

# Eight R&D 100 Awards are Sandia's best effort ever

**Winning devices will benefit a variety of fields, from computing to medicine**

By Neal Singer

Sandia researchers have won eight awards in this year's R&D 100 competition — the largest number Sandia has garnered since it began competing in the late 1970s.

The awards honor inventors of the 100 most significant technological innovations of

1996, as judged by a panel of experts selected by *R&D Magazine*, a technical trade publication in Des Plaines, Ill., that sponsors the annual event.

The inventions must already be applied, or close to it, rather than "breadboard" — good ideas with much still to be worked out.

Sandia winners entered devices — newly or nearly in use — in fields ranging from medicine to computers, and from manufacturing to resource exploration to the prevention of widespread power failures.

Winners will receive plaques at a

*Sandia was second in the total number of awards won this year.*

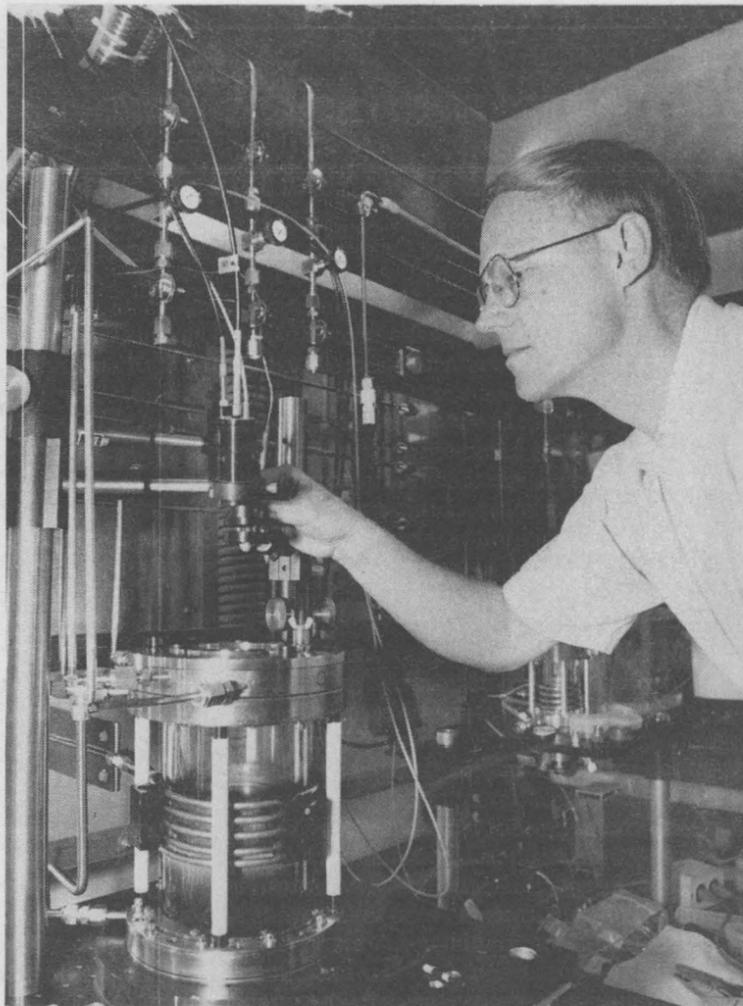
black-tie dinner at the Chicago Museum of Science and Industry on Sept. 25. All winning projects will remain on display at the museum for a month after the awards, says Vic Camello, a senior editor at *R&D Magazine*. The magazine also will announce its "Researcher of the Year" during that awards dinner.

Sandia was second in the total number of awards won in this year's competition. Oak Ridge National Laboratory, which along with Sandia is operated for DOE by Lockheed Martin Corporation, won nine. Los Alamos won six.

The bulk of the applications, which "number in the hundreds," come from industry, which won the lion's share in total number, says Camello.

Each entry is judged by "a minimum of six judges out of a volunteer pool of 51 from national labs and industry," Camello says. If judges reach a consensus on a product, the editors of *R&D Magazine* "generally do not presume to overrule them." But, when there are split decisions, "the editors take into account comments that are made by the judges, particularly if one has a particularly insightful view into the product."

See pages 6 and 7 for descriptions of the winning entries and names and photos of the Sandia innovators.



**WINNING TECHNOLOGY** — The Filmetrics F-30 optical probe, developed by Bill Breiland (1126, above) and colleagues, was one of eight Sandia technologies to win R&D 100 Awards in this year's competition. Read more about the winning technologies and Labs innovators on pages 6 and 7.

(Photo by Randy Montoya)

## Labs' Revolution in Engineering event catches the eye of Washington

By Chris Miller

Sandia's "Revolution in Engineering" event June 26 caught the eye of Washington.

About two dozen media and some 130 government and industry representatives turned out at the Capital Hilton for the daylong event. It was designed to demonstrate how Sandia is using its high-performance computing capabilities as a tool to revolutionize the engineering process (*Lab News*, June 20).

As it turns out, any tool that helps to make products cheaper, faster, and better can definitely pique the interest of a wide range of people, whether it's a staff representative of the

Office of Management and Budget, a technician at IBM, or a reporter with a major trade journal.

While the mugginess and temperatures approached 100 degrees outside, attendees stayed cool inside as they witnessed the signing of a \$17 million cooperative research and development agreement with Goodyear to share technology

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*About two dozen media and some 130 government and industry representatives turned out for the daylong event.*

# Sandia LabNews

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## It's Performance Management time, and (news flash!) not much is changing

### Recent phone survey solicits employee & manager input

By John German

As thousands of Sandians sit down with their managers to take stock of their work for the last 12 months and write performance goals for the next 12 months, they'll likely notice (or perhaps not notice) something unusual: The Performance Management process won't change much this year.

Since the process was implemented in 1994, says project manager Becky Statler (3500), refinements have been made each year based on feedback from managers and staff. For the performance period that began this week (Tuesday, July 1) and lasts through June 30, 1998, however, very few changes are being made.

"I think we're where we need to be as far as the process is concerned," says Becky, "and that's certainly supported by comments in recent surveys," including a recent phone survey conducted by members of Process and Performance Improvement Dept. 4023.

Labs top management requested the survey late last year in hopes of identifying issues and opportunities concerning how the Performance Management process is implemented Labs wide.

### Differing perceptions

In January and February, Dept. 4023 staff interviewed by phone random samples of 85 managers and 85 of their employees about the Performance Management process. The data were compiled and analyzed and then summarized as findings and recommendations in a report issued in April.

Among both managers and employees, "communication" about Performance Management and the clarity of "goals and expectations" were thought to be working well. Respondents in both populations, however, suggested improvements with the process and PMFs themselves, and with appropriately linking pay to performance.

Managers and employees had different

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Here's the skinny on a slew of changing business practices

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Society of Women Engineers honors Jill Fahrenholtz

# This & That

A unique welcome back — Maureen "Mo" Locher (7823) recently returned to work after undergoing some chemotherapy treatments and learned that her co-worker Paul Duran (7821) is indeed a man of his word. Folks who undergo "chemo" often lose their hair — as did Mo. Although her hair is starting to grow back, Paul knew Mo would be a bit self-conscious coming back to work this way. So, he promised her he'd shave his head if she lost her hair as a result of the treatments. Sure enough — when Mo returned several weeks ago, Paul's head was as slick as a billiard ball. Those kinds of friends are hard to find.

\* \* \*

Still time to suggest topics — You have a few days left to suggest topics for Paul Robinson's employee dialogue sessions July 28-31. Please send suggestions by Tuesday, July 8, to Paul's assistant, Jane Elson, at [mjelson@sandia.gov](mailto:mjelson@sandia.gov) or mail stop 0101. If you want to remain anonymous but submit suggestions via e-mail, send them to me ([lgperri@sandia.gov](mailto:lgperri@sandia.gov)), and I'll remove your name and forward them to Jane. We'll announce Paul's topics in our July 18 issue. Here's the schedule:

- Monday, July 28, 1:30-2:30 and 3-4 p.m., Sandia/New Mexico's Technology Transfer Center (Bldg. 825)
- Tuesday, July 29, 2-3 p.m., Sandia's Carlsbad, N.M., large conference room
- Wednesday, July 30, 1:30-2:30 p.m., Albuquerque BDM Bldg.
- Thursday, July 31, 8:30-9:30 and 10-11 a.m., Sandia/California's Bldg. 904 Auditorium

\* \* \*

Eight is grrrrreat! — A hearty *Lab News* congratulations to all Sandia winners in this year's R&D 100 awards competition. The eight awards are the most ever won by the Labs, breaking our record of seven winners in 1994. See Neal Singer's articles on pages 1, 6, and 7 that discuss much of the fascinating Sandia technology that brought us these awards.

\* \* \*

Computer jockeys in suits — Unless you just awoke from a coma, you know Sandia now has the world's fastest computer — the "teraflops high-performance ultracomputer" — capable of performing 1.8 trillion operations a second. We featured it in the last issue. For an interesting contrast, see the old photo on page 5 of this issue. It was taken at Sandia in 1959, when our newest "supercomputer" performed a then amazing 4,000 operations a second. Computer speed isn't the only change. I'm sure you'll note that the dress code has changed, too. If you know who those well-dressed gents are in the photo, please let us know.

— Larry Perrine (845-8511, MS 0167, [lgperri@sandia.gov](mailto:lgperri@sandia.gov))

## Tackling drylands issues: Sandia teams with UN, City of Albuquerque to host conference

Drylands make up some 40 percent of the earth's land surface and are home to almost two billion people. By their very nature as arid, semi-arid, and dry subhumid regions where water supply is problematic, drylands are the source of a variety of problems that can lead to human conflict.

To address those problems and seek solutions that will mitigate conflict, Sandia, the United Nations Environment Programme (UNEP), and the City of Albuquerque are cosponsoring an innovative workshop. The conference, "Improving the Science and Technology of Environmental Security in Drylands," will be held in Albuquerque July 8-11, with sessions at the Glaesner Training Facility at the Crown Plaza Hotel (formerly the Holiday Inn Pyramid).

Nations from every continent except Antarctica will be represented at the conference, which addresses problems that are global in scope.

Franklin Cardy, Executive Coordinator of UNEP's Natural Resources (Land) Division, says his organization actively seeks new partners — such as Sandia and the City of Albuquerque — in improving the assessment of and finding solutions to the challenges and problems of sustainable environmental management in the world's drylands.

According to conference co-organizer Dennis Engi, Manager of Sandia's Strategic Initiatives Dept. 4504, DOE has a vital interest in drylands concerns because conflicts arising from arid land issues have the potential to affect US security interests in political, economic, and military spheres.

"All sorts of issues arise," Dennis says, "when you start thinking about the implications of drylands and desertification [the expansion of arid regions as a result of global climate changes and human activities] — loss of farmlands, mass migrations, loss of economic activities, concentrations of population, urbanization, depletion of resources, competition for diminishing resources. Problems like these can lead to conflict.

"What we want to do in this conference is begin to consider ways science and technology can be brought to bear on drylands-related issues."

According to Dennis, the most tangible immediate outcome of the conference will be a summary document of results intended to be used as a guide for determining future scientific and technological work related to drylands issues.

— Bill Murphy

## Assessing risk: Sandia to work with NRC on International Risk Center

By Bill Murphy

The US Nuclear Regulatory Commission plans to create a new International Risk Center at Sandia to integrate and coordinate research, results, and experience associated with the application of probabilistic risk assessment to improve safety and regulation of nuclear reactors worldwide.

Nestor Ortiz, Director of Sandia's International Institute for Systematic Risk Studies, was scheduled to formally announce the establishment of the International Risk Center during a risk-related conference at Sandia this week.

Nestor was to make the NRC announcement and provide details about the Center and its mission as the kickoff for a two-day review of Sandia's risk programs by a blue ribbon panel of risk experts. The panel was convened at the Labs' invitation, and was expected to provide an objective analysis of Sandia's strengths and shortcomings in its extensive probabilistic risk assessment and analysis initiatives.

Nestor, a nuclear engineer who also serves as Director of Nuclear Energy Technology Center 6400, said the creation of an international risk center makes sense because reactor accidents, regardless of where they occur, can have global, or at least transnational, consequences.

"Nuclear accidents have no respect for national boundaries," Nestor says.

### Emphasis on performance and risk

Probabilistic risk assessment and analysis, he says, are assuming increasing importance in the licensing, operation, and regulation of nuclear facilities.

At this time, most countries, including the US, regulate reactors based on deterministic requirements — reactor licenses must meet specific standards and procedures, which are not based on risk.

In the last few years, though, the NRC — the ultimate reactor licensing authority in the US — has begun to move toward revamping its regulatory system, placing increasing weight on performance and risk. Advanced risk assessment can be a powerful regulatory tool; using state-of-the-art techniques, risk assessment can augment the regulatory process by focusing on activities that improve the performance of the plant and reduce its overall risk.

With the NRC moving toward an increased emphasis on risk assessment as part of its regulatory suite, a number of countries have expressed a strong interest in following suit. More than 20 countries, in fact, are interested in teaming with the NRC in creating the International Risk Center at Sandia.

### Long experience in risk assessment

Sandia was chosen by the NRC to serve as the integrator for the International Risk Center, Nestor says, because of the Labs' decades of experience in risk assessment related to nuclear reactors and the synergism with several key aspects of its primary nuclear weapons mission for DOE. In addition, he says, Sandia has worked closely and effectively with the NRC for many years.

"Our broad-based safety research for the NRC," Nestor says, "has made us a leader in probabilistic risk assessment, containment structural integrity, severe accidents, seismic reliability, dynamic loading from missile impact on structures, equipment operability, fire protection, reactor safety phenomenological research, and safeguards and security."

Sandia has worked closely with the nuclear industry and DOE's Office of Nuclear Research to develop and implement reactor safety features and aging-management techniques and concepts. In addition, Sandia has worked with such countries as Japan, France, Russia, Germany, and England on a wide range of cooperative research projects, code development, and experimental work related to nuclear reactor safety and consequence assessments.

The signatories to the International Risk Center will meet in Washington, D.C., in October to begin the process of identifying risk-related research projects to be coordinated by the new International Risk Center. The first project will probably be launched sometime in 1998, Nestor says.

## Sandia LabNews

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LOCKHEED MARTIN

# School district charts new courses under Sandia helmsmanship

## Educational partnership receives 'Explorer' award acknowledging Sandia's scientific guidance

By Nancy Garcia

Engineer Vera Revelli entered new territory when she began designing ways for teachers to better educate elementary school children in math and science.

As a result of her efforts for the Leadership Academy for Science Education Reform (on behalf of Science & Technology Outreach Dept. 8818), Vera was recently honored by the school district that is benefiting from her efforts. She received a compass trophy as one of several Alameda Unified School District's "Explorer Award" recipients. An employee of Structural & Thermomechanical Modeling Dept. 8742, she has implemented the teacher institute, known as LASER, since 1995.

The compass is a fitting memento of how she is working to change the direction of science education by showing teachers new paths. Vera has been supported by a grant from the National Science Foundation, under the National Teacher Enhancement Project, with matching funds from DOE Defense Programs. Sam Bowen, who oversees that nine-lab consortium that LASER is part of, says LASER is a rare and promising example of a science education institute intended to make systemic, long-term changes in an entire school district.

When presenting the award to Vera at a

recent meeting, AUSD Board Member Gail Greely commented on the new enthusiasm for science teaching and the enhanced access to these lessons.

"I don't remember there being much science when I was in elementary school," she said. "Then in junior high and high school, it was the domain of a small number of boys. I'd love to be an elementary school student in one of the LASER teachers' classes."

"This is a project that could never have been mandated or required," she added. "It happened because individuals made a commitment, found joy in learning, and passed it along to their students."

### Immersion in science scenarios

After visiting the institute, which is entering its third and final year at Sandia this summer, Bowen said he was impressed with how teachers were immersed in a science scenario in which they had to gather evidence and make policy decisions with no clear-cut answer. He also commended the Sandians involved in the training session for shifting from the role of knowledge bearer to using instructional strategies that are different from common approaches learned in childhood and are based on new understanding of the learning process.

Bowen complimented the district for pioneering this intensive institute, saying in a letter of commendation last fall, "Your participation in this program may offer the best case study for the impact on the teaching of science and its influence on general student productivity of any school in the country." He said students appeared likely to "gain a real enthusiasm for learning."

Eight other DOE labs participate in similar programs, says Dept. 8818 Manager Karen Scott. "We are proud of the recognition Vera has received," she says.

"She has approached this like an engineering problem, delving into the research on how students learn and how to make cultural changes in schools. Her persistence and contributions are paying off."



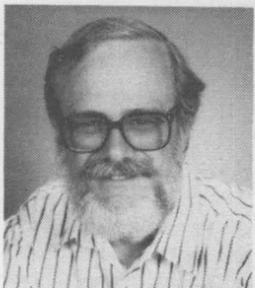
**HANDS ON** — Vera Revelli, standing in center background, watches elementary school teachers practice a lesson in gravity during a teacher training institute at Sandia last summer.

## Sandia California News

In the institute, leader teachers attend summer workshops for three years, with additional training throughout the school year. These teachers share their exposure to the process of scientific inquiry with six elementary schools.

"Working with teachers and other Sandia scientists and engineers who have presented parts of this institute has been a creative and rewarding challenge," Vera says. "The Explorer Award confirms that our vision and enthusiasm for new ways of learning are shared at the highest levels within the school district."

## R&D 100 winner



HILARY JONES

Hilary Jones (8910) is a Sandia/California member of a Sandia team that has won a 1997 R&D 100 award. The group's Hierarchical High-Performance Storage System is described in the R&D 100 awards article on pages 6 and 7. The team's award is one of eight R&D 100 awards won by Labs researchers this year.

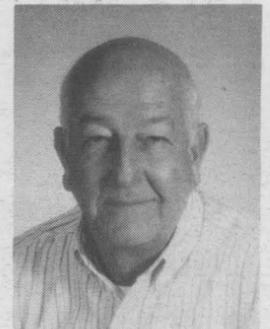


**TOOL TEAM** — This recently installed manufacturing machine built to Sandia specifications is one of the first of its type in the country (the first went to MIT). Called a hexapod, it moves machine tools with three pairs of arms. The pairs provide both a wide range of motion and stiffness. The hexapod can merge the functions of many separate manufacturing stations into one device with a small footprint. Oak Ridge National Laboratory and the National Institute of Standards and Technology also have versions for their research. A similar one will also soon be installed at Sandia/Albuquerque. From left are Bernhard Jokiel, Chip Steinhaus, Vince De Sapio, and Calvin King of Advanced Manufacturing for Metals Processing Dept. 8240. They are examining a piece of wax that was tooled during a demonstration.

## Recent Retirees



Louise Taylor 22  
8930



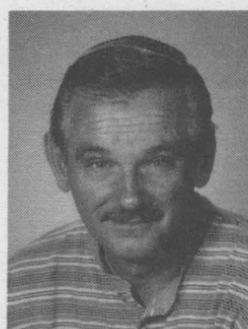
Bob Miller 35  
8416



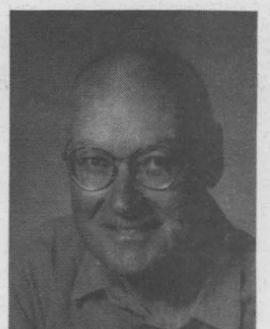
Ron Allen 31  
8533



John Daniel 38  
8815



Robert Tirnetta 31  
8513



Bob Benedetti 31  
8741

# Sandia, Goodyear enter into fifth joint R&D project

## New project focuses on manufacturing technology of interest to both

By Larry Perrine

And now there are five.

Goodyear and Sandia will work together to develop new and more efficient manufacturing processes under an agreement signed in Washington last week. The \$17 million pact allows Goodyear and Sandia to share technology.

Goodyear president of global support operations William Sharp and Sandia President C. Paul Robinson signed the agreement at Sandia's Washington event June 26.

This is the fifth cooperative research and development agreement (CRADA) between Goodyear and Sandia since 1993.

"Several computational analysis tools in tire mechanics, materials, and manufacturing have been developed by our cooperative efforts," Sharp says. "As a result, we are shortening product development time, allowing us to bring new products to market faster."

"Technology developed under this project will greatly advance manufacturing processes critical to our national security," says Secretary of

Energy Federico Peña. "Working with Goodyear, we can leverage scarce tax dollars while advancing US global competitiveness and preserving jobs for Americans."

The new CRADA will focus on advanced process technologies, Sharp says. "We place a very high value on our work with Sandia and are pleased to continue it by making this investment. Sandia will help us develop more efficient manufacturing processes, which are absolutely essential along with accelerated new product development in order to compete in today's global marketplace."

### Useful to Lab, DOE, and Goodyear

Paul says Sandia has been delighted with its previous cooperative R&D projects with Goodyear. "The resulting technology is proving useful to our laboratory, to the Department of Energy, and to Goodyear," he says. "These CRADAs have allowed us to put together the very best computational methods from industry and government labs to solve important problems."

Goodyear is funding approximately 90 per-

cent of the joint work — about \$7 million directly and \$8 million to fund facilities and labor costs for its own researchers.

In addition, the tire company recently announced it would invest \$26 million to hire 125 new engineers and scientists for its technical centers in Akron, Ohio, and Colmar-Berg, Luxembourg, to spur new product development.

Based in Akron, Goodyear manufactures tires, chemicals, and engineered rubber products in 81 facilities around the world, including 34 plants in the US and 47 in 27 other countries. It employs more than 90,000 people worldwide.

Jimmie Searcy, Director of Manufacturing Technologies Center 1400, is projects coordinator for the Sandia work under this new Goodyear agreement. For Sandia, individual parts of the project will be headed by Carol Jones Adkins (1472), Terry Stalker (2524), Rush Robinett (9611), Mark Smith (1831), Tommy Simpson (1481), and Joe Harris (1404).

As with most CRADAs, project details are proprietary and protected by the 1989 National Competitiveness Technology Transfer Act.

## Performance

(Continued from page 1)

perceptions regarding how communications relating to performance improvement were handled. Employees who received low performance ratings said the rating was the first communication from their managers about their declining performance, although most managers who gave low ratings said they had indeed warned those in need of performance improvement prior to assigning the ratings.

Still, 15 percent of managers said they gave base-pay increases to employees who received low ratings, and 53 percent said they gave non-base pay increases. And 69 percent of managers and 64 percent of employees reported they had established action plans with their employee/manager to improve performance.

The survey also uncovered a misperception that quotas are enforced regarding the number of high and low ratings that can be assigned within organizations. Becky says there are no "forced"

### 1997 Performance Management timeline

July 1, 1996 - June 30, 1997	'96-'97 performance period
July 1, 1997 - June 30, 1998	'97-'98 performance period
July 30	'96-'97 performance ratings due to HR
September 25	Recommended completion date for '97-'98 PMFs
September 30	'97-'98 PMFs due in center offices
September	Employees notified of compensation changes
September 25	Non-base compensation amounts distributed
September 26	Base pay salary increases take effect

quotas, although for consistency many directors and vice presidents do establish guidelines on high- and low-performance ratings within their organizations. (No employee should be assigned a low performance rating solely because of such a guideline, she adds.)

### Some other findings

One-hundred percent of surveyed managers know they are to provide PMFs for all their direct reports. (In 1994, only 75 percent of employees completed PMFs; last year, 95 percent did.) In addition, the survey indicated that 86 percent of managers say they have established "line-of-sight" objectives, which allow every employee to see how they fit into the higher goals of their organizations and the Labs in general.

"Those findings are encouraging," says Becky.

The survey also underscored a widespread perception among employees that their managers don't spend enough time communicating about Performance Management to them. "Managers reported that they spend more time with each employee than employees say they spend with their managers," she says. "That's probably indicative of each manager having performance discussions with multiple employees."

And despite the few perceived "bugs" remaining in the process, she says, "overwhelmingly respondents said of the Performance Management process itself: 'Stop changing it,' 'Stop improving it,' and 'Let's live with it for a while.' People said they haven't yet had a chance to get comfortable with it."

### Web guidance available

As a result, no changes will be made this performance year aside from providing additional guidance, now available on Sandia's Internal Web, to help employees and managers complete

## Feedback

**Q:** Could Sandia publish a list of the people leaving and of those who left last year because of downsizing so we can know whom not to expect to see around anymore?

**A:** For many employees, the decision to leave the Laboratories is personal and private. While we appreciate those who volunteered to separate during Workforce Realignment so that others can remain employed, we also respect their privacy. Therefore, we will not be publishing a list of people leaving the Laboratories. —Don Blanton (3500)

**Q:** If one receives a parking ticket, does it go to one's manager or does nothing happen?

**A:** Thank you for your inquiry about the consequences of receiving a parking ticket. Per our parking policy, the following actions will result when an employee receives a parking ticket:

- A memo identifying the violator and the violation is sent to the employee's manager. The manager may administer discipline as outlined in the Sandia Personnel Guide.
- A quarterly report identifying the violators is sent to the applicable vice president.
- Revocation of vehicle permit or pass by Sandia Security or Kirtland AFB Police may be executed if so warranted.

It is expected that everyone will obey our traffic and parking regulations. —Frank Gallegos (7400)



## Welcome

New Mexico — Jeremy Giron (2665), Elaine Martinez (14307), Walter Nickerson (9302), Rebecca Villane (12111), Douglas White (14301)

the process and PMF, she says. (See "You asked for more guidance, you got it" at left.)

"We're considering the review team's recommendations," says Becky. "Some, like the Web-based guidance, we're already working on. Others will be looked at during the coming year."

Recommendations under consideration include changing the timing of the performance periods to match the fiscal year cycle, clearly publicizing how pay is linked to performance, ensuring Labs-wide consistency in how the process is applied, providing additional training for managers regarding performance improvement, and developing a clear system of rewards and consequences for managers who do or don't deal appropriately with poor performance.

"Most of the recommendations relate to enhanced communications and additional tools and job aids to help people get through the process," she says. "We don't anticipate any changes to the process itself."

The *Lab News* will cover any future changes to the Performance Management process.

## You asked for more guidance, you got it

Many respondents to the recent phone survey suggested simplifying the Performance Management process and Performance Management Forms (PMFs) and said they wanted accessible guidance in developing goals and metrics and filling out PMFs.

Human Resources Center 3500 has developed a Performance Management User's Guide on Sandia's Internal Web. (Click the "Bookshelf" and "Corporate Initiatives" buttons from Sandia's Internal Web home page or enter [http://www.hris.sandia.gov/policy/pmf\\_fr.html](http://www.hris.sandia.gov/policy/pmf_fr.html).) A variety of Web-based tools are now available at the site, including:

- A user friendly PMF template (an on-line form is under consideration)
- Performance Management principles, process steps, and goals
- Tips for completing PMFs
- Performance Management terms and definitions

In addition, new job aids will be available at the site in coming months to help employees and managers fill out their PMFs and complete the process. The searchable job aids describe how to go about writing "smart" objectives, examples of appropriate objectives, and coaching and feedback tips for managers.

## Washington's eye

(Continued from page 1)

(see "Sandia, Goodyear enter into fifth joint R&D project" on page 4), and the announcement of a collaborative research program between Sandia and the National Science Foundation to ensure that the advanced computer modeling and simulation being done today is an accurate representation of the events they depict (see "Sandia, NSF announce research program to advance science in support of simulation" at right).

### Accomplished what we wanted

"We accomplished what we set out to do," says Sandia President C. Paul Robinson, citing the establishment of greater visibility to Sandia's high-performance computing and engineering capabilities among Washington media and key government and industry representatives.

"We believe we are the nation's premier engineering laboratory," he said, "and this event provided an excellent forum in which to demonstrate that."

Those thoughts were reinforced by Lockheed Martin Chairman and CEO Norm Augustine, who talked one-on-one with reporters and provided the keynote address at the luncheon.

"I'm very pleased to be associated with a laboratory that can be considered among the best engineering labs in the world," he said.

Attending the reception that capped off the day's events was Gil Weigand, the DOE deputy assistant secretary who oversees its Accelerated Strategic Computing Initiative.

Sandia Executive VP John Crawford says he and other Sandians received much positive feedback from a discriminating Washington media as well as from curious and interested government and industry representatives.

"I think we exceeded our expectations, and I believe we will continue to see the benefits of this event for a long time to come," he said.

Among the reporters attending the event were those from *Aviation Week*, *The Washington Times*, *Baltimore Sun*, *Computers in Physics*, *Design News*, *Defense News*, *Science*, *Science News*, *Electronic Design*, *New Technology Week*, and *The Albuquerque Tribune*.

In addition to their discussions with Sandia engineers, reporters also carried on in-depth interviews with top Sandians, including Paul, John, and VP Gerry Yonas (9000).

### 'An unqualified success'

Government offices and associated agencies represented at the event included DOE and several other laboratories, the National Science Foundation, National Institute of Standards and Technology, Office of Management and Budget, House Science Committee, and staffers from several congressional offices, including those of Sen. Pete Domenici (R-N.M.), Sen. Jeff Bingaman (D-N.M.), and Rep. Joseph Skeen (R-N.M.).

Industry attendees represented a wide range of interests and included those from IBM, Intel, Goodyear, Battelle, and Lockheed Martin Corp.

The event included Sandia exhibits and live presentations by Sandia researchers on the safety, security, and reliability of the nuclear stockpile; teraflops (trillion floating-point operations per second) computing; advanced manufacturing; modeling of aircraft crash-and-burn tests; computer visualization of oil and gas exploration data; and other uses of computationally intensive computer simulations in microelectronics, weapon component design, and comet impacts.

"This event was an unqualified success," says Russ Skocypec (9102), who helped lead the team of engineers who conducted the demonstrations. "This definitely boosted Sandia's reputation and visibility."

The event also helped to demonstrate Sandia's growing virtual-reality computing capabilities, such as EIGEN-VR and V-MAS. The technology was used to display visual representations of calculations run on high-performance computers and depicted such things as an airplane catching fire, a Goodyear tire, oil and gas deposits in the Gulf, and a comet striking the Atlantic Ocean.

## Sandia, NSF announce research program to advance science in support of simulation

The increasing speed and power of today's high-performance computers bring with them engineering challenges. Some of the engineering fundamentals behind current computational analysis have not advanced enough to take full advantage of this new capability, however.

To ensure that the advanced modeling and simulations being done today are accurate representations of the events they depict, Sandia and the National Science Foundation (NSF) have launched a new collaborative research program. The program aims to promote research in the fundamental sciences and engineering on which complex computational analyses are based.

DOE's teraflops computer at Sandia was developed under DOE's Accelerated Strategic Computing Initiative (ASCI), which aims to create the leading-edge computational modeling and simulation capabilities essential for maintaining the safety, reliability, and performance of the nation's nuclear stockpile. Currently the fastest computer in the world, the teraflops computer is capable of performing more than one trillion operations per second, and it is producing results with unprecedented detail for Sandia's implementation of DOE's science-based stockpile stewardship responsibilities (*Lab News*, June 20).

Engineers have traditionally had to fit such large, complex problems within the limited capabilities of their computing resources. Consequently, today's engineering analyses are often limited in scope and in their ability to identify optimal or innovative designs because they are based on approximate or empirical information that cannot capture fundamental physical details.

"With the explosive growth of computing power and capacity, the opportunity exists to conduct simulations of unprecedented resolu-

tion and complexity," says Russ Skocypec, deputy to Gerry Yonas, VP of Information and Pulsed Power Research and Technology Div. 9000. "These can be used to make engineering decisions that are directly based on detailed, fundamental information and knowledge previously considered to be only of academic interest."

### Overlap of interests

Sandia is committed to revolutionizing the way products are engineered and is moving toward a modeling- and simulation-based life cycle engineering approach in accomplishing its national security mission. This approach requires advances in fundamental science and engineering, resulting in the overlap of interests between Sandia and NSF.

"Teraflops machines are very fast, very powerful," says Tim Tong, program director in NSF's Chemical and Transport Systems Division.

This makes them excellent for simulating vast, complex processes that would take many years to study through experimentation. But the foundations of these simulations need to be verified. "Otherwise you just get wrong results faster," he says.

Research under the program is aimed at improving the confidence and functionality of these simulations. There are five general research categories: model fidelity, uncertainty quantification, experimental discovery and validation, high-performance computing, and problem-solving environments. Focus areas for the first year are thermal transport, solid mechanics, design and operation of engineering systems (including design theory and modeling and simulation uncertainty), and knowledge modeling and computational intelligence. Tong says he expects that the program will fund six to 12 projects in the fiscal year beginning Oct. 1.



THEN AND NOW — This IBM 705 mainframe computer photographed in 1959 makes Sandia's recently dedicated teraflops supercomputer seem futuristically speedy. The new IBM 705, the *Lab News* reported in July 1958, filled an entire room in Bldg. 880 (like the teraflops) and could perform 400 "multiplications or divisions per second." (The teraflops is capable of 1.8 trillion operations per second; see the June 20, 1997, *Lab News*.) The 705 was used primarily to keep track of employee records and payroll, but its faster cousin, Sandia's IBM 704 (acquired weeks later), could perform a whopping 4,000 operations per second. The 704 was to be used to simulate a "theoretical nuclear war" and crunch data obtained from weapon field tests. What about memory? The 704 could store 4,000 36-bit words (binary strings). It also had an "unlimited" storage capacity on magnetic tape (the 705's tape machines are seen in the background). Prior to installation of the 704 and 705, the article said, Sandia purchased time on computers at Kirtland AFB, Los Alamos Scientific Laboratory, and Lockheed Aircraft Corporation. (Photo courtesy of Corporate History Archives)

# Eight Sandia-developed innovations honored with 1997 R&D 100 Awards; largest number ever for the Labs

By Neal Singer

Here are brief descriptions of the eight Sandia winners of 1997 R&D 100 Awards (see news article on page 1), the largest number Sandia has ever received in one year.

## GEOSEIS mini-hole seismic surface initiation system

The earth doesn't come with signs on it pointing downward, saying, "This Way To The Oil," or to any other natural resource. So, once companies target a general area, how do they know precisely where to drill?

"One way is to put an array of little detonators and explosives in the ground, fire them, and when the echoes come back, you can map where the oil is," says Sandia researcher Bob Bickes (1553), coinventor of the semiconductor bridge (SCB). The SCB is far more precise than previous methods in setting off explosions that aid seismic explorations: The more accurate the timing on the explosions, the sharper and more powerful the seismic wave, and the better the data collected from return echoes.

The SCB detonator ignites the energetic material pressed against the bridge in a few microseconds — a formerly unattainable precision for low-energy initiators.

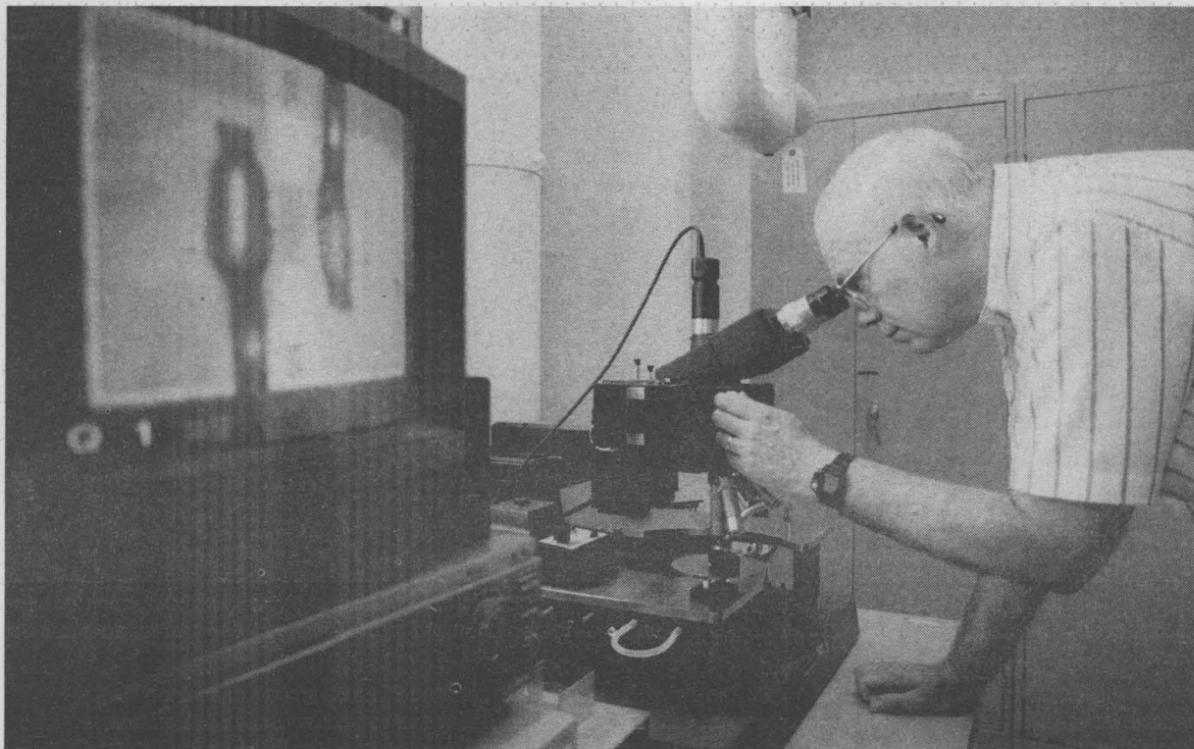
The SCB detonator used in the GEOSEIS (trademarked) system is designed, manufactured, and marketed by the Ensign Bickford Co., Simsbury, Conn. The SCB chip is designed and manufactured by SCB Technologies Inc., in Albuquerque, the exclusive licensee for commercialization of the SCB technology. The semiconductor bridge — the first wholly owned Sandia patent (1987) — was coinvented by Bob with former Sandian Al Schwarz (ret.), who died last August.

Other listed developers, in addition to Bob, are Brendan Welch and David Ewick at Ensign Bickford, and Bernardo Martinez-Tovar at SCBT.

## Hierarchical High-Performance Storage System (HPSS)

Everyone knows — well, many people know — that the amount of data storable in a modern desktop computer exceeds that of the entire North American Strategic Air Command in the early 1960s. Now, in the Internet age, the rent's come due — how, online, can we continue to store and make use of government, corporate, foundation, university, commercial, and private data when at least one study suggests the amount of such data is increasing about 100 percent annually?

The HPSS project at Sandia is part of a research collaboration among industry, university research centers, and national laboratories to develop mass storage system software. The system improves performance and increases storage merely by adding more units. The primary purpose of the HPSS is to store large amounts of data and move the data



COINVENTOR of the semiconductor bridge (SCB) Bob Bickes (1553) in his lab. The SCB is used in the trademarked GEOSEIS system. The other coinventor, former Sandian Al Schwarz, passed away in August. (Photos by Randy Montoya)

rapidly among high-performance computers, clusters of workstations, and storage libraries. "Rapidly," in this case, means at speeds 100 times or more faster than today's storage software systems.

"We have 13 sites already running our software at national labs, universities, and industry on IBM-type platforms across the country," says Sandia project leader Rena Haynes (4418).

The storage system transfers files at rates of billions of bytes per second and can contain millions of gigabytes of data.

As one of five principal development sites, researchers at Sandia — both in Albuquerque and in Livermore, Calif. — helped develop the algorithms to make high-capacity storage systems both secure and high-performing in a massive computational environment. (The other principal sites are at Lawrence Livermore, Oak Ridge, and Los Alamos national laboratories, and at IBM.)

Other Sandia contributors are manager Mike Cahoon (4418), Marty Barnaby (4418), Hilary Jones (8910), Sue Kelly (2611), Bill Rahe (4621), and Bill Swartz (4619).

## PQ2000 Power Quality System

One of those awful power surges comes down your power line, heading for your hard drive. If you were clever, you've purchased a surge protector that will open your circuit, thus (you hope) preventing your computer from frying. But you've lost information you haven't yet saved.

Large power users have even worse problems. Tens of billions of dollars in production losses, according to the Electric Power Research Institute in Palo Alto, Calif., occur annually because of power sags and momentary, 100 percent power losses that shut down microprocessor-controlled systems. (We notice these in our homes when the lights flicker and the VCR needs to be reprogrammed.)

The PQ2000 is a battery-based, energy storage and delivery system designed to mitigate the effects of factory-wide power disturbances on sensitive electronic and electrical equipment,

says Sandia project leader Garth Corey (1525). It may also mitigate the effects of a power surge, sag, or outage on a utility grid.



SANDIA PROJECT LEADER for the PQ2000 Power Quality System, Garth Corey (1525). The PQ2000 is a battery-based energy storage and delivery system designed to mitigate the effects of factory-wide power disturbances.

Rather than acting like a circuit breaker and shutting down a utility line, the PQ2000 monitors the line for voltage sags, swells, or momentary interruptions. Sensing something amiss, the PQ2000 transfers the line in one four-hundredths of a second to stored battery energy. This acts as a high-power voltage source for up to 10 seconds before returning the equipment to normal power service as the momentary disturbance passes.

The system has the potential to provide wide-area grid voltage support and to reduce momentary peaks of demand for power that sometimes necessitate building entirely new power plants to accommodate them.

The work was done jointly by Sandia, the AC Battery Corp. (East Troy, Wis.), Electric Power Research Institute (Palo Alto, Calif.), Oglethorpe Power Corporation (Tucker, Ga.), and Pacific Gas and Electric Co. (San Ramon, Calif.). DOE was an early sponsor of the project with Sandia.

## CLIP-C, or Closed Loop Induction Process Controller

The horror of "morphing" in movies — when the bad guy turns from a human into a vampire, or from a pool of mercury into a bad cop from the future — is that no control is possible as the process is occurring. The good people have to wait until the process is finished, and the bad person appears intact at full strength.

The same waiting period could be said to happen in engineering, when a part being hardened



HPSS TEAM members, from left, Marty Barnaby (4418), Bill Rahe (4621), Rena Haynes (4418, project leader), and Sue Kelly (2611). Team member Hilary Jones (8910) is shown on page 3.

(Continued on next page)

begins to change its physical characteristics — sometimes for the worse — as it's being heat-treated. During this period, there's nothing to be done; the heating process goes dumbly on as the part takes shape. The result may be a bad part.

Using signals from the heat-treated part to control the induction process has been an unattainable goal for five decades. But under a partnership between Sandia and Delphi Saginaw Steering Systems (a subsidiary of General Motors), a system was developed and brought to the factory floor in less than three years, says Sandia principal investigator Phil Kahle (2338).

The new technique, CLIP-C, monitors material as its physical characteristics change. It has five times less tolerance for error than previous methods. A feedback loop orders changes in operating conditions to take into account changes in materials.

Prior to introduction of the patented technique — currently used to harden half-shafts for Saturn automobiles and now being installed in Ford and Chrysler plants — the only feedback in most systems was after the process was over. Inspectors would test a completed part and then keep it or toss it on the scrap pile. With CLIP-C, corrections to the process can be made in real time, so scrap losses are all but eliminated, and good parts are made more accurately.

Other developers are Russ Skocypec (9102), Doug Adkins (9113), Jeff Spooner (2338), Suzanne Stanton (2103), Bruce Kelley (1846), Charlie Robino (1833), Fred Zutavern (9323), Anthony Russo (ret.), Gerald Knorovsky (1833), Brian Damkroger (1833), and researchers from Delphi Saginaw Steering Systems.

### Nonvolatile field effect transistor device

This new class of memory technology, more familiarly known as the protonic chip, saves a computer user's sanity when the power unexpectedly turns off. The chip uses clunky protons that maintain screen memory by staying where they are, rather than skittish electrons that vanish into the night, taking with them your latest entries. The device is inexpensive, low-powered, and simple to fabricate, says Bill Warren (1812), lead Sandia researcher on the project.

To create the memory-retentive chip, the key fabrication step is to bathe the hot microchip in hydrogen gas. The gas, permeating the chip, breaks up into single ions — protons — at defects in the silicon dioxide. (The defects were created by the heat of the manufacturing process.)



NONVOLATILE field effect transistor device team, from left, Bill Warren (1812), Peter Winokur (1332), Mike Knoll (1205), Dan Fleetwood (1332), and Jim Schwank (1332).

The protons can roam only within the chip's central layer of silicon dioxide, where they are trapped by two layers of silicon that sandwich the silicon dioxide.

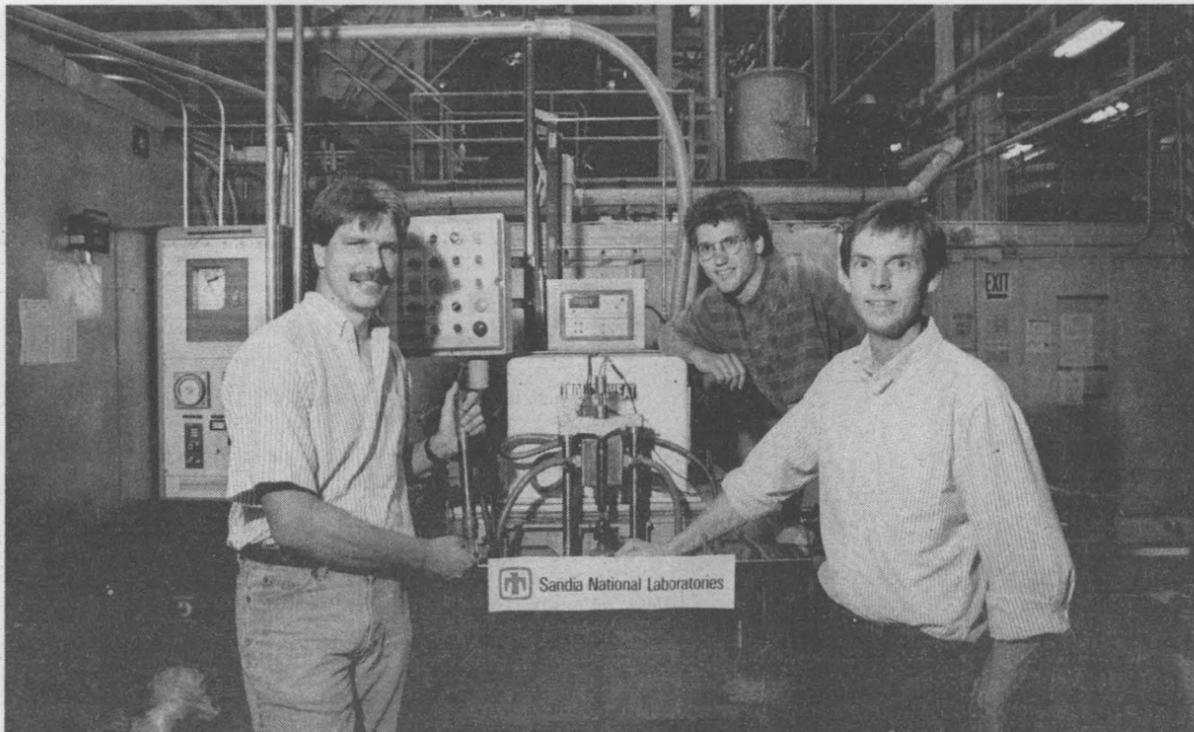
A positive low-voltage applied to one side of the silicon repels the protons to the far side of the silicon dioxide. A negative low voltage applied to the silicon attracts the protons to the near side of the silicon dioxide.

If the power is turned off, the protons stay where they are, retaining information until the machine is repowered.

Developers of the chip, in addition to Bill, are Karel Vanheusden of the University of New Mexico Center for Micro-Engineered Materials; at Sandia, Dan Fleetwood (1332), Jim Schwank (1332), and Michael Knoll (1205); Rod Devine at France Telecom/CNET; and Jeffrey Bullington, AMMPEC.

### Filmetrics F-30 optical probe

Varying a conception in the middle of a task may mean one is the Michael Jordan of one's field, adaptable and high scoring. Until Filmetrics F-30, there was no simple, inexpensive way for growers of thin films of materials (essential components of



CLIP-C TEAM members, from left, Philip Kahle (2338), Jeff Spooner (2338), and Douglas Adkins (9113). CLIP-C monitors material as its physical characteristics change during fabrication. (Photos by Randy Montoya)

modern microelectronics) to modify the recipe that deposits film as it was being grown. Instead, a production run would repeat what had just been grown, or be limited to the awkward procedure of modifying a physical or chemical condition before beginning and then judging results after finishing.

With the F-30 probe (photo on page 1), "Failure within a growth run is detected immediately," says Sandia researcher and project head Bill Breiland (1126), "and the source of the failure is quickly determined by studying the real-time in situ history of the growth run." The recipe can be modified as the run progresses. The F-30 probe — approximately one-fifth the cost of comparable probes — also can be used as a pre-growth calibration tool: procedures at Sandia that used to take weeks can now be accomplished within a single one-hour growth run, Bill says.

The device works by reflecting visible or near-infrared light from films to measure their growth rates. The technique is based on the principle that different film thicknesses and materials cause different patterns of reflected light. The sensitive probe can evaluate almost 10 times the number of wavelengths as its closest competitor. The sensitivity is important in distinguishing between materials that refract at different wavelengths.

Other Sandians involved in the successful work are Hong Hou and Gene Hammons (both 1314) and Kevin Killeen (formerly 1126, now at Hewlett Packard).

### Aztec

Those who remember their desperate attempts in high school to solve groups of equations with two, three, or even four "unknowns" may be impressed that scientists today sometimes solve problems featuring several hundred million unknowns. But not easily.

The frustrations of a physicist or engineer who must slog through a mire of equations to solve an otherwise interesting problem can be lessened by Aztec. Aztec is a library of equation solvers developed at Sandia for very fast supercomputers. The group of solvers means that scientists are relieved of a major computational burden and can focus more fully on the fundamental issues of their problems.

"Aztec has allowed Sandia to solve scientific computing problems previously unsolvable by any other means — problems of importance to the Department of Energy and to US industry," says Ray Tuminaro (9222), Sandia project leader.

Aztec's approach is iterative, which means that it approximates a solution by repeatedly correcting an initial guess. The method is faster than reducing large systems equation by equation, which can be laborious.

Aztec has helped make massively parallel computing a practical platform for large-scale simulations and design codes.

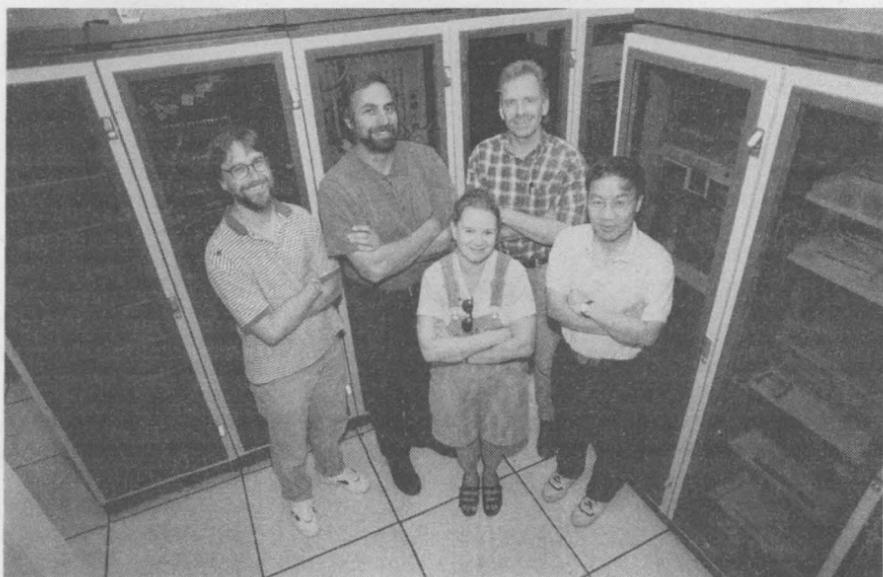
Additional developers are John Shadid (9221), Scott Hutchinson (9221), Charles Tong (8117), and Lydie Prevost (contractor in 9222).

### Biological microcavity laser

A handheld device that analyzes blood samples in minutes — it currently may take laboratories hours to weeks to return an analyzed sample — has been jointly patented by researchers at Sandia and the National Institutes of Health, says principal researcher and Sandia project leader Paul Gourley (1112).

The proof-of-principle device, which uses many tiny fingers of laser light to image cells in a drop of blood placed in a small chamber, can be miniaturized to microchip size and would be field-portable. The apparatus eliminates the need to "stain" blood cells for better visibility, or send them to a distant lab for analysis, thus eliminating transportation costs and delays as well as potential for additional error.

Using the device, "It's possible to take a blood sample containing millions of cells and extract information about each cell within a few minutes,"



AZTEC, a library of equation solvers developed at Sandia, has helped make massively parallel computing a practical platform for large-scale simulations and design codes. Aztec team members shown here are, from left, Ray Tuminaro (9222), John Shadid (9221), Lydie Prevost (9222), Scott Hutchinson (9221), and Charles Tong (8117).

says Paul. "The method determines variations in cell characteristics that might be indicative of disease."

The device should prove useful in combat situations or terrorist attacks when shipment of a blood sample to a remote location is impractical, and the presence of foreign gaseous or biologic components in the blood must be quickly determined to save lives.

Another Sandian who worked on the project was technician Anthony McDonald (1112).

# Watch for big changes in Labs' business practices

More business-like. More in accord with commercial practices. More responsive. More efficient. Faster. Better. Cheaper. Those are the principles underpinning the host of changes Sandia is implementing in many of its basic business practices. Labs employees have already begun to see some of the changes: Many Sandians are already using electronic timecards, for example.

In the months ahead, many more new business practices will be rolled out. The changes are in large measure a fulfillment of the long-anticipated "paperless office"

concept. Many procedures traditionally performed via paper passing from in-box to in-box will be performed electronically, at individual desktops. Other changes represent streamlining of procedures in response to red team studies, Curtis Commitment requirements (reduce indirect costs by \$250 million over 5 years), and priorities set by Sandia's senior leadership team. On these two pages is a chart, adapted by the *Lab News* from source materials developed by the Corporate Communications Task Force, outlining key changes, their impacts, and when they will be implemented.

## HUMAN RESOURCES

### What and when

### Description

### Impact on managers

### Impact on employees

#### Integrated Job Structure October 1997

Jobs classification will be based on occupation descriptions and level criteria. This will simplify and streamline the employee classification process. The new "integrated job structure" criteria, and the processes by which they are applied, are intended to be more objective, accurate, equitable, and reflective of the outside marketplace.

- Time estimated for manager training, center manager meetings, employee meetings, employee placements estimated at one week for the manager of 10-15 affected employees.
- Managers assume responsibility for evaluating and placing employees according to published corporate level criteria; provide HR with occupation data for use in external market matching.
- Greater ability to place the right employees in the right job (and level) at the right time, without going through extensive and cumbersome administrative processes.

- There will be no changes in salary as a result of implementation.
- Salary bands will be implemented, with a minimum and maximum base salary for each of the four levels in the Technical, Laboratory Staff, and Technologist ladders.
- Administrative and technical employees will have similar titles; there will be one additional level each for Technical Staff and Technologist and two fewer levels for exempt administrative employees.

#### Internal Movement October 1997

The reengineered internal movement process is the third and final phase for integrating all staffing acquisition. With its implementation, all staffing acquisition will be requisition-based, the concept of "one-stop shopping" will improve service to the customer, and the introduction of new technology will reduce cycle times and allow better utilization of people resources. Rules such as bidder eligibility and personnel action approvals have been simplified.

**Real-time job vacancy postings:** Job vacancies will be posted on the day after the approved tactical staffing requisition is received.

**Electronic bid packages:** The day after a job vacancy posting closes, managers will be able to view bidder resumés and additional bidder information as part of an electronic bid package.

**Electronic selection documentation:** Managers will be able to enter selection documentation directly into electronic forms on the Web.

**Simplified and automated personnel action approvals:** Personnel Action codes have been simplified and the number of codes reduced by almost half. Line managers will electronically approve and route many personnel action approvals.

**Resumé to bid:** Nonrepresented employees will be required to have a resumé in the database in order to bid on a job opening. This resumé will become an integral part of the information contained in the electronic bid package that goes to the selecting manager. Employees will be encouraged to use the Web-based Resumé Builder to prepare their resumés. (Enhancements to this Web application are under development and will be available prior to the resumé requirement.)

**Streamlined bidder eligibility rules:** Fewer, and more consistent, bidder eligibility rules make it easier for employees to bid on job vacancies. (For union-represented employees, bidder eligibility is defined in the contract.)

#### Leave Administration Changes October 1997

**Vacation leave:** Maximum vacation leave balances established, with leave being accrued on a monthly basis.

**Sickness absence:** A 40-hour sickness absence pool established with additional accrual on a monthly basis. When 40 hours are depleted, then Sickness Absence Plan is activated.

**Vacation leave:** More flexibility to meet project commitment across year-end boundaries.

- Managers will not be required to sign exception and approval memos for end-of-fiscal-year carry-over.
- The employee will be responsible for requesting exceptions from Paul Robinson or John Crawford.

**Sickness absence:** Managers will only need to keep track of a single sickness absence time charge.

**Vacation leave:** A more liberal fiscal year-end vacation carry-over policy.

- Employees will be responsible for managing their vacation balances.
- Vacation will cease to accrue once the maximum leave balance is hit.
- Employees with ten years of service who terminate during the fiscal year will receive the remaining accrual for the year.

**Sickness absence:** A single A-Order for sickness absence will be implemented. Employees will only need to report a sickness absence on the timecard — the system will determine whether the employee is on short-term absence or long-term absence. **Note:** An employee could be moved to the long-term plan sooner and will be required to return to work through medical for any absence of 40 hours or more during one month.

#### Telephone and Web Pay Deduction System (Employee self-service) October, 1997

This is a Web-based employee benefits home page where an employee can view benefits-related information both corporate-specific (corporate policies governing benefits) and employee-specific (individual coverages, benefits etc).

Same as for employees

Provides employees with one place where they can access and update (certain) online information about their benefits and benefits options. The self-service Web page also provides a guide to help the employee through the entire benefits change process for any event that impacts any aspect of their employee benefits.

#### Training & Education Development Systems (TEDS) March 97 (first implementations)

This is a corporate training tracking system that allows individuals to register training requests and requirements, and track completed training. Individual, organizational, and corporate reports can be generated using this system.

- Both managers and employees will have one place to access all of their training information.
- Managers will be able to input organization-specific training requirements and completions.
- Reporting capabilities are enhanced. TEDS has the flexibility to generate more types of management reports.
- Training requirements for courses can be tracked for better budget planning.

- TEDS allows users to view course descriptions, training schedules, and session availability at their desktops.
- This new system will allow online registration and data entry.
- Course completions can be entered and recorded quickly.
- Detailed training history and accurate compliance information is easily accessible.

## PURCHASING

What and when	Description	Impact on managers	Impact on employees
<b>Electronic Purchase Requisition (EPR)</b> October, 1997	The Electronic Purchase Requisition (EPR) will provide the end user the ability to fill out a purchase requisition on-line. The electronic requisition will be checked for case validity, be routed to the appropriate persons for electronic approvals, and be electronically sent to procurement for processing.	<ul style="list-style-type: none"> <li>Managers will approve EPRs electronically.</li> <li>Manager's e-mail load will be increased.</li> <li>Managers will be required to use a Kerberos password to approve EPRs.</li> </ul>	<ul style="list-style-type: none"> <li>Employees will no longer have to walk paper PRs through the system.</li> <li>EPRs will reduce the time it takes to get goods and services.</li> <li>It will no longer be necessary to manually fill out a paper PR; information will be entered directly into EPR.</li> <li>Enables employee to check the status of the EPR</li> <li>System will strictly enforce all business rules.</li> <li>Employees will be accountable for accuracy of data input into EPR.</li> </ul>

## FINANCE

<b>Bi-weekly Payroll</b> October 1997	Change in the frequency with which employees are paid.	Same as for employees	Employees will receive a 40-hour payment on Oct. 2. Their next payment will be received on Oct. 16 (80-hour payment). No payment will be received on Oct. 9. (See related story below.)
<b>Standard Labor Rate Implementation</b> October 1997	The purposes of implementing Standard Labor Rates include being more consistent with best practices in both industry and at other DOE labs; to bring about consistency between budget pricing and actual costing of labor; to prepare for the implementation of commercial software; to improve the predictability of costs; to improve the accuracy of quotes to customers; and to change the level of confidentiality of employee salary data.	Managers and staff who deal with budgeting and monitoring costing will be able to budget by individual, by salary band, or by organization average. In addition, it will be possible to determine virtually any employee's salary to within 5 percent, and labor will cost very close to its budgeted amount.	In general, the changes associated with SLR implementation will be invisible to employees.
<b>New Pay Stub Format</b> October 1997	The look, content, packaging, and distribution of pay stubs will change.	Same as for employees	Need to find pay and deduction data in new location on pay stub.
<b>Management and Budget Tracking of Nonbase Funds</b> October 1997	Financial Information System will be used to track budgetary expenditures of nonbase monies.	Timely availability and tracking of non-base balances by division level with the option to budget and track expenditures at the center and even department level if so desired.	Employees will be able to choose tax and 401(k) deductions. Division and center administrative assistants will be able to monitor non-base spending and balances weekly, as it occurs.
<b>Electronic Timecards (Enhancement)</b> April/October 1997	This is an effort to put the approval/reviewer function in the Web environment. An interim solution was rolled out in April 1997 with full implementation in October 1997.	Ability to approve original and corrected timecards via Web browser.	Ability to initiate corrections themselves. Expands record availability from 13 weeks to six months.
<b>Financial Reporting</b> October 1997	This tool is for use by the line and provides financial tracking and financial reporting information.	Same as for employees	Financial reporting using the commercial package, when accepted and used by line customers, will replace portions of the corporate and local reporting systems currently in use. The corporate data warehouse will be enhanced to provide the data necessary for financial reporting.
<b>Electronic Business Expense Report (EER)</b> October 1997	This is a Web-based application for submitting employee travel and non-travel expense vouchers.	Managers will approve expenses electronically.	Employees will voucher their travel and business expenses electronically. Reimbursement to the employee will be quicker than using the paper system.

## Labs goes to biweekly pay in October

### No impacts on pay amounts; transition financing available

Effective Friday, Sept. 26, 1997 (timecard week ending Oct. 2), Sandia will implement biweekly pay for all of its employees. Employees will receive their normal 40-hour payment on Oct. 2 at the FY97 rate of pay. Their next payment will be received on Oct. 16: 80 hours of pay at the FY98 rate (weeks ending Oct. 2 and Oct. 9).

There is no impact on pay amounts. Employees will receive their normal 40-hour payment on Oct. 2 at the FY97 rate of pay. Their next payment will be received on Oct. 16, for 80 hours of pay at the FY98 rate.

### Deductions

In general, deductions that were previously deducted the first four possible pay periods of each month will now be doubled and deducted the first two possible pay periods each month. Deductions that were deducted every pay period

of each month will be doubled and still be deducted every pay period of each month. Deductions from pay and loans at the SLFCU will automatically be converted to the biweekly schedule.

### Transition financing

Since at the outset of biweekly pay there will be a two-week period following pay for a single week, employees may need help financing the week ending Oct. 2. Plans to ease the transition include permitting employees to:

- 1) sell 40 hours of vacation on Sept. 25 to supplement their regular weekly pay, or
- 2) request an additional 40-hour payment on the Oct. 2 payroll. (Repayment will be made through payroll deduction over the next eight weeks).

Note: Transition financing will not be available for Metal Trades Council members.

## Web site details upcoming changes

For more information about these changes, check out the Changing Business Practices site on Sandia's Internal Web at <http://www-irn.sandia.gov/announce/scbp/mgrtm.html>.

When you get to the page, a good place to start might be the "resources available" link. To get to it, scroll down the page and click on the "resources available." It'll be in blue on your browser.

The Web site offers detailed descriptions of the many changes in the works and features an extensive collection of answers to questions asked at employee and manager town meetings.

The site is constantly updated, with additional information being posted on a regular basis, so frequent returns are suggested.

# Mileposts

## July 1997



Gilbert Leyba  
1412 45



Dan Luna  
9116 25



Lana Everett  
14000 15



Larry Arellano  
3650 15



Timothy Malone  
5849 20



Bob Gallagher  
8366 25



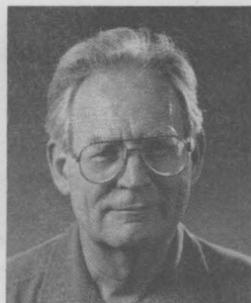
Dale Breeding  
5704 35



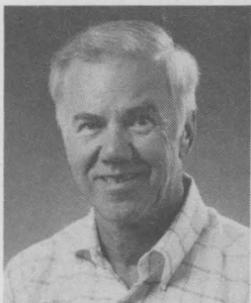
Harold Spahr  
9115 40



Alton Shaut  
2663 35



David Holt  
5715 35



David Skogmo  
5838 35



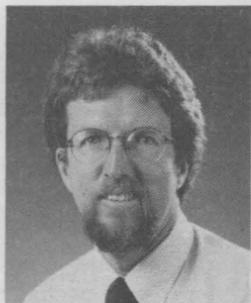
Bill Hale  
5341 35



Terry MacDonald  
7524 15



Elizabeth Sorroche  
1832 15



Larry Walker  
5704 20



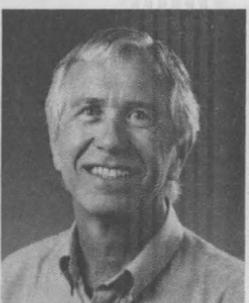
Edward Saucier  
3650 15



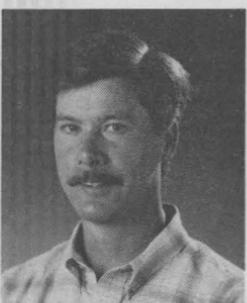
Ricardo Garcia  
3524 20



Rosemae McKillip  
9208 15



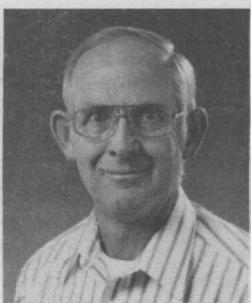
Dan Thompson  
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Jim Aubert  
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Craig Tyner  
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David Johnson  
9521 20

## Jill Fahrenholtz named Society of Women Engineers' Distinguished New Engineer

Jill Fahrenholtz, Acting Manager of Intelligent Systems Principles Dept. 9621, has been awarded the Distinguished New Engineer Award by the Society of Women Engineers (SWE) in recognition of her many contributions to and leadership in the engineering profession, the SWE, and other technical, professional, and community organizations.

This national award, limited to only five recipients a year, was presented to Jill on June 28 during the SWE National Convention in Albuquerque. Jill is a senior life member of SWE and was program chair for the recent national convention.

Jill has a BS from Carnegie Mellon University and an MS from Stanford, both in mechanical engineering. She joined Sandia in 1988 as a control system and robotics applications software developer. Since then, she's worked on a variety of projects as a project engineer developing software control systems and robotics operations, including developing a real-time environment for prototype robotics operations for the Yucca Mountain Nuclear Waste Repository to transport spent fuel rods and perform assembly and disassembly operations in high radiation areas.

One of Jill's most recent assignments has been project lead for the Automated Pit Packaging Project, one of Dept. 9672's robotics systems delivered to Pantex for hazardous material handling. In addition to her project

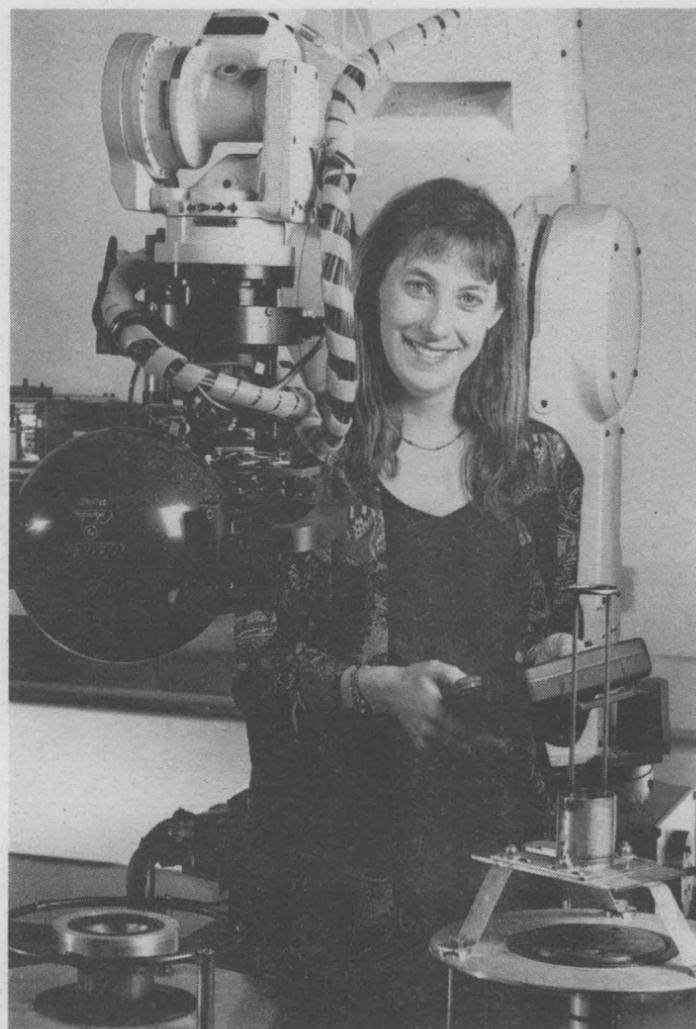
lead assignments, Jill has aided in Intelligent Systems and Robotics Center 9600 strategic planning.

She has been active in many women's activities at Sandia, working to improve networking and communication among women employees. She founded the Women's Inreach Network and assisted the Women's Program Committee in organizing Take Your Daughters to Work Day.

Jill also participates in the Women in Science and Engineering Mentor Program, coaching a UNM freshman engineering student. She is also involved in many community activities, including the Sierra Club, American Diabetes Association neighborhood fund drives, and Albuquerque Domestic Violence Shelter supply drives.

The Society of Women Engineers is a nonprofit educational organization that supports member and student member sections across the country. The society's activities are in career guidance for young women and girls, encouraging them to stay in math and science classes and activities; continuing development for members in professional development activities, such as leadership and family issues; educating the general public about engineering's role in daily life; and encouraging people to pursue careers in engineering and science.

—Janet Carpenter



JILL FAHRENHOLTZ demonstrates use of an Automated Pit Packaging system developed at Sandia and delivered to Pantex. The bowling ball approximates the size and weight of a nuclear weapon "pit." (Photo by Randy Montoya)

# Sandia Classified Ads Sandia Classified Ads Sandia Classified Ads Sandia Classified Ads

## MISCELLANEOUS

WEDDING DRESS, w/long sleeves & head-piece, white, floor-length, size 7, \$50; cat litter box, large, \$5. Hardison, 271-2838.

COMBINATION FUTON/BUNK BED FRAME, black metal, great shape, \$75; Sega Genesis game deck, \$25. Medina, 294-3182.

FOUR-POSTER QUEEN CHERRY BED FRAME, \$800; king oak sunburst headboard, \$100, w/matching 7-drawer dresser, \$150. Jensen, 823-9203.

WHITE WICKER DOUBLE HEADBOARD, \$40; double mattress set, \$75, matching night stand, \$25; 5-drawer dresser, \$30. Widmer, 823-9203.

REFRIGERATOR, Hotpoint, 19.7 cu. ft., frost free, almond, great condition, \$250 OBO. Schell, 792-8587.

GE FROSTLESS REFRIGERATOR/FREEZER, white, excellent working condition, \$125. Vallejos, 292-4625.

TV CONSOLE, color, cable-ready, \$125; microwave, \$45; washer & dryer, electric, white, \$125/both; gas grill, dual burners, \$40. Gregory, 275-3855.

ORGAN, Wurlitzer Funmaker, approx. 20 yrs. old, rhythm-beat options to accompany play, \$375 or consider piano trade. Potts, 292-5697.

SPEAKERS, 15-in., crossovers, tweeters, on panel to fit under hatchback of '84-'86 Mustang, \$125. Beagle, 298-0330.

AQUARIUM, 30-gallon, complete w/fish, stand, \$100. Hess, 898-5113, ask for Barbara.

TEAK TEACART, \$75, rolltop desk & file, \$250; half-bra, '95 Civic, \$35; Lane cedar chest, \$250. Turner, 823-9506.

TWO STEREO SPEAKERS, Technics, large, \$75. Jennings, 878-0828.

BABY ACCESSORIES, double stroller, Port-a-Crib, bed rail, Little Tykes baby swing, potty chair. Luna, 881-6808.

LASERJET HP IIIP, \$250; Toshiba T-3400 laptop, 4.2 lbs., 486/33MHz, 16MB, lithium-ion battery, \$500. Lauffer, 867-2043.

KING-SIZE WATERBED, 12-drawer pedestal, hutch headboard, triple dresser, w/hutch, 2 nightstands, large armoire, \$650. Mayer, 286-1460.

HOT TUB, 8-person spa w/hard cover, 250,000 Btu input, natural gas heater, \$750 OBO. Feng, 275-6639.

CRIB & MATTRESS, very good condition, \$75; NordicTrack bike, \$50. Martin, 268-5892.

EXERCISE EQUIPMENT, Tuff Stuff Muscle 3, w/leg press & vertical knee raise, new, \$1,400. Hammons, 281-1205.

OCTAGON DINING ROOM TABLE, pecan, two 18-in. leaves, 4 cane-back chairs, w/matching buffet, \$400; Cuisinart, w/attachments, \$35. Ruggles, 275-3855.

DINING ROOM SET, beige Formica, oak trim, vinyl seats, 4 yrs. old, \$275. Nielson, 292-6188.

PURSES, LUGGAGE & ACCESSORIES, original Dooney & Bourke, new, from Dooney factory in Conn. Sumruld, 877-0879.

GE VHS CAMCORDER, \$75; crib & dresser/changing table, excellent condition, \$275; Singer serger, hardly used, \$75. Jones, 899-1187.

FISHER-PRICE HIGH CHAIR, \$20; Crown DC300 audio amplifier, IC150 preamp, \$275. Pregent, 281-1414.

DINING TABLE, glass top, w/4 chairs, \$200 OBO. Foust, 255-6326.

KITCHEN TABLE, w/6 chairs & leaf, good condition, perfect for starter home or college apt. Rule, 884-8762, ask for Mark.

BETTY CROCKER COUPONS, 3,300 plus, free, you pick them up. Booker, 299-3554.

GERMAN SHORTHAIRED POINTER, AKC, male, whelped 3/31/97, proven hunting lines, great family dog, guaranteed, \$400. Prairie, 837-1452.

AUTOMATIC BREAD/DOUGH MAKER, West Bend, recipe book & video, makes 1- & 1-1/2 pound loaves, \$60. Hamlet, 299-5124.

CLARINET, Yamaha, w/case, used 6 months, \$300. Ottinger, 275-2348.

EXERCISE MACHINE, will firm & shrink thighs, hips, buttocks. Barton, 268-7349.

CAMPER SHELL, for long-bed pickup, cab level, aluminum over-wood frame, windows all around, \$225. Burger, 884-5270.

INKJET PRINTER, monochrome, HP DeskJet 500, excellent condition, w/extra high-capacity print cartridge, Windows drivers, manuals, \$150 OBO. Kobs, 281-1102.

STONEWARE, Pfalzgraff, complete set "Village" pattern, 8-place settings, w/serving pieces, matching stainless flatware & glassware. Seyfer, 292-0179.

ACOUSTIC ELECTRIC GUITAR, Yamaha 6-string, (black finish), w/hard case, excellent condition, \$550. Foster, 823-1162.

STOVES: electric, almond, \$125; gas, double over/under ovens, avocado, \$95; both good condition. Nutt, 856-8267.

ALUMINUM SCREEN DOOR, 36-in., \$15; exercycle, \$40. Nicolaysen, 275-9657.

CUSTOM CAR COVER, w/look for BMW 325; front-end bra, \$100/for both. Wise, 898-8151, leave message.

FENDER BLUES DEVILLE, w/4 x 10-in. Fender custom speakers, vinyl not tweed, w/foot switch, still in plastic, \$450. Cerutti, 229-6104.

AQUARIUM STUFF: 20-lb. gravel, UG filter, power filter w/bags, top light (fits 10-gallon), all \$20. Baldo-Pulaski, 345-0432.

DRUM SET, skateboard ramp, inversion boots & bar, Toyota truck bumper. Cordes, 299-0511.

GARAGE DOOR, metal sectional rollup, w/all hardware, fair condition, \$30. House, 293-6016.

FINANCIAL CALCULATOR, HP 17BII, new, manuals, case, warranty, \$72. Gabaldon, 857-9853.

MERCHANDISE CREDIT, at OfficeMax, for \$79, selling it for \$50. Wagner, 823-9323.

TREADMILL, heavy-duty (jog, run), programmable, w/electric grade adjustment, \$2,000 new, asking \$1,500 OBO. Ball, 344-7437.

DARK WOOD WATERBED, drawers, TV stand, \$200 OBO. Sparling, 281-7267.

COMPUTER DOLLY, wheeled, wooden, holds CPU, monitor, keyboard, printer, \$20. Finger, 266-8906.

WEDDING DRESS, size 8, silk, off-the-shoulder, \$250; dining table & chairs, excellent condition, \$50. Kincaid, 296-6014.

CHEST FREEZER, 10-cu.-ft., \$75; baby stroller; 180 XLS Honda motorcycle; queen headboard, solid fruitwood; IBM momo XT w/386-16. Fisher, 881-8072, or 881-8611, after July 7.

TRANSOM SAVER, for outboard motor, \$25; clamp-on depth transducer mount, \$15. Holmes, 292-0898.

KITCHEN UTILITY TABLE, butcher block, 2-ft. square top, approx. 3-ft. high, \$60; 2 matching stools, \$15. Ryan, 298-8692.

AEROBIC RIDER, excellent condition, \$160; girl's 20-in. bike, \$30; oak coffee table, \$30; heavyweight bag (30-lb.), \$30. Martinez, 296-9035.

BABY ITEMS: infant car seat, swing, exerciser, walker, girl/boy clothing, sizes NB-4T, crib mobile, bathtub, play gym, more. Nelson, 828-2755.

WATER PUMP, "Homelite," new, gas powered, 2-in. waterpump, w/3-hp Briggs & Stratton engine, \$160. Sandoval, 866-6991.

YARD SALE, July 11-12, 7:30 a.m.-3 p.m., 1600 Catron SE, Four Hills Rd., right at Y, 2.3 miles left, furniture, lines, dishes, more. Pitts, 293-5481.

REFRIGERATORS: 18-cu.-ft. Whirlpool, white, \$300; 22-cu.-ft. Kenmore, side-by-side, white, w/optional black front, ice in door, \$500; both excellent condition. Petersen, 275-7467.

CARDIO-GLIDE, \$150; stair stepper, \$40; exercycle, \$25; student trombone, \$90; antique dressing table, \$200; radio, Philco collector's edition, \$100. McKay, 294-2935.

SEGA GENESIS, 2 controllers & 3 games, \$55; Superscope 6, for SNES, w/game, \$30. Starr, 821-6480.

BARBIE COLLECTION: 7 dolls, clothes, & accessories; \$25; 2 model horses, \$5 ea. Geitger, 856-0829.

COUCH, 98" x 42"; loveseat, 70" x 42"; ottoman, 28" x 43"; earth tones. \$250 OBO. Nation, 298-5605.

QUEEN-SIZE SEALY POSTUREPEDIC BED, \$275; pair Volvo wheels, \$25; shop vacuum, fits 30 gallons, \$15. Anderson, 281-1560.

NIKON ZOOM LENS, new in box, 35mm-70mm, f3.5 autofocus, can be used w/manual camera. \$125. Montoya, 296-4268, call before 9 p.m.

POP-UP SLIDE-IN TRUCK CAMPER, Sun-Lite, fits small trucks, sink, stove, ice-box, power converter, see at base lot, \$1,500 OBO. Bronkema, 291-1323.

OVEN, dual, built-in electric, works fine, \$40. Brown, 884-8581.

ORGAN, Wurlitzer, w/synthesizer & bench, \$950, piano, antique concert grand, upright, \$1,000; bike, 10-spd., \$50. Pacini, 821-2861.

**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.

## TRANSPORTATION

'93 MITSUBISHI GALANT, 5-spd., AC, 30+ mpg, AM/FM cassette, \$6,600. Ashworth, 281-2824.

'73 CORVETTE STINGRAY, 73K miles, matching numbers, 350-V8, AT, new red paint, brakes, carpet, door panels, stored 8 yrs., \$8,750. Muirhead, 281-2925.

'89 TOYOTA COROLLA, 5-spd., 4-dr., new tires, AC, CD player, \$3,650. Chavez, 865-6293.

'89 TOYOTA PICKUP, good condition, metallic blue w/matching snugtop shell, 1-yr.-old tires, shocks, & timing belt, 113K miles, \$2,600. Giersch, 299-9512.

'90 HONDA CIVIC LX, 4-dr., AC, PW, PL, white, Michelin tires, 63K miles, like new, \$8,400 OBO. Smith, 299-8562.

'92 BUICK SKYLARK, white, 4-dr., PS, garage-kept, \$6,200. Marrs, 856-9195, ask for Campbell.

'95 SUBARU LEGACY OUTBACK, 28K miles, exceptional condition, fully loaded, AWD, automatic, factory warranty, \$15,750 OBO. Spring, 293-8028.

'88 DODGE PICKUP, white, AT, AC, clean, great condition, \$3,500. Sanchez, 877-9385.

'94 CHEV. G20 VAN, V6, Starcraft conversion, loaded, 49K miles, excellent condition, must see, \$13,000 OBO. Kearns, 898-4122.

'85 NISSAN TRUCK, 4x4, w/camper, PS, AC, PB, \$3,200. Guinn, 898-9339, leave message.

'84 CUTLASS CALAIS, runs well, excellent interior, 120K miles, \$1,800. Nelson, 293-7180.

'93 DODGE GRAND CARAVAN SE, silver/red, damaged but working sliding door, 85K miles, runs great, new shocks/struts/brakes, \$9,500. Barnette, 861-2451.

'78 LINCOLN MKS, 100K miles, 460 V8, brown, cream leather, runs/drives great, \$2,000 OBO. Hanson, 299-6421.

'85 FORD BRONCO II, 4x4, XLS pkg., rebuilt engine, PB, PS, AC, new tires, great hunting/fishing vehicle, \$3,150. Starkweather, 268-1182.

'94 GMC SIERRA SLE, extended cab, 4x4, short bed, 5.7L V8, white/blue, 21,600 miles, 5-spd., virtually every option, original owner, garaged, \$19,000. Dwyer, 271-1328.

'89 FORD PROBE GT, white turbo, 141K miles, new clutch, brakes, timing belt, tires, \$4,500 OBO. Hands, 836-1578.

'91 FORD EXPLORER XLT, 4WD, 4-dr., V6, 4-spd., AT, power, cruise, 84K, excellent condition, \$8,995 firm. Langwell, 858-5954.

'95 HONDA CIVIC EX, 2-dr., 5-spd., manual transmission, loaded, power everything, excellent condition, \$11,000. Barela, 299-1037, ask for Mike.

'85 HONDA ACCORD, reliable, \$900 OBO. Urrea, 890-7902.

'93 SAAB 9000 CSC, 5-dr., 5-spd., manual w/factory warranty, leather, CD, auto sunroof, beautiful car, below blue book, \$16,500 OBO. Bruff, 232-7608.

'96 SATURN SL1, AT, AC, ABS, dual air bags, cruise, cassette, 15.7K miles, perfect, below book. Carpinelli, 275-7842.

'90 PLYMOUTH LASER TURBO, black, 5-spd., AC, AM/FM cassette w/equalizer, cruise, 70K miles, 1 owner, garaged, below book, \$5,750 OBO. Chapman, 821-0095, ask for Jim.

'93 CHEV. BLAZER S-10, LT-Tahoe, 4-dr., antitheft, cruise, leather seats, royal blue, PD, PL, PS, 78K miles, \$16,000. Gallegos, 899-9004.

'93 BMW, metallic gray, low mileage w/extras, \$20,000 OBO. Domingo, 271-1105, evenings or leave message.

'88 DODGE GRAND CARAVAN, V6, AT (new), AC, PS, AM/FM cassette, cruise, tilt, tinted windows, super clean. \$4,500. Behr, 856-6273.

'85 HONDA ACCORD LX, 3-dr., 5-spd., 30-35-mpg, AC, cruise, AM/FM cassette, all records, \$2,800 OBO. Ho, 237-2668.

'90 HONDA CIVIC, hatchback, 4-cyl., 4-spd. manual, AC, red, 99K miles, economical transportation, \$3,600. Gelet, 898-7117.

'90 PONTIAC BONNEVILLE LE, dark blue w/gray interior, 3.8L, fully loaded, runs great, \$5,900 OBO. Tomasi, 797-2661.

'91 TOYOTA PREVIA, 5-spd., dual air, cruise, new tires, white, 99K miles, excellent condition, \$10,500. Criel, 856-6582.

'90 SUBARU LEGACY, 4-dr. sedan, AWD, 5-spd., PW, PL, 88K miles, \$6,100 OBO; '91 Ford Aerostar XLT 4WD; extended wagon, rear AC, AT, 85K miles, \$8,900 OBO. Loucks, 255-9444.

'88 FORD CONVERSION VAN, 72K miles, high top, great condition, 302, towing pkg., rear air, \$7,500 OBO. Platzbecker, 299-6096.

'87 NISSAN MAXIMA, 4-dr., 122K miles, PW, PL, moonroof, new tires, great condition, all service records, \$4,500. Schkade, 244-1983.

'79 IMPALA WAGON, good condition inside/out, many new parts, 2nd owner, must sell, \$800. Gershin, 293-9648.

'91 FORD EXPLORER XLT, 4WD, AT, AC, silver/blue, great condition. \$9,450. Pullen, 858-1500.

'89 GMC SUBURBAN SLE, 4x4, 350, 114K miles, exceptional condition, has everything, nice as new, but 1/3 the price, \$9,900 OBO. Reser, 345-7294.

'94 FORD F150SC, SWB, PS, PB, AC, 5-spd., Big Six, sliding RW, excellent condition, \$11,111 OBO. Schaub, 821-7242.

'88 ACURA INTEGRA LS SE, AC, PS, PB, PW, cruise, tint, new rims & tires, very clean, \$6,000. Lucero, 296-2473.

'91 Z28, original owner, 33K miles, 305, 5-spd., AC, cruise, cassette, rear disks, performance goodies, \$10,500. Fogelson, 296-0620.

'92 PLYMOUTH LASER, 57K miles, 5-spd., 2-dr., garage-kept, blue, \$6,500. Szklarz, 865-3637.

'94 FORD TAURUS WAGON GL, fully loaded, fully powered, 3.8 V6, dual airbags, ABS brakes, 51K miles, \$10,900. Hart, 291-8774.

'96 HONDA CIVIC DX, 5-spd., AC, CD changer, tint, bra, 15,800 miles, warranty, excellent condition, \$12,000. Boling, 296-4215.

'86 MERKUR XR4TI, 5-spd. turbo, 68K miles, records, new ECM, AC, brakes, shocks, etc., \$3,350 OBO. Emery, 766-9629 or 296-2367.

'84 GMC CONVERSION VAN, 3/4-ton Starcraft, AT, dual AC, 305, green, green interior, 100K miles, \$4,500. Henley, 821-5457.

'73 FORD MUSTANG, 2-dr., 351C, AT, PS, PB, AC, needs engine rebuild. Pineau, 268-3693.

## RECREATIONAL

'94 KIT 5TH WHEEL CAMPER, 18-ft., used once, w/hitch, see south of Coronado Club, \$8,500. Spires, 275-3655.

'95 MOUNTAIN BIKE, Bianchi lbex, 15-in. frame, LX & XT Shimano components, Rock Shock, Suntour aluminum alloy pedals, paid \$800, asking \$500. Venegas, 299-4324.

'83 KAYOT PONTOON BOAT, 24-ft., 60-hp motor, trim & tilt, excellent condition, \$6,500. Patton, 298-9987.

CAMPER SHELL & CARPET KIT, fits late model Chev., \$500; Class III receiver pre-1988 Chev., \$50. Gallegos, 293-5634.

'85 440 KAWASAKI JET SKI, \$500. McRee, 898-5165.

MEN'S BICYCLES: Performance 430, 18-spd. hybrid (good condition); Murray Westport cruiser (like new); \$45 ea. Sikora, 821-1983.

GIRL'S MOUNTAIN BIKE, 20-in., 6-spd., \$40. Shrouf, 821-0765.

'97 TRIUMPH T595 DAYTONA, yellow, factory-polished frame, stock, 1,400 easy miles, showroom condition, \$10,000. Curtis, 281-8364.

GIRL'S BIKE, 16-in., w/training wheels, 2 yrs. old, \$35. Meeks, 828-9825.

'81 HONDA CB 900, inoperable, would like to sell for value of parts, best offer. Meirans, 271-2313, evenings.

'83 YAMAHA 920, "Midnight" Virago, excellent condition, 1 owner, custom seat & hitch, 30K miles, \$1,400. Brosseau, 286-1969.

DALLAS COWBOYS PRE-SEASON TICKETS (2 ea.), vs. Rams, Aug. 15 & vs. Oilers, Aug. 23, \$35 ea. Hernandez, 293-7180.

'95 TRAVEL TRAILER, Jayco Designer Series, 31-ft., loaded, sleeps 6, used once, warranty available, must sell. Thompson, 823-4567.

GIRL'S BICYCLE, 18-in., 10-spd., Murray bike, like new, \$60. Zutavern, 298-6523.

BIKE FRAME, Wolf Creek, 20-in, titanium, used once, excellent condition, \$1,000 new, asking \$850. Blickeck, 323-9145.

MONACO MOTORHOME, 35-ft., elegant, immaculate, oak tile, new motor, radiator, 7K generator, levelers, rear-queen, 49K miles, \$31,900. Ostensen, 296-4227.

## REAL ESTATE

3-BDR. HOME, 2 baths, 2-car garage, 2,300 sq. ft., new roof, siding & windows, fireplace, deck, upstairs sitting rooms, located in Chester, Va., owner must relocate, \$152,000. Rader, 292-6241.

4-BRM. HOME, 1-3/4 baths, big pool (w. sec. cover), hot tub, fruit trees, roses, sprinklers, brick, sloped roof, big yard, east of Tramway, south of Copper, \$183,000. Gemmill, 292-5910.

TWO ONE-ACRE LOTS, in Angel Fire, adjacent, utilities available, fully wooded at 9,000 ft., \$11,000 ea. Lee, 286-2823.

3-BDR. MOBILE HOME, 2 baths, fenced, 1,320 sq. ft., in NE park, \$14,000 (negotiable). Crosby, 858-3128.

1-BDR. PARK PLAZA CONDO, 11th floor, mountain view, \$78,000. Roth, 248-1940.

4-BDR. HOME, custom, new, 2 baths, 2,066 sq. ft., 2-1/2 acre irr./alfalfa, master bath w/jacuzzi, barn & storage shed, horses okay. Baca, 865-3717.

2-BDR. TOWNHOUSE, 2 baths, 1,050 sq. ft., fireplace insert, fruit trees, 4 miles to Eubank gate, \$94,900. Benton, 275-2602.

3-BDR. HOME, Cortez, Colo., 2 baths, 1,559 sq. ft., double garage, detached workshop, large lot, \$125,000. Beasley, 298-3398.

3-BDR. HOME, 2 baths, large den, 2,014 sq. ft., city of Belen, \$97,000. Garcia, 872-9511.

## WANTED

PATRICK NAGEL, commemerorative prints, other Nagel material. Montoya, 839-0758.

NINTENDO CARTRIDGES & GAME GUIDES, for original Nintendo video game machine. Forster, 293-7231.

HOUSEMATE, to share 3-bdr. home, Rio Rancho, nonsmoker, male or female, \$300/month plus 1/2 utilities. Hedge, 896-7991.

FENCING MATERIALS, cedar posts or split rails & horse fence; swamp cooler, small-to-medium size. Rector, 286-1217, ask for Mike.

FOUR CANS OF FREON-12, willing to pay going rate. Alexander, 291-8028.

HOUSE SITTING jobs until July 24, experienced, college senior, \$10/day, by week or weekend. Perrine, 293-1429.

## LOST & FOUND

FOUND: Two wallet-size pictures, parking lot east of Benefits, written on back: Emily, May 1997 and Brian, May 1997. Pounds, 844-5674, ask for Sheila.

LOST: Pair of "black" prescription sunglasses, bright turquoise case. McCutcheon, 845-8433.

# How happy are they? Sandia survey measures customer satisfaction

**Survey finds overall satisfaction scores of 8.5 and 8.9 on scale of 10**

By Bruce Hawkinson

With advertisements for major US companies now sometimes mentioning intra-industry "customer satisfaction" rankings, it's clear that a term once familiar only to the drudges poring over Malcolm Baldrige quality criteria has become an accepted part of the nation's culture.

Sandians have used (and debated and defined in many ways) the term "customer satisfaction" often throughout the 90s. Within the last couple of years, the Sandia Quality Leadership Council (SQLC) looked seriously at its two middle names and decreed that "customer satisfaction" would be one of Sandia's corporate metrics, one of the attributes by which to measure its performance for itself, for DOE, and for Lockheed Martin.

Measurable — there's the rub. It's not simple to determine a "customer satisfaction" score that quantifies the satisfaction level of the owners of thousands of more-or-less identical automobiles. It's really tough for an R&D lab that produces diverse "deliverables" — ranging from an idea to a software package to a piece of hardware — to determine a way to assess the satisfaction of its many customers accurately over time. Making it even tougher is that SQLC recognized early on that the "CSat" mechanism must also identify areas for improvement.

The tough assignment of developing that mechanism went to a cross-labs team headed by Bonnie Apodaca (4522). The team came up with

two approaches — one aimed at key customers, one at project/program customers.

"Key customers," says Bonnie, "are selected high-level officials in the federal agencies we do business with frequently. Our project/program customers are the ones with whom we have negotiated a specific deliverable, or product, which can be software or hardware, cost a few thousand to several million dollars, and take a very short or a very long time to deliver."

In each case, half of those identified were surveyed.

For the key customers, the CSat scores were derived from the high-level officials' answers (sought either through interviews or printed on a survey) to 1) two open-ended questions about what we are doing well and where we need to improve and 2) two questions to be scored 1 to 10 on the customer's overall satisfaction level and Sandia's value to the nation.

The survey was mailed to program/project customers. It asked for agree/disagree responses to statements about Sandia's performance, schedule, technical and professional support, relationship, communication, and value of products and services. It then asked for answers to open-ended questions about what Sandia is doing well and where it needs to improve; it concluded with 1-10-scored questions about overall satisfaction, willingness to continue to work with Sandia, and willingness to recommend Sandia to colleagues or business associates.

## From analysis to action

Customers' responses were analyzed for root causes. Corrective actions are now being developed and implemented. Key customers' overall satisfaction score (on the 1-10 scale) was 8.5; that of program/project customers was 8.9. Both scores would appear quite acceptable, but the CSat literature indicates that scores lower than 9.0 should be a cause for some concern and corrective action.

After analyzing responses to the more subjective questions on the surveys, the CSat team identified a "vital few" areas for improvement at the laboratory level: the substance and communication of Sandia's "mission/priority/focus"; Sandia's external relationships; and the financial interface with customers (weak cost management, poor communication on financial information, too expensive).

The Sandia Customer Satisfaction team and other focus groups are now working with both the raw data (such as customers' answers to specific questions) and the analyzed and distilled data to determine courses of action and potential means of remediation.

## Sandia News Briefs

### DOE's Ray Semko brings D\*I\*C\*E briefings back to Sandia

Ray Semko, the popular DOE counterintelligence officer who has provided briefings to standing-room-only crowds at Sandia for the past several years, will be presenting a series of six briefings at the Labs July 14-17. The D\*I\*C\*E '97 (Defensive Information to Counter Espionage) briefings, with all-new material this year, are scheduled for the Technology Transfer Center (Bldg. 825) auditorium. The times for the 90-minute briefings are: July 14 — 9 a.m. and 2 p.m.; July 15 — 9 a.m.; July 16 — 9 a.m. and 2 p.m.; and July 17 — 9 a.m. As with past D\*I\*C\*E briefings, Semko will provide current, unclassified information about intelligence activities around the world and how these activities may impact Sandians. D\*I\*C\*E '97 is sponsored by Safeguards and Security Center 7400. Attendees will receive annual Security Refresher credit.

## LOCKHEED MARTIN Around the corporation

### Lockheed Martin names new VP

Brian Daily has been named VP, strategic development, succeeding John Egan, VP, corporate development, who plans to retire early next year. President and Chief Operating Officer Vance Coffman announced the change.

"The new title of this senior staff position reflects the importance of strategic planning and creative thinking to Lockheed Martin's continued growth in our increasingly complex and competitive global markets," Coffman said.

Daily has served as the Space & Strategic Missiles Sector's vice president, business development, since the formation of Lockheed Martin in March 1995. Past positions have included executive secretary of the National Space Council in the Bush Administration, senior professional staff member for the Senate Armed Services Committee, and various assignments in the DoD and research institutes.

## Feedback

**Q:** Why is the Sandia home page beginning to resemble a video game? The Internal Web is a great resource for disseminating information, but all of the animation is distracting. I also wonder if the additional graphics are loading down the network. These pages must get visited thousands of times per day. This seems to be contradictory to the advice we've been getting regarding minimizing graphics in e-mail transmissions.

**A:** The subject of animated images on Web pages is a controversial one, even among those responsible for creating and maintaining Sandia's Internal home page. Some believe it adds significant value and others like yourself believe it to be no more than a distraction. As a result, we tried to work toward some type of compromise. We've placed several restrictions on home page graphics, such as a "teaser" image's total file size must be less than 75K and animated gifs cannot loop more than five times.

If the animations are looping continuously on your machine, then it could be that you have an older version of the browser. Some older versions do not recognize the loop setting in an animated gif file. The current supported browser is Netscape Version 3.0.

We have not seen a detrimental effect on the

## Coronado Club

July 3, 10, 17, 24, 31 — Thursday bingo night. Card sales and buffet start at 5 p.m., early birds' bingo at 6:45 p.m.

July 4 — Independence Day celebration. A la carte buffet. Pool open at 11 a.m. Music by Isleta Poor Boys, 2-6 p.m. KAFB fireworks extravaganza at dusk. (Enter through Truman gate.)

July 13 — Sunday brunch buffet, 10 a.m.-2 p.m. \$6.95 all-you-can-eat buffet, kids 3-12, \$1, under 3 free. Music by Bob Weiler, 1-4 p.m.

July 18 — "Western Night" dinner/dance. \$6.95 all-you-can-eat buffet (\$7.95 for guests), 6-9 p.m. Music by Isleta Poor Boys, 7-11 p.m.

July 25 — Kids bingo. Buffet, 5-8 p.m., cartoons, 5-7 p.m., bingo at 7 p.m.

Thursdays and Fridays all month — Summer swim nights. A la carte buffet. Pool open until 9 p.m. (Pool closes at 5 p.m. on July 25.)

July 26, 27, 28 — Sundance championship swim meet. Pool and Club closed to regular activities on 7/26-27; lunch line open 11 a.m.-1:30 p.m. on 7/28.

## Next on CSat target list: internal customers

The CSat team is now working on a corporate-wide system for measuring internal customer satisfaction with in-house infrastructure support functions. (Sandians are the first customer in the customer chain.)

Because the team is reluctant to add more surveys — "We've heard the message that Sandians are over-surveyed," says Bonnie Apodaca — the current approach is to synthesize existing survey data and supplement that data with other means of getting feedback from external customers.

Internal support groups will also use the feedback from external customers to improve their processes.

"With the feedback from our customers, we now have the responsibility to make this a closed-loop process and take corrective actions to improve our customer satisfaction at the corporate, project, and individual level," says Bonnie. "Every Sandian will ultimately be involved in the customer satisfaction improvement efforts."

network or Web server as a result of the additional home page graphics.

From the thousands who see the home page, we've had a handful of complaints about the animated home page graphics. We are taking these concerns seriously and watching for negative side effects on the network and Web servers. We're striving to make Sandia's Internal Web as useful as possible for every employee.

— David Leong (4612) and Jennie Negin (4817)

The Feedback Program provides a communications channel to management from employees who have questions and comments about Sandia policies, procedures, benefits, and work environment.

If you have an unclassified question or comment you'd like answered, contact the Feedback Administrator by interoffice mail at MS 0165, by e-mail at [jacarbe@sandia.gov](mailto:jacarbe@sandia.gov), or through the Feedback page on the Sandia Internal Web at <http://www-im.sandia.gov/corpdata/feedback/fbindex.html>.

Submitters' names are never published and, unless otherwise requested, are kept confidential by the Feedback Administrator.

If you do not include your name with your Feedback, you will not receive an answer nor will your question be published, but your feedback will be forwarded to the appropriate director for his or her information only. For information about Feedback, call Janet Carpenter (12640) at 844-7841.