aging impact on stockpile performance. Before 2004, the data were analyzed using an optical comparator and the subjective eye of the analyzer to manually locate data points — typically prone to reader error. Warthen made a significant effort to understand the detector and field environment specifics of each relevant nuclear test as well as the experimental limitations for devising his new approach. Warthen's method capitalizes on the automatic extraction of data points from digitized images of the film, correcting for various analysis deficiencies, which are then propagated through the process. This information is used in tandem with generated radiation curves of interest and a rigorous error analysis methodology to generate viable data sets with credible error bars.

Warthen demonstrated ingenuity, vision and many technical contributions. Multiple stockpile-related programs have benefited from this new methodology and software-analysis technique. These in turn have enabled increased confidence in the annual stockpile assessments and analysis of potential aging impacts on the U.S. nuclear deterrent capabilities.

LANL Swift Team

This team created components key to enable the NASA Swift satellite mission. The NASA Swift is the first fully autonomous satellite capable of recognizing gamma-ray bursts — the largest explosions in the universe since the big bang. The work of David Palmer and Edward Fenimore is having a tremendous impact on the Laboratory's status in the scientific community. In only the first few months of operation, and as a direct result of their contributions, Swift is making profound and unexpected discoveries about GRBs described in notable publications like Nature, The New York Times, The Washington Post, Science News, Sky & Telescope, the NASA Science Update and others.

Three remarkably creative innovations by Palmer and Fenimore made this work possible: (1) development of an ingenious computer code to process massive information flow using only ~100 cycles of the computer for each gamma ray and its data products; (2) an increased capability in the triggering code, increasing the checking capacity to 100 times that of any previous satellite; and (3) development of autonomous on-board software.

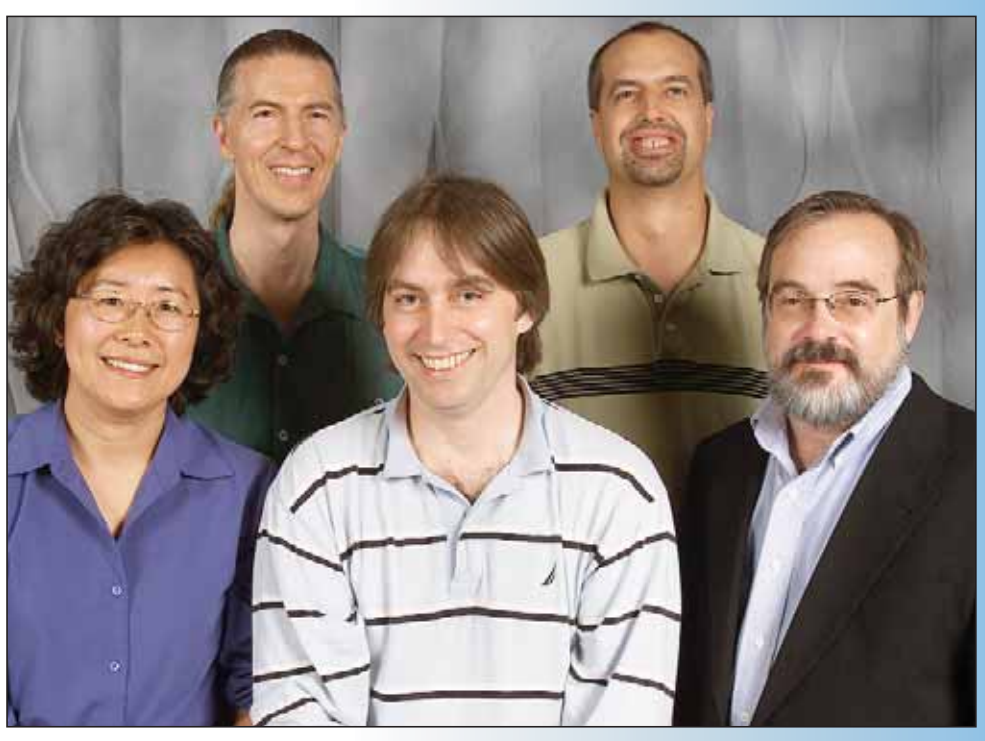
Team members are Edward Fenimore, left, and David Palmer of Space Science and Applications (ISR-1).

Biological "End-to-End" Risk Assessment Team for Homeland Security

The Department of Homeland Security released Homeland Security Presidential Directive 10 in early 2004 for guiding the rapid evolution of the biosecurity of the nation. The directive called for creation of a defensible and transparent methodology for the ranking of biological threats and the identification of knowledge gaps, which, if closed, would decrease the nation's risk to biological threats.

The Laboratory established the Biological Risk Assessment Team to respond to HSPD 10 and to develop a methodology for assessing risk from end-to-end (intelligence and threat, to vulnerability and interdiction, to consequence and mitigation) for any biological agent. The team also had to apply the method they developed to anthrax and influenza, as well as the CDC category A agents.

Not only did the team accomplish these tasks in five months, but they did so without any roadmaps on how to approach the project. A project like this one had never previously been done. This team showed great creativity in moving past barriers to solve technical problems. As a result of their synergy, the Laboratory-developed methodology and its application will be the cornerstone of the biological risk assessment to be delivered to the president in January 2006.



Team members from left to right, Helen Cui of Safeguards Systems (N-4); Norman Johnson of the Center for Homeland Security (CHS); Paul Fenimore of Theoretical Biology and Biophysics (T-10); Scott White of Molecular Microbiology and Immunology (B-1); and John Ambrosiano of Energy and Infrastructure Analysis (D-4). Not pictured, John Darby of D-4.

Hands-Off Sampler Gun Team

This multidivisional team was tasked with developing and commercializing a next-generation, hand-held sample collection and tracking device for homeland security-related applications. The device enables first responders to rapidly collect cross-contamination free solid, gas and/or liquid samples after a radiological, chemical or biological terrorist attack. It also electronically records essential multimedia sample information, such as video footage of the sampling scene, sample type, spatial coordinates and sampling conditions.

The team demonstrated tremendous creativity in taking this user-friendly technology from a design to a prototype. The device has been entered in the 2005 R&D100 competition. The U.S. Department Homeland Security, the Department of Defense and private corporations all have expressed interest in the technology.

Team members from left to right, Gus Takala of Applied Engineering Technologies (ESA-AET); John Charles III of Materials and Explosives Engineering (ESA-MEE); Torsten Staab of ESA-AEI; Lawrence Bronisz of Applied Electromagnetics (ISR-5); and Veronique Longmire of the Technology Transfer (TT) Division. Inset photo is John Jensen (deceased) of ESA-AET.

SMALL TEAMS

LANL Space Reactor Design Team

Early in 2004, NASA received approval to use naval reactors as the supplier of the nuclear power source for the Jupiter Icy Moon Orbiter mission, scheduled to launch in 2015. Los Alamos landed the task of capturing all available information on this type of reactor, recommending possible options for use and training other engineers and scientists on the project on fast fission reactors.

Despite the demanding schedule to complete the work, this team participated directly in the multi-laboratory effort to successfully complete feasibility studies and to achieve final concept acceptance for the first nuclear-reactor-powered satellite launch.

Team members, front row, Tom Marcille, left, and Holly Trellue of Nuclear Design and Risk Analysis (D-5); back row from left to right, Pratap Sadasivan, Richard Kapernick and Dave Poston of Nuclear Design and Risk Analysis (D-5); and Richard Lujan of Weapon Design Services (ESA-WDS).

Northern New Mexico Math and Science Academy Team

The Northern New Mexico Math and Science Academy works to create long-term cultural changes in teaching that are required to bring about meaningful and sustained improvements in student learning and achievement. Initiated in 2000 with a small pilot program in the Chama and Mora school districts, this program has expanded to include Española, Pojoaque and Taos school districts, increasing teacher participation from 12 to 86. To make all of this happen, the Lab's MSA team has been involved in a wide-ranging set of interactive and support-building relationships with local and state government officials, school representatives, education agencies and organizations, and local corporate and business interests.

2004 was a particularly active and expansive year, and the program began to receive national attention and recognition as a truly unique, highly effective approach to K-12 teacher professional development, particularly in rural, underperforming, minority communities. The Northern New Mexico Math and Science Academy team is in pursuit of a strong and sustainable program and is well on its way to achieving it.

Team members are Cathy Berryhill, left, Lorenzo Gonzales, center, and Carol Brown of the Education Program Office (STB/EPO).

Full Scale Test Facility Team

The Full Scale Test Facility represents a unique capability in the weapons complex to measure hydrogen compatibility during simulated boost testing. It is an integral part of the surveillance mission to determine the reliability of plutonium pits in the nation's nuclear weapons stockpile.

As a result of this team's work, high-quality FSTF data is now rapidly delivered to supporting programs and to the appropriate scientific community for peer review. This team demonstrates an intense commitment to operational excellence — enabling them to successfully perform work that has spawned improvements in data quality and test design.

Team members from left to right, Joseph Reynolds, Jon Bridgewater, Rollin Lakis, Joseph Anderson (standing), James Langford (standing), and Jeffery Archuleta of Nuclear Materials Science (NMT-16).

SMALL TEAMS

4 MJ Capacitor Bank Design and Construction Team

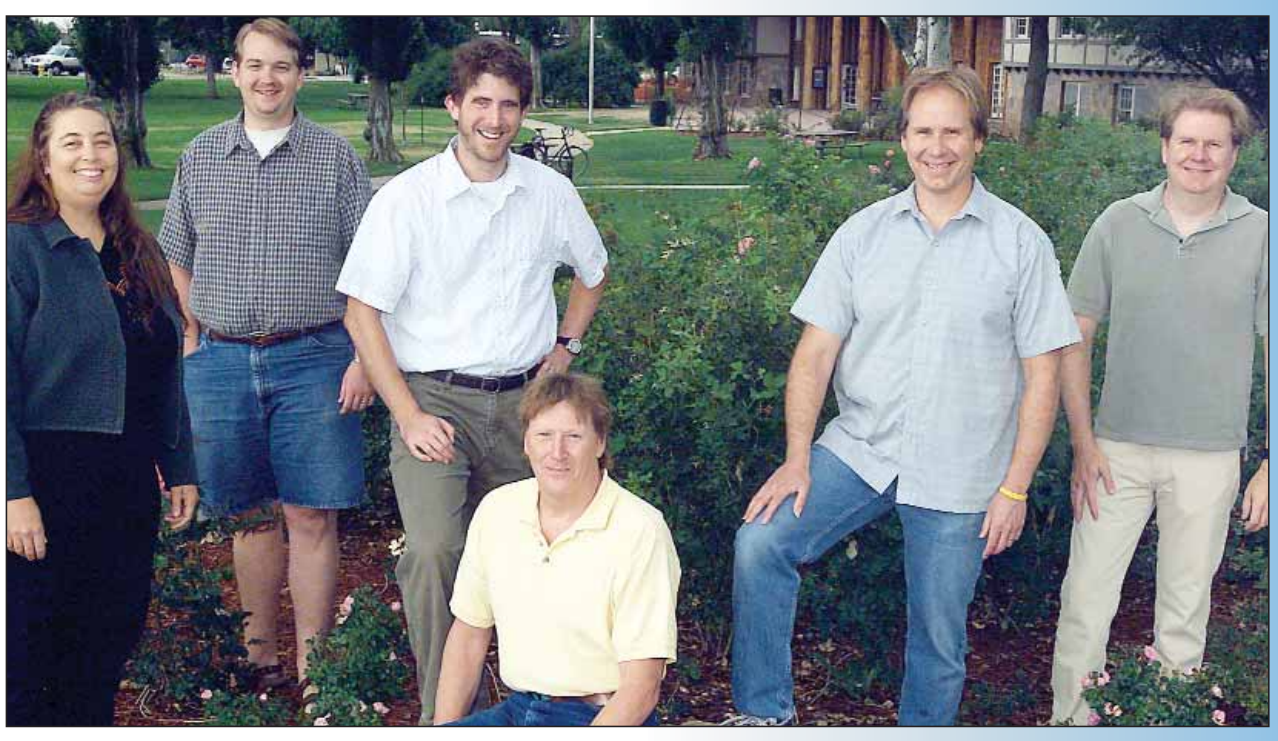
This work started in January 2004 and culminated in the successful prototype design and testing of a 75- tesla magnet in December 2004. Attaining this major milestone was perceived to be the highest risk for the 100-tesla magnet project and represents a significant engineering accomplishment in high-magnetic field research. The magnet team logged 12 pulses at 76 teslas and went on for 60 pulses at 70.5 teslas before a minor insulation failure. This accomplishment has not been duplicated anywhere in the world and marks Los Alamos as a leader in pulsed magnet research, as well as validating our 100-tesla magnet designs.

This power supply "jewel" is a rugged, versatile, pulsed-power supply with state-of-the-art controls and safety systems. Working in a spirit of exceptional cooperation and dedication, this effort is an excellent example of what a highly skilled and motivated small team can produce in support of Laboratory scientific research.

Team members from left to right, Michael Gordon of the National High Magnetic Field Laboratory (MST-NHMFL); Jeff Martin of PLCs Plus; Alan Paris and Josef Schillig of MST-NHHMFL; and Mario Manzo of Weapons Design Services (ESA-WDS)

LARGE TEAMS

Application of a Networking Processing Unit to High Performance Scientific Data Visualization Team



Application of a Networking Processing Unit to High Performance Scientific Data Visualization Team members from left to right, Carolyn Connor Davenport, CCN-9; Michael Fisk and Neale Pickett, CCN-5; Parks Fields, David Dubois and Andrew Dubois, CCN-9. Not pictured, Fredie Marshall and Stephen Poole, CCN-9.

This team exhibited exceptional creativity and ingenuity in demonstrating the first known application of network processor unit (NPU) technology to significantly improve a high-performance scientific data visualization system. This was a complex undertaking as the NPU is essentially a 16-processor computer array on a single chip with multiple interfaces and memory banks traditionally used in network functions like packet analysis and network routing.

This project team programmed the NPU to intake visualization data from multiple high-speed data ports and combine the sub-images into a single composite image. The image composition moved from the visualization cluster to the network processor and reduced the input/output requirements for each node of the computer cluster by more than 50 percent.

Compact Linear Accelerator Team

Compact Linear Accelerator Team members from left to right, Thomas Lopez, ISR-5; Frank Romero (sitting), ISR-6; Greg Dale, ISR-5; and William Haynes, Cynthia Heath (sitting) and Robert Wheat Jr., ISR-6. Not pictured, Hugh Kirbie, ISR-6.

A team of researchers from Applied Electromagnetics (ISR-5) and High Power Electrodynamics (ISR-6) developed a new type of pulsed-power source that efficiently converts low-voltage direct-current power into a continuous stream of high-voltage pulses, where pulse width, duty factor and pulse shape are all digitally controlled. The modulator was developed as part of the Compact Linear Accelerator project to produce a mobile 8 megaelectron volt, S-band accelerator. In addition to meeting the required goal of developing a compact, lightweight modulator for an S-band magnetron, the equipment has found applications far beyond its original purpose. The Marx Modulator is an innovative, broadly enabling technology that resulted from breakthroughs in several power-source technical areas. The enhanced capabilities have attracted the attention of several other Laboratory divisions and programs and the Department of Defense.

EDOTX for Attribution Team members from, front row left to right, Matt Kirkland, X-4; Alfred Fernandez, ISR-2; Amy Regan, ISR-4; and Xuan-Min Shao, ISR-2. Back row from left to right, Morrie Pongratz, ISR-2; M. William Johnson, N-2; Jeremiah Harlin, Mark Stanley, ISR-2; Michael MacInnes , X-2; and Kalpak Dighe, ISR-2. Not pictured, Jeremiah Harlin, William Junor, Aaron Musfeldt, Skyler David Speakman, and Inez Valdez, ISR-2; Robert Roussel-Dupre, Heidi Tierney and Laurie Triplett, EES-2; Charles Wilkerson Jr., X-2; and Ronald Moses Jr., T-3.

EDOTX for Attribution Team

The EDOTX* for Attribution team developed an entirely new capability to detect in real time the detonation of an improvised nuclear device — and to identify the perpetrator (Attribution). The team's work responds to a Defense Nuclear Science Board recommendation to provide support to the National Command Authority in the event of an unconventional nuclear attack against the United States. The innovative science of the EDOTX for Attribution effort combined atmospheric physics, nuclear weapons effects and nuclear weapons design. The project began with a testbed and continued on to production and installation under difficult circumstances.

The EDOT* sensor array previously deployed in Florida for lightning research served as the basis for EDOTX. There are similarities between the electromagnetic effects of an endo-atmospheric nuclear detonation and those associated with lightning strikes. The National Nuclear Security Administration funded the team to enhance the EDOT capabilities through advanced instrumentation design and modeling of weapons effects to make them useful to Attribution.

The team's work culminated in deployment of EDOTX sensors at key national events in 2004.

*the source of both the EDOTX and EDOT acronyms are the derivatives (d) of electricity (E) and time (t).

Immersive Visualization Environment Implementation Team members, front row from left to right, Charles Wilder, CCN-5; David Modl; CCN-8; Timothy Harrington, CCN-7; Laura Monroe, CCN-8; and Curtis Canada and Steven Stringer CCS-1. Back row from left to right, Robert Kares, X-8; Robert Tomlinson, CCN-DO; Robert Greene, CCN-8; and Gerald Antos and CCN-5.

Immersive Visualization Environment Implementation Team

The Immersive Visualization Environment Implementation Team created a unique Laboratory facility for analyzing and visualizing scientific data that visualization experts recognize as "world class." The facility, known as the CAVE (Computer Automated Virtual Environment), is now the premier component of the Los Alamos Data Visualization Corridor, a suite of high-performance visualization capabilities, all driven by a common software infrastructure.

The CAVE is used by nuclear weapons scientists and engineers to explore and understand the results of extremely large simulations computed on the NNSA Advanced Simulation and Computing platforms. Located in the Nicholas C. Metropolis Center for Modeling and Simulation, the CAVE consists of a 5-sided environment with high-resolution projection surfaces. Users are surrounded by a visualization of their data on the walls, floor and ceiling of a room enabling users to view details and also see them in full context.

The team developed the unique project specifications and overall design as well as worked with other subcontractors on the architecture, construction and integration of the CAVE in the Data Visualization Corridor.

Libya Rollback Team members from left to right, George Ortiz, N-1; Darrin Stafford, HAZMAT; Crystal Johnson, PADNWP; Jeffrey Bedell, N-3; Diana Langner, N-1; Frank Pabian, N-3; Michael Miller, N-1; William "Bill" Flor, HAZMAT; Carlos Rael, N-1; Gary Maestas and Joy Torres, SUP-2; and Matthew Hykel, N-1. Not pictured, George Eccleston and Gerald Strickfaden, N-3; Benny Martinez and Joseph Pilat, N-4; David Garcia, N-5; and Susan Watkins, SUP-6.

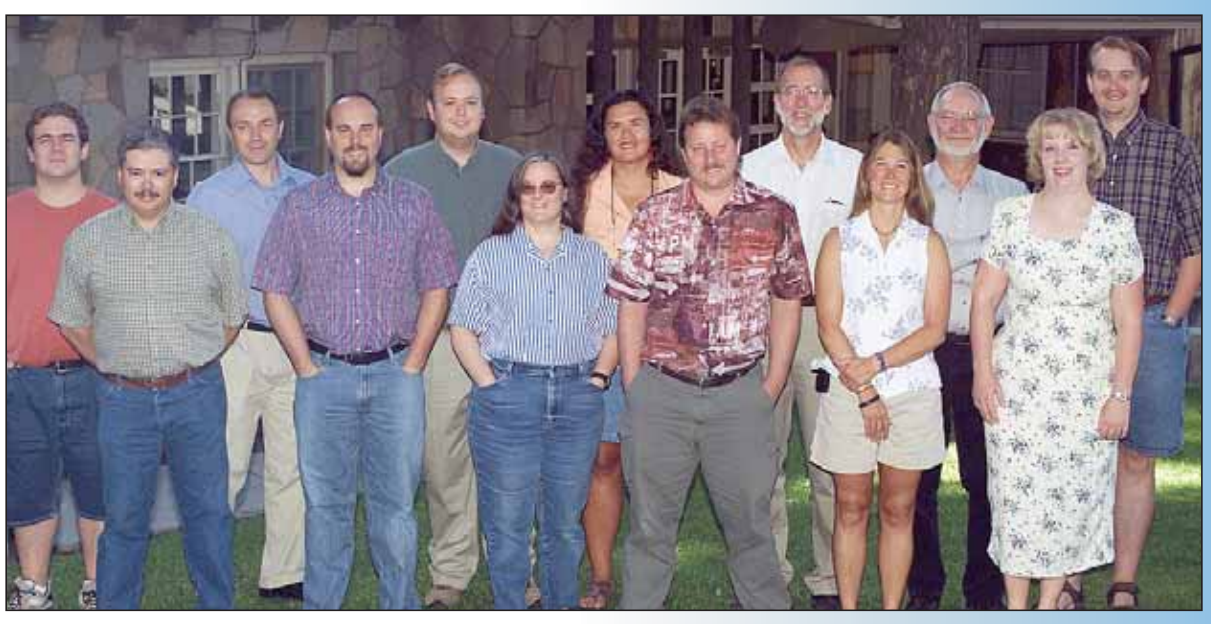
Libya Rollback Team

The announcement in December 2003 of Libya's decision to terminate and dismantle its weapons of mass destruction programs under a U.S./UK/Libya trilateral agreement was unprecedented. In January 2004, two Laboratory experts were selected to help define and guide U.S./UK on-site dismantlement and removal efforts of the Libyan nuclear program material. Soon, three technical teams, primarily composed of Los Alamos experts and some other national laboratory contributors, went to Libya to remove the capability from the country and to verify that Libya could not reconstitute the threat.

The team members contributed expertise in gamma-ray spectroscopy and neutron measurements, provided an expert understanding of both the civilian fuel cycle proliferation opportunities and established weapons programs, as well as supplied much additional management, scientific and technical support.

Los Alamos was the only national laboratory to participate in all three phases of this enormous effort.

Network Quarantine Team



Network Quarantine Team members from left to right, David Sayre, Darryl Sandoval and Eugene Gavrilov, CCN-5; Alex Kent, CCN-DO; Danny Quist, CCN-5; Cheryl Ammann, CCN-DO; Dorothy Merrigan, CCN-5; Michael Mikus, CCN-2; Gale Slentz and Susan Coulter, CCN-5; Randy Cardon, CCN-3; and Leslie Geyer and Michael Fisk, CCN-5.

The Network Quarantine team installed an automatic network quarantine system that has dramatically reduced the Laboratory's risk and exposure from Internet worms and viruses. Begun in 2003 as a proof of concept, the effort was in response to extensive damage from the Internet worms that infected hundreds of Laboratory systems in 2003. The existing manual response system took several hours to detect infected systems. During those critical hours, the worm continued to infect other vulnerable systems. The resulting damage took months to clean up at enormous cost in lost employee time and productivity. At one point, Computing, Communications and Networking (CCN) Division considered shutting down the computer network as a result of an infection. Such a shutdown would have impacted almost every employee.

The automatic system monitors security logs from a variety of sources and once a computer is determined to be infected, command messages sent to the associated network switches either disconnect the system entirely or block specific network switch ports. User notification and support and a "patch-me" server are additional elements of the system. Team members developed the quarantine system in addition to performing their regular job assignments. They succeeded in performing those tasks without a lapse in network security.

NMED Consent Order Negotiation Team

NMED Order Negotiation Team members, front row from left to right, Alison Dorries, ENV-ECR; Michael Saladen, ENV-WQH; Richard Mirenda, ENV-ECR; Gabriela Lopez Escobedo, ENV-RS; Linda Nonno, ENV-ECR; Alice Barr, ENV-SWRC; and Beverly Ramsey, EMRGCY OPS. Back row, Left to right, Steven Veenis, ENV-WQH; David McInroy, ENV-RS; David Broxton and Donald Hickmott, EES-6; Danny Katzman, EES-9; Charles English, ENV-ECR; Linn Tytler, CER-20; and S. Catherine Thayer, LC-ESH. Not pictured, Anthony Grieggs and Paul Schumann, ENV-SWRC; John Hopkins, and Terry Rust, ENV-ECR; John McCann, ENV-WQH; and Deborah Woitte, LC-ESH.

On March 1, the New Mexico Environment Department, University of California and Department of Energy entered into a 255-page fence-to-fence cleanup Order on Consent based on lengthy negotiations in 2004. "This cleanup order will protect New Mexicans for generations to come," said New Mexico Gov. Bill Richardson.

The Consent Order resolved long-standing legal and technical issues regarding cleanup of legacy waste at the Laboratory. The negotiations included resolution of environmental management decisions on appropriate risk scenarios and cleanup levels, ground water monitoring, surface water monitoring, clean up of PCBs and reporting requirements, which will ensure the Laboratory appropriately handles legacy environmental problems created during the Laboratory's 60 years of operations. Enforceable by the state of New Mexico, the order establishes a cleanup schedule ending in 2015 — 15 years ahead of the originally projected schedule.

For several months, negotiations could only be conducted evenings and weekends, due to the limited schedule of the NMED negotiator. Team members spent hundreds of hours researching overlapping jurisdictions and requirements, preparing data and administrative records, position papers and other support for negotiations. These efforts were in addition to the requirements of their regular job assignments.

Primary Verification and Validation Hydro Milestone Team

Primary Verification and Validation Hydro Milestone Team members from left to right, James Hammerberg, X-7; Maria Rightley, X-4; Scott Runnels, X-3; Greg Sharp, X-4; Brian Williams, D-1; Ralph Nelson Jr., X-4; Jerry Brock, X-7; and Richard Kandarian, CCN-12. Not pictured, Rhonald Keinigs, X-4; Jon Boettger, X-7; and Dave Higdon, D-1.

The purpose of the primary verification and validation milestone is to pave the way in supporting the designer's use of the new primary computational tool in certification simulations of the W76-1. A successful stockpile stewardship certification program without testing depends on the ability to quantify uncertainty in simulating and predicting the behavior of weapons systems.

Completing this milestone is a major step forward. It brings together advanced materials and physics work, massively parallel computational physics codes and experimental data. Work performed to achieve this milestone included calculations of a nature and scale that had never been previously attempted. In performing these calculations, the team encountered many problems that were resolved only by the outstanding efforts of all members.

SHAVANO L2 Milestone Team members, front row from left to right, Scott Runnels, X-3; Sam Shaw, T-14; Hal Marshal, CCN-7; Alan Harrison, X-3; Peter Sheehey, X-4; Johnny Collins, X-3; and Matt Kirkland, X-4; Second row from left to right, Maria Rightley, X-4; Thomas Canfield, T-3; Shelly Spearing, CCN-12; Donald Burton, X-3; Mark Potocki, X-2; Hank Alme, X-8; Kent Parsons, X-4; and Michael Prime, ESA-WR. Back row from left to right, Thomas Gianakon, Mack Kenamond, Jacob Waltz and Brian Lansrud, X-3; Theodore Carney, EES-11; Eugene Dougherty, CCN-12; and Ralph Nelson, X-4. Not pictured, Charles Ferenbaugh, Laura Lang and CCN-12; Michael Berry, Rodney Douglass, James Hill, and X-3; Robert Chrien, Carl Hagelberg, D. Donald Sandoval, Bruce Trent and Gary Wall, X-4; Randall Bos, Doran Greening and John Walter, X-7; Brian Reardon, X-8; and Paul Maudlin, T-3.

SHAVANO L2 Milestone Team

The SHAVANO Team was tasked in 2004 to provide a high fidelity primary implosion code to support the W-76 Lifetime Extension Program. This work included major progress in developing simulation capability, demonstration of new physics models and demonstration of a preliminary 2-D implosion calculation for the primary. The team's mission was to release a code that met the designers' certification strategy requirements. The team not only met these requirements, which include significant physics model and algorithm advances beyond any current production code, but also set a new and defendable standard for project management, testing and release management.

The dedication of the team and the high quality of the work is demonstrated by the acceptance of the product code within the primary design community and by the prominent role that the code now plays in the certification process.

Technology Transfer — Technology Maturation Fund Team members , front row from left to right, Marc Oettinger, Laura Barber and Erica Sullivan, TT. Back row from left to right, Eric Canuteson and Randy Tremper, TT; Tony Beugelsdijk, C-CSE; and Allen Morris, TT. Not pictured, Kevin Jakubenas, Mike Connolly, Veronique Longmire, Brad Morie, Charles Gibson and John Russell, TT.

Technology Transfer — Technology Maturation Fund Team

The Technology Maturation Fund Team supports promising Laboratory-developed technologies perceived to have high, but unproven, commercial potential with the intent of moving them to the proof-of-concept or prototype stage to attract commercial licensees or investors to fund start-up companies to commercialize the technologies. This program is similar to a venture capital fund, a unique concept for a national laboratory.

The New Mexico business community applauds the program as an extremely innovative approach to matching the vast technology assets within New Mexico to real marketplace needs, providing a critical missing element in facilitating technology startups in this state.

At a time when the Laboratory is recognizing the importance of and discussing how to best support small-scale science, the TMF team already is taking action. The TMF team independently and effectively developed and executed a program representing an integration of Technology Transfer (TT) Division's education, commercialization and regional economic development objectives into a program other laboratories seek to emulate.

SABRS Validation Experiment (SAVE) Team

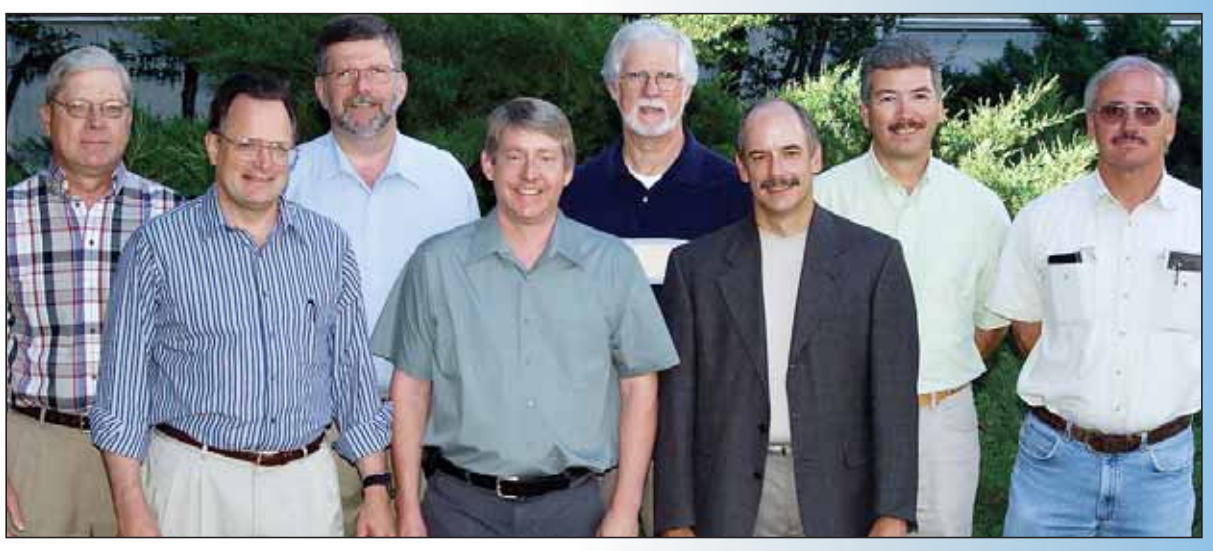
The SAVE team deployed the most complex and technically sophisticated instrument system produced in the Laboratory's satellite program history. SAVE is an on-orbit test, risk-reduction and demonstration of the next-generation Space and Atmospheric Burst Reporting System. The project goal is to deploy the primary U.S. high-altitude and space nuclear detonation detection system within the next decade. The five-year effort culminated in successful integration and instrument testing in June 2004.

Radically changed requirements for nuclear detonation monitoring have driven the need for SAVE. To respond to larger numbers of small-scale proliferants, SABRS must be sensitive enough to detect fainter gamma ray and neutron radiation over an expanded region. The system employs a new generation of smaller, lighter, and more reliable instruments. The reduction in instrumentation volume and weight required the team to develop a high degree of sensor and electronic integration. Similarly, SAVE uses an entirely new on-board event triggering mechanism that reduces the volume of data down-linked to the ground and greatly reduces ground processing requirements.

SAVE reinforces the Laboratory's recognized position within the national security community as the nation's premier source of space-based neutron/gamma ray instruments and associated expertise in nuclear weapons phenomenology and signatures.

SABRS Valiation Experiment (SAVE) Team members (not in order of photo): Thomas Murphy, Frank Ameduri, Juan Baldonado, Bruce Barraclough, Richard Belian, Roger Byrd, Eric Dors, Richard Elphic, Daniel Everett, Edward Fenimore, Ronnie Harper, David Lawrence. Michael Meier and Thomas Prettyman, ISR-1; Leonard Burczyk, Rod Christensen, Robert Dingler, Richard Hodson, Phillip Klingner, Patrick Majerus, Troy Moore, Daniel Neagley, Diane Roussel-Dupre and John Sutton, ISR-3; Sean Apgar, James Archer, Joseph "Bernie" Archuleta, Jacobo Archuleta, Nancy Baca, Mabel Cata, Robert Clanton, Kenneth Fuller, Theodore Garcia, Celestino Gonzales, Irma Gonzales, Sangkoo Hahn, Rollin Garthe Jones, Christopher Kofoed, Jerome Kolar, Joseph Latino, Jerry Longmire, Ruxanne Lopez, Adam Martinez, Leland Morrison, Susan Nava, Richard Ortiz, Douglas Patrick, Amelia Roybal, Patricia Saavedra, James Sheldon, Gary Smith, Kenneth Spencer, Martin Sweet, William Varoz, Vernon Vigil and Robert Williford, ISR-4; Herbert Funsten, ISR-CSSE; Gregory Nunz, ISR-RD; Steven Bourret, N-1; and John Montoya, FM-CMR

Reliable Replacement Warhead Concept Development Team



Reliable Replacement Warhead Concept Development Team members from left to right, Steven Maaranen, DDNS; Gary Stradling, Mark Domzalski and Jon Nielsen, PADNWP; Paul White and Bryan Fearey, DDNS; Peter Sandoval, ESA-WSE; and John Pedicini, X-4. Not pictured, Dwight Jaeger, JPADNWP; and Stephen Kemic and Jennifer Young, X-2.

The Nuclear Posture Review (NPR) and the new U.S. National Security Strategy set new goals for the nation's nuclear forces. The Reliable Replacement Warhead Concept Development Team participated in a study to examine the implications of these new demands for the makeup of the weapons stockpile and infrastructure.

A key finding of the effort was a more detailed understanding of how a reliable replacement warhead approach could contribute to a more sustainable, longer-lived stockpile and facilitate movement toward a smaller, less costly and more responsive infrastructure.

The team has been successful in convincing NNSA, DoD and Congress that the successive refurbishment of Cold War legacy warheads is not the right path for the nation's long-term nuclear future but that development of replacement warheads (that are easier to manufacture and certify) will ensure the long-term safety and reliability of the nation's stockpile.

The reliable replacement warhead is anticipated to represent a major advancement for credibly sustaining the nuclear deterrent in the 21st century. This team was instrumental in putting RRW on the national agenda.

Interdicting Radiation-Emitting Materials (IREM) Team

Interdicting Radiation-Emitting Materials Team members from left to right, George Ortiz, Kenneth Kroncke, James West, David Pelowitz, Chris Horley and Cliff Keller, N-1. Not pictured, Jeffrey Audia, Michael Browne, Ted Dye, Kiril Ianakiev, Michael McGee, Edward McKigney, Matthew Newell, Ha Nguyen, Buddy Pulse, Richard Rothrock, Daniel Roybal and Craig Stinson, N-1; William Casson, N-2; David Garcia, N-5; and Stanley Simmonds, HAZMAT

Essential to national security is the ability to detect, identify and classify radiation sources in vehicles and cargo holders so law-enforcement agencies may pinpoint and neutralize any radiation threats, as well as distinguish innocent radiation-emitting cargos without impeding the flow of commerce. Such a tool must be accurate, quick and easy to operate.

In five months, the IREM Team designed, built, tested and delivered a state-of-the-art, comprehensive, mobile interdiction tool for radiation source identification and classification. IREM is a transportable system designed to detect and identify sources of radiation at locations under the jurisdiction of the Port Authority of New York/New Jersey. Designed to be extremely user-friendly, IREM allows law-enforcement and customs officials to use the system with only hours of training. The system consists of radiation sensors, associated electronics, communications and advanced analysis software mounted on a liftbed aboard a small truck.

One person, serving as both driver and system operator, can operate the system. IREM can be operated in attended or unattended mode, with alarm events displayed on a wireless personal data assistant device. The port authority used the IREM in August 2004 to scan more than 3,000 cargo container trucks in conjunction with a special national security event held in New York City.

Large Volume Calorimeter Team

Large Volume Calorimeter Team members from left to right, David Bracken, Louis Carrillo, George Ortiz, N-1; and Clinton Shonrock, ESA-WR. Not pictured, Steven Bourret, Norbert Ensslin and Matthew Newell, N-1.

The Large Volume Calorimeter Team created a high-sensitivity large-volume calorimeter capable of measuring tritium and plutonium-bearing samples in up to 55-gallon shipping or storage containers (before this, the largest container was about 11 gallons). By using a different type of sensor along with other space-saving modifications, the team accomplished something that experts had previously dismissed as impracticable and unworkable. The Laboratory has tested the LVC and it now qualifies for performing accountability measurements in the plutonium facility at Los Alamos. The Department of Energy called the project a success noting, "The LVC will not only be extremely useful in materials control and accountability programs measuring previously unmeasurable items and creating and creating secondary working standards, but also will be useful measuring difficult to measure waste items."

MOX Plutonium Oxide Polishing Project Team members (not in order of photo): Jennifer Alwin, Georgette Ayers, Kevin Bailey, Matthew Bailey, Simon Balkey, Elizabeth Bluhm, Ronald Chavez, Fawn Coriz, James Dyke, Daniel Garcia, Brenda Griego, Charles Lehman Jr., Cathy Martinez, David Martinez, Joe Martinez, A. N. "Lonnie" Morgan, Ronald Nakaoka, Judy Roybal, Mark Saba, Davy Sparks, Aquilino Valdez, Jose Adel Valdez, Gerry Veazey and Yvonne Vigil, NMT-2; Leo Archuleta, Jackie Bustamante, Tony Drypolcher, Ruth Hapke, Chastity Kolar, Keith Lacy, Mike Marquez, Elizabeth Martinez, Neil Nothwang, Pauline Rodriguez, Elizabeth Ronquillo, Tim Stone, Leo Urbina, Joel Vargas, Darryl Vigil and Maria Vigil, NMT-4; Martin Gomez, NMT-5; Stewart Voit, NMT-11; Kevin Ramsey, Brian Bluhm, Curtis Emms, Paul Graham, Becky Guillen, Vance Hatler, Gary Herrera, Jane Lloyd, Carl Martinez, Yvonne Rivera, Mark Swoboda, Lonnie Theye, Manuelita Valdez, Alida Van Etten, David Wayne and Trish Wright, NMT-15; Ronald Allen and Charles Davism, NMT-16; Kevin Vigil, N-1; Harry Majors, N-2 contractor; Jesse Martinez, MST-6; Randy Drake, S-7; Margaret Gautier, David Gallimore, Fran Martin, Alexander Martinez, Jeffrey Miller and Joseph Rodriguez III, CAAC; Larry Honeycutt, J.J. Lujan and Alvin Valdez, SUP-5; Benjie Martinez, CMRR; and Roger Wishaw, HSR-1

MOX Plutonium Oxide Polishing Project

The Mixed Oxide (MOX) Plutonium Oxide Polishing Project team prepared, certified, packaged and shipped to France 125 kilograms of a weapons-grade plutonium oxide. In France, the material will be refabricated as fuel for nuclear reactors.

This effort supported the Mixed Oxide Fuel Lead Test Assembly in France. Shipment of the material to France required use of a European-approved shipping container, transport across the United States, the Atlantic Ocean and France, and an exemption of this activity from the Laboratory suspension of operations. The material was successfully delivered to Cadarache, France, in October 2004.

The Laboratory has polished plutonium oxide since 1945. The material prepared by this team is unique because it is the first plutonium oxide polished for use in commercial nuclear reactors. Therefore, the material had to confirm to the Nuclear Regulatory Commission's requirements. Team members had to revise equipment, processes and documentation to meet the customer's stringent product specifications. They developed new analytical specifications and extremely rigorous quality assurance and quality control requirements.

The success of this project advances the U.S. commitment to reduce the proliferation of surplus plutonium under treaty agreements between the United States and Russia.

Parallel Scalable Backbone Team members, front row from left to right,Tony Heaton, Gary Grider, CCN-9; Denny Rice, CCN-5; and Hsing-Bung Chen, CCN-9; Back row from left to right, Robert Martinez and CCN-5; Jerry Delapp, David Neal, Parks Fields, CCN-9; James Lujan, CCN-7; and Sean Blanchard, CCN-9. Not pictured, Paul Martinez, CCN-5; Teresa Morris, CCN-7; Sean Blanchard, Daryl Grunau, Satsangat Khalsa, James Nunez and Stephen Poole, CCN-9; and Abbie Matthews, industrial partner.

Parallel Scalable Backbone Team

Supercomputer users need to be able to quickly and efficiently read and write thousands of computer data files for each large simulation they run. The Parallel Scalable Backbone Team developed a design for a local area network that would scale to unprecedented file input/output throughput. As a result of the team's innovative approach, additional supercomputers of almost any size can be attached to the file input/output network with only modest growth of the network itself. A particularly impressive aspect of this system is its use of small routers and switches so that incremental growth is not expensive or invasive.

Working closely with industry was a key component of this achievement. Obtaining industry cooperation and collaboration took extra effort as manufacturers had to be convinced of the efficacy and long-term potential of this approach.

Dramatically improving file storage performance while at the same time reducing equipment procurement and maintenance costs is a major achievement.

High Explosive Radio Telemetry Team members, front row from left to right, Clinton Shonrock, John Sandoval, Thomas Petersen and Donald Ortiz, ESA-WR. Back row from left to right, Roger Bracht, Lawrence Castellano, Rosa Cristina Schmitz, Jim Lake, Erwin Schwegler Jr., Brett Nadler and Fabian Vigil, ESA-WR.

High Explosive Radio Telemetry Team

The High Explosive Radio Telemetry (HERT) Team, composed of employees in Weapon Response (ESA-WR) successfully fielded telemetry, sensing and data acquisition systems that captured highly transient quantitative information from the detonation of a mock nuclear weapon from a flight test body re-entering the atmosphere.

The technical challenges for collecting nanosecond level performance data from an exploding weapon are daunting even for static ground tests. That the data obtained were of very high quality and that all systems exceeded anticipated performance are indicators of the detailed work the HERT team performed.

Major accomplishments of the team include development of a novel telemetry system that has the speed and bandwidth to transmit data during the explosive event, a fiber-optic sensing system that allows precise temporal determination of the shock location, and fabrication and deployment of a suite of receiving assets to provide redundant capture of the event data.