

How atomic structures evolve: Collaborators predict the future on a very small scale

Experiments with thin films of moving atoms correlate with theoretical simulations

By Nancy Garcia

California Reporter

A chance conversation between a microscopist and a theorist led to creation of a sort of scientific time machine that reveals how a structure of around one million atoms is built, atom by atom, minute by minute, without having to infer how the final form evolved.

The microscopist, Andreas Schmid (8716), and the theorist, Norm Bartelt (8717), challenged themselves to use the experimental system as a rare model to demonstrate their predictive

capabilities. They will now apply this type of model in studies of microelectronics failures and corrosion.

"This model is now our standard for understanding things," Norm says. "We don't want to know what will happen on average, we want to know the dynamics of how each defect actually evolves. It offers a more thorough validation of the theory."

Andreas was taking scanning tunneling microscope pictures of oxygen atoms forming flat crystal patterns on ruthenium, similar to frost on a windowpane. Close up, he could see single oxy-

gen atoms hopping about randomly, resembling fuzzy black dots on a lattice. Viewing a larger sheet of about one million oxygen atoms, he saw small regions, enclosed by white boundaries, that coalesced like soap bubbles over time.

Predicting the evolution of patterns

Andreas snapped images of these regions at intervals as small as seven seconds. The regions represent four different grain orientations. Each region has an amorphous shape something like a geographic domain. Merging like continents in reverse plate tectonics, each grain orientation joins regions of similar orientation over time, finding a preferred lower energy state.

To deduce which orientations matched, Andreas ran his "film" of the sequential STM snapshots back and forth, seeing which regions coalesced with areas of matching grain orientation over time. He color-tinted each of the four different orientations on the gray images and gave an initial snapshot to Norm.

Norm then wrote a probability code to predict how the pattern would evolve, based on
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IT'S SPRING — Marty Salazar, who recently earned the "certified arborist" designation from the International Society of Arboriculture (ISA), offers some tender loving care to a flowering purple leaf plum tree in front of the Sandia Dome. As Sandia's first certified arborist, Marty is a recognized expert in all aspects of tree care. To attain his certification, Marty demonstrated to the ISA that he had achieved a level of knowledge in the art and science of tree care through at least three years' experience and passed a comprehensive examination developed by some of the nation's leading experts in tree care. "I've got the best job at Sandia," Marty says. "I get plenty of exercise and I'm not stuck indoors behind a desk." (Photo by Randy Montoya)

Peña greets DOE and labs' employees, sets nuclear and science priorities

The safety and reliability of the nation's nuclear deterrent and continued leadership in science and technology — driven by the national labs — are two of the top four priorities of the new Secretary of Energy, Federico Peña. The other two are energy security and environmental cleanup.

Peña issued greetings to DOE and national labs employees March 13, his first official day as DOE Secretary, succeeding Hazel O'Leary. He was confirmed earlier that day by a 99-1 vote in the US Senate and quickly sworn in.

Peña comes to DOE with Cabinet-level experience as Secretary of Transportation (see related photo on page 7 of his 1994 visit). Although he has had no direct experience with DOE-related issues, he has been praised by political leaders and lab officials as a quick study and able leader.

He reemphasized his priorities for DOE, first stated in confirmation testimony.

The first priority, he said, is to strengthen the nation's energy security. Energy consumption and reliance on imports is worsening and has reached a point he called "unacceptable." He said one of the Department's key missions is "development of new technologies that will enable our nation to use cleaner and more efficient energy sources... This is a most difficult challenge, but we must succeed."

The nuclear deterrent and nuclear security

He said the nuclear deterrent and nuclear security is his second priority. "We must maintain the capacity and resources to assure the safety and reliability of our nation's nuclear deterrent. This is how we won the Cold War, and this is how we maintain a strong national security. But we must also keep nuclear weapons out of the wrong hands — worldwide. There is no higher national security priority... and it will receive my active participation."

The environmental legacy of the Cold War is his third priority. "We must aggressively continue our cleanup of the environmental legacy of the Cold War and find lasting ways to dispose of nuclear waste." Peña noted that he came from Colorado, site of the Rocky Flats facility. "So I understand and appreciate the concerns of millions of Americans who want prompt, safe, and efficient cleanup of their communities."

"Fourth," said Peña, "we must maintain our country's leadership in science and technology. Scientific and technological advances, particularly at the national labs we support, have led to sweeping discoveries that have benefited society as a whole, not to mention the missions of the Department of Energy. Science and technology is at the center of all we do."

Peña said he had spoken to President Clinton the day before his confirmation. "The President challenged us to develop a next generation of computers, and we at DOE will deliver," Peña said.

"These are our priorities," he said. "Our country will need your full support in meeting them, and I know I can rely on your professionalism, dedication, and expertise in accomplishing them."

Sandia provides technical help to thousandth small business

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Revamped 'business rules' policy structure debuts April 1

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Paul Robinson testifies on need for stockpile stewardship funding

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CRADA to improve processes for photo film, adhesives coating

This & That

Seventy-five hundred and some Sandians remain - After everyone who decided to leave through the voluntary separation incentive program departs next month, Sandia will have about 7,550 regular, full-time employees remaining. This includes about 6,660 reporting to Sandia/New Mexico and 890 to Sandia/California. [Thanks, Pat Reilly (3535), for these projections.] The 7,550 total is down about 880 (nearly 11.6 percent) from the 8,430 employees we had in January 1996.

* * *

Family service records - Here are winners and runners-up in both categories of the Sandia family service competition. Service only from regular, full-time Sandians and former Sandians was counted. (I counted only complete years for each employee and didn't add extra months from individuals to add total years to families.) Stay with me to the end, please, because this gets a little complicated.

Immediate family: Tops is Walt Simpson's family with 156 years: Walt (9537), 22 years; his wife Regina (1823), 19 years; and Walt's brothers Tommy (1481), 32; James (ret.), 42; and Charles (ret.), 41. Runner-up is the family of Sally Dyer with 150 years: Sally (ret.), 32 years; her late husband Richard, 18; their late son James, 19; daughter Rebecca Villane (ret.), 18; Rebecca's husband Gerald Villane (ret.), 30; and Richard's brother Lawrence, 33.

Extended family: Tops is the family of Curtis Domme and his wife Bess Campbell-Domme with 186 years: Curtis (7842), 26 years; Bess (2000), 13; Curtis's late father Vincent Domme, 29; Vincent's brothers Clarence (ret.), 25, and Edward (ret.), 36; Curtis's sister Elizabeth Domme-Hansen (10502), 13, and her husband Len Hansen (1152), 31; and Bess's late mother Merry Campbell, 13. Runner-up in this category is the same Simpson family that won the immediate family competition; when we add in 12 years of Sandia service for Charles's late wife Sandra Simpson, that gives their extended family 168 years. (According to the definitions and rules published in the last issue, I could count the service years from only one spouse of the Simpson brothers in the "immediate family" category; in-laws qualify only in the extended family category).

Special mentions and California records: Look for several special mentions in the April 11 issue, including information about three brothers who average more than 40 years at Sandia! We'll also establish records just for families at Sandia/California; folks there were at a slight disadvantage because the California lab has existed only since 1956. (Californians: See March 14 issue for entry rules, or e-mail me. I need all of your entries via e-mail by noon on Thursday, April 3.)

Thanks to everyone who submitted entries, and to Lynne Powell and Bonnie Vigil (both 3650) for confirming some service dates.

* * *

"Friends" suggest alternate titles - Since I announced several weeks ago that I'd taken over the External Webmaster duties, but that the title sounds too formal, several alleged friends have suggested alternate titles. They include Webmonger, Webmonster, Webmiser, and Webshyster. I must need friends badly to continue suffering such abuse.

- Larry Perrine (845-8511, MS 0129, lgperri@sandia.gov)

Former Lockheed Martin Energy Systems exec Frank Figueroa selected as new CFO

Francisco "Frank" Figueroa, Vice President and Chief Financial Officer of Lockheed Martin Energy Systems (LMES) at Oak Ridge, has been named Sandia's Chief Financial Officer and VP of Business Management Division 10000. He replaces Gary Riser, who retired this month.

Lockheed Martin Energy Systems manages the Y-12 and K-25 facilities in Oak Ridge, Tenn.

The company also manages the environmental management programs at the Paducah (Kentucky) and Portsmouth (Ohio) gaseous diffusion plants, which are leased from DOE by the US Enrichment Corporation.

In his LMES position, Frank was responsible for all business-related mat-

ters, including finance, accounting, estimating risk assessment, contracts, procurement, property management, business systems, benefits management, and product-area business management.

He began his professional career in 1967 as an officer in the US Air Force, where he held a number of positions in the USAF space program. Among his other responsibilities, he was chief of launch operations and program control for a major new satellite program and launch controller for several launch systems.

He joined Lockheed Martin (formerly Martin Marietta Astronautics) in 1987 and served as business manager for a number of major programs.

"While I am personally sorry to see Frank go, I wish him well in his new assignment," said LMES President Robert Van Hook. "Frank became Vice President and CFO of Lockheed Martin Energy Systems on Oct. 17, 1994. During his tenure here, Frank successfully negotiated the new performance-based contract, initiated focused performance measures, established the Y-12 incentive task order, and led the company's reengineering efforts in business systems. We are very appreciative of Frank's efforts on behalf of the company, the customer, and our employees; we will miss him."

Frank earned a BS in electrical engineering from Texas Tech University, an MS in astronautics (orbital mechanics) from the Air Force Institute of Technology, and an MS in systems management from USC. He is a Certified Financial Planner, licensed nationwide, and a Certified Public Accountant, licensed in Tennessee, Colorado, and California. In addition to his work at LMES, Frank owns his own consulting firm, Frank A. Figueroa, CPA, CFP. In that capacity, he serves as a consultant to businesses and individuals on accounting policies and practices, financial planning and investment options, risk assessment, income taxes, and related areas. He has conducted numerous seminars for industry groups and financial planning firms.

-Bill Murphy



FRANK FIGUEROA

Retiree deaths

Nonie Earl Brooks (78)	1710	Jan. 21
Hunter Hanna (90)	4142	Jan. 21
Procopio Lopez (75)	7481	Jan. 21
Thomas Holmes (89)	8125	Jan. 22
Max Engle (87)	2492	Jan. 24
Franklin Moore (89)	8121	Jan. 25
Edna Toolis (74)	5122	Jan. 29
Miramón Armijo (88)	2419	Feb. 1
Lois Price (86)	7453	Feb. 1
James Rogers (86)	1525	Feb. 1
Gertrude Byrne (77)	5000	Feb. 2
Frank Lane (77)	5241	Feb. 4
Jose Sanchez (87)	4614	Feb. 7
Fritz Wettin (81)	9573	Feb. 7
Vaughn Nogle (76)	2343	Feb. 11
Robert Hopper (80)	9000	Feb. 18
Wilbur Miller (92)	8214	Feb. 21
Bernard Goncher (78)	8213	Feb. 24

National AISES Science Fair in Albuquerque needs judges

As many as 1,000 Native American students, grades kindergarten through high school, will gather in Albuquerque next Thursday to exhibit new and winning science fair projects in the 10th Annual National American Indian Science & Engineering Fair and the 6th Annual New Mexico Native American Science Fair.

The two fairs are being held simultaneously at the Albuquerque Convention Center April 3-5,

sponsored by the American Indian Science & Engineering Society (AISES). Twelve winning students from the national fair will be sent to the 48th International Science & Engineering Fair in Louisville, Ky., in May.

In addition to conventional science fair categories (math, chemistry, earth sciences, etc.), both fairs include a "traditional knowledge" category. Past exhibitors in this category have tested alternative materials for making pottery, studied native plants as natural dyes, and demonstrated how traditional pueblo architecture contributes to heating and cooling of dwellings, for example.

Because of the size of this year's event, many more judges are needed, says Sandra Begay-Campbell (4512), a member of Sandia's American Indian Outreach Committee involved in helping recruit judges for the event. (Others are Gary Nez, 4815, and Miriam Leon Hilborn, 1472.)

Although some of the approximately 10 Sandians already scheduled to participate in the weekday judging are being sponsored through Sandia's A280 volunteer time-charging case number, any additional judges would need to be volunteers. Unfortunately, there are no more A280 allotments available for the event, she says.

"I think this could be a rewarding opportunity for Sandians or retirees to give back to the community and participate in a large national event without having to travel out of town," she says.

Judges should hold degrees in science, mathematics, or engineering disciplines or have equivalent work experience. Contact Karen Gomez with the Indian Resource Development office at (505)646-1347 (Las Cruces).

-John German

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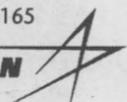
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Livermore, California 94550-0969
Tonopah, Nevada • Nevada Test Site • Amarillo, Texas

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LOCKHEED MARTIN



Atomic model

(Continued from page 1)

physical forces measured at the atomic level. Given the initial grain orientations provided by Andreas, he has been able to map both the changing shape and location of the regions over time. To show the correlation on his computer screen, he can play side-by-side movies of the regions, seen in experiment and in theory, as they coalesce in matching patterns.

"This system is very similar to a soap bubble froth," Norm says. "Each boundary has a tension like a soap bubble and the system is trying to lower its free energy. The simulation samples different configurations and finds more likely ones, simple configurations without grain boundaries."

Predicting complex systems

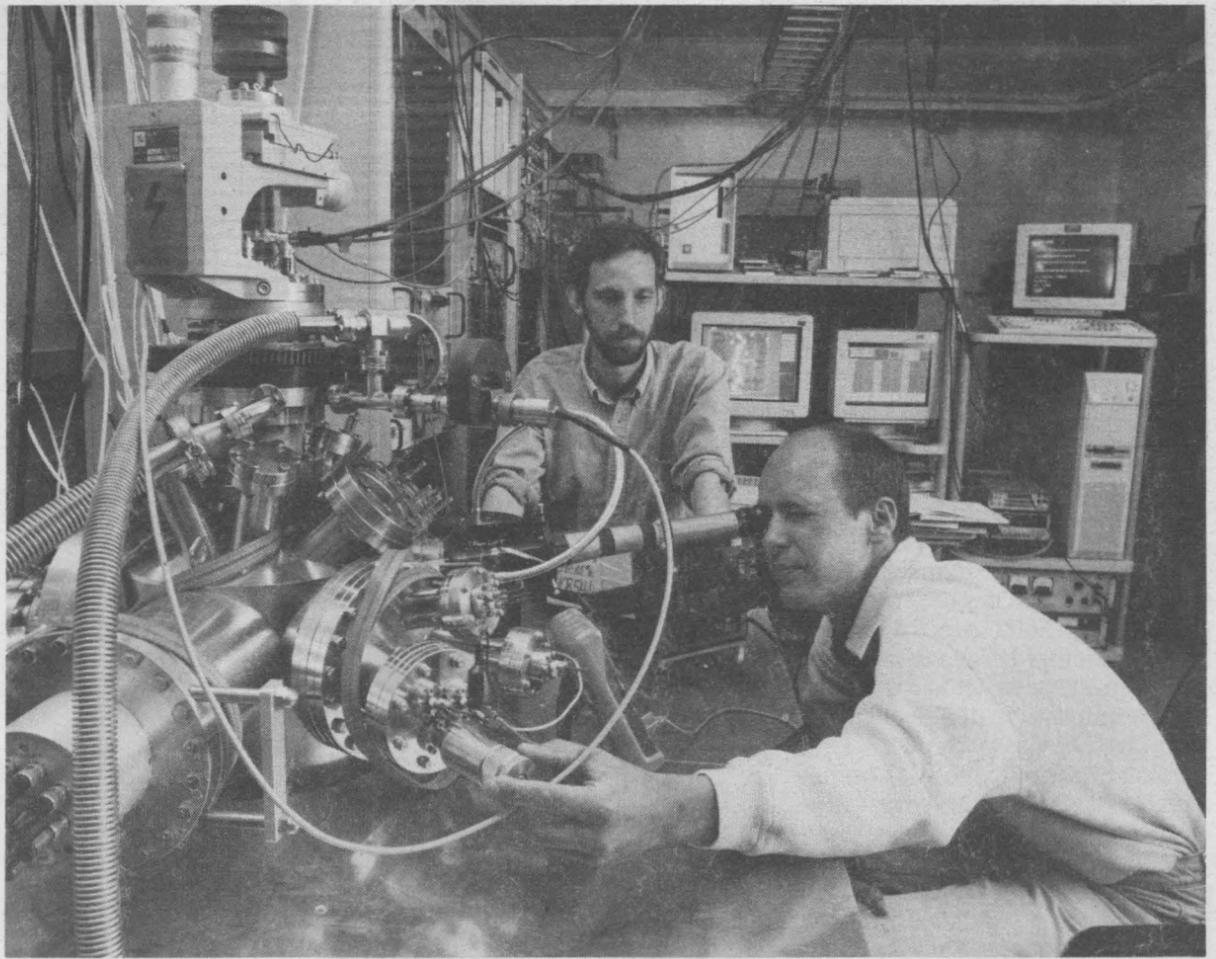
The fact that large numbers of moving atoms form a predictable pattern over time and distance indicates how small and seemingly random events can lend direction to a larger system. Norm demonstrates this by briefly running small-scale "movies" of the motion of a small number of oxygen atoms backwards and forwards in time with no apparent difference. He also cites natural selection — the way differences in individuals lead to evolution — as an example of how small changes create trends.

Changes in complicated systems like weather are often considered too difficult to predict, Norm says, because very small initial changes can lead to an exponential divergence in what happens. However, the collaboration with Andreas shows complicated systems can be predicted for long periods of time with precision.

"A long-standing goal of materials science is to take information about the atomic scale and extend it to a larger length scale," Norm says. "One of the most challenging problems is to know when that has been done, when you have an accurate model. As far as I know, that has never been done like this before."

Andreas had been studying oxygen on ruthenium to see how oxygen influences deposition of gold. Early results suggested gold preferentially stuck along oxygen grain boundaries, making

The collaboration with Andreas shows that complicated systems can be predicted for long periods of time with precision.



TOOLS OF THE 'TIME MACHINE' TRADE — Norm Bartelt, left, and Andreas Schmid, right, used this scanning tunneling microscope in their predictive research. (Photo by Lynda Hadley, 8815)

Sandia California News

dotted loops that look like chains. These "necklaces," as Andreas calls them, followed "country borders" on the grain-orientation map.

The idea of testing predictive capabilities arose after Andreas mentioned these observations to Norm. The collaborators realized that atoms of most elements move too quickly or slowly at room temperature to be easily visualized.

Thousands of hopping atoms

"Once we saw atoms in this system making hops at room temperature," Norm says, "we knew we could measure all the events necessary to predict a large-scale evolution of thousands of atoms. We sort of challenged ourselves. . . . The standard

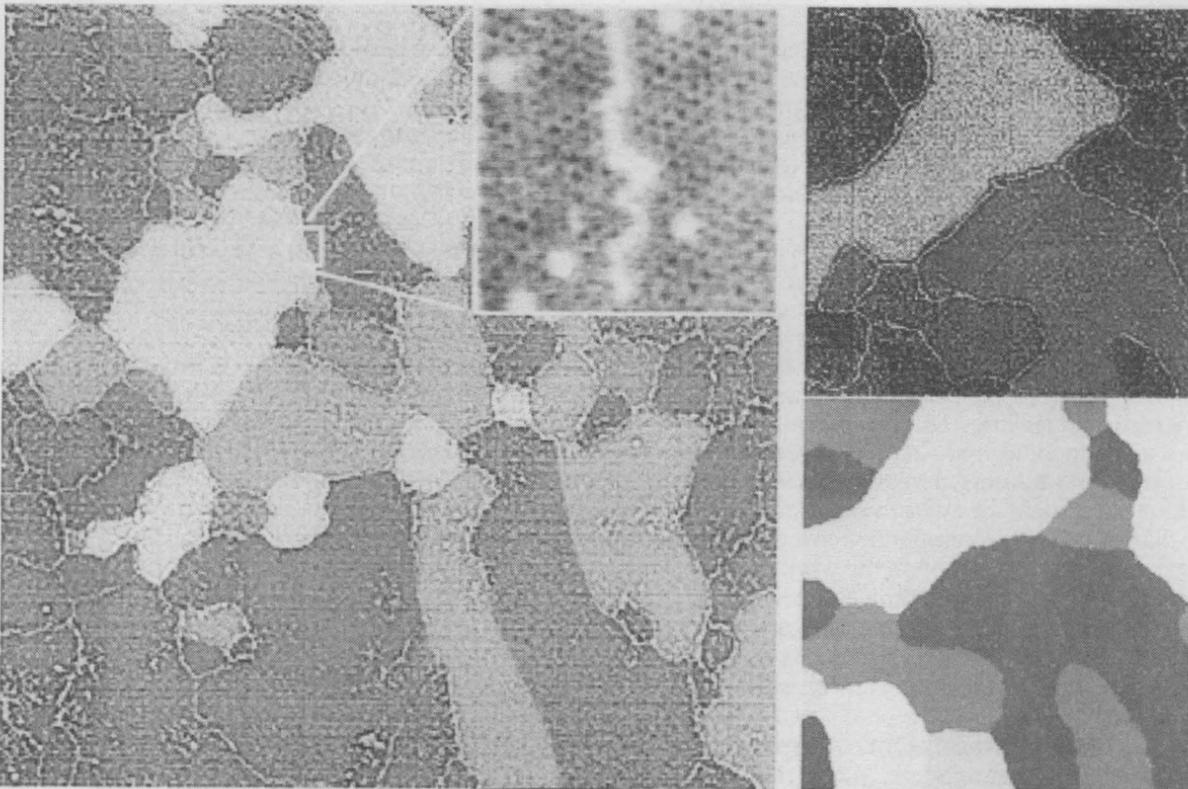
way to interpret STM pictures is to look at them and try to guess how they were built, sort of like archaeology, but this way, we can actually look at them and see each 'brick' being laid."

The accomplishment required not only skill but patience over some months by Andreas. "I consider myself really fortunate to have the theoreticians here in the same building," he says. "It's really powerful."

The model system can be used in studying more complicated materials problems at Sandia, such as corrosion of catalysts or defects in semiconductors. Norm will apply this sort of model, for instance, to help understand and predict the reliability of metallic "interconnects" on integrated circuits. These are metal films formed on semiconductors to link transistors. The electric current necessary to switch transistors has the effect of an "electron wind" blowing through the narrow interconnect lines. This electron wind can blow metal from one end of the line to the other, causing short circuits or broken lines. Andreas and Greg Cardinale (8250) are using Sandia's experimental extreme ultraviolet lithography tool to print the smallest lines possible, 0.1 micron, for these studies.

"Understanding grain growth kinetics is very basic and important to these problems," Andreas says. "Aluminum film on silicon oxide is very complex, so we need to find scientific models. . . . Now we can do fundamental electromigration work for interconnects of the future."

"Now we can do fundamental electromigration work for interconnects of the future."



SUCCESSFUL PREDICTIONS — The left panel shows the starting configuration of oxygen crystal grain orientations. The inset shows the positions of individual oxygen atoms on the ruthenium substrate. The black dots are oxygen atoms; the central bright region is a grain boundary. The upper right panel shows the configuration of grains after nearly 3 hours. The lower right panel shows the theoretically predicted configuration at the same final time.

★ Congratulations

Terry Jordan-Culler (9115) and Bill Culler, a daughter, Megan Jordan Culler, Jan. 10.

To Virginia O'Neill (1342) and Stanley Edmund (12860), married in Albuquerque, Feb. 16.

Labs' Small Business Initiative reaches milestone with thousandth technical assistance project

Sandia's semiconductor bridge technology is subject of milestone project

By Bill Murphy

Lab News Staff

It may not have the glamour of the multimillion-dollar industrial partnerships, but if you could place a dollar value on appreciation, the technical assistance provided under Sandia's Small Business Initiative (SBI) might well be the Labs' most lucrative program.

Sandia recently completed its 1,000th technical assistance project since the program began seven years ago. Number 1,000 helped a small high-technology company run tests on a thermite device it had developed using a Sandia-patented semiconductor bridge (SCB) as an igniter.

Bob Bickes of Explosive Components Dept. 1553, co-inventor of the semiconductor bridge, assisted Energetic Materials Associates, located in Centerville, Ohio, in testing the thermite device/SCB configuration in harsh environments. The company had developed and built an ignition device made of thermite — a pyrotechnic aluminum and metal oxide conductive material used in hot-wire devices — and wanted to use the SCB as the igniter because of its small size and low-energy, low-volume capabilities.

In running the tests, Bob used unique Sandia



SHIPPING GLASS — Diego Ruiz (left), Dagoberto Ruiz (both of Interstate Glass Distributors), and Sandian Dave Harding (6642) examine a new type of glass windshield shipping container. Dave, applying expertise gained in developing nuclear materials shipping containers, helped validate and refine the IGD design. The improved container could save the auto glass industry millions of dollars annually.

capabilities unavailable elsewhere to investigate component design, heat transfer, environmental thresholds, firing set characterization, and operating levels for safe and reliable operation.

DOE applications

The test series showed that the thermite/SCB combination worked fine, Bob says.

"I know Jon [Mohler of Energetic Materials Associates] was very pleased with the work," says Bob. He and Mohler will present a paper on the test series at the July meeting of the American Institute of Aeronautics and Astronautics.

Although Sandia resources were used specifically to assist a small business, Bob says the test results "will be of particular interest for DOE applications." Thermite, he says, has the potential for helping ensure the safety and security of weapons and will be of interest to other government agencies for such things as diversionary devices or similar applications.

Bob, who has worked closely with Energetic Materials Associates and a number of other companies in the past, says he enjoys the interactions with small businesses.

"These [technical assistance] projects are a nice break," he says. "When a business comes to you for help, you're faced with a real problem that you have a chance to solve. You're dealing with something that people need, so there's a good feeling when you can provide a solution."

Assistance supported by DOE

Under the SBI's technical assistance program, overseen by Partnerships and Licensing Dept. 4211, small private-sector companies partner with Sandia to help solve technology-based problems, tapping into the Labs' unique capabilities, expertise, and facilities. Such technical assistance takes a variety of forms — technical consultation, education and training, access to specialized or unique equipment, or any combination of these. Sandia performs its services at no cost to the private company. DOE supports the work done by Sandia at up to \$5,000 per project, and a small business may apply for no more than one project per year.

While Sandia's 1,000th technical assistance project happened to involve Ohio-based Energetic Materials Associates, the majority of assistance projects have been closer to home. In fact, more than half of the assistance has been provided to New Mexico and California companies, says Leland Traylor, who administers the project along with Dept. 4211 colleague Kim Ford.

Olen Thompson, Manager of Partnership Outreach Dept. 4221, has watched the technical assistance program thrive over the years and is clearly proud of its recent milestone.

"That's a thousand small businesses in our community and across the nation that have been helped by Sandia staff," he says. "Nobody else in the country [in the DOE national laboratory complex] is anywhere close to that."

In the technical assistance program, Leland says, there is no "cash out" from Sandia; the support provided to businesses is "in kind" — staff time and expertise and access to Labs facilities. And while DOE will support technical assistance efforts of up to \$5,000, Leland notes that the median assistance project is valued at about \$3,000 and many are, essentially, free — a quick phone call from a small business to the right Sandia technical expert can often lead to the solution of a thorny problem in a minute or two, Leland says.

While the thousand technical assistance projects have covered the gamut of Labs' technical capabilities,

the materials area receives the most requests for help.

"Welding, joining, and soldering really seem to pose the biggest challenges for a lot of small shops," he says.

Sandians enjoy interactions

Leland says he's not surprised by the satisfaction expressed by Bob in helping his technical assistance partners.

"I've had all kinds of people [Sandians] tell me how much they enjoy the interactions," Leland says. "Sandians really get a kick out of seeing such quick results from their work."

If Sandians enjoy the interactions, their customers apparently are even more pleased. A recent survey of program participants, Leland says, found a "customer satisfaction" rate of more than 90 percent.

According to customer survey responses, "what really amazes people is that government can be so nonbureaucratic," Leland says. "They just can't believe they can get someone on the phone and start getting the help they need literally right away."

In fact, the best testimonial to the value of the technical assistance program, he says, is that "word-of-mouth" has been the program's most effective marketing technique.

"There's an informal network of people who really know about the program," he says, "and when they go to Chamber of Commerce meetings or whatever, they talk it up. They tell their stories and other folks come to us."

Two recent successes

As part of the national laboratory system, Sandia is mandated to offer technical assistance to businesses from around the nation. Indeed, many of its success stories have been told in small towns across America. Still, most of the Labs' technical assistance projects have involved New Mexico and Livermore-area companies, helping small businesses create jobs in the local marketplace.

Here are a couple of recent examples:

A year or so ago when Dan Castilleja, vice president of Albuquerque-based Academy Precision Materials, wanted his company to begin manufacturing silicon shower heads for plasma etcher equipment used in the semiconductor industry, his company partnered with Sandia in a technical assistance project. Although the company is one of only two in the world that can ultrasonically drill a

(Continued on next page)

Economic impact of technical assistance

A broad spectrum of small manufacturing firms, R&D companies, and scientific organizations with various technology needs have benefited from technical assistance projects with Sandia since October 1991.

To determine the value and benefits of the program to US taxpayers, DOE, small businesses, and the participating national laboratories, the Small Business Initiative office surveys its customers.

Surveys are conducted immediately after a technical assistance case closes and again about one year after closure. The surveys focus on: jobs created; jobs retained; revenue increases; process and quality improvements; reduced costs; access to new markets; new sales contracts; and the development of new products. Here are key results of the most recent survey:

- The median total economic benefit cited was \$30,000 per technical assistance case. Total economic impact is defined as the sum total (current and projected) of new revenues, avoidance of sales lost, and cost avoidance resulting from technical assistance. A broad distribution of values were reported by SBI customers for total economic impact — ranging up to \$19 million.

- A median of two jobs were created per technical assistance.

- A pilot study of long-term impact revealed that a significant amount of business activity related to the technical assistance occurred at least one year later: Of the six New Mexico companies interviewed in the study of long-term impact, eight new contracts were generated with a combined value of \$55 million in annual revenues and 105 new jobs created — at least one year after technical assistance was received. In addition, the survey disclosed five new contracts currently in negotiation with anticipated future value of \$70 million.

Simplified new business rules structure replaces jungle of SLPs and OIs

By John German

Lab News Staff

It's a jungle out there.

A year ago, the Labs' policy system included more than 200 Sandia Laboratories Policies (SLPs) and Operating Instructions (OIs), and new policies were proliferating like weeds. Many SLPs and OIs were obsolete or of questionable value. (One SLP spelled out Sandia's official mailing address.) Redundant and contradictory information often caused confusion and reduced efficiency.

Beginning April 1, a simplified new Corporate Business Rules structure will replace the old policy system. Eventually, all SLPs and OIs will be eliminated and their content, if absolutely necessary for the Labs' operations, replaced by new business rules documents.

The project was set in motion during the Sandia 2000 Managers' Conference in April last year, when Financial Advisor Paul Stanford (VP-15000) pledged to reduce the number of SLPs and OIs by 50 percent in one year. Corporate Policy Dept. 15105, with executive office support, established a moratorium on developing new (or updating existing) SLPs in May and set out to reengineer the corporate policy system.

"From the beginning, the requirement for this project has been to develop the absolute minimum set of business rules necessary to run the business and eliminate redundant or unnecessary information," says Don Devoti, Dept. 15105 Acting Manager. "We're not just turning SLPs into new policy documents. We've built a new, less burdensome, and less costly structure from the ground up."

Business rules and VP policy sponsors

The reengineered system includes new terminology and a new set of "owners." Each new policy (now called a "Corporate Policy Statement," or CPS) will be associated with one of five policy areas. Executive VP John Crawford has assigned each new policy area a vice president policy sponsor who has responsibility for developing Corporate Policy Statements within the assigned policy area and the documents that implement them. (See "The five corporate policy areas and their VP sponsors" at right.)

The CPSs are formal, enduring, high-level, principle-based documents that establish the boundaries within which Sandia operates, explains Don. Under the new model, Sandia's

executive office (the offices of John Crawford and Paul Robinson) will own and approve Corporate Policy Statements. Any request for an exception to a CPS must be approved by the executive office.

Lower-level documents that implement the Corporate Policy Statements are called "Corporate Process Requirements" (CPRs). Owned by the VP policy sponsors, CPRs prescribe in detail how Sandia's business is to be conducted. For the policy area under his or her purview, the VP policy sponsor is responsible for developing a set of Corporate Process Requirements that help implement each higher-level Corporate Policy Statement, approving new CPRs, ensuring that line organizations have input into development and modification of CPRs, and approving any exceptions.

Individual business units (organizations, work sites, or facilities, for instance) may establish their own additional requirements or rules specific to their operations as long as they are consistent with the CPSs and CPRs.

Enduring business needs

In the past, policies were developed by (and largely at the discretion of) primary responsible organizations (PROs), with the assistance of the Corporate Policy Department. Under the new structure, clearly delineated VP-level accountabilities for policy and process development should keep the number of business rules to a "bare minimum" while establishing clear responsibilities for implementing the new rules, Don says.

All CPSs and CPRs are driven either by Internal Directives (issued by the executive office) or External Directives, such as requirements contained in the prime management and operating (M&O) contract or matters that relate to Lockheed Martin corporate requirements. Requirements that can't be linked to one of those sources are prime targets for review and elimination, says Don.

"It's a major shift in the philosophy of how

The five corporate policy areas and their VP sponsors

People.....Charlie Emery, 3000
InfrastructureJ.D. Martin, acting 7000
Financial.....Frank Figueroa, new VP-10000
External CustomerDan Hartley, 4000
Interactions
Product RealizationGary Beeler, 14000

we do business," he says.

Sandia didn't reengineer its policy system in a vacuum, he adds. A customer-focused steering team, external "red team" assessments, and a review by business consultants Ernst & Young exposed the shortcomings of the old policy system. In addition, every vice president was interviewed, primary responsible organizations and process owners were consulted, focus groups were conducted with former SLP board members and policy department staff, and the old policy process was benchmarked against 27 outside institutions, including Fortune 500 companies, other national laboratories, and universities.

"They all said our policy process was broken — that it was too slow, too burdensome, and too costly," he says. "The new policies are more permanent, borne of enduring business necessity rather than a short-term problem or issue."

Official policy source now on the Web

During the transition from the old policy system to the new structure, says Don, Dept. 15105 will be providing tools and training in the new business rules system. SLPs are being phased out, but information within existing SLPs still applies until the SLP has been either canceled or replaced with a CPR.

Official, updated business rules can now be found on the Internal Web. (Click on the new "Business Rules" link, which replaces the "Directives" link on the Internal Web home page, or type <http://www-irn.sandia.gov/rules.html>). There employees can find search capabilities, quick access capabilities, a table of transition changes, and a matrix showing where old SLPs and OIs can be found in the new structure. An alphabetized index of business rules allows users to find specific information directly (by selecting "T" for travel, for instance). A new Business Rules Dictionary has been developed that defines terms used throughout the new system.

"It's one-stop shopping for business rules information," he says. "Webco has been working with us to make the Web site as intuitive as possible."

All online CPSs and CPRs also now feature a watermark signifying they are official Sandia business rules. Don warns that hard copies or printouts of any business rule may not be the documents currently in effect.

"The new process is definitely a change for the better," he says. "We've begun to tame the jungle and clear the weeds."

(Continued from preceding page)
silicon wafer, it had no experience at lapping, cleaning, and etching silicon wafers.

Terry Guiling (1811) and Joel Stevenson (1841) provided the technical assistance the company needed to develop a prototype silicon shower head. The Sandians also suggested materials, formulas for the chemicals, etching rates, and safety procedures.

"I couldn't have hired this kind of expertise in the open market at any price," says Castilleja.

As a result, the company is currently negotiating two distribution agreements for the silicon shower heads. It also has added 5,000 square feet to its existing 6,000-square-foot facility, hired two new employees in high-level skilled jobs, and is now a supplier for another application for its new-found expertise: silicon coatings for architectural glass.

"Our sales in the optical business went from \$2,000 in 1994 to \$800,000 in 1995 and to \$850,000 in 1996. We're forecasting \$1.3 million for 1997, all thanks to what we learned from Sandia," says Castilleja.

Helping Laguna Industries

Sandian Neil Davie and his colleagues in the Mechanical Shock Testing Lab helped Laguna Industries, Inc., an American Indian-owned company with manufacturing facilities located at the Laguna Pueblo, secure an Army contract to design and build cargo transportation structures that can be mounted on all-terrain "Humvee" vehicles.

When prototype containers were subjected

to rigorous qualification tests at the Aberdeen Proving Ground in Maryland, as stipulated by the contract, they failed two portions of the test. Laguna redesigned the structures and again readied them for testing. With no testing facilities of its own, the company requested Sandia's assistance in prequalifying its design changes to identify and resolve any further problems prior to the Aberdeen tests.

Technical assistance customers praise Sandia's help

[Sandians at Livermore] took an extraordinary interest in our project, doing late night work and making mid-air adjustments, but always keeping an eye on the fact that this must be mass produced economically.

Michael Wood, President
Leapfrog RBT, Alameda, Calif.

The result [of the project with Sandia] is a self-sufficient signal system that will help the country retain its place in this technological field, not only for marketing purposes but also for defense applications and treaty verification.

Robert J. Woodward, Vice President
Chesapeake Sciences Corp., Annapolis, Md.

It's companies like us, who don't have the in-house resources, that can benefit from Sandia's technical assistance. Sandia was able to bring in test equipment that would otherwise

"I can't say enough about the professionalism, responsiveness, and expertise of Neil Davie and all those who helped with the tests at Sandia," says Laguna's David Melton.

At the time of this technical assistance project, Laguna Industries employed 170 people. Since then, the company has grown. It now provides 350 high-quality jobs in New Mexico.

have been unavailable to us, potentially saving us tens of thousands of dollars in testing and engineering resources.

Ron Lemberger, Vice President
TriOx, Dublin, Calif.

I had heard of Sandia's technical assistance program, but I assumed it was for high-end, large businesses — not for small operations like mine. I'm delighted Sandia was able — and willing — to provide the help I needed.

Dave Stewart
Corporate Image Video, Albuquerque

On the line was an \$8 million contract that could have been canceled for non-compliance. Our contract — indeed our corporate viability — hung in the balance. We needed a fast turnaround, and Sandia provided it.

Robert M. Lantis, Manufacturing Manager
Lasertechnics, Inc., Albuquerque

Paul Robinson urges balance in funding for core programs and new science-based stockpile stewardship initiatives

Congressional testimony makes case for strong support of DOE weapons program

In written testimony submitted last week to the Senate Armed Services Committee's Subcommittee on Strategic Forces, Labs Director C. Paul Robinson focused on the mission Sandia and DOE's other weapons laboratories fulfill in the stewardship of the nation's nuclear weapons stockpile.

In addition to offering written testimony, Paul served on a panel with other lab directors and production plant managers from DOE's nuclear weapons complex to answer senators' questions about stockpile-related issues.

The subcommittee was meeting to consider proposed legislation authorizing funds for fiscal year 1998 for DoD and the future years' defense program, focusing on DOE weapons programs. New Mexico Sen. Jeff Bingaman, ranking Democrat on the subcommittee, co-chaired the hearing with subcommittee Chairman Bob White (R-N.H.). Other senators participating in the hearing were John Glenn (D-Ohio) and Dirk Kempthorne (R-Idaho).

"The challenges of stockpile stewardship are formidable,"

Paul said in his written testimony, "particularly now that there are no new weapon designs in the offing and we are constrained from nuclear testing by treaty. In addition, there seems to be widespread indifference or opposition toward nuclear issues in policy circles today."

Major challenges to stockpile

After briefly reviewing the Labs' accomplishments in pulsed power, synthetic aperture radar, replacement of the B53 with the B61-11, warhead dismantlement, neutron generator production, and high-speed computing, Paul made the case for congressional funding support of the stewardship mission at adequate levels.

"We in the nuclear laboratories serve as the nation's conscience for the technical integrity of [the] stockpile. . . The stockpile stewardship program faces several major challenges — some of which are urgent."

Paul asserted that the deterrence value of nuclear weapons was the dominant factor in preventing the Cold War from becoming "hot," adding that the US "must depend on its stockpile of nuclear weapons to prevent major wars for the foreseeable future."

He said a number of issues must be addressed to assure a viable stockpile.

"One of the major long-term challenges we face," he said, "is how to ensure the reliability of an aging stockpile. . . It is our daunting task to ensure that systems remain reliable for decades beyond their planned service." To do that, he said, it is necessary to understand the parameters of aging in electronics, materials, and structures in order to anticipate "failure paths," and to provide for timely upgrades, replacements, and rebuilds.

At START II levels, he noted, the stockpile will be much smaller and much less diverse than it was during the Cold War. "Less diversity in the stockpile raises the risk that a single repeated flaw, a 'common-mode failure,' could compromise a significant portion of the deterrent." In turn, a smaller production capability has less ability to rapidly correct a common-mode failure that might occur. As a result, he said, "the production complex also urgently needs modernization."

"These factors narrow the margin of error that can be tolerated in the remaining weapons and drive the need for much tighter stockpile surveillance."

Paul outlined ways Sandia is addressing the aging-weapon concerns. Among them: the Enhanced Surveillance Program, which conducts fundamental research in materials aging; studies

of the effects of aging in components and subsystems; and the augmentation of computational capabilities needed to model and predict the effects of aging without resorting to destructive testing from the increasingly limited stockpile base.

Paul also discussed the Model Validation and System Certification Test Center, which will support the integration of empirical testing and theoretical understanding through computation. Also, Paul said, Sandia is exploring on-board sensors that can constantly and automatically monitor telltale "signatures" of aging and degradation in weapons.

Paul noted that two years ago DOE's weapons lab directors told President Clinton the labs could meet the challenge of maintaining the nation's nuclear deterrent under a comprehensive test ban "if we pursued a long range program of science-based stockpile stewardship."

"We emphasized that a continuing strong commitment to a science-based stockpile stewardship program would be essential if we were to have a chance to succeed. This commitment requires sufficient funds to support the core program for maintaining the stockpile as well as an investment in special facilities required to perform our work in the absence of underground nuclear tests."

Reaching the threshold

Although there are those who regard the \$4 billion budget for nuclear weapons as excessive, Paul said, the costs of stockpile stewardship are not a linear function of its size.

"A threshold capability will be needed to support the stockpile as long as it numbers in the thousands. . . I believe we are near that threshold now."

Although some try to portray the "core activities" within the weapons program as "a sandbox for scientists and engineers to play in," the fact is "the core is at the heart of the historical bond between the laboratories and the government in carrying out nuclear weapons research and development efforts. Through the core, our laboratories are accountable to the government to anticipate what the technical needs of the weapons program will be years in advance."

Paul said the essential question for managing



LABS DIRECTOR C. Paul Robinson, here answering a reporter's questions during a recent news conference at Sandia, presented congressional testimony March 19 to the Senate Armed Services Committee's Strategic Forces Subcommittee. (Photo by Randy Montoya)

the total program under a substantially reduced budget will be how to balance the needs to support and maintain the stockpile itself — to maintain the essential skills needed to address problems as they arise — while also creating new facilities (the Dual Axis Radiographic Hydrotest facility, the National Ignition Facility, the X-1 facility, and others) to partially substitute for the loss of nuclear testing.

"I believe the present course we are pursuing — a continual reduction of an already depleted core weapons program — will be particularly destructive to the ability of Sandia to meet the challenge we promised the White House we would undertake. Having served for much of my early career in leading the nuclear weapons efforts at one of the nuclear physics design laboratories [Los Alamos National Laboratory], I can also express my doubt that the present funding can sustain their necessary core weapons capabilities while also financing their needed efforts in new facility initiatives. If no additional funds become available, I believe that it will be necessary to readdress the funding allocation to achieve a better balance between core and initiatives."

After addressing several other concerns — the need to support adequate joint flight test capabilities, to maintain adequate design and production capabilities, and to assure a supply of radiation-hardened microelectronics — Paul returned to the issue of funding for the core weapons programs versus funding of new initiatives driven by the needs of science-based stockpile stewardship.

"Without proper funding," he said, "we will ultimately face a tough choice: Shall we adequately support the people and skills that are essential to sustained stewardship, or those that are required for developing and operating the new initiatives in science-based stockpile stewardship?"

"It would be regrettable to have to once again rebalance the objectives in the overall program between the core weapons activities and the new initiatives to find substitutes for testing; but a tradeoff between preserving irreplaceable expertise or 'bricks and mortar' for the future would indeed be a Hobson's choice. The stockpile stewardship program must be prudently managed to provide for our technology base needs; and we must also find a way to fund the strategic investments required for science-based stockpile stewardship at a pace that will bring them into useful service to support the program before we face a crisis within a critical weapon system in the existing stockpile. I fear that time is not on our side."

[The complete text of Paul's testimony is available on Sandia's Internal and External Web at http://www.sandia.gov/testimony/test_hom.html]

Lab directors, plant managers testify

In addition to Paul Robinson, others submitting testimony to the subcommittee and participating in panel discussions included: Vic Reis, Assistant Secretary, Defense Programs, DOE; Gen. Eugene Habiger, USAF, Commander-in-Chief, US Strategic Command; Sig Hecker, Director, Los Alamos National Laboratory; Bruce Tarter, Director, Lawrence Livermore National Laboratory; Ambrose Schwallie, Westinghouse/Savannah River Corp., Aiken, S.C.; Karen Clegg, AlliedSignal, Inc., Kansas City; F.P. Gustavson, Lockheed Martin Energy Systems, Oak Ridge, Tenn.; and William Weinreich, Mason Hanger/Pantex Plant, Amarillo, Texas.

Kathy Carlson on Blair House Papers: Deliver, partner, reinvent, solve

The challenge to the future for DOE, concluded Kathy Carlson (DOE/AL's acting assistant manager for Defense Programs) in a talk to Sandia managers at a recent Coronado Club breakfast, is "to walk on water." Specifically:

- Predict future nuclear weapons needs;
- Do more with less; and,
- Design and build more agile, cheaper, and faster production and management systems.

The challenge is extrapolated from the "Blair House Papers," which are quickly becoming "the principles by which federal agencies must operate," she said. As the principles filter down, the national laboratories and all other federal contractors will need to get to know — and follow — them.

The Blair House Papers, handed to all Cabinet members by President Clinton and Vice President Gore on Jan. 11, are the marching orders in the administration's National Performance Review (also known as the "reinventing government" initiative).

Three principles

The papers are built around three precepts:

1) Deliver great service: "Identify your customers; continually ask your customers what they want." Kathy said DOE's survey of its customers' satisfaction was to be completed by the end of March.

2) Foster partnership and community solutions: "DOE sees this principle as a mandate to streamline and/or reduce regulatory burdens," said Kathy. "It's an area where we're looking to Sandia for help, especially as we must also work together to reduce the overall costs of DOE's nuclear operations."

3) Reinvent to get the job done with less: "Don't decide anything inside the [Washington, D.C.] Beltway that can be decided outside." As the congress-



FEDERICO PEÑA, the new Secretary of Energy (see his greeting to DOE and national lab employees on page 1), visited Sandia in October 1994 as Secretary of Transportation. He received briefings on the application of DOE-developed national security technologies to national transportation needs. In this *Lab News* photo on that occasion, Peña (second from right), speaks with, from left, James Kelsey (now 5700), Steve Roehrig (now 2663), and Gerry Yonas (VP, Div. 9000).

sionally mandated 120-day study is showing, "We have too many feds chasing too little work."

DOE's Defense Programs must somehow balance the demands of the DoD, the DOE labs and production facilities, the administration, and Congress, she said. With its systems engineering, Sandia "is the glue that holds the nuclear weapons system together," she said.

The full Blair House papers are available electronically at <http://www.npr.gov/library/papers/bkgrd/blair.html> — Bruce Hawkinson

One-volume history of Sandia available for advance orders

400-page book will be available in early summer

The Sandia History Program announces the pending publication of a one-volume history of Sandia, *Sandia National Laboratories: A History of Exceptional Service in the National Interest*. This general history traces Sandia's development from its Cold War origins during the 1940s to the present.

To be available in early summer, the 400-page history is heavily illustrated and provides information on the vast range of Sandia's programs. A reference copy will be sent to each department and above, but funding does not permit providing a copy to every Sandian.

The National Atomic Museum Store has

agreed to handle distribution of the book while quantities last and will offer reduced rates to Sandia employees and retirees. Prices will be \$17 for the general public, \$12.50 for Sandia employees, and \$10 for retirees.

An announcement will appear in the *Lab News* when the book is printed. Advance orders are being taken now to ensure that enough copies are printed for those interested. Use the order form below to reserve your personal copies. The deadline for orders is May 1. If you have any questions about the book, contact the corporate historian, Carl Mora (15102), at 844-8011.

Welcome

New Mexico — Bryan Ingram (2663)
 Kansas — Joseph Castro (9221)
 Nevada — Michael Fahrenheit (9719)
 Ohio — Julie Fillinger (4823)

Ideas in Science & Electronics (ISE) Exhibition May 6-8

Albuquerque Convention Center

KEYNOTE LUNCHEON

May 6, noon

"Access to the Future: Where is Today's Technology Going to Take Us?"

- Sandia Executive VP John Crawford
- Intel Site Manager Bill Sheppard

Luncheon RSVP to 872-8020 by April 25 deadline.

Technical topics and demonstrations

- Topic information and schedules available on the Web at <http://www.isetradeshow.com/exhibit>

Professional development four-hour courses

- *ISP 14000: Environmental Management Systems*, Toni Ristau, PNM Director of Environmental Systems
- *Digital Signal Processing: Theory to Implementation*, Neeraj Magotra, Associate Professor EECE, UNM
- *Probabilistic Risk/Safety Analysis*, Arlin Cooper (12331), Adjunct Professor, UNM
- *Tools for Intelligent Problem Solving*, George Luger, Professor of Computer Science, UNM

To register for a booth, luncheon, or seminars or for more information, call ISE at 872-8020.



Sandia history book order form

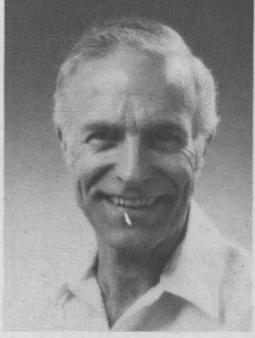
I would like to order a copy of *Sandia National Laboratories: A History of Exceptional Service in the National Interest*. To reserve your copy, fill out the information below and send it, along with a check or credit card information, to the National Atomic Museum Store at the following address: P. O. Box 5800, MS 1490, Albuquerque, NM 87185-1490.

I am a Sandia employee (cost for employees \$12.50/copy).
 I wish to purchase _____ copy(ies). Amount of check enclosed: _____ or
 charge to: ___Visa ___MasterCard
 Card No.: _____ Expires: _____
 Name: _____ Phone: _____ MS: _____
 Employee copies will be delivered to mail stops.

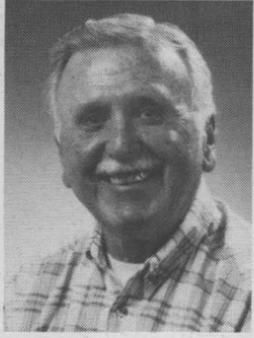
I am a Sandia retiree (cost for retirees \$10/copy + postage and handling fee of \$5).
 I wish to purchase _____ copy(ies). Amount of check enclosed: _____ or
 charge to: ___Visa ___MasterCard
 Card No.: _____ Expires: _____
 Name: _____ Phone: _____
 Mailing Address: _____

I do not want my copy mailed; I will pick it up at the National Atomic Museum after the announcement in the *Lab News* that copies are available.

Recent Retirees



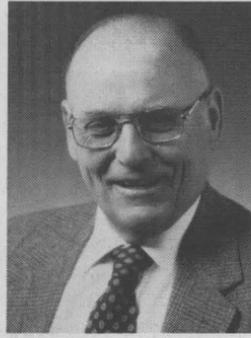
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Ed Kociscin 35
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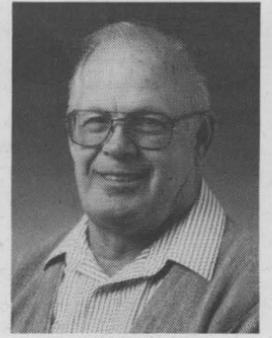
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Ralph Johnson 31
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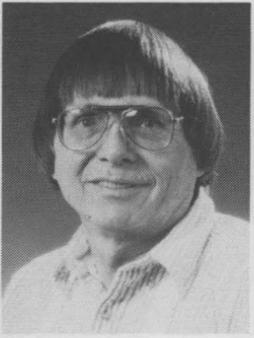
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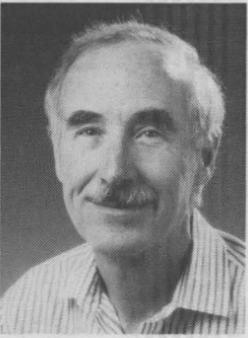
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Ken Gentry 40
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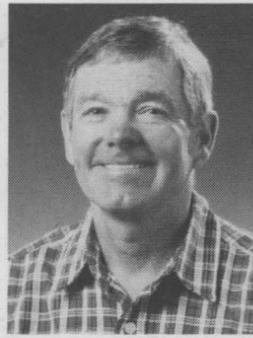
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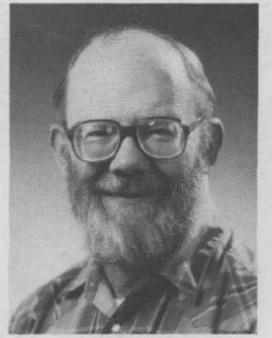
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Al Ayotte 28
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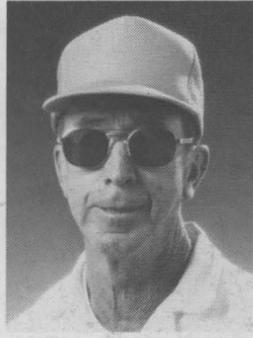
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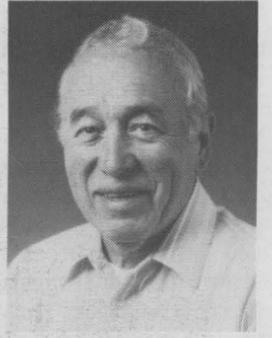
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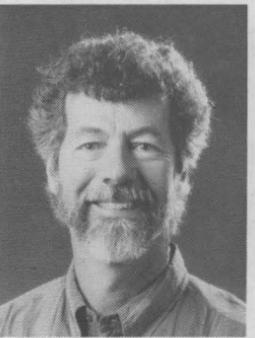
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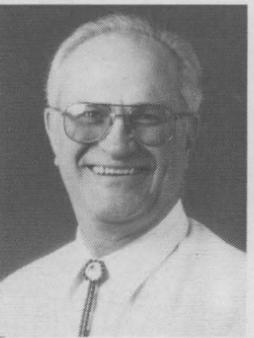
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Larry Lopez 19
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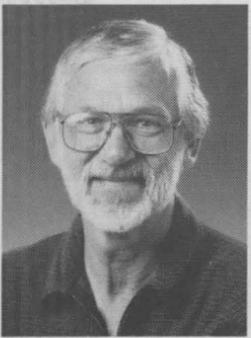
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Bob Simpson 34
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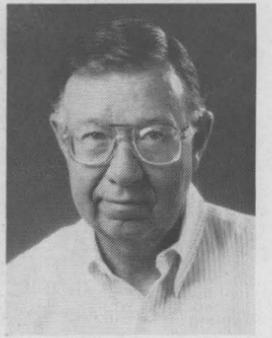
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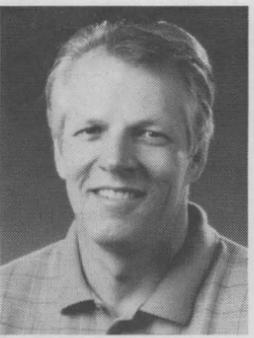
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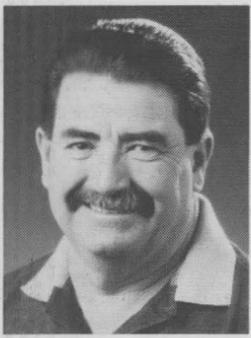
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Alan Spencer 27
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Ollie Davis 30
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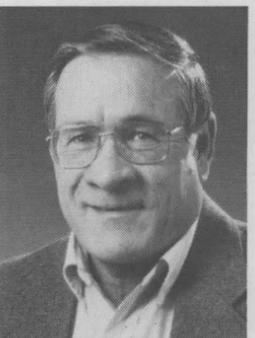
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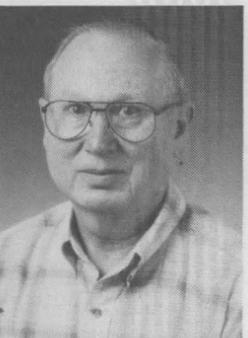
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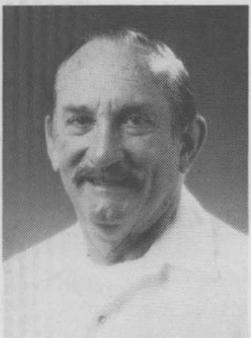
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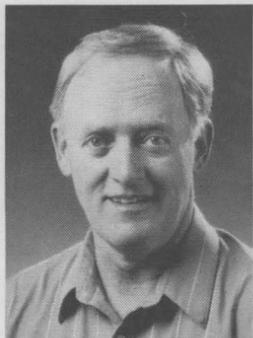
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Larry Hermesmeier 28
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Lester Harris 38
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Carl Pennington 31
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Cleo Kerr 27
6000

Software forum marks 50 years of software

Although the news media took considerable note last year of the 50th anniversary of the birth of the computer, little attention has been given to the 50th anniversary of software.

Advances in software over the past 50 years as well as software issues for the future are the focus of the 1997 Software Quality Forum, April 1-3, at Sandia's Technology Transfer Center (Bldg. 825). About 200 software engineers, technicians, and managers from throughout the nation's nuclear weapons complex and from software-related industries and academia throughout the Albuquerque area are expected to attend.

"We are going to have to treat software development with the same seriousness and rigor as we have our hardware development," says Sandia Deputy Director John Crawford, who is scheduled to speak at the forum on April 2. "The potential value of computing resources increases daily, and so do the challenges to use those resources in a way that contributes to corporate enrichment."

The forum will give participants a chance to exchange information and ideas about technologies and methods of software development,

including software quality in aerospace and defense applications. Participants will share experiences, technologies, processes, successes, and lessons-learned in implementing software practices at their sites.

David Parnas, a recognized advocate of software quality, will lead three tutorials on April 1. Capers Jones, an international consultant on software management and chairman of Software Productivity Research, Inc. in Burlington, Mass., will present the keynote address at 9 a.m. April 2. His address will be followed by 30 presentations by other speakers later on April 2 and 3.

The Software Quality Forum, held every three years since 1988, is open to the public. Registration fee is \$25 for employees of DOE laboratories, government employees, and members of the Software Process Improvement Network (SPIN); \$100 for others.

The forum is sponsored by the Software Quality Assurance Subcommittee, DOE Quality Managers, and the Weapons Quality Division — DOE/Albuquerque Office and is hosted by Sandia and the Albuquerque-area chapter of SPIN.

Sandia joins in CRADA to improve film coating processes

Representatives of Sandia and several major companies met in Albuquerque March 18-19 in the first annual meeting for a cooperative research and development agreement (CRADA) that potentially will advance special simulation software to help improve manufacturing processes for products such as photographic films and adhesives.

The participating companies — Xerox, Avery Dennison, 3M, Imation, Kodak, Polaroid, and PPG Industries — have formed the Coating and Related Manufacturing Processes Consortium to undertake the work. The purpose of the CRADA is to develop, test, and evaluate technologies of near-term application that improve the quality and reduce the cost of continuous liquid-film coating processes. Sandia will develop computer software that will be used for evaluation, validation, and testing.

Continuous liquid-film coating is a process whereby gas is displaced at a solid substrate (coating base) with a layer of liquid (typically, a sheet or bead of the liquid to be solidified) in a continuous fashion. The total value of products produced with continuous liquid-film coating techniques is \$200 billion annually in the United States and \$600 billion worldwide.

The process is used in many products, including electronic films, packaging films, photographic films, decorative films, adhesives, and magnetic optical storage media. For further information, contact Randall Schunk (9111) at 844-5992.

SQPC sponsoring Week of Caring drive April 7-10

The Secretarial Quality Process Council (SQPC) is sponsoring and coordinating the special drive for the Sandia Week of Caring April 7-10. Sandia's Week of Caring is focused on St. Martin's Hospitality Center, a United Way agency that provides services for homeless and near-homeless individuals and families in Albuquerque. Originally a soup kitchen, St. Martin's now provides shelter (open 24 hours during the winter), Alliance Job Service, Behavioral Healthcare Service (including housing for mentally ill people), and Traveler's Aid Service (for stranded families and individuals).

Special drive items include new toothbrushes, combs, athletic socks, and small toiletries (such as those required while traveling). Items will be collected at posted locations in each building, as well as the lobby of Bldg. 811. Items can also be taken to the March 31 SQPC information session at the Technology Transfer Center (Bldg. 825), 10-11:30 a.m. If you have questions, call Kelly Bobbe (1800) at 845-949.



COMET HALE-BOPP rises above the Sandia Mountains in this predawn view from Albuquerque's Sandia Heights last week. *Lab News* Editor Ken Frazier took this 18-second exposure with a 105 mm lens March 18. Comet Hale-Bopp is the largest and brightest comet in decades. Cloudcroft, N.M., astronomer Alan Hale (Southwest Institute for Space Research) and Arizona amateur astronomer Thomas Bopp discovered the comet independently on the night of July 22, 1995, at a near-unprecedented discovery distance well beyond the orbit of Jupiter, and it has been approaching the inner solar system in an orbit nearly perpendicular to the plane of the ecliptic ever since. It reaches its closest point to the sun on April 1 and is expected to remain a visible object for some time. It can now be seen easily with the naked eye after dark in the northwest. For several weeks its morning appearance rising low in the northeast before dawn was dramatic, but this week the morning view has diminished, with comet-rise and early daybreak coming nearly simultaneously.

Around the corporation **LOCKHEED MARTIN**

Norm Augustine presents panel's Antarctica findings

Lockheed Martin Chairman and CEO Norm Augustine recently reaffirmed to members of the House Science Committee the importance of maintaining the US presence in Antarctica, but suggested a slimmer renovation of outdated US facilities.

Speaking as chairman of the US Antarctic Program External Panel, Augustine summarized the panel's report, which has not yet been released. He said panel members agree with a National Science and Technology Council conclusion that "from a policy perspective, the NSTC finds that maintaining an active and influential presence in Antarctica, including year-round operation of South Pole station, is essential to US interests."

Committee Chairman James Sensenbrenner, R-Wis., spoke of the importance of continued US presence in Antarctica and mentioned passage last year of funding to alleviate some of the most pressing problems but noted that after visiting US facilities there, he had "many concerns if the buildings will last until even the end of the decade."

Committee member Steve Schiff, R-N.M., agreed, saying, "Congress has not focused on this as much as it should."

Augustine's panel recommends replacement of the South Pole station with what they call an "optimized station," which would cost \$30 million less than a \$120 million "enhanced station," although the latter would provide "additional capability and the opportunity for development of energy and environmental technologies."

Employee death

Michael Garcia (31) of Protective Force Dept. 7435 and his wife, Yvette (29); daughter, Chelsea (2); nephew, Miguel Garcia (13); and niece, Janine Pino (12) died March 23 in an auto accident.

Michael came to Sandia in 1986 as a nonregular recurrent security inspector and became a regular employee in 1989. He was a Security Police Officer III assigned to the Special Response Team.

Survivors include their 6-year-old son, Justin, and a niece, Angel Gomez.

With the help of Sandia's Security Police Association, the Sandia Laboratory Federal Credit Union has opened a trust fund for Justin (#117307) and a Garcia Memorial Fund (#502290-00-01) for dealing with the costs of funeral arrangements.

Mileposts

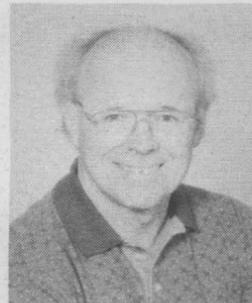
March 1997



Sallie Robertson
20 8534



Curt Cofield
30 8411



Don Osbourn
30 2265



Ron Allen
35 8533



Judd Hollister
10 8815



Jackie Garrett
35 8812



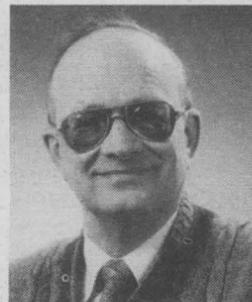
Mitch Williams
20 8117



Marty Abrams
30 8114



Mary Gallegos
20 10244



Don Wright
30 12335



Raymond Decker
25 1541



Al Manzanares
30 7934



Hugh Church
40 6612



Louis Nogales
35 5513



James Poukey
30 9541



Carla Perea
20 7845



Nestor Ortiz
20 6400



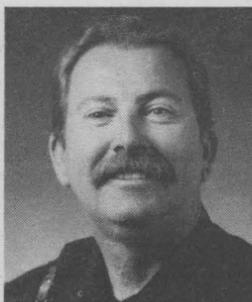
Linda Garcia
15 4823



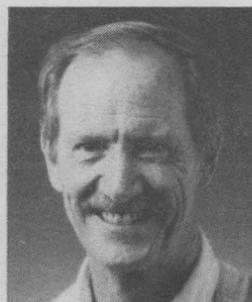
Bill Bonahoom
25 2121



Catherine Benavidez
20 10206



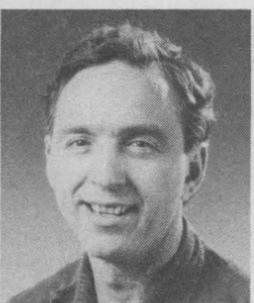
Dennis Carroll
15 7435



T. Frank Ezell
30 6524



Gary Concannon
15 10505



Thomas Hund
20 6218



Rusty Gillen
15 14404



Judith Jojola
15 10244



Carl Iafonaro
20 10503



Michael Patton
15 7435



Yolanda Padilla-Vigil
15 3560



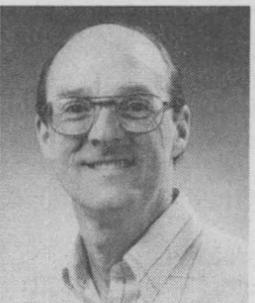
Joseph Roesch
20 5513



Fred Yost
25 1841



Paul Beeson
35 1812



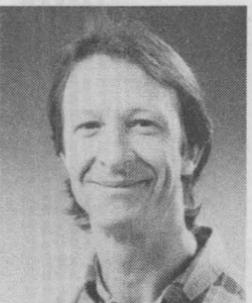
Tom Mayer
25 5516



Sandra Foster
20 4913

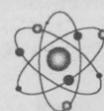


Robert Varga
30 5716



Rick Heintzleman
20 2343

Trinity Site tour April 5



The National Atomic Museum is sponsoring a tour of the Trinity Site, where the world's first atomic bomb was detonated, on Saturday, April 5.

Trinity Site facts:

- The Trinity Site on White Sands Missile Range is open to the public only twice a year.
- The 21-kiloton explosion on July 16, 1945, marked the end of the Manhattan Project and the start of the Atomic Age.
- Visitors can see "ground zero," Jumbo, Trinitite, and the Schmidt-McDonald ranch house.

How to get tickets:

Tour buses leave the National Atomic Museum at 6:30 a.m. and return by approximately 4 p.m. Cost of the tour is \$25. Tickets are available at the Museum store; call for more information: 284-3242. All profits go to further the Museum's educational goals.

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

MISCELLANEOUS

SOFA AND LOVE SET, w/two recliners built into each piece, great condition, \$600. Anderson, 883-2647.

ENGLISH BITS: 5-in. rubber "D" snaffle, \$12; "D" copper roller snaffle, \$13; woman's size 32 stretch-denim schooling britches, \$10; leather running martingale, \$14. Baldo-Pulaski, 345-0432.

AMANA GAS DRYER, large capacity, 2 yrs. old, white, \$200 firm. Cole, 332-4175.

FOUR WHEELS, white-spoked steel wheels, for tandem-axle flatbed trailer, 15 x 7, Chev. bolt pattern. Martinez, 821-7467.

'83 PICKUP CAMPER, shortbed, 6-ft., full-size, six-pac, heater, \$800; drafting table/desk, full-size, 38" x 60", free if picked up. Love, 832-1338.

KITTEN, free to loving home, 7-month-old female, spayed. Lucero, 867-4504.

WEDDING DRESS, Jessica McClintock, size 10, perfect for summer wedding, halter-style, w/tea-length raw silk skirt, \$175. Blackburn, 286-1772.

486-50 PC, \$200; video security system, \$125; exercise bike, \$75; parrot breeder cage, \$175. Snowden, 856-7215.

CHOW, red male, neutered, current shots, gentle, friendly, free to good home. Pineau, 265-6969 or 821-1628.

DINETTE TABLE, solid wood, oval shape, 48" x 36", w/4 wood chairs, \$50. Henson, 291-0180.

TREADMILL, WESLO-EPIC, 1-10-mph, power incline, programmable speed, 1.5-hp, excellent condition, \$150. Thompson, 823-4567.

RIFLE, Winchester, Model 94, carbine .30-.30 excellent condition, \$200. Zarick, 898-8840.

STUDENT VIOLA, w/case, bow, \$400 (appraised); small microwave, nice, \$40; solid oak super-single waterbed, \$150. Barron, 294-3216.

BEDROOM SET, Pennsylvania House, cherrywood, 4-post bed, triple dresser, mirror, night stand, \$1,200. Jones, 244-1259, after 6 p.m.

SKI-MACHINE, Precor 515e, commercial, heavy-duty model, w/display, \$200 OBO. Miskowicz, 821-4149, after 6 p.m.

MOWER, Sears rotary, 5-hp, used 1 season; belt/disc sander, 6-in., like new. Hanson, 298-2120.

FIREWOOD, about 1/2 cord, cut & split, you load & haul, \$20. Nutt, 856-8267.

SMALL IMITATION ICE BOX, wood grain, \$35; stereo cabinet, wood grain, w/glass front, \$25; rattan stereo cabinet, \$20. Gregory, 275-3855.

TWO SOLID-OAK BARSTOOLS, excellent condition, \$65 ea.; Scotts lawn spreader, \$10. Oborny, 299-8509.

FISHER PRICE CHANGING TABLE/DRESSER, white, 4-drawer, excellent condition, \$50. Marshall, 298-1699.

COMPUTER MONITOR, 20-in. Control Data, \$75, Sun Sparcstation 330, \$300. Nava, 286-3306.

TELESCOPE, don't miss Hale-Bopp, Celestron 4.5-in. Newtonian, 250x, Equatorial mount, several lenses & filters, hardwood tripod, \$900+ invested, asking \$500. Robbins, 292-7355.

WOMAN'S GOLF CLUBS, custom-made, new, will fit to your height, 3-PW, driver, \$175/all. Fischer, 292-3427.

MATERNITY CLOTHES, career & casual, spring, summer, some fall styles, small sizes 6 & 8. Moya, 856-1245.

STEREO AMPLIFIER, Aragon 4004 Mk II, EC, \$1,200, interconnects, Continental snow tires, on 13-in. rims, \$25 ea. Miller, 281-3655.

CARPETING, w/pad, living/dining/family, master, 3 bedrooms, \$2/sq. yd. Rogers, 292-4396.

LIFESTYLER PRO EXERCYCLE, Professional series, 5 training tracks, enclosed wheel, \$200. Phelan, 869-6094.

REFRIGERATOR, 17-cu.-ft. (frostless). Harrison, 344-2613.

SECURITY PATIO DOOR GRILL, wrought-iron, decorative 9-ft. patio/sliding door guard, w/dead-bolt locks, \$40; matching window grill(s), \$25. Chu, 275-9353.

PHOTOVOLTAIC PANELS, Solarex MSX60 modules, 3 available, \$300 ea. Zirzow, 281-9896.

RUGER HANDGUNS: P-94 semi-auto 9mm; SP-101 revolver 9mm; super-single-six revolver, 22 cal. Garrett, 856-6191.

ELECTRIC GENERATOR, Coleman 5000 plus, used once, cost \$600, asking \$495 cash. Babcock, 299-3121.

BOXER PUPPIES, AKC-registered, good pedigree, parents on premises, dew claws removed, 1st shots, ready on April 4, \$300. Lopez, 873-4094.

MINOLTA XG-1 CAMERA, single-lens reflex, great for beginner, \$100. Clausen, 856-4018.

CONN ALTO SAX, excellent condition, \$300; man's bicycle, 10-spd., excellent condition, \$75. Webb, 828-2271.

COOLING SYSTEM ANALYZER, never used, new, \$100; deluxe hubcap & wheel lock removal kit, \$70; advance timing light, \$150. Mays, 1-800-659-1779, then 844-5432.

PRO MIDI SEQUENCER, internal memory, 3-1/2-in. floppy drive, 32-tracks, 16 channels, many other features, \$150. Prins, 867-9440.

WASHER/DRYER, Magic Chef, like new, excellent condition, \$350/both. Matz, 332-3359.

PROPELLERS: 20-, 21-, 22-pitch Mercury/Yamaha aluminum/SS; mobile home furnace; Blazer/Jimmy bedliner, misc. Trollinger, 265-1615.

SEGA GENESIS, w/CD, games, accessories, \$175. Fenstermacher, 298-9050.

FISHER STEREO COMPONENTS: CA-272, 100-watt amplifier; FM-272 AM/FM tuner; CR-W45 dual cassette; MT-720 semi-automatic turntable; \$50 ea. Lojek, 898-2979.

TIRE, 195/70R14, w/rim, \$60; tire cable chains, \$35; bike carrier, \$35; 4 Berretta wheel mud flaps, \$20. Jarrett, 254-1035.

MACINTOSH COMPUTER LC575, 12MB RAM, internal 4X CD ROM, built-in 13-in. screen, extended keyboard, \$750. Kuhlmann, 294-3462.

MICROWAVE, 15H x 24W x 18D, Toshiba, \$50. Shunny, 265-1620.

OFFICE FURNITURE (industrial quality): round conference table, 48-in.; desk, 59" x 30", w/90-degree side extension; computer desk, w/printer stand. Snelling, 294-5751.

SLEEPER SOFA, queen-size, earthtones, excellent condition, \$225. Castillo, 292-2709.

CADENCE 955 TREADMILL, 0-10-mph, 2-hp, safety key, incline adjust, AccuSmart Fitness monitor, \$695 new, asking \$375. Lopez, 291-0010.

GARAGE SALE, March 28-29, 8 a.m.-3 p.m., dinette set, china, electronics, golf clubs, gas grill, exercise equipment, 10800 Hagen NE. Martel, 293-1892.

YORK PEPPERMINT PATTY VENDING MACHINES, new in boxes, paid \$240 ea., asking \$100 ea. or 60 for \$5,000. Frazier, 345-7189.

GARAGE SALE, nice 5-ft. coffee table, child's desk, more, Fri. March 28, 1321 Glorietta St. NE. Baney, 294-8970.

CRAFT FAIR, April 5, 9 a.m. to 4 p.m., La Cueva High School, LCHS band fund raiser. Ekman, 296-3758.

LEATHER SOFA, good condition, beige, \$450; pine futon frame, w/o mat, \$80; drafting table, \$35. Olbin, 275-2681.

AKC TINY TOY POODLE, father is teacup, mother is toy, chocolate, has all shots, \$175. Vigil 880-0026.

COUCH/SLEEPER, \$125; table/chairs, \$60; dresser w/mirror, \$125; computer desk, \$60; all excellent condition; antiques. Epperson, 271-9880.

TRANSPORTATION

'92 PONTIAC SUNBIRD, AT, AC, PS, 2-dr., new tires, new brakes, 54K miles, \$5,800. Quintana, 275-5842.

'89 MUSTANG LX HATCHBACK, AC, PS, PB, PL, PW, new paint & tires, \$4,000 OBO. Sanchez, 865-9077.

'81 DATSUN 200SX, 4-cyl., 5-spd., PS, PW, AC, 113K miles, new front brakes, good condition, \$1,600 OBO. Swanson, 275-9495.

'95 DODGE B250 GLAVAL CONVERSION VAN, 23K miles, warranty, V8, drivers air bag, dual AC, TV/VCP, PW, towing pkg, more, \$18,900 OBO. Gonzales, 299-3491.

'85 DATSUN TRUCK, 4x4, extended cab, AC, 5-spd., \$4,050. Guinn, 898-9339.

'96 PONTIAC SUNFIRE, purple, 2-dr., tint, tilt, AC, 5-spd., AM/FM cassette, 29K miles, 3 yr./45K mile warranty, excellent condition, \$11,800 OBO. Riley, 843-9698.

DEADLINE: Friday noon before week of publication unless changed by holiday. MAIL to Dept. 12640, MS 0165, FAX to 844-0645, or bring to Bldg. 811 lobby. You may also send ads by e-mail to Nancy Campanozzi (nrcampa@sandia.gov). Call Nancy at 844-7522 with questions. 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. No phone-ins.
4. Use 8 1/2" by 11-inch paper.
5. Type or print ad; use accepted abbreviations.
6. One ad per issue.
7. We will not run the same ad more than twice.
8. No "for rent" ads except for employees on temporary assignment.
9. No commercial ads.
10. For active and retired Sandians and DOE employees.
11. Housing listed for sale is available without regard to race, creed, color, or national origin.
12. "Work Wanted" ads limited to student-aged children of employees.

'87 SUBARU GL HATCHBACK, 4x4, AC, dependable, \$2,700; '70 Buick LeSabre 350, 2-dr., AC, 35K original miles, very clean, \$4,200. Zarrella, 831-1981.

'92 MAZDA MIATA, convertible, 38K miles, 5-spd., AC, AM/FM cassette, 4-cyl., \$9,700, \$1,000 below retail. McRee, 898-5165.

'93 SAFARI CONVERSION MINI VAN, loaded, 59K+ miles, AT, AutoVantage valuation, \$11,100. Wiley, 897-1891.

'88 TOYOTA TRUCK SR5, 4WD, 78K miles, AC, alarm, roll/push bar, stereo, numerous extras, excellent, \$8,100. Thompson, 292-2877.

'90 BUICK PARK AVENUE, 54K miles, loaded, immaculate, NADA retail \$10,450, asking \$8,500. Jacobus, 271-1796.

'94 ACURA INTEGRA GS-R, immaculate, V-TEC, 170-hp, 5-spd., 18K miles, AC, ABS, sunroof, \$500 below NADA. Henderson, 299-6083.

'92 FORD RANGER XLT, shortbed, 2.9L, 4x4, 5-spd., w/bedliner & matching shell, low mileage, excellent condition, \$9,999. Willis, 281-5059.

'92 LEXUS ES300, plum, excellent condition, leather, sunroof, 6-CD, cassette, 69.7K miles, asking \$17,900 (\$2,150 below NADA). McKeever, 299-4050.

'89 JEEP CHEROKEE, 4-dr., 95K miles, white, \$7,500. Madrid, 296-7104.

'92 CADILLAC ELDORADO, excellent condition, loaded, leather interior, taupe color, Delco Bose sound system, vinyl top. Alarid, 294-4930.

'90 LINCOLN TOWN CAR, loaded, tinted windows, AM/FM cassette, leather, auto climate, 1 owner, like new, \$11,000. Morton, 296-6108.

'77 CHEV. MANZA 305, straight body, AT, PS, \$900 OBO; '72 Chev. pickup, 350, 4-spd., 4-barrel w/headers, CD, PS, runs great, \$3,000 OBO. Black, 246-9181.

'91 ACURA INTEGRA, 3-dr., 5-spd., excellent condition, (\$500 below book value), \$8,300. Kaplan, 797-2115.

'88 PONTIAC GRAND PRIX, 2-dr. coupe, AT, AC, V6, AM/FM cassette, tilt, great condition, 122K miles, \$3,900. John, 281-5795.

'95 FORD F-150, 351 V8, AT, PS, PB, towing pkg., 22K miles, excellent condition, \$13,300 OBO. McNeill, 837-9224.

'85 CHEV. PICKUP SILVERADO, camper shell, bedliner, chrome wheels, running boards, excellent condition, \$4,800 OBO. Ronquillo, 842-8833.

'90 DODGE GRAND CARAVAN SE, great condition, AC, PS, AM/FM cassette, PL, PW, cruise, 75K, \$6,800 OBO. Herrera, 884-4925 or 881-1600.

'90 MAZDA PROTEGE, 4-dr., AT, AC, AM/FM cassette, service records, great condition, \$4,100 OBO. Greenholt, 294-5286.

'94 FORD MUSTANG GT, red, fully loaded, excellent condition, 49K miles, \$14,000. Cerna, 898-4193.

'76 OLDS OMEGA, grandma's car, good compression, tune-up, muffler, shocks, 120K miles, AT, missing interior door handles, \$895. Grenfell, 344-9355.

'79 JEEP CJ-5, w/Meyer snow plow, V8, 3-spd., soft top, power angle/lift plow, \$3,500 OBO. Loucks, 255-9444.

'84 HONDA PRELUDE, red, 5-spd., AC, AM/FM stereo, low mileage, new clutch, good engine, \$1,800 OBO. Boissiere, 291-0159.

'89 CHEV. BLAZER S-10, 4x4, 5-spd., AC, \$4,500; '91 Isuzu Stylus, 5-spd., must see, \$2,900 OBO. Perez, 857-9677.

RECREATIONAL

FISHING BOAT, Starcraft, 16.5 ft., 40-hp Evinrude, trolling motor, new tires, Humminbird Fish Finder, \$1,300. Buttz, 822-1448.

'87 HARLEY DAVIDSON FXLR 1340cc, perfect condition, spoke wheels, new pipes, 20K miles, \$9,900. Rizkalia, 293-4476.

'82 HONDA GOLDWING MOTORCYCLE, excellent condition, low mileage, loaded, \$2,800 OBO. Robles, 294-6904.

SEA RAY OUTBOARD, 19-ft., w/235-hp Johnson, SS prop, 24-gallon built-in gas tank, 55+ mph, low hours, excellent condition, \$5,500. Schaub, 865-8807.

MOUNTAIN BIKE, Specialized RockHopper, 16-in., \$200 OBO. Rector, 286-1217.

'82 HONDA GOLDWING 1100cc, non-interstate, 20K miles, dark red, new tires, \$2,000 OBO. Brooks, 275-0056.

FREE SPIRIT BIKE, Sears, 10-spd., good work bike, \$30. Carlson, 897-1850.

'90 YAMAHA RADIANT 600cc, set for short rider, beautiful, sport suspension, wind screen, accessories, 9,200 miles, \$2,050. Hickerson, 281-2329.

'90 SEA RAY BOAT, 20-ft. bowrider, tandem trailer, many extras, excellent condition, lake ready. Mills, 823-4484.

ADULT TRICYCLE, single-spd., caliper brakes, large, comfortable seat, carrying basket, excellent condition, \$150. Brion, 298-1761.

MOUNTAIN BIKE, Specialized Stumpjumper, 16.5-in., Shimano Deore DX components, originally cost \$750, asking \$275. Koenig, 294-2264.

MOTORCYCLE TRAILER, 3-rail, light weight, good condition, w/spare tire, needs paint, \$300. Roeske, 255-6188.

'94 HARLEY-DAVIDSON 1200cc, 5-spd. Sportster, adult ridden, 3,100 miles, \$1,300 worth of extras, \$8,000. Larsen, 292-7301.

'95 PACE ARROW MOTORHOME, 35-ft., loaded, 9K miles, satellite, queen master, oak/leather/Corian, awning & towbar, estate sale, \$76,000. Wemple, 281-7661.

REAL ESTATE

4-BDR. HOME, Cedar Crest, 2,300 sq. ft., oversized garage, 1-1/2 acres, behind security gate, 3 yrs. young, \$249,900. Wilde, 281-7027.

6-BDR. CUSTOM HOME, 3,200 sq. ft., 3-car garage, custom shed, 2 acres, wooded, secluded subdivision, \$260,000. Rogers, 286-2143.

2-BDR. MOBILE HOME, 1-3/4 baths, newly remodeled, all utilities, 1 acre, quiet location, \$26,000. Freeman, 833-2928.

4-BDR. HOME, Four Hills, 2,400 sq. ft., 2-1/2 baths, 3-car garage, fully landscaped, great views, 2 yrs. young, \$272,000. Campos, 275-7830.

4-BDR. HOME, 2-1/2 baths, 3-car garage, 2,625 sq. ft., excellent condition, 11701 Molly Brown (Prospectors Ridge), \$219,900. Krause, 299-0931.

3-BDR. HOME, NE, 1,700 sq. ft., 1-3/4 baths, den w/fireplace, LR, formal DR, tiled entrance & kitchen, \$137,000. Machin, 822-8125.

2-BDR CONDO, Wyoming/Spain area, 2-story, garage, w/all appliances, pool, walk/bike path, \$73,000. Walters, 857-9767.

2-BDR. PATIO HOME, Sandia Heights, great views, light, open, corner lot, FSBO, \$152,000. Bromberg, 828-1548.

3-BDR. CUSTOM HOME, 1 mile from I-40, Los Lunas, magnificent views, 1/2-acre, \$149,900. Amundson, 866-1300.

2-BDR. TOWNHOME, open floor plan, raised ceilings, separate laundry room, 2-car garage, SW courtyard entry, private backyard, \$99,800. Draper, 281-2663.

2-BDR. ANGEL FIRE CONDO, furnished, 2 baths, listed w/realtor, but will sell direct w/o his commission. Howard, 268-8471.

BEAUTIFUL VIEW LOT, Rebonito subdivision, high on mountain side. Lewing, 602-584-2291.

3-BDR. RETIREMENT HOME, Grants Pass, Ore, 3 baths, 4 acres, shop, 4-car garage, gardens, views, \$199,000. McNabney, 541-476-7686.

4-BDR. HOME, Four Hills area, city & mountain views, 3,000 sq. ft., 2-1/2 baths, great room. Vigil, 296-3590.

4-BDR. HOME, 1,600 sq. ft., 2-car garage, sunroom, storage shed, updated, immaculate, Juan Tabo/Copper, \$123,500. Mayer, 299-8524.

3-BDR. HOME, Sandia Park, 2-story, 2,300 sq. ft., 2-1/2 baths, 2-car garage, 4 large porches, 2 yrs. old, fenced, 2.25 acres, views, \$205,900. Salazar, 899-0483.

3-BDR. HOME, 2,640 sq. ft., 2-story, w/amenities, Los Lunas, 2 irrigated acres, \$235,000. Hernandez, 865-4410.

2/3-BDR. CUSTOM HOME, Four Hills, 2 baths, authentic Southwest-style, 3 kiva fireplaces, 2-car garage, den, unlimited mountain/city views. Campanozzi, 275-5333, ask for Camille.

WANTED

FUTON FRAME, double size. Spear, 822-8982.

RECLINING CHAIR, comfortable & good condition. Conner, 281-9370.

CONSTRUCTION VOLUNTEERS, in mission to Macedonia, June 26-July 5, tent, cost \$1,600, space limited, call ASAP. Hardesty, 275-3905.

SLIDING GLASS DOORS, 6 ft., w/frames & threshold track. Andersen, 294-1814.

MOTHER'S HELPER (college/HS student), after-school care, 2 children, PT, 12 hrs./wk., M-F; FT/summer or job share, references, own transportation. Marquez, 294-9014.

DRIVER, licensed, for sight-impaired retiree, needed to drive to Lovelace, lives near Rio Grande Blvd., 3 or 4 times per month; do odd jobs, will pay. Lambert, 242-1822.

KODAK CAROUSEL SLIDE PROJECTOR, in working condition. Spears, 266-9782.

PERSON TO CONVERT 18mm films to video. Muguira, 286-6393.

YOUR EXTRA ISSUES of the Dec. 6, 1996, Lab News. We have only two file copies left. Mail or bring to Ken Frazier, Editor (MS 0165, Bldg. 811).

LOST & FOUND

FOUND: Pen, Bldg. 878 parking lot, claim by identifying. Maguire, 845-3105.

FOUND: Glasses, brown case, saying "safety optical," parking lot south of parade ground, identify & it's yours. Branstetter, 844-0137.

LOST: Silver dreamcatcher earring bottom, turquoise bear fetish in center, feather dangles, between Bldg. 890 & cafeteria. Pecheuwys, 856-6878.

FOUND: Socket set, at Sandia, appears complete, call to identify and it's yours. Underhill, 844-6665.

FOUND: World History textbook, Bldg. 825 conference room, March 7. Pantuso, 844-5948.

SHARE-A-RIDE

FROM BELEN AREA, working the CWW, 7 a.m. to 4:30 p.m., willing to work 6:30 a.m. to 4 p.m. Mendoza, 844-6444.

Sandia News Briefs

Sandia wins 1997 PCB Technology Leadership Award

Monitoring Systems and Technology Center 5700 has received the 1997 Technology Leadership Award from Mentor Graphics recognizing innovative printed circuit board (PCB) designs produced in the last year using the Mentor Graphics automated design tools. The contest is in its 11th year and draws worldwide entries from firms such as Hughes, Hewlett Packard, Caterpillar, TRW, Motorola, Sony, and NCR. This year, Center 5700 received this recognition for the motherboard used in the Cobra Brass telescope electronics payload. The board, designed by Tim Gibson (5722) and Rich Wilson (5717), is 13 inches by 20 inches and consists of 20 layers. The motherboard integrates 34 electronics modules each with a 220-pin connector and 8 additional connectors routing 350 external signals. The designers worked in partnership with Dept. 5706 fabrication engineers and manufacturers to tackle manufacturability issues. Other help was provided by Dept. 5717 design automation tools experts in overcoming software issues. The award will be presented at the 1997 PCB Design Conference in Santa Clara, Calif.

Sandians 'rule' in American Welding Society awards

Mike Cieslak (1860) and John Brooks (8240) have been elected Fellows of the American Welding Society. In addition, in awards announced recently by the Society, Mike won the William Irrgang Award as the individual who has made the greatest contribution to welding science and technology over the past five years. Phil Fuerschbach (1833) won the Lincoln Gold Medal for the best single-author paper published by the *Welding Journal* in 1996. And Charlie Robino (also 1833) won the Professor Masubuchi/Shinso Corporation Award as the best welding scientist under the age of 40 in the world.

Terri Roseth wins Lockheed Martin award

Terri Roseth of Property Reapplication and Services Dept. 7617 has been named a recipient of a 1996 Lockheed Martin Corporate Property Management Achievement Award. The award cites Terri for her "outstanding performance and sustained commitment to property management." Because Terri was unable to attend the presentation ceremony in Bethesda, a special presentation ceremony was to be held for her at Sandia on March 26. David Goldheim, Director of Contracts Center 15100, was to make the presentation.

Send potential Sandia News Briefs to Lab News, Dept. 12640, MS 0165, fax 844-0645.

Coronado Club

March 27 — Thursday bingo night. Card sales and buffet start at 5 p.m., early birds' bingo at 6:45 p.m.

March 29 — Carnival and Easter egg hunt with the Easter Bunny, 9 a.m.-noon. \$1.50 per person. A low-cost buffet lunch served 9 a.m.-noon.

March 30 — Family Easter brunch; call 265-6791 to select a seating time: 9 a.m., noon, or 2:30 p.m. \$10.95 for members.

April 3, 10, 17 — Thursday bingo night. Card sales and buffet start at 5 p.m., early birds' bingo at 6:45 p.m.

April 4 — "Western Night" dinner/dance. \$7.95 all-you-can-eat buffet; steak or shrimp, \$8.95, 6-9 p.m. Music by Isleta Poorboys, 7-11 p.m.

April 6 — Sunday brunch buffet, 10 a.m.-1 p.m. \$7.95 all-you-can-eat buffet. Kids 3-12, \$1, under 3 free. Music by Swingshift, 1-4 p.m.

April 11 — German music dinner/dance, 7-11 p.m.; floor show, 8-8:30 p.m. of Die Polka Schlingles. \$7.95 all-you-can-eat buffet; steak or shrimp, \$8.95, served 6-9 p.m.

April 20 — Sunday brunch buffet, 10 a.m.-1 p.m. \$7.95 all-you-can-eat buffet. Kids 3-12, \$1, under 3 free. Music by Bob Weiler 1-4 p.m.

NetDay draws Sandia volunteers to help wire local schools for the information superhighway

It is an ambitious goal that President Clinton announced last year: to wire every school in the country for access to the Internet and its information-rich World Wide Web. Now Sandia, teaming up with the nonprofit Network New Mexico organization, is helping to make the goal a reality in the Land of Enchantment.

Sandia is working with the group to wire area schools through a series of NetDay events, patterned after the successful NetDay activities in California that have expedited bringing California schools on-line.

Although the first statewide NetDay is scheduled for April 12, Sandia volunteers working with Network New Mexico helped Chaparral Elementary School in Albuquerque get a jump on the process. On March 15, working from a local area network (LAN) wiring design developed by Jay Peterson and Kathie Gustwiller of Telecommunications Operations Dept. 4417, more than 100 volunteers — including parents, teachers, and other community partners such as US West, and Sandians from Technical Library Information Resources Dept. 4414 — pulled the wires for a computer network at Chaparral, one of the largest elementary schools in the state.

Sandia was recruited into the Network New Mexico effort following a contact with Mike Eaton, Sandia's Chief Information Officer. Mike liked the sound of Network New Mexico's plans and said Sandia would help.

Networking Chaparral was a particular challenge, says Sally Landenberger, coordinator of Sandia's team involvement with Network New Mexico, because it has so many portable classrooms. That means the wiring had to be strung aurally from building to building, a trickier proposition than simply pulling wire from classroom to classroom.

According to Network New Mexico's vision, when a school conducts a NetDay event, teams of volunteers descend en masse to pull wires, add drops, and create local area networks that can be linked to the Internet.

Network New Mexico supports the NetDay process at individual schools — public and private — by providing technical support in network design, training in installation skills, and the loan of specialized tools for cable installation.

An ambitious goal: wiring the state's schools

Sally, Manager of Dept. 4414, says Network New Mexico's goal is no less ambitious — in its own, local way — than President Clinton's vision for the country as a whole: to ultimately wire every school in the state.

After a meeting with Network New Mexico members and APS technologists, Sally says, it was determined that Sandia could provide valuable assistance in the vital area of LAN design. The Labs, with its abundance of technically astute and community-minded individuals, could also prove to be a great source for NetDay technical experts and skilled volunteers.

A "lesson learned" from the Chaparral experience, Sally says, is to create a written document describing the steps in designing and installing an effective LAN.

As a librarian who understands the value of the Internet as an information resource, Sally says she is glad to see the NetDay initiative take hold. And she's glad to be a part of it.

"I feel really positive in giving something back to the community," Sally says.

In addition to Sally, other members of Sandia's team involved with Network New Mexico include: Gary Shepherd (4911), Rick Harris (4423), Dick

Allen (9205), Ivory Alexander (4417), Joe Jung (9118), Vicki Brown (3613), and members of the Integrated Information Systems staff.

Sally says Network New Mexico welcomes and encourages volunteer involvement; in fact, the group can use all the volunteers it can get for the April 12 NetDay events and future individual school designs and installations. Sandians interested in helping out can reach Sally via e-mail at salade@sandia.gov or by phone at 845-8869 for more details.

— Bill Murphy



GETTING WIRED — Sandia volunteer Tim Macalpine of CSU Technical Staff Dept. 4423 tugs local area network cabling through a ceiling panel in one of the portable buildings at Chaparral Elementary School. Tim was among more than 100 volunteers who helped wire a computer network at Chaparral during a recent NetDay event.