Rings around the Earth: A clue to climate change?

Sandia and UNM scientists suggest past climate changes could be tied to debris rings around Earth

By Will Keener

Rings around the Earth?

While most of us know about rings around Saturn and Jupiter, some scientists believe there have been rings of rock debris around our own planet. Two scientists — Peter Fawcett of the University of New Mexico and Sandia's Mark Boslough (9212) — have suggested that a geologically "recent" collision (about 35 million years ago) may have caused such a temporary debris ring.

The two also suggest that such temporary rings — lasting from 100,000 to a few millions of years — may explain some patterns of climate change observed in the Earth's geological record. These conclusions are spelled out in an upcoming article in the *Journal of Geophysical Research, Atmospheres*.

Lore of the Rings

"One way to get a ring," says Mark, "is with an impact." There is a growing body of evidence showing that the Earth has been subjected to numerous impacts by comets and asteroids throughout its history. Among these impacts are Meteor Crater in Arizona, the buried Chixulub crater in the Yucatan Peninsula of Mexico, and a chain of at least five craters spread across several continents.

Several studies, both theoretical and with laboratory data, suggest that some large impacts are capable of ejecting material into space in the form of debris rings, if the mechanics of the impact meet certain requirements. The authors conclude that the mostly likely scenario for ring creation is a low-angle impact by a fiery meteor. Some Earth materials and melted meteoric debris, called "tektites," would form the ring materials.

Mark and Peter describe an impact where the meteor ricochets back into the atmosphere. The ricochet becomes part of an expanding vapor cloud, setting up an interaction that allows some of the debris to attain orbit velocity. The orbiting debris will collapse into a single plane by the same mechanics that led to the rings of Saturn and other planets, Mark explains. Such a ring would most likely form near the equator, because of the dynamics involved with the moon and the Earth's equatorial bulge.

RINGWORLD — Peter Fawcett, left, and Mark Boslough examine some of the possible materials involved in creating rings around the Earth at a display at the University of New Mexico Meteorite Museum, in Albuquerque. Large-object collisions with the Earth — such as comets, asteroids, or large meteors — could interact with the Earth's surface and atmosphere to eject material, including melted and reformed materials, called tektites (shown in foreground) to create a debris ring.

(Photo by Randy Montoya)

Speculation on climates past

The effects of the larger impact events on Earth's environment and climate have been the subjects of much speculation and research over the past two decades. "Clearly, large impacts have affected the evolution of the Earth, life on it, and its atmospheric environment," says Peter, who teaches paleoclimatology, mathematical modeling, and environmental science in UNM's Earth and Planetary Sciences Department.

Much of the paleoclimate work has focused on the Cretaceous-Tertiary (K-T) boundary event, which marked a mass extinction and the end of the age of the dinosaurs. A number of these studies suggest an impact resulting in the suspension of a layer of dust in the upper atmosphere, blocking sunlight and cooling the Earth. But could other impacts result in different atmosphere-altering phenomena?

An equatorial ring would cast a shadow primarily in the tropics, as it does for Saturn. (See illustration on page 4.) Depending on location, surface area, and darkness of the ring shadow, the amount of incoming solar warmth, or insolation, could be significantly altered, the two concluded. To test their theory, the two assumed an opaque ring, like Saturn's B-ring, scaled to Earth-size, and tested global climate effects using a climate model.

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Sandia LabNews

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Sandia National Laboratories

Dave Nokes named new VP for National Security & Arms Control, succeeding Roger Hagengruber

Paul Robinson announces changes; Roger to focus on creating UNM/Sandia center, security issues until his retirement in 2003

By Ken Frazier

It's going to seem the end of an era for Sandia.

Roger Hagengruber, a 30-year veteran at Sandia and a VP-level executive since 1986, will be retiring next year and in advance of that is moving from his position as Senior VP of National Security and Arms Control Div. 5000 to take on special assignments. Dave Nokes will become VP of the division.

"Roger is one of the most special folks at Sandia. I believe his blood runs Sandia blue."

The twin announcement was made by Sandia President C. Paul Robinson June 5. Both changes take effect July 12.

Roger will move from his position as Senior VP of 5000 and manager of the Non-Proliferation and Materials Control Strategic Business Unit (SBU) and be on special assignment for the Labs until his retirement next February.

Roger was named Sandia's first Senior Vice President in July 1998 in recognition of his experience and valuable contributions.

"Roger is one of the most special folks at Sandia," Paul told the *Lab News*. "I believe his blood runs Sandia blue. Roger has been one of Sandia's top managers for most of his career, having run the nuclear weapons programs, nonproliferation, and intelligence support, as well as work-for-others. I'm just delighted that, come February, Roger will continue his Sandia association under an 'emeritus' title, following his retirement."

Dave, a 42-year veteran of the Labs, will become the new VP of 5000 and head of the Non-Proliferation and Materials Control SBU. Dave is

(Continued on page 5)

First commercial EUVL tool ordered, VNL user facility on track

By Nancy Garcia

Just as anticipated five years ago, the founding member of the Extreme Ultraviolet Lithography Limited Liability Corp., Intel, has placed an order for the first beta version of a lithography tool based on technology developed at Sandia through a historic labs-industry partnership.

An unprecedented $250 million Cooperative Research and Development Agreement in 1997 between the Intel-led consortium and the Virtual National Lab — Sandia, Lawrence Livermore, and Lawrence Berkeley national laboratories — led last year to integration of the first full-field EUVL chip-patterning tool, the Engineering Test Stand, at Sandia.

"It's no longer just a VNL technology," says Glenn Kubiak, leader of the Nanoscale Science and Engineering Section in Center 8700. "It's becoming a truly commercially available technology, with an order from the world's largest exposure tool manufacturer" (ASML, the tool-making supplier of the order from Intel).

In keeping with this transition from a precompetitive phase of collaborative research with industry, the VNL is poised to begin a technology-maturation phase by offering access to a Resource Development Center (RDC) at the VNL beginning next year.

In the RDC, research agreements are anticipated from integrated circuit manufacturers, the EUV LLC, semiconductor equipment manufactur-

(Continued on page 3)

What's What

Unrequested and unwanted e-mail — which has hijacked and given a bad name to the otherwise perfectly good staple Spam — has long-since become ubiquitous. It's kind of like e-kudzu, which, if you've never driven through parts of the South, you won't get, of course. Kudzu is a plant that was to miraculously stabilize eroding overworked soil in the rural South in the middle of the last century. To say it was wildly successful as a plant is an understatement of an order of magnitude. It took over hillsides, roadsides, barnsides, and eventually whole small forests.

I made this connection after returning from a short trip to Kentucky a couple of weeks ago where I drove through several stretches of this Southern roadside topiary, then returned to an e-mailbox stuffed with offers.

Several of these invited me to move my mortgage to their financial institutions, which if I did, I could be justifiably considered for lodging in a *different kind* of institution.

One offered "World Cup Action!" betting. That to a guy who, once writing overnight sports stories from the Associated Press Boston bureau, drew the disdain-bordering-on-contempt of long-time sportswriter Dave O'Hara for informing New England morning commuters that the night before, the Bruins had scored their winning goals in the third *quarter*. University of Kentucky basketball is about the extent of my sportsfanship — except, of course, horse racing. To me, a hockey puck was some poor sucker in the way of a Don Rickles comedy tirade.

But I digress. Other e-offers included genealogy research from "the No. 1 source for family history online;" a couple of whizbang ways to keep me from "drowning in credit card debt;" a magical vitamin regimen that would increase my energy, banish unwanted pounds, and build muscle (I need all of those), and which an Oregon woman testified had reversed the effects of aging for her; and several that promised enhanced physical attributes, including one that was confused about my gender.

This is all pretty entertaining. But despite knowing me well enough to want to loan me money, inviting me to bet on a sport I can only identify as the one whose announcer occasionally startles me with a drawn-out "Goooooaaaaaaaaaaaaaaaa," and being way too familiar about subjects that I, as a well-brought-up Southern boy, shrink from saying aloud even to my own self, these friendly folks haven't offered me what I'd really like to know.

Where can I get a pristine TR3 in British racing green with spoke wheels? If they'd tell me that, I might reconsider the lending offer.

* * *

Irene Dubicka (5941) sent over a giggler from a recent issue of the Pentagon *Early Bird*. Describing a House/Senate Intelligence Committee hearing, it noted, "Among those expected to be early witnesses are Richard A. Clarke, the White House's top countererrorism official...." That countererrorism official's got a busy schedule ahead.

Irene says it reminded her of a sign on the tips jar at the Flying Star restaurant: "Support Counter Intelligence."

— Howard Kercheval (844-7842, MS 0165, hckerch@sandia.gov)

Operation America bomb squad training program blasts into Portsmouth, Va.

This week Sandia is sharing advanced bomb-disablement tools and approaches with members of local, state, and federal bomb squads gathered in Portsmouth, Va., during the latest in a series of Labs-sponsored Operation America training workshops.

The five-day, hands-on program focuses on the science of explosives and advanced technologies — including several developed at Sandia — to protect the public and bomb techs from the explosive devices being fielded by today's terrorists and criminals.

The workshop is sponsored by the National Institute of Justice, DOE, DoD, and Sandia and hosted by the Virginia State Police.

Sandia hosted its first bomb-squad training conference — called Operation Albuquerque — in 1994 to put emerging bomb-disablement technologies into the arsenals of the world's busiest bomb squads, primarily those of state governments, the US military, federal law enforcement agencies, and select foreign government antiterrorism organizations.

BOMB TOOLS — Chris Cherry (5932) demonstrates use of a Sandia-developed Percussion-Actuated Non-electric (PAN) Disrupter to bomb techs who participated in an Operation America workshop in San Diego.

Since then regional Operation America conferences have been held in Riverside, Calif., San Diego, Calif., Astoria, Ore., and Orlando, Fla., to provide the same widely sought training to the nation's first responders from surrounding state and local governments.

Participating in Operation America – Portsmouth are approximately 125 specialists representing state and local bomb squads from Virginia, West Virginia, Maryland, North Carolina, and other states; federal law enforcement agencies including the FBI and US Secret Service; and all branches of the US armed forces.

The workshop includes classroom instruction and range demonstrations of advanced disablement strategies, vehicle bombs, and other issues associated with current terrorist-type threats. Small teams of bomb tech "players" will practice defeating mock bombs, and players and instructors will then discuss and evaluate the teams' tactical approaches.

"This is the honors program for bomb techs," says Operation America organizer Chris Cherry (5932). "Our goal is to give them the training they'll need to deal with the kinds of terrorist-type devices we think they'll encounter in the next 10 to 20 years."

— John German

Science Day is June 24

Sandia's second annual Science Day will be held Monday, June 24, 8 a.m.- 5 p.m. at the Steve Schiff Auditorium. The theme of this year's event is "Microsystems and Beyond." The program will begin with a discussion of the importance of microsystems to Sandia's mission. During the course of the day several Sandia researchers will talk about their microsystems work and discuss ideas currently on the drawing board as well as future designs that would be based on entirely new architectures. A poster session will feature Sandia capabilities and recent research advances. All Sandians are invited to attend. For information, see the Science Day Web site at www-irn.sandia.gov/hp-elements/announce/scienceday.htm.

Sandia LabNews

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Recent Patents

Fred Dickey (2612) and Scott Holswade (2333): Method and Apparatus to Measure Depth of Skin Burns.

Jonathan Weiss (1739): Microbend Fiber-Optic Chemical Sensor.

Kenneth Peterson (14171) and Robert Watson (11500): Microelectronic Device Package with an Integral Window.

Kevin Boyack (9212), Brian Wylie (9227), V. Gerald Grafe (9200), and David K. Johnson: Patent Data Mining Method and Apparatus.

C. Jeffrey Brinker (1846), Hongyu Fan (1846), and Yungfeng Lu: Method for Making Surfactant-Templated Thin Films.

James Fleming (1749) and Shawn-Yu Lin (1743): Photonic Layered Media.

Maher Tadros (16000): Method for Chemically Inactivating Energetic Materials and Forming a Nondetonable Product Therefrom.

Paul Galambos (1769), Richard Givler (9114), D. Russell Humphreys (2612), Frank Peter (2614), and Jeffry Sniegowski (1749): Magnetic Drive Systems and Methods for Micromachined Fluid Ejector.

Paul Galambos (1769), Richard Givler (9114), Frank Peter (2614), and Kevin Zavadil (1832): Micromachined Fluid Ejector Systems and Methods.

William Filter (6524) and John Hohimer (11500): Micromechanical Die Attachment Structure.

Thomas Raymond (1118), William Alford (1118), Mary Crawford (1123), and Andrew Allerman (1126): Frequency-doubled Vertical External Cavity Surface Emitting Laser.

EUVL tool

(Continued from page 1)

ers such as ASML, and Sematech, the advanced manufacturing and development consortium.

In the past year since the site celebrated completion of the Engineering Test Stand (*Lab News*, April 6 and April 20, 2001), Glenn says, efforts have focused on making upgrades to enable reliable access to chip companies that will use the tool for process development and learning. Individual companies can practice exposing wafers with circuit patterns using the exposure tool. Equipment manufacturers, meanwhile, will study the tool environment to reduce

Sandia CaliforniaNews

contamination of the optical system and investigate the EUV light source.

EUV patterning, or lithography, is considered an extension of the current approach to reducing and printing circuit patterns on wafers. However, EUV light is more than 10 times shorter in wavelength, requiring the use of reflective image-reduction surfaces and photomasks, since this wavelength would be absorbed by traditional clear lenses.

This next-generation approach was undertaken because the chip-making industry faced insurmountable physical limits along its path of doubling the number of transistors that can be packed into a chip every 18 months to two years, a pace that has propelled the business for the last 30 years.

Patterning wafers with shorter wavelengths of light allows finer features and thus more densely packed transistors. That translates into better performance, with clock speeds of up to 10 GHz or faster (compared to the best speeds today of 2.4 GHz).

The beta tool ordered by Intel is expected to be delivered in 2005, and the first commercial chip production with EUVL should take place in 2006-2007. ASML anticipates it will be used to image critical layers in integrated circuits with feature sizes below 45 nm.

EXTREME LIGHT — Kevin Krenz, left, and Luis Bernandez work on developing the current Extreme Ultraviolet light source with a new laser in the winter of 2001. (Photo by Lynda Hadley)

Software simulations sped EUVL

By Nancy Garcia

One of the key contributions of Sandia to the success of the Extreme Ultraviolet Lithography project was the use of simulation software and hardware control systems to shorten design cycles. The simulation environment is a virtual Engineering Test Stand for developing the control system software.

"We minimized integration time on the machine because of our simulation environment," says team leader Karen Jefferson (8732). Her 10-person team of software and electrical engineers began working together in a large common area (a former conference room) about five years ago to enhance collaboration and coordinated decision-making.

The team captured the attention of Intel, the lead company in the industrial consortium funding the $250 million Cooperative Research and Development Agreement. Intel executive Peter Silverman at quarterly review meetings applauded the Sandia software effort because of its major contributions toward meeting the overall project's deadlines.

Karen says that because of the availability of the simulation systems, there was very little interference with operation and development of the next-generation microchip-printing tool, the Engineering Test Stand. When integrating software over the years, the team only needed to use the tool for periods so brief the intervals added up to less than four days.

Dedicating folks to de-bug through simulation, says manager Bill Replogle (8731), "was a big investment that really paid off."

Simulations also enabled examining test conditions that would be difficult or expensive to create. For instance, the function of components that monitor machine state-of-health could be verified without having to make parts actually fail.

Since the test stand is a precommercial tool subject to upgrades, improvements, and experimentation, the software team was challenged to create a control system that could accommodate frequent changes in hardware. One recent change was installation of a powerful new laser to energize the EUV light source in the 10-foot-cubed machine. The tool uses lithography in a photographic-like process to reduce integrated circuit features onto silicon wafers. The shorter wavelengths of EUV light enable smaller feature sizes, and thus, faster and more powerful chips. (For more on the laser, see http://www.TRW.com/home/main/0,,,FF.html.)

EUVL CONTROL SOFTWARE TEAM — Front row, from left: Bill Wilcox, (8112) Al Ver Berkmoes (8242), Karen Jefferson (8732), Pamela Barr (8731), Jennifer Chan (8731). Standing row, from left: Bill Forbes (8731), Mark Zimmerman (8731), Jim Van De Vreugde (8731), Terry Porter (8731), Dan Knight, Spencer Neilsen .

The control system software is developed in LabVIEW and C, with over 40,000 lines of software written in C and 560 components (including 17 subcontrollers) developed in LabVIEW. LabVIEW, a graphical programming language, was chosen for its flexibility when adding or modifying components.

The team will now focus on supporting experiments by users of the new EUVL Resource Development Center. Moving past the precommercial phase, these partnerships will pursue development of commercial systems or equipment.

Seeing the fruits of their labors being used in the functioning tool was one of the greatest satisfactions of the project, Karen says.

Anastasio named new director of LLNL; Sandia's Paul Robinson welcomes appointment

The new director of Lawrence Livermore National Laboratory will be Michael Anastasio, currently LLNL's deputy director for strategic operations.

MIKE ANASTASIO

The University of California Board of Regents named Anastasio LLNL's ninth director during a special meeting June 4 conducted by a telephone conference call. Anastasio, a research scientist nationally recognized for leadership in the design and stewardship of nuclear weapons, will succeed departing director Bruce Tarter on July 1.

The decision came just two days before President Bush's June 6 announcement proposing creation of a new Cabinet-level Department of Homeland Security. The proposal includes LLNL in the new department, raising a host of unanswered questions.

"I am pleased with the selection of Mike Anastasio to lead our sister laboratory at Lawrence Livermore," Sandia President and Laboratories Director Paul Robinson told the *Lab News*. "We have worked closely with Mike for many years, and his brother, Jim, has been a long-time Sandian.

"I had the pleasure of Mike's participation in the US STRATCOM Advisory Group study on the future stockpile," says Paul. "He was one of the most valuable contributors to that effort, which in turn, provided important input to the Nuclear Posture Review.

"His experience and expertise in nuclear weapons will be invaluable to his new role."

Anastasio, 53, has degrees in physics (B.A., Johns Hopkins University) and theoretical nuclear physics (PhD, State University of New York at Stony Brook). He began his career at LLNL in 1980. Before becoming the deputy director responsible for all laboratory and national security operations last year, Anastasio was associate director for defense and nuclear technologies.

Earth rings

(Continued from page 1)

The model selected and modified for the simulation was developed by the National Center for Atmospheric Research (NCAR). NCAR's "Genesis" climate model includes atmospheric circulation information and layers of vegetation, soil, snow, sea temperature, and land ice data.

"The idea for this project was to write a distributed-memory parallel version of this existing and popular climate code, so we could run it on machines with Cplant-type architectures," Mark explains. "From Sandia's point of view, we wanted to gain experience with the code and develop collaborations with the paleoclimatology research community."

Sandia funded Mark's work on the program through its Laboratory Directed Research and Development (LDRD) program and Peter's efforts through the Sandia University Research Program (SURP). Mark accomplished the rewriting of the code and crunched the ring data. Peter shared his expertise to analyze the results.

RING SHADOWS — This illustration shows how the B-ring of Saturn casts a shadow on the planet's surface. The shadow moves from the northern hemisphere in winter to the southern hemisphere in summer.

Ring World

"The equatorial debris ring has a profound effect on climate, because it reflects a significant fraction of tropical insolation back to space before it can interact with the atmosphere," the pair conclude. Surface and atmospheric temperatures, changes in temperature ranges from equator to poles, circulation patterns, and the rain and snow cycles were all impacted by the ring, their model showed.

The two scientists looked at changes shown in the model to predict changes that might be found in the Earth's geologic record as a way to test their work. In addition to the K-T boundary event, they looked at more recent impacts and a much older one.

The most recent event — about 35 million years ago — is identified by an iridium layer (often associated with meteors) and two pronounced micro-tektite fields, where these melted meteor-related materials have been found and dated. Climatic records from sedimentary materials just above the iridium/micro-tektite interval indicate a 100,000-year cooling interval. Orbiting debris in a ring, casting its shadow in the subtropics, could have sustained such a cooling trend, the two authors suggest.

The K-T boundary impact (about 65 million years ago) was much larger than the more recent impact and had a much larger immediate effect on the environment as measured by extinctions and atmospheric changes. But there were no long-term effects on the climate, leading the authors to conclude the event probably did not generate a debris ring.

This large-impact without a ring underscores the importance of the geometry of an Earth collision, Mark explains. When the size of the impacting body is below some critical dimension, the impact must be at a shallow angle to create ring debris.

"The idea for this project was to write a distributed-memory parallel version of this existing and popular climate code, so we could run it on machines with Cplant-type architectures."

Snowball Earth

Another interesting aspect of the modeling work done by Peter and Mark is its implications for a somewhat controversial theory, often referred to as "Snowball Earth."

This theory, supported by some evidence in the geological record, holds that the Earth was completely frozen over on the surface as many as four times in the "neoproterozoic" time, 750 to 580 million years ago.

(A *Scientific American* article from January 2000 explains this theory in some detail at: http:/www.sciam.com2000/0100issue/0100hoffman.html.)

Much remains to be learned about the geologic evidence for "Snowball Earth," Mark and Peter acknowledge. But the ring concept overcomes at least one major criticism of the theory. "An opaque ring could have acted as the trigger to at least one episode of global glaciation," the two researchers agree. Powerful cooling in the tropics combined with high-latitude "feedbacks," causing encroaching polar ice sheets, could explain in part how the Earth came to completely freeze over at the outset.

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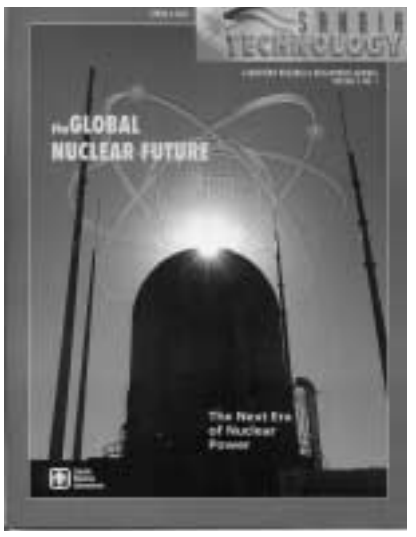
Nuclear renaissance: Are we there yet? Sandia researchers, execs say 'yes'

Are we on the verge of a renaissance of nuclear power in the US and the world? In view of recent developments in US-Russian relations and other energy-related events around the globe, many Sandia researchers and executives believe the answer to that question is "yes."



Such a renaissance — and Sandia's support of it through research and testing efforts — is the focus of the Spring issue of *Sandia Technology*, now available to interested readers in magazine format or electronically on the Labs' website. Sandia publishes the quarterly research and development journal for a variety of interested audiences to describe the scope of Labs' research efforts in a nontechnical format.

The centerpiece of the current issue is a description of the "Global Nuclear Future" vision, outlined by Senior VPs Roger Hagengruber (5000) and Tom Hunter (9000) and VP Bob Eagan (6000.) The three believe it is time for a new era of nuclear power in the world and for the US to return to this energy field as a key player, after more than two decades on the sideline. They outline their ideas as to how that can happen.

Many of the issue's stories — describing Sandia research into reactor safety, advanced fuel cycles, space nuclear power, nuclear waste management, nonproliferation, fusion and other related fields — grew from a series of *Lab News* articles on nuclear power. The original articles ran last summer and provided a strong starting point for the theme of the magazine, says Will Keener (12640), publication editor.

Sen. Pete Domenici, R-N.M., in a guest essay in the magazine offers his view of what needs to be done in Congress to support a nuclear power renaissance.

A series of agreements by US President Bush and Russian President Putin at a late May summit meeting may have paved the way for the renaissance to continue. In addition to agreeing on sharp reductions in stockpiled weapons, study projects involving proliferation-resistant reactors and advanced fuel cycles also emerged from the summit. This makes the timing of the current issue very good, says Tom Sanders, Manager of Nuclear Initiatives Dept. 6406.

Tom championed the issue and wrote the introductory article for the magazine, outlining the historic path of nuclear energy and how events, such as global warming and the end of the Cold War, have converged to create an opportunity for a new era of nuclear power.

To see the issue, check Sandia's internal web page under "Newscenter" and click on "Sandia Technology." (On the external Web the latest issue is posted under "News and Events" and "Publications.") To obtain a copy, contact Michelle Fleming, 844-4902, or meflemi@sandia.gov

Hagengruber

(Continued from page 1)

currently Director of Systems Assessment and Research Center 5900. Last year he was also designated as Sandia's point of contact for the Labs' role in homeland security and combating terrorism. He first joined Sandia in 1960 and has been involved with weapons design work and management ever since.

Paul said Roger will focus on several specific tasks in his new temporary assignment, including expansion of relationships with the University of New Mexico, completion of a number of special projects with the National Nuclear Security Administration, and participation in a number of panels and special studies in the national security area (see "Roger to help set up new UNM/Sandia policy center, 'emeritus program,' work on other Labs security projects" below).

Roger told the *Lab News* he asked for the opportunity to focus particularly on those projects for the next several months before his retirement, seeing a chance to apply his leadership in those areas.

Said Paul: "In requesting the change of status, [Roger] noted that in the past two years, the opportunities for him to contribute to Sandia and the nation have increased far more quickly than could be accommodated with his management responsibilities for the division and SBU," said Paul. "Given his desire to retire next year, a special assignment appeared to be the best way to maximize his personal contribution to the laboratory in the remaining months."

"I look forward to continued outstanding national service from Roger in the coming months," said Paul.

"Please join me in supporting Roger in his new assignment and in congratulating Dave as he assumes his new responsibility."

Paul said it was with "extreme pleasure" that he was announcing Dave's appointment as VP of 5000 and head of the Non-Proliferation and Materials Control strategic business unit.

DAVE NOKES , foreground, holds a mock-up of an explosive used in a Feb. 21 demonstration of Sandia counterterrorism technologies to Homeland Security Director Tom Ridge (at right) and other dignitaries. Dave will become VP of National Security and Arms Control Div. 5000, succeeding Roger Hagengruber who is retiring next year. (Photo by Randy Montoya)

Dave first worked in electromechanical design of conventional and nuclear weapons systems after he came to Sandia in 1960. Since 1982, he has been a member of management leading the W81 Division, Phase 1 and 2 Division, the Trident Department, the Surety Technology Department, and the Cooperative Monitoring Program. In this last role he was instrumental in creating the lab-to-lab cooperation with the Russian nuclear weapons laboratories.

In 1989, he spent two years in Washington as the Special Scientific Advisor to the Secretary of Defense (Atomic Energy). In 1994 he was named Sandia's Manager of the Year.

Since 1995 he has been Director of the Systems Assessment and Research Center and has served as the DOE-designated Director of Sandia's Field Intelligence Element.

ROGER HAGENGRUBER, a 30-year veteran at Sandia and a VP-level executive since 1986, will be retiring next year and in advance of that is moving from his position as Senior VP of National Security and Arms Control Div. 5000 to take on special assignments. Here he is shown at the dedication of the Center for National Security and Arms Control building in 1997.

(Photo by Randy Montoya)

"The work of the Non-Proliferation and Materials Control strategic business unit has never been more important to the security of the nation," Dave told the *Lab News*. "It is at the heart of stopping the proliferation of WMD devices into the hands of people that wish us ill.

"Roger has built a great organization staffed with exceptional Sandians who are doing work truly critical to our national security. I feel privileged to be offered the opportunity to lead this group and the important work they accomplish and look forward to our future."

"I am very grateful to Paul, Joan, and the Sandia Board for the chance to complete my service with the Labs by allowing me to have the time to complete some important work before I retire. I will be busy with some old work and even some new projects, but the prospect of having an hour where I now can only find minutes is energizing." — *Roger Hagengruber*

Roger to help set up new UNM/Sandia policy center, 'emeritus program,' work on other Labs security projects

Among the projects Roger Hagengruber will concentrate on in the remaining months until his retirement next February is the creation of a new center at the University of New Mexico that will be a collaboration between Sandia and UNM. The center will focus on the interactions among security, technology, and policy.

Roger has served as an adjunct professor of political science at UNM for more than 25 years and is currently Director of UNM's Institute for Public Policy. He expects the new center will open many new opportunities for both UNM and Sandia.

Roger will continue his work in nuclear security and on unconventional nuclear threats to the US. He also will maintain his involvement with the National Security Leadership Program, which he initiated.

Also, at the request of Executive VP Joan Woodard, Roger will take management responsibility for setting up a new Emeritus Program, in which, upon their retirements, Sandia directors and vice presidents can be granted the title "emeritus" and continue to work closely with management on programs in their fields of expertise.

"I am very grateful to Paul, Joan, and the Sandia Board for the chance to complete my service with the Lab by allowing me to have the time to complete some important work before I retire," said Roger. "I will be busy with some old work and even some new projects, but the prospect of having an hour where I now can only find minutes is energizing.

"I have been fortunate to work with extraordinary people all my career at Sandia and especially in my Division."

Roger on Sandia's code

When Roger Hagengruber became Sandia's first senior VP in 1998, he spoke movingly of his and his colleagues' responsibilities to Sandia and the nation.

In a wide-ranging *Lab News* interview at the time with Bill Murphy (*Lab News*, Sept. 11, 1998), Roger reviewed a career that could have taken him into academia but instead landed him at Sandia working in nuclear materials security, arms control, physical security and safeguards, energy programs, and intelligence.

"My early years painted the laboratory for me from a very wide perspective, within which our central mission was always there, was always important," Roger said.

"There's something special about Sandia because you can change the world here," he said. "But not if you have to ask for instructions."

He said throughout his Sandia career he had been helped by people who were "absolutely selfless" and people of extraordinary character with a strong sense of duty who helped build "a laboratory of character."

"The flag that's at the top of the flagpole at Sandia is always the American flag. It's not the flag of self-interest; it's not the flag of the contractor; it's not even the DOE flag. It's the flag of the national interest. And that's part of our character, part of our code. We are always ready to sacrifice our self-interest as a laboratory on behalf of the nation. And it's a mark of our character that everybody here understands that we would do so."

Gordon Osbourn becomes a Sandia Fellow

Rare honor has been offered only four times in the 53-year history of the Labs

By Neal Singer

Gordon Osbourn has been appointed a Sandia Fellow by Laboratory Director Paul Robinson.

He is the fourth Sandian so honored since the Laboratories were founded 53 years ago.

Says Paul, "Throughout my entire time at Sandia, people have praised Gordon's outstandingly original work. And the praise is not only in-house. The Department of Energy's Office of Science, in assessing outstanding science developed at DOE in the last century, rated Gordon's work in strained-layer semiconductors as one of DOE's very top contributions. I am extremely delighted to have him as a Sandia Fellow."

GORDON OSBOURN is Sandia's fourth Fellow, and the first active researcher to be so honored. (Photo by Bill Doty)

Says Sandia VP Al Romig, who nominated Gordon for the honor, "Sandia would not be exploring the science and technology of compound semiconductors, and we would not all be using cell phones were it not for Gordon's remarkable achievements years ago in strained layer superlattices. There might not be a MESA [Sandia's largest project] had there not been Gordon."

In addition, says Al, "What is remarkable is that Gordon's interests today are utterly different from his early-career interests. Recently, he's made remarkable scientific contributions in the field of vision science and pattern recognition by creating analytical tools by which to interpret large quantities of data. Most recently, he's made significant contributions in the area of collective intelligence and self-organizing systems. He's shown a consistent ability to work at the cutting edge — one of Sandia's criteria for choosing a Fellow."

"It was a great surprise," says Gordon (1001). "I'm looking forward to more opportunities to do science that matters. I'm also looking forward to continuing to partner closely with my affiliate center, 1100, and to contribute to strategic planning with the management team there."

A significant difference between Gordon's appointment and the appointments of his predecessors Gus Simmons, Walt Herrmann, and Wendell Weart is that Gordon is the first active researcher to receive the honor.

On the facing page, we reproduce a poster that will hang in the Bldg. 800 lobby. Designed by Mike Vittitow (12620), the poster honors the four Labs researchers who have earned the designation "Sandia Fellow."

"All of the three previous appointees had long tenures in management at the time of their appointments" says Al. "Gordon is the first one who's gone up the technical ladder and who is in the middle of his career, rather than near the end of it."

Because of this, the position of Sandia Fellow is no longer just an honorary award but now comes with stated conditions of obligations of the Fellow to Sandia and of Sandia to the Fellow.

Says VP for Human Resources and Protection Services Don Blanton, who, with Al and Sandra Barnes (1000 HR Customer Service Manager), drew up the terms for Sandia Fellows, "We've made a conscious decision that Sandia Fellows can be recognized not only for work over a lifetime but for work they're doing right now. It's a promotion for staff members as well as an honor. A Sandia Fellow becomes a director–equivalent, and there's recognition that he or she is in a very elite group of technical staff members. There's honor and recognition that goes along with the title, but we expect the Fellow's work to continue, with little change in job responsibility except for outreach efforts and advising Large Staff."

Gordon will don a mantle that includes many directors' privileges — including attending Large Staff meetings and having input on overall Sandia policy — without taking on the load of a director's administrative tasks. As a one-person department, he will report directly to his vice-president. He also can expect preference in requests for LDRD funding, and in office location and space, depending on need and availability.

The obligations of Sandia Fellows are to demonstrate a continued and expanding high profile in the scientific community that brings respect to both the Sandia Fellow and Sandia; to lead Sandia in new technical directions; to mentor Sandia staff; to provide advice and consultation across Sandia on technical matters and special assignments of a technical nature; and to participate in Leadership Forums, Spring Managers' Conferences, Directors' Quarterly Meetings, and so on. Furthermore, Sandia Fellows are expected to earn their salaries, as do all other members of the technical staff; i.e., they are not paid from overhead except for time spent in the types of meetings mentioned above and in other activities not related to technical projects.

Candidates for Sandia Fellow are nominated by their VPs. The process is not highly structured— that is, there is no fixed number of Fellows, and thus no quota to be filled. Nor is there a specific time for nominations to be made. The number of Fellows at Sandia is expected to remain extremely small, reflecting the rarity of the distinction, says Don.

Gordon's appointment to this life-long working, vs. honorary, position completes the population of all positions in Sandia's dual career ladder (IJS), with the approximate correspondence of Distinguished Member of the Technical Staff, Senior Scientist/Engineer, and Sandia Fellow to Manager, Level II Manager, and Director, respectively.

New Mexico Small Business Assistance Program celebrates successful inaugural year; Labs helped in more than 300 projects

Sandia scientists and engineers lent their expertise in more than 300 projects, providing $1.3 million of assistance to New Mexico small businesses, during the first year of the New Mexico Small Business Assistance (NMSBA) program.

People who participated in the 2001 program, including representatives of businesses that received assistance, were honored at a June 3 reception at the New Mexico Museum of Natural History and Science. The reception also recognized and thanked the New Mexico State Legislature for creating the assistance program. Sandia's Regional and Small Business Partnering Department hosted the reception.

VIC CHAVEZ (1380), Manager of Regional and Small Business Planning, talks with Mack Henington, owner of Canyon Woods, and his wife, Kathy Nunn, at the reception to celebrate a successful first year of the New Mexico Small Business Assistance (NMSBA) program. (Photo by Bill Doty)

The New Mexico State Legislature approved the small business assistance program in 2000, authorizing New Mexico's two national laboratories to receive up to $1.8 million each in tax credits to help New Mexico small businesses access the labs' unique capabilities, expertise, and facilities to solve problems. Small businesses in rural New Mexico can receive up to $10,000 worth of assistance, and small businesses in Bernalillo County can receive up to $5,000 worth of assistance. Over the first year of the program, ending Dec. 31, 2001, Sandia experts participated in more than 300 projects, and the lab received more than $1.3 million of tax credit.

The NMSBA program is seen as a means to expand existing small businesses throughout New Mexico, retain current small businesses, generate additional employment opportunities, increase state tax revenues through additional sales and jobs, and enable the national laboratories to provide technical support to businesses that currently do not qualify for the assistance.

Here are a few of the small businesses helped during the program's first year:

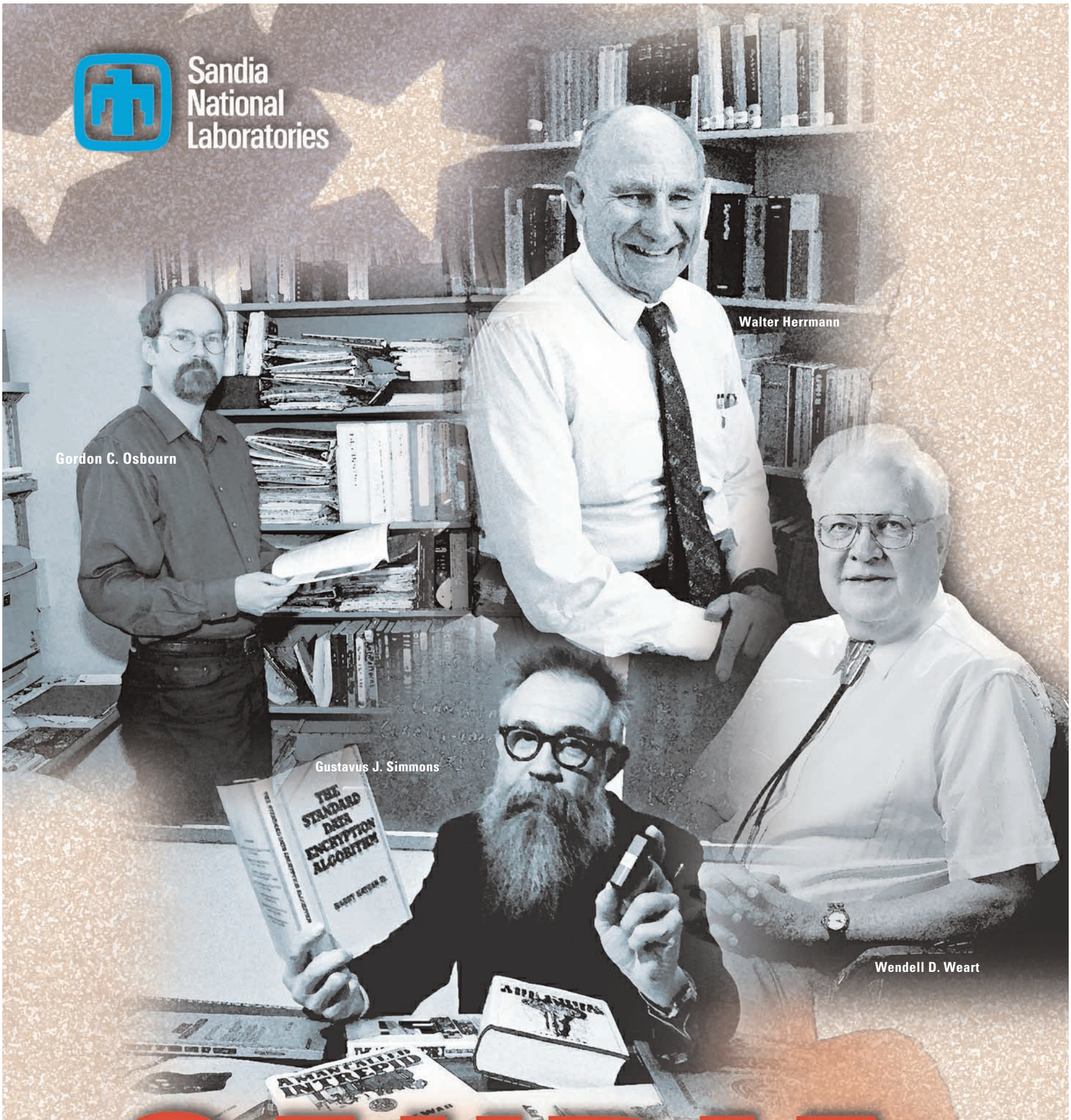
• **Rio Grande Exports** of Albuquerque — Sandia helped take the design of a new bicycle pedal from concept to prototype, including assistance in selecting materials and modeling the geometry to make it a viable new product.

• **Santa Fe Aerospace** — Sandia helped design, fabricate, and test a pulse amplification and switching circuit for a fuel-flow simulator; solved a test-panel grounding problem; debugged test-panel wiring problems; and modified microcontroller software to improve timing accuracy.

• **Quicktruss Inc.** of Farmington, which markets and distributes professional painting products — Sandia provided design consultation and modeling using stereolithography and selective laser sintering to develop a "wire scrub brush with water inlet." The model will be used to verify the concept design for cleaning surfaces before painting.

• **Canyon Woods** of Rio Rancho — Sandia provided re-engineering and design consultation through the use of computer-based manufacturing applications to develop a knock-down/reassemble design for wooden chairs and rocker.

— Chris Miller



SANDIA *Fellows*

The Sandia Fellow designation recognizes employees who have made extraordinary contributions in technology, science, engineering, or national policy. The title also acknowledges contributions of exceptional breadth, depth, and creativity in fields impacting the mission of the Laboratories and for which Sandia Fellows are typically internationally recognized. They are generally viewed by their colleagues as pioneers in their fields.

Designed by Mike Vittitow, 12620

Lockheed Martin, Los Alamos played key roles in discovery of 'vast quantities of water' on Mars

Sandia researchers offer their perspectives on NASA announcement

By Bill Murphy

It is certainly one of the most significant discoveries in the history of planetary exploration. NASA's Jet Propulsion Laboratory announced May 28 that its 2001 Mars Odyssey spacecraft has identified vast quantities of subsurface water on Mars. The water exists in the form of "dirty ice," as one JPL senior scientist described it, and if melted would be enough to fill Lake Michigan twice over. The discovery was based largely on observations of the planet's south polar region. When the northern region's seasonal cover of frozen carbon dioxide melts, scientists expect Odyssey's instruments to reveal even more water in that region of the globe.

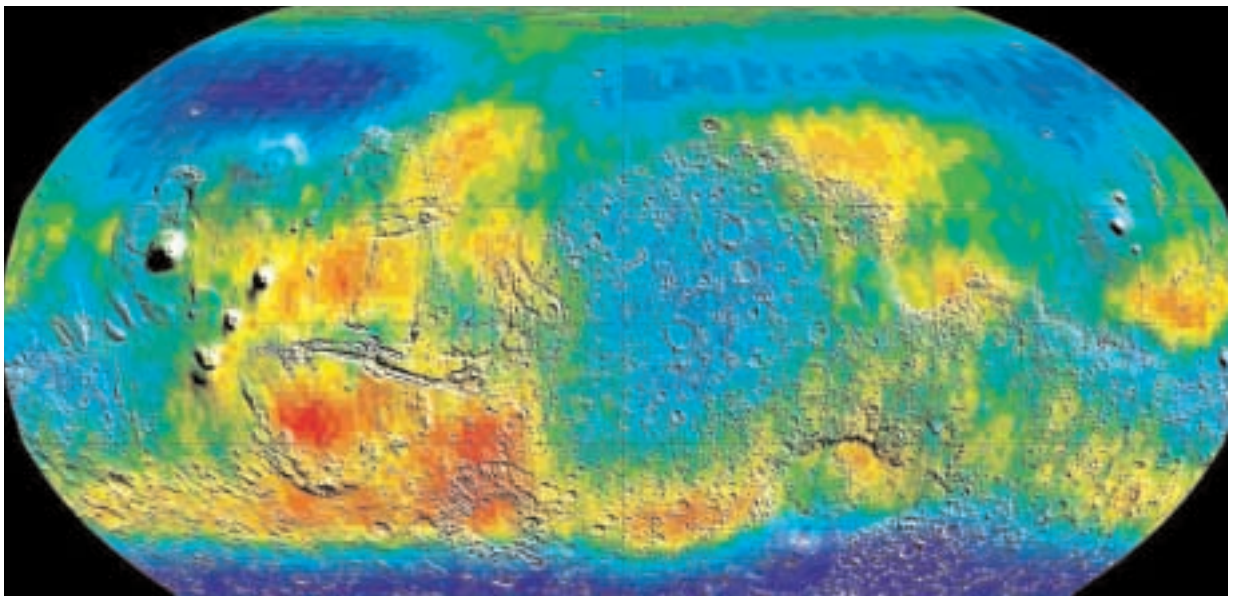
The discovery was made using Odyssey's onboard gamma ray spectrometer suite of instruments. A key element of that suite, the mission's neutron spectrometer, was developed at Los Alamos National Laboratory. Lockheed Martin Astronautics in Denver developed and built the Odyssey orbiter and, jointly with the JPL, conducts mission operations.

"We have suspected for some time that Mars once had large amounts of water near the surface," said Jim Garvin, Mars Program Scientist, NASA Headquarters, Washington. "The big questions we are trying to answer are, 'where did all that water go?' and 'what are the implications for life?' Measuring and mapping the icy soils in the polar regions of Mars as the Odyssey team has done is an important piece of this puzzle, but we need to continue searching, perhaps much deeper underground, for what happened to the rest of the water we think Mars once had."

Several Sandia researchers who have closely followed NASA's Mars missions expressed delight and excitement at the latest discovery. They offered some perspectives on what the discovery might mean for future Mars exploration.

Len Duda (2542), an official JPL/NASA "Solar System Ambassador" (see story on page 12), says, "I found the announcement very exciting. It means that the probability for some form of life to have existed on Mars in the past has increased and places a new emphasis for the next Mars Rover mission in 2003. Also, this discovery makes a manned Mars mission easier to accomplish — you won't need to bring all the water you'll need — and much more interesting for its exploration possibilities."

Ron Lipinski, Roger Lenard, and Steve Wright, colleagues in Advanced Nuclear Concepts Dept. 6424, have thought long and hard about Mars missions and how nuclear power might play a role.



OBSERVATIONS by NASA's 2001 Mars Odyssey spacecraft show a global view of Mars in intermediate-energy, or epithermal, neutrons. Soil most enriched by hydrogen is indicated by the darkest blue areas on the map, which show a low intensity of epithermal neutrons. The darkest areas in the polar regions are believed to contain up to 50 percent water ice in the upper one meter (three feet) of the soil. Hydrogen in the far north is hidden at this time beneath a layer of carbon dioxide frost (dry ice). The view shown here is a map of measurements made during the first three months of mapping using the neutron spectrometer instrument, part of the gamma ray spectrometer instrument suite. Topographic features are superimposed on the map for geographic reference. (NASA imagery)

Says Ron: "My congratulations to the Los Alamos science team. The discovery of substantial quantities of water ice in the upper few feet of Martian soil should provide the scientific impetus to galvanize Mars exploration efforts. The likelihood of finding microbial life there is now much higher. This could spur the deployment of Martian rovers with various microsensors and perhaps even a Mars global rover powered by a small reactor. Numerous analyses and experiments have been conducted to indicate that such a pervasive source of water might also be used for base support and manufacture of return propellant for a human expedition, thus reducing the cost of such a venture. Sandia could play a significant part in providing sensors, radiation-hardened electronics, and power to such future missions.

Adds Roger: "The presence of such water deposits has re-energized the debate over Viking lander biochemistry experiment results [from 1976] — only expeditions with much more capable sensors and chemical processing suites can resolve the existing issues. Further, greatly enhanced surface mobility is going to be necessary."

Steve brings the issue closer to home, noting that Sandia's expertise in nuclear energy systems might be a critical component of future missions. He says, "Substantial amounts of power are going to be required to process the water for use on Mars, regardless whether it is to be used for the production of oxygen to support human life, production of propellant for the return trip home or for use in mobile vehicles, or for the generation of hydrogen and oxygen in fuel cells. We believe that this finding will increase the growing need for the development of small nuclear power systems on the surface of Mars for the production of power to process water for a variety of uses."

JPL manages the 2001 Mars Odyssey mission for NASA's Office of Space Science, Washington. In addition to Los Alamos and Lockheed Martin, other key mission collaborators include: Arizona State University, the University of Arizona, NASA's Johnson Space Center in Houston, and the Russian Aviation and Space Agency (which provided the high-energy neutron detector).

Renovated Sandia lab, Z-Beamlet, wins high praise

R&D Magazine honors Z-Beamlet facility for 'formidable achievement,' 'innovative use of . . . space'

Celebrating an event that may reach the status of myth for later generations of Sandians, *R&D* magazine devotes page 25 of its May issue to praising as "a formidable achievement" Sandia's renovation of an old warehouse "into a facility that houses [the Z-Beamlet laser, the third-largest pulsed laser on earth and] one of the most sophisticated scientific instruments in the world."

The project (*Lab News*, Jan. 11, 2002; Dec. 14, 2001) won "Renovated Special Mention Award" in the magazine's "2002 Lab of the Year" competition. The award was announced in March (*Lab News*, March 22), and the May article contains the magazine's published write-up.

R&D's article faithfully recounts how the laser "was disassembled, packed into 25 semi-trailers, and transported from Lawrence Livermore National Laboratory to Sandia, a project of great delicacy." Researchers reassembled the laser (which arrived with no manual) while renovation of the 25-year-old pre-cast concrete warehouse proceeded "with imagination, with controlled yet flexible planning, [and] an enormously innovative use of available space."

Z-BEAMLET FACILITY'S high bay interior. Rolling clean rooms are in place on each side of beam line. (Photo by Walt Dickenman)

Said competition judge and architect Victoria David, "Once you consider how they threaded the components up and around and through, you think that too often we don't give constructors enough credit for the unique, clever, and often ingenious ways they devise for shoehorning new construction into existing space."

Said a second judge and architect, Howard Wertheimer, "One of the most amazing things about this facility is that the technology associated with the laser's light must travel more than 75 meters, through two buildings and a connector bridge that crosses over a roadway, to a target [in the adjacent Z machine] no bigger than the diameter of a human hair."

The environment created in the 1,084-square-meter building is of clean-room quality. The project's ubiquitous operations coordinator is Mike Hurst (1673). Steve Fritz (10824) was the Sandia Facilities Project Manager for the building renovation. Overall project leadership is by John Porter (1673). — *Neal Singer*

'New' Steve Schiff Auditorium boasts latest, greatest state-of-the-art presentation capabilities

By Bill Murphy

When Richard Sanderville shows you around the newly remodeled Steve Schiff Auditorium, shows off the new technological goodies that make the space one of the most advanced presentation venues in the city, you won't hear him brag. He's not that sort of guy.

But you *will* see him beam.

Richard's obviously proud of the new, improved TTC — and with good reason, as a review of the impressive list of enhancements, additions, and refinements confirms.

Richard (12610) is the mostly-behind-the-scenes technical guru who keeps the auditorium's suite of audio and visual systems up and running.

Over the past several years, the auditorium — renamed in honor of US Rep. Steve Schiff when he passed away in 1998 — has been the primary venue for large gatherings at Sandia. It's hosted Nobel laureates, presidential candidates, US senators and representatives, DOE secretaries, and countless Sandians from both the technical and administrative sides of the house.

As excellent as it is — it seats more than 400 in comfortable, theater-style chairs — some of its audio-visual systems were getting a bit long in the tooth. Richard, who listens to and takes seriously the concerns of his customers, got the message: it was time for a major renovation. And not just a facelift, but a full makeover.

He rolled up his sleeves and went to work.

An audio-visual specialist, he was on familiar turf as he developed the technical specifications for the new equipment needed to meet the expectations of his super-savvy customer base. He then contacted Ed Sanchez (10825) in Facilities to get the ball rolling. Ed assigned an architect to work with Richard and develop the plans for how to integrate the new equipment into the existing building.

RICHARD SANDERVILLE checks out the new multiscreen display system in the Steve Schiff Auditorium, which is now open for business after a two-month renovation/upgrade process. (Photos by Randy Montoya)

When the plans were finished, the equipment purchased, and the contractor hired, the auditorium closed and locked its doors for two months earlier this year while its insides were transformed.

The result?

"Let me put it this way," Richard says. "With this new setup, I'm ready for anything that comes along."

- Widescreen high-definition TV? Check.
- Multiple large screens, each capable of showing a different image? Check.
- Simultaneous computer images, video playback, and video-conferencing? Check.
- 7.1 Dolby digital surround sound? Check.

"If you don't have state-of-the-art [for presentations], you're not meeting Sandians' needs or expectations," Richard says, "and now, we *are* state-of-the-art."

When you walk in the front door, you might notice the lobby has been spruced up — new carpets, new trim. Richard worked with Moss Tallant (10847) and Cynthia Figueroa-McInteer (10853) to make that happen. Nice.

When you proceed through the doors from the lobby into the auditorium everything seems about the same. But wait. That big screen up there at the rear of the stage. Was that there before? And the two large screens on either side of the big center screen? Those are new, aren't they? Yes.

Indeed, the new screens — three panels stretching all the way across the back of the stage — are the most immediately apparent changes in the auditorium. The two screens to the side measure 9'x9'; the center screen is 16' by 9'. (There's also an even wider high-definition screen that can be rolled down from the ceiling when needed.) The big new Digital Light Processing-based projectors in the glass booth at the rear of the hall throw ultrabright images to the screen. Coupled with the room-shaking Dolby surround sound system — the big bass woofer is under the stage, and it really rocks — the auditorium will prove to be an ideal venue for next-generation high-definition multimedia presentations about Sandia's work.

While Richard and Russ Adams (12610) developed the specs for the new auditorium features, they worked closely on the project with colleague Ed Sisneros (12610, now retired) to make sure there is a corps of individuals familiar with managing the nontrivial task of keeping the facility operational for a diverse and demanding customer base.

MISSION CONTROL — Richard Sanderville in the cockpit of a Boeing 747 . . . er, that is, the control room for the Steve Schiff Auditorium's audio-visual systems.

Col. David Hackworth to speak at KAFB Theater on June 21

Col. David Hackworth, the highly decorated combat veteran who entered the nation's consciousness in 1971 when, as the Army's then-youngest colonel he asserted publicly that the war in Vietnam was "a bad war [that] can't be won," will speak at the Kirtland Base Theater on June 21 at 2 p.m. Sandians are invited to attend and hear Hackworth's perspectives on the challenges facing the US military in the 21st century.

Hackworth is an advocate of military reform and is recognized as a champion of the combat solider in the field. He is author of the best-selling autobiography *About Face*, and has just published a new book about Vietnam, *Steel My Soldiers' Hearts*.

Auditorium to host open house on June 27

The renovated Steve Schiff Auditorium will host a grand-reopening celebration on Thursday, June 27, from 9 a.m. to 3 p.m. Richard Sanderville says the presentations that day will be of special interest to folks on the line. You'll be able to see and hear the new capabilities in the auditorium: the improved quality of the sound and the vivid new projection systems. In addition, Panasonic is loaning the Labs' Video Services Department a high-end, high-definition (HD) video camera for a few days this month. A video crew will be out and about the Labs, shooting HD video of "a day in the life of Sandia."

That HD video will be shown throughout the day on the 27th, showcasing Video Services' capabilities and the stunningly vivid imagery of HDTV. Jeff Merritt, a well-known HD expert, will give a 30-minute presentation on HD at 10:30 a.m. and again at 2 p.m. You'll learn how this format of the future is different from today's formats.

There will be on-going behind-the-scenes tours all day.

And you've got to hear that Dolby sound system!

Sandia explosives engineer improves racecar combustion as hobby

'Engineering junkie' Mark Grubelich makes a 33-year-old Plymouth Valiant competitive

By Neal Singer

Sandia engineer Mark Grubelich (2552) is lying in the open trunk of a '69 Plymouth Valiant, head toward the passenger compartment and feet extended toward the racetrack behind him, as he tinkers with the valving on two large metal bottles of nitrous oxide. The carefully monitored but dangerous additive — its output programmed by Mark to compensate for decreases in ambient pressure and increases in temperature — has enabled this flat-walled, renovated green clunker — sale price $350 in an auction ten years ago — to compete against aerodynamically curved and customized cars that each may have cost as much as a half-million dollars.

East of the aluminum grandstand behind Mark, this late morning in mid-May, is a 25-foot-tall chain-link protective fence topped by loudspeakers placed every 20 feet. The asphalt racetrack — which belongs to Sandia Motorsports Speedway, five miles west of Albuquerque — is given character by a few weeds, two long rows of billboard ads, five banks of floodlights each about a hundred feet in the air (their concrete supports surrounded by white-painted tires to cushion impact), and an ambulance parked along a far turn of the course. A New Mexico flag and an American flag hang from a high pole. The Sandia Mountains are visible in the distance, their image beginning to waver in the rising heat, as some of the approximately 90 "One Lap of America" competitors rev their engines.

TANK JOB — Mark Grubelich (right) and a friend install nitrous oxide tanks in the trunk of the 1969 Plymouth Valiant, which has been re-engineered and upgraded several times over the last decade.

'Nuke GM'

To the west of the metal cave in which Mark sweats in jeans and T-shirt is a small regatta of fine cars. Casually parked on a flattened field, they bear names like Porsche, Miata, BMW, Lamborghini, Viper, and Corvette. Some have black-and-white checkered racing flags painted on their haunches. Others have gleaming red or flawless yellow paint jobs. They have curved-down front ends and sleek low lines. A turbocharged Saturn vehicle entry is attended by a teamful of jacketed technicians, including a videographer and a soundman who record each moment for posterity or, at least, for future advertisement.

The 8-cylinder, 392-cubic-inch (a stroked 340 small block) vehicle on which Mark works, on the other hand, sports a commercially unfeasible vanity license plate that reads, "Nuke GM." It has the old-time side vent windows, the old-time support (called a B pillar) between front and back seat that serves as the poor man's roll bar, and bugs on its headlights.

"We don't wash the car," flatly asserts the car's owner, Richard Ehrenberg, who is technical editor of the magazine *Mopar Action*, a Chrysler-enthusiast automotive magazine. Ehrenberg says he paid for the original car, as well as its entry on the weeklong competitive tour — a multi-city, 5,000-mile event in which the cars race each other at a variety of tracks. He likes to see the car — which he refers to alternately as "a junkyard dog" or "the green brick" — race successfully against much newer and more expensive cars.

HALF-MILLION-DOLLAR LAMBORGHINIS, like the one in the foreground, are the kinds of cars the $350 1969 Plymouth Valiant (modified) chase down before breakfast and eat for lunch.

Usually it does so, with the aid of Kevin Wesley, a race driver who has driven the car since 1993 and finds road racing at 150 mph "relaxing," and Mark, a Sandia engineer with a penchant for fast cars. The car has placed well into the top ten — and once in 4th place overall — of a field that runs about 100 competitors.

Death takes a holiday

Today, however, the team will be spectacularly unsuccessful. Kevin has been complaining that the nitrous oxide has been a second and a half late in kicking in, losing him time and accuracy on turns. Mark, working now curled up on the front seat of the Dukes of Hazzard-type vehicle with a laptop wired into the car's engine, adjusts the ignition timing curve to compensate for both altitude and nitrous oxide injection. Moments later Kevin, carrying a bit too much speed, enters a turn on the track. The front wheels momentarily lock and the car slams into a barrier.

"My adjustment made the car fly, but unfortunately, Kevin flew it right into the wall," Mark comments matter-of-factly. Fortunately, Kevin was well protected and unhurt. Undaunted, the team spent the rest of the day pulling out the front end, installing a new radiator and hoses, transferring fenders from another old car, and, for lack of a lightweight part, attaching a 2' X 6' wooden front bumper. By 9 p.m., the crew was on the road 800 miles to its next race, deep in Texas. After competing at several other race tracks the team finished 15th overall out of a 90-car field.

"We would have finished about 7th if we hadn't crashed in Albuquerque," says Mark. "But we beat some of the Vipers, some of the 'Vettes, and the Lamborghini Diablo."

LOOKS ARE DECEIVING — This unassuming 1969 Plymouth Valiant sports modifications by Sandia engineer Mark Grubelich — notably, a nitrous oxide-boosted engine. The license plate expresses the owner's sentiments about another car maker's products. (Photos by Randy Montoya)

Asked why he makes this effort, Mark jokes about enjoying self-imposed adversity in the service of competition for no obvious benefit.

"But the real reason," he says, "is that I'm an engineering junkie. Can I take a 30-year-old vehicle designed with 40-year-old technology and make it competitive for a fraction of the price? I think so! Basically, the car is a rolling engineering experiment, a dynamometer on wheels." A dynamometer is a highly instrumented device for measuring engine performance.

Re-engineering that works

Over a decade, the team has re-engineered the Valiant several times from a '60s four-speed, '70s brakes, and a '90s factory crate engine (designed in the '60s) to its present form. With donations from a variety of sponsors, the vehicle today sports aluminum wheels, a Tremec five-speed transmission, a professionally built engine, silicon carbide-faced composite lifters (to prevent wear induced by the NASCAR short track cam), a hydraulic accumulator in the oiling system to prevent oil starvation in the high "g" corners, Viper brakes, a pressure-regulated nitrous oxide injection system (adjustable from 50 to 300 hp) along with tune-on-the-fly sequential multi-point fuel injection, and a data-logging system capable of recording the partial pressure of oxygen in the exhaust and the exhaust gas temperature of each cylinder. Rance Fuel Injection Service and Ray Barton Racing Engines, both in Pennsylvania, "kicked in time and effort," says Mark.

IT EVEN DOES CURVES! — The tricked-out 1969 Valiant makes for an unlikely picture on a racetrack dominated by cars with marques like Porsche, Miata, BMW, Lamborghini, Viper, and Corvette.

So, after all this work, how fast is the car?

Mark says, "Aerodynamic drag seems to limit it to 165 mph. On a quarter-mile stretch, it runs 12.40 seconds at 116 mph — or, with nitrous, 11.90 seconds at 122 mph."

But it's not just the engineer in him that enjoys these rolling encounters. Racing is also a social event: Two competitors were married between events at Road Atlanta in Georgia, Mark reports. And, he adds, "Where else can you race for a week with several hundred of your friends?"

Sandia Classified Ads Sandia Classified Ads Sandia Classified Ads Sandia Classified Ads

MISCELLANEOUS

UTILITY SHELL, "ARE" for full truck short bed, side bin tool boxes, rack, bedliner, excellent shape, $800. Maes, 291-1970.

'97 SORREL GELDING, breeding stock appy, sired by AQHA Hazard County, Dam APHA, big, beautiful & athletic, green broke but learns quickly, $1,800 OBO. Keyworth, 281-2362.

THREE-WHEELED SCOOTER, Amigo J-9 for handicapped person, accessories, excellent condition, paid $3,000, asking $1,250 firm; wheelchair, $75. Gomez, 291-1062.

MICROWAVE, Sharp R200E, 1,200 amp, practically new, $50. Logan, 821-0488.

GARMET BAG, Diana von Furstenberg, gray tapestry, never used, no wheels, $35 OBO. Wagner, 823-9323.

RIDING MOWER, Wards, 8-hp, $175. Storks, 831-7149.

TERRARIUM, reptile etc., oak & glass, lighted, 150-gal. capacity (5.5' x 2.5' x 1.5') with accessories, $195. Abbin, 344-4062 or 296-7678.

GELDING, 14 yrs. old, 15-1/2 hands, roped, penned, trail, easy keeper, $1,800. Roth, 865-0384.

CHEST OF DRAWERS, antique cherry, excellent finish. Muchow, 299-1813.

LAWN EQUIPMENT: MTD 5-hp chipper/shredder; Snapper, 5-hp, self-propelled mower; Sears Craftsman (Troy Built) leaf shredder, $100 ea. OBO. Tolman, 296-8239.

WAX RECORDS, 35, music from '20s on, make offer. Locher, 266-2021.

VENDORS, Arts & Crafts shows, Balloon Fiesta, Cottonwood Mall, Oct. 4-13, Santa Fe, DeVargas Mall, Oct. 25, 26 & 27, Thanksgiving, Wyoming Mall, Nov. 28-Dec. 1. Self, 296-4137.

PATIO FURNITURE, $50; Jet ski auger, $35; microwave oven, $25; stereo cart, $20; new 5.30-12 tire, $10. Gurule, 292-4736.

BABY STUFF: high chair, $5; baby backpack, $60; crib, $5; jogger/stroller, $40; clothes. Swahlan, 286-2808.

COMPUTER DESK, w/hutch/file/drawer, whitewashed, 44" x 27" x 51", $80; coffee table, cultured marble/hardwood frame, 60's era, $100 OBO. Partridge, 256-0215.

TIRE RIMS, 4, aluminum, 15" x 8.5", standard 5-hole bolt pattern, $80. Munoz, 259-2094.

SOFA, w/6 throw pillows, Rowe, excellent condition, purchased at Academy Furniture for $900, asking $600. Garcia, 232-2010.

DRUM SET, Ludwig, 5-pc., w/cymbals, stands, seat, etc., $350. Douglas, 281-9843.

KITCHEN CUPBOARD, antique Hoosier, original oak, flour bin, metal bread drawer, tin countertop, etched glass spice jars, early 1900. Carpenter, 250-6604.

BACKPACKING BOOTS, men's size 8, Asolo Latitude model, used 3 times, low mileage, $30 OBO. Sedlacek, 296-4963.

TELEPHOTO LENS, Nikon, 400mm, EDIF, f/3.5 (122/39), w/lens covers & case. James, 294-6837.

SPINET PIANO, Grand Mfg., w/bench, sounds very good, $900. Kovacic, 256-9867.

WINDOW SWAMP COOLER, Champion, ws47, (4700 cfm), 3 yrs. old, great condition, $200. Rembold, 281-3469.

EXERCISE BIKE, Tunturi, $75; double, beige, kitchen sink, $30; porch swing, $10. Stiles, 275-2941.

COUCH, white/blue piping, very clean, elegant, firm, removable/washable upholstery, retro-style, $175 OBO. Straumanis, 350-9532.

WASHER & DRYER, full-sized stackable, front loading, $525; 15-cu.-ft. refrigerator, $200; microwave, $40; queen-sized futon frame; $50; various furniture. Stein, 323-4975.

COUCH, seats 4, beige/earth tones, Southwest-style, good condition, $250; rust velour chair, w/wood accents, good condition, $60. Oberkampf, 292-4366.

MIRRORS, 4, 72" x 24", $25 ea., or all for $90. Bruce, 897-7416.

WASHER & DRYER, Speed Queen, good condition, $200 OBO. Jaramillo, 203-3450.

ELECTRIC GUITAR, w/amp, Yamaha, black, comes with gig bag, excellent condition, new $377, asking $277. Anderson, 821-6321.

SOFA BED, 3 cushion, queen-size mattress, good condition, $100, delivery $10. Allen, 884-4859.

VACATION, Acapulco, Thanksgiving week, 11/23-11/30, Mayan Palace, Gold Crown Resort, 2 adults, ocean view, beachfront, pool, restaurants, $850. Wilsey, 237-8614.

ARMOIRE, 5-drawers & 2 shelves, antique white, $275. Bronkema, 286-0423.

CAR RADIO/CD, Blaupunkt Nevada, & Phoenix Gold QX 180.2 power amp, both $175. Andrews, 858-0569.

FUTON, premium quality, white frame, used 2 wks., not used for sitting, like new, $160. Zeuch, 296-4969, daytime.

DOG CRATE, $25; bike rack, $30; queen mattress, $85; 13-in. TV, printer & more. Brunner, 856-7651.

TIMESHARE, 2 bdr., 2 baths, sleeps 8, Pagosa Springs, the week of June 28-July 5, $900. Woodard, 856-0785.

TICKETS, 'Forever Plaid', at Highland Theatre, 2 seats, 3rd row center, 2 p.m. on Aug. 4, $21 ea. Torres, 292-1663.

CONCRETE MIX, 35 bags, Quickcrete, 80# ea., take one, take all, you haul, free. Dreike, 299-6670.

EXERCISE EQUIPMENT, low impact, Sears Lifestyler Cardio Fit, gives a total workout, $50. Kepler, 296-0402.

COMPUTER WORK TABLE, Marvel brand, sturdy metal white table, w/built-in shelf, excellent condition, $150; desk, sturdy wood, 60" x 30", $35 OBO. Vigil, 792-0180.

FRENCH DOORS, 60-in., double pane, $40; cement mixer, $150; beams 8" x 14" x various lengths, ¢.40/BF; 8" x 8" x 16", ¢.50 ea. Talbert, 298-9036.

SOUTHWEST AIRLINES VOUCHER, one roundtrip, expires 6/1/03, $300. Benjamin, 869-9922.

WATER SOFTENER, Ionics, 3 yrs. old, call w/questions, $2,000. Owens, 292-9627, after 6 p.m.

MOVING SALE: china cabinet, sofa, loveseat, chair, ottoman, desk, Sony speakers, KLH floor speakers, 60-gal fish tank w/all accessories, & more. Chen, 299-3031.

STEP LADDER, wood, 12-ft. Type I industrial, 250-lb. duty rating, flip down shelf, like new, $50. Gabel, 275-3436.

SPINET PIANO, oak, excellent condition, $700 OBO. Shoemaker, 869-2775, ask for Peggy.

VIGAS, 7, varied in length, from 10-12 ft. Girsch, 228-3528.

LAWN MOWER, Craftsman, 21-in., 4-cyl.; exercise bike, stationary; tarp (new), 18' 9" x 13' 4". Pitti, 256-1629.

TRANSPORTATION

'59 WILLYS JEEP, turquoise & white, fair condition, not running, $1,200; '65 VW Bug, all original, good condition, rebuilt engine, $1,995, must sell both. Smith, 550-5501.

'98 RANGE ROVER, fully loaded, roof rack, brush guard, running boards, excellent condition, dealer maintained, below book, $27,400 OBO. Kazensky, 362-2624.

'96 MERCURY GRAND MARQUIS LS, 4-dr. sedan, 56K miles, $9,250. Prew, 296-3815.

'00 DODGE DURANGO, 4x4, Magnum 5.9L V8, 4-dr., AT, AC, all power, AM/FM/CD/cassette/equalizer, approx. 23.3K miles, bids accepted through June 24, right to refuse bids, sold as is. SLFCU, 237-7384.

'98 OLDS 88, white, new tires, runs well, excellent shape, 30-mpg, 57K miles, very clean, $6,950 OBO. Sullivan, 298-4880.

'98 LINCOLN NAVIGATOR, Sport Utility, V8, 4WD, AT, CD, fully loaded, blue exterior, tan leather interior, tow package, 57.8K miles, $28,500. Thomas, 877-8255.

How to submit classified ads

DEADLINE: Friday noon before week of publication unless changed by holiday. Submit by one of these methods:

- **E-MAIL: Michelle Fleming (classads@sandia. gov)**
- **FAX: 844-0645**
- **MAIL: MS 0165 (Dept. 12640)**
- **DELIVER: Bldg. 811 Lobby**
- **INTERNAL WEB: On Internal Web homepage, click on News Center, then on Lab News frame, and then on the very top of Lab News homepage "Submit a Classified Ad." If you have questions, call Michelle at 844-4902. Because of space constraints, ads will be printed on a first-come basis.**

Ad rules

1. Limit 18 words, including last name and home phone (We will edit longer ads).
2. Include organization and full name with the ad submission.
3. Submit the ad in writing. No phone-ins.
4. Type or print ad legibly; use accepted abbreviations.
5. **One ad per issue.**
6. We will not run the same ad more than twice.
7. No "for rent" ads except for employees on temporary assignment.
8. No commercial ads.
9. For active and retired Sandians and DOE employees.
10. Housing listed for sale is available without regard to race, creed, color, or national origin.
11. Work Wanted ads limited to student-aged children of employees.
12. **We reserve the right not to publish an ad.**

'00 TOYOTA TACOMA, 4x4, extended cab, loaded, 6K miles, $18,000 OBO. Padilla, 873-3870 or 688-0013.

'96 OLDSMOBILE CIERA STATION WAGON, 3.1L V6, PS, PB, AC, 3rd seat, tinted windows, allow wheels. Dybwad, 296-9047.

'94 DODGE RAM 1500, 2x4, 5.2L, SLT Laramie package, new tires, bed liner, tool box, bed cover, excellent condition, 99K miles, $7,800 OBO. Miller, 293-4682 after 6:30 p.m.

'89 FORD TAURUS SHO, 5-spd., Yamaha V6, extremely fast, silver/gray, good condition, 133K miles, $2,000. Clem, 379-0475.

'93 MAZDA MIATA, supercharged, 17-in. wheels, black w/tan leather, extras, 49K miles, must see, $10,000. Hamilton, 858-1371.

'87 VOLVO GLE, 4-cyl., 5-spd., white w/red leather, 1 owner, always garaged, excellent, $3,500. Kranz, 822-0174.

'91 HONDA CIVIC HATCHBACK, 174K miles, many more to go, runs well, $900. Johnson, 286-2276.

'92 TOYOTA 4RUNNER, 4WD, V6, fully loaded, CD, moon roof, ski racks, 131K miles, excellent condition, $7,500. Trujillo, 975-1163.

'93 JEEP GRAND CHEROKEE LIMITED, 4x4, V8, PS, AT, AM/FM/CD, leather, towing, original owner, 149K miles, very clean, $7,000. Blankenship, 281-2257.

'95 FORD F150, 4x4 off road, V8-302, 5-spd., PW, PL, AC, CD, 86,428 miles, $8,200. Flores, 291-8649.

'99 FORD TAURUS, 6-cyl., red, 27.5K miles, NADA $7,225 plus $675 asking, $7,000. Kaestner, 823-4792.

'95 TOYOTA PICKUP, x-cab, V6, 4x4, AT, blue, very good condition, 91K miles, must see, $11,500. Trujillo, 899-0349.

'95 EXPLORER, Eddie Bauer, V6, 4-dr., 4WD, green, 6 CDs, leather, moon roof, 1 owner, records, 79K miles, $9,850. Hoyal, 823-1421.

'97 BUICK LESABRE, 4-dr., AC, PS, PW, CC, AM/FM/cassette, 1 owner, good condition, 59K miles, $8,800. Champion, 299-0163.

'93 FORD RANGER, ext. cab, V6, 5-spd., AC, PS, 1 owner 75 yrs. old, excellent condition, 93K miles, $5,490 OBO. Donald, 332-1446.

'93 SATURN SL2, 5-spd. manual, AC, PW, PL, ready to hitch (tow bar included), 92K miles, $2,500. Halasz, 821-2814.

'84 TOYOTA TERCEL WAGON, AWD, 5-spd., AC, runs well, too many cars, $1,000 OBO. Eichert, 873-4981.

'93 MERCURY VILLAGER LS, leather, moonroof, AC, PW, PS, ALB, AM/FM/cassette, looks & runs great, 107K miles, below book, $5,900. Waters, 256-4917.

'93 JEEP CHEROKEE COUNTRY, 4WD, only 46K miles, excellent condition, May NADA $7,188, asking, $6,200. Van Deusen, 299-4328.

'90 SAAB 900S, AT, PW, leather, 135K miles, runs well, $1,500. Porter, 833-7426.

'92 NISSAN SENTRA XE, 2-dr., AT, AC, cruise control, Michelin tires, red, 122K miles, $2,200. Ashcraft, 281-9676.

'93 MERCURY VILLAGER LS, red/silver, leather seating, fully loaded, new tires, excellent condition, 103K miles, NADA $7,550 OBO. Gaona, 889-0248.

'98 VW CABRIO GLS, convertible, 4-spd., AT, loaded, green/tan, 1 owner, like new, 22.5K miles. Bailar, 866-7809.

'00 OLDS ALERO GLS, 6-cyl., AT, AC, CD, leather, power, 37K miles, $12,900. Fromm-Lewis, 332-1280.

'02 FORD RANGER, 4x4, 4L engine, AT, AC, PS, yellow, perfect condition, refinance or TOP. Johnston, 248-0650.

RECREATIONAL

'84 MIDAS CLASS "C" MOTORHOME, 26-ft., AC, TV/VCR, sleeps 6, class 5 hitch, lots more, 52K miles, excellent condition, $9,200 OBO. Goodson, 286-1267.

'99 HONDA SHADOW, 1100cc motorcycle, mint condition, includes accessories, 2K original miles, $6,200 OBO. Sarfaty, 323-8576.

'78 CHEVROLET MONACO motorhome, 23-ft., AC, generator, electric fuel pump, good condition, $4,000 OBO. Bentz, 323-9760.

CAMPING & SCUBA GEAR, 6-person white water raft, kayak, bow, large woodstoves, 65-gal. LP tanks, call for information. Vickers, 291-1333.

'00 HARLEY ELECTRA GLIDE CLASSIC, very nice w/extras, 6,800 miles, $20,500 OBO. Tarango, 232-9543.

CAMPING EQUIPMENT: 6-ft., 6-in. tent, 2-burner camp stove, propane lanterns, & more, good condition, good prices. Williams, 271-8104.

'99 HOLIDAY RAMBLER, 35-ft. motor home, lots of extras, tow dolly included, excellent condition, 15K miles, $67,700. Colson, 864-4308.

SAILBOAT, AMF Sunfish, trailer, spares, great condition, $975. Stephens, 265-5341.

SAILBOAT, Bonito, 14-ft., $150. Stromberg, 299-8591.

WOMEN'S BICYCLE, 15-spd., Asama Bahama model, w/Shimano gears, purple & black, like new, $35. Simon, 299-8468.

O'DAY 17-FT. DAYSAILER, Monohull, 24-ft. mast, main/jib/Swedish-storm sails, highlander trailer, all excellent condition, $2,500. Schaub, 821-7242.

'92 YAMAHA SECAII, 600cc, 4-cyl., black, new seat, battery carb flush & tune, very clean, $2,000. Gugliotta, 293-7233.

GIRL'S SPORT BIKE, 16-in. wheels, good condition, $25; girl's white French Provincial bedroom furniture, $100. Surbey, 823-2843.

'97 ALPENLITE 5TH WHEEL, lots of extras, excellent condition, $26,500. Rogers, 328-1107.

'87 BOUNDER CLASS A, 31-ft., basement model, 454 turbo 400, loaded, excellent condition, 37K miles, $18,000. Paboucek, 821-2049.

V-HULL BOAT, aluminum, 14-ft., w/trailer, oars, life jackets, $450; w/battery/trolling motor, $525. Zirzow, 281-9896.

'95 5TH WHEEL, Layton model 2125, 23' x 8', lightly used, AC, furnace, stove, oven, stabilizer, jacks, $7,900. Brenkosh, 286-9497.

REAL ESTATE

3-BDR. HOME, 2 baths, bonus room, pantry, fireplace, tool shed, jet tub, in Foothills, near base, FSBO. Zaragoza, 292-4071 or 220-1323.

5-BDR. MOUNTAIN HOME, 3-car garage, office, 13-1/2 acres, FP, country chef's kitchen, 1,600-sq. ft. barn, w/living quarters, MBR suite w/garden tub, sell ASAP, $399,900. Rowe, 286-5432.

3-BDR HOME, 1.75 baths, 1,500 sq. ft., brand new carpet/paint, Eldorado/Hoover/Matheson Park district, great starter home, Juan Tabo/Menaul, $114,900. Armstrong, 299-8705.

3-BDR. HOME, 1-3/4 baths, 2,100 sq. ft., 2-car garage, RV pad, 2 blocks from Sandia HS, $157,900. Rice, 352-7590.

3-BDR MOBILE HOME, 2 baths, '97 Schult Double Wide, 60' x 28', beautiful kitchen, Zone 1 construction, assumable loan, excellent condition. Kopczuk, 384-3103.

3-BDR. HOME, 2 full baths, 1,862 sq. ft., living room, formal dining room, laundry room, covered patio, on lovely golf course lot in Paradise Hills, FSBO, $178,400. Kopriva, 897-0140.

3-BDR. SOLAR MOUNTAIN HOME, 2,200 sq. ft., 5 acres, tall trees, hot tub, views, 30 min. to Labs, $210,000. Davis, 281-1248 or 239-1206.

3-BDR. HOME, Corrales, 2 baths, 1,800 sq. ft., Mt. views, private 1 acre, passive solar throughout, 2 kiva fireplaces. Tharp, 792-5163.

WANTED

AUDIO AND/OR RF GENERATOR, multiple wave patterns desirable, no tube sets please. Menicucci, 842-6330.

COMPUTER PC, 150 MHz, or better processor, want CPU only, have peripherals. Coleman, 884-5009.

GOOD HOME, for Tibetan Spaniel mix, female, brindle coat, 5 yrs. old, spayed, smart, friendly, cute. Rider, 450-2018.

'68-'73 CORVETTE, project car, does not have to be running. Briand, 821-1904.

OAK SIDEBOARD, in good condition, w/ or w/out mirror. Hammond, 892-2193.

CHAIR, for PC desk, armrests, high quality. Moss, 298-2643.

MOSAIC OR WALL TILES, bright colors, any amount; computer desk, w/doors, good condition. McIntyre-Pacheco, 873-0999.

DORM SIZE REFRIGERATOR, good condition, reasonable, need for college next fall. Lowinske, 342-2249 ask for Mike or Eileen.

GOOD HOME, for kittens, approx. 6 wks. old, 1 black & white, 1 gold & white. Roberts, 275-2941.

MOTORCYCLE, Enduro or dirt bike, good working condition, reasonably priced. Ritchey, 299-7082.

VOLKSWAGEN VANAGON, stick shift in good running condition. Horton, 883-7504.

'59 CHEVROLET EL CAMINO, engine, transmission not important, body must be in restorable condition. Sena, 873-1665.

WORK WANTED

HOUSE SITTING, responsible college student, available now thru Oct. Driver, 255-1047 or 296-2585.

FLUTE LESSONS, beginners, ages 10-13, taught by accomplished high school student, call for information. Bencoe, 294-3768.

Len Duda, Sandia's newest Shining Eagle Award winner

Sandia volunteer extraordinaire Len Duda at Explora museum.

Labs volunteers honored at awards ceremony

The recent annual volunteer awards ceremony recognized the work Sandia volunteers have provided to the Albuquerque community over the past year.

Each year, Sandia's Corporate Outreach & Partnership Department (12650) gives the **Shining Eagle Award** to an employee and a retiree who have volunteered an extraordinary amount of time in the Greater Albuquerque area. A monetary award of $500 is given in their name to the community organization of their choice. The award winners for 2000 and 2001 were:

2000 — **Dwight Coles** (6535), for his work with Boy Scouts, New Mexico Hunter Safety, Albuquerque Java Users Group, New Mexico Science Fair Judging, Moneys Worth Bicycle Repair Project. The beneficiary of the $500 was Boy Scouts Troop 285.

2001 — **Len Duda** (2542), for his work with Explora, CroSSlinks, NASA Jet Propulsion Laboratory Solar System Ambassador, New Mexico Space Society. (See accompanying article.) The beneficiary of the $500 was Explora.

The retiree award winners were:

2000 — **Ben Gardiner** for his work with the US Coast Guard Auxiliary.

2001 — **Will Vandermolen**, for his work with the Senior Center at Highland, the New Mexico Museum of Natural History and Science, tutoring elementary students, School to World, and working with his church.

Sandia gives the **Goodness Award** to a volunteer who helped the most in achieving corporate goals. The award is named after Harriet Goodness, a Sandia employee, who was killed in a car accident shortly after retiring and who personified her last name. The award is given to volunteers who rise above the rest, employees who have helped achieve corporate goals. The winners were:

2000 — **Loa Buckwalter** (9000), for the very successful Roadrunner Food Bank drive.

2001 — **Dale Leonard** (2332), for leading projects for every corporate-sponsored effort, using his truck to haul supplies whenever needed.

Dale is married to **Darlene Leonard** (12650), Sandia's Volunteer Coordinator. Darlene was recently awarded a Distinguished Public Service Award by New Mexico Gov. Gary Johnson (*Lab News*, May 31). This dynamic duo obviously believe in the gift of giving.

Congratulations to all our volunteers. You make us shine in our community.

By Iris Aboytes

The alarm goes off. It couldn't be time to go to work already! Hop in the shower, and to work we go, breakfast in hand. For most of us, it means going to work maybe eight or nine or perhaps 10 hours and then home again to our families.

"Most of us" does not include Len Duda (2542), Sandia's newest Shining Eagle Award winner. Shining Eagle Award winners are Sandians who have donated the most hours as volunteers to the local community. Len donated 1,400-plus hours over the past year.

For six months Len came to work at 6 a.m., calibrating instruments in Sandia's Primary Standards Laboratory, then by mid-morning he would go to Albuquerque's Explora Science Center and Children's Museum of Albuquerque. Len served as interim director, filling the void created by a transition in the museum's directorship. Enough, right? No, his day did not end there. Many evenings he would shift into his role as community science presenter, which meant arriving home at 9:30 p.m., only to do it again the next day. This lasted for six months.

Well, Len doesn't do that anymore. He limits his volunteer activities to eight hours a week. He is a NASA Jet Propulsion Laboratory Solar System Ambassador, a position that takes him into the community for presentations about NASA's planetary missions. He has written several articles in local papers on this subject.

As a volunteer in Sandia's CroSSlinks program, he works with Mitchell and Comanche elementary schools in their science programs. The principal at Comanche wants Len to come every day, because since he has been there 4th-grade science scores have gone up. This, of course, means using his vacation time to educate kids about science.

How does he make science fun for the kids? He said he has found that "the messier the experiment, the more fun the kids have." So he aims to please. Messy experiments the students get.

Len has two children, Andrew, a high school senior, and Pamela, a college sophomore. His wife, Pat, is a chemistry teacher at Cibola High School. "Two of her students went to the International Science Fair this year," he says. "Now she is really making a difference." This from a Shining Eagle Award winner — no, this from a proud husband!

Asked what he's doing with his spare time now that he's not interim director at Explora, Len replies, "I've been going to the gym trying to bulk up." Has he — bulked up? "Well, actually" he responds sheepishly, "I've lost weight."

Sandia Speakers Bureau being rejuvenated, volunteers sought

Wanted: A few good speakers. Actually, quite a few speakers on a variety of subjects, says Pam Catanach of the Labs' Community Involvement Office (12650). And, if you're interested but not sure you're that good, you can get some coaching to make you better.

Sandia is recruiting members for a Sandia Speakers Bureau. "We receive requests from community members on a regular basis and need volunteers who are interested in giving presentations," Pam explains. Requests come from a variety of sources, including community business organizations, volunteer groups and local schools. Topics requested range from an overview of what Sandia is to detailed technology presentations to talking to grade-schoolers about science.

Sandia has operated a speakers program in the past, but with the volume of requests coming in now, it seemed a good idea to approach a speakers bureau in a more formal way, says Pam.

"We've had a lot of requests and we need a better way to match them up with speakers," Pam says. "In an effort to meet the needs of our community, we ask that you consider signing up for the Speakers Bureau so we can add you to our resource base." Ideally, the program would like to have a broad variety of topics to offer. "So sign up no matter what your topic," she says.

The Speakers Bureau will have some A-order time available for speakers and will offer training. Contact Pam at 284-5211 or pcatana@sandia.gov to sign up.

Eniwetok, Johnston Island contacts sought by test veteran

Bennie Palmer, who worked on nuclear weapons in the 1950s and '60s, sent the following message to the Sandia Webmaster. We are publishing it in the Lab News *as perhaps the best way to reach retirees who may have an interest.*

"In 1958 I worked at Eniwetok Atoll on Operation Hardtack. In 1962 I was at Johnston Island during Operation Dominic. I met some engineers from Sandia. One person was Jack Garriott, he is likely gone now. I was 26 then, I am 70 now. I am planning a visit to Eniwetok for making a video documentary for historical record. Anyone interested may contact me. Bennie R. Palmer, phone 503-652-9079 or e-mail bennierpalmer@aol.com."