

Newly upgraded ACRR is up and running in Area 5

Sandia's primary research reactor is ready to accommodate hundreds of requests from researchers



ACRR CHECK — Ron Farmer makes some last minute checks to the ACRR. (Photo by Randy Montoya)

By Chris Burroughs

A newly upgraded Annular Core Research Reactor (ACRR) — Sandia's largest research reactor — is up and running in Area 5, ready to accommodate researchers' requests from across the Labs wanting to use the ACRR for hundreds of experiments.

The ACRR has been out of operation for about six months while the upgrades were made.

"We made major upgrades in every area of the rod control and reactor console (RC/RC) systems," says Danny Beets (6431), project lead. "We put in 15 new control rod drives as well as new computers, going from 386s and 486s to Pentium-III's. We installed an Ethernet communication system and went from a DOS computer operating system to WIN2000."

They upgraded the programming language and rod control interface. In addition, the reactor console area, which monitors the reactor, was completely modernized. Old and obsolete computers and data acquisition equipment were replaced with new equipment.

Not replaced were the actual reactor components below the waterline, including fuel elements and control rods.

Ron Farmer (6431), facility supervisor, says the upgrades were necessary to ensure a reliable reactor. The reactor has had three major upgrades in its 40-year history, the most recent in the mid-1990s.

"Researchers from throughout the Labs rely on the ACRR to test components in harsh radi-

ation environments," Ron says. "We have to provide them with a reliable facility they can count on when doing their experiments."

The word is apparently out that the ACRR will soon be open for business. Researchers have already requested 508 days of experiment time — more time than can be produced this year.

Danny notes that initially the project wasn't meant to be so large. Some 80 percent of the upgrade wasn't "part of the original thought process," he says.

"It made sense to upgrade everything at once instead of doing it piece by piece. So we put everything we thought we needed in the proposal," Danny says. "We were able to get everything we asked for."

The project, which moved on an accelerated schedule, started in April 2001 with the award of the construction contract to Automation Concepts Incorporated (ACI) of Albuquerque. Testing of the new RC/RC systems at ACI was completed by June 2002 and installed at ACRR by September 2002. Installation testing was completed on Nov. 2, 2002, followed by a Sandia/DOE Readiness Assessment conducted the first week of December 2002. The DOE letter authorizing operation to test the new equipment was written on Dec. 18, 2002. The next day the reactor went critical for the first time in more than six months and on Jan. 7, 2003, the ACRR was operated at 100 percent. Everyone working in Tech Area 5, emphasizing a coordinated team effort, con-

(Continued on page 4)

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MicroFuze: A new generation of devices for safe, arm, fuze, and firing of weapons

Tiny new safety, arming devices for conventional weapons use MEMS

By Will Keener

A new generation of hardware — to make conventional weapons safe, more robust, smarter, and ready to fire when they are needed — is under development at Sandia. The new hardware makes use of Sandia's microelectromechanical system (MEMS) technology: micro-machines acting as sensors. You'll need magnifiers to see most of these devices.

The MicroFuze concept

For America's conventional weapons stockpile, the concept of "safe, arm, fuze, and fire" is a familiar one. It's technology designed to keep a weapon safe until it's armed and fuzed for firing, or detonation. Now Sandia is working to make these technologies more robust and much smaller.

"Microsystem component designers are working on conventional munitions systems as a first step," says Darren Hoke of the Electro-mechanical Engineering Dept. 2614 and project manager for the effort. "Our aim is to get reliability data on a large scale. That will be important to proving these concepts for future applications."

By way of illustration, Darren carefully spills a small handful of parts across his desk. They comprise the safe, arm, fuze, and firing mechanism for a mortar shell and fit into an egg-sized dome atop the shell. Components like these are typically manufactured by a declining number of vendors, he says. They are sometimes assembled by hand. Dissimilar materials used for different parts of the mechanism create worry in terms of

the unit's shelf life.

Next, Darren picks up a quarter-inch cube. "We want to replace these parts with this," he says. The cube is the first generation of what researchers are calling MicroFuze, MEMS safety and arming device.

Creating the cube

The cube has three silicon wafer layers etched or treated using techniques borrowed from the manufacture of integrated circuitry. The layers are designed so that a sliding plate in one layer is released by the acceleration force on the weapon and clicks into a new position as the weapon begins to spin. In the new position, tiny explosives contained in a third layer are lined up for detonation.

"The device has to react to the acceleration of being shot out of a barrel, which is very different from being dropped on the floor or other shocks," Darren says. This releases the bar, unlocking the sliding plate. "It also has to 'see' or sense the spin created by the rifling in the barrel and react to it."

(Continued on page 5)

Partner of the decade



FIRST PARTNER OF THE DECADE — Loretta Armenta, president of the Albuquerque Hispano Chamber of Commerce, hugs Sandia VP Lenny Martinez (14000) as she recognizes Lockheed Martin Corporation, Sandia, and Technology Ventures Corporation as the chamber's first Corporate Partner of the Decade.

Rep. Heather Wilson lays out her views on Iraqi threat

Rep. Heather Wilson, R-N.M., is fully on board with President Bush in his intention to bring down the Saddam Hussein regime.

Last summer, when the president first began making the case that Saddam Hussein poses a threat to the US and must be removed from power, by force if necessary, Wilson was among those who said she wanted to see more compelling evidence.

As a result of information she has gained in

(Continued on page 5)

California site fetes intellectual property inventors

3

Sandia donates 183 computers to local schools

8



What's what

Iris never goes to WIS meetings; she's way too shy for that. But over the past couple of years, she's discovered writing and Editor Ken Frazier discovered that and now *Lab News* readers and the editors of the *Ragan Report* (a widely read publication covering corporate communications) have discovered it, too. For a long time, only those of us in the PR group were treated to a daily dose of Bubbly Iris Aboytes – always the potluck organizer, rememberer of everybody's birthday, keeper of reports and records, advisor about the intricacies of timecard keeping, etc., etc., etc. But she took up making retiree and milepost photos and began spreading her brand of infectious cheer more widely.

Then she started writing and, as Ed Norton used to say on *The Honeyymooners*: "Va, Va, Va Voooooooooom!!"

After writing her first story, about her experiences in an aerobics class – "about how I stood frozen at the back of the class, hoping people wouldn't notice me, that they'd think I was just a chair," she told a *Ragan Report* reporter who called to interview her – RR noted that "dozens of employees responded – most saying the piece was the funniest thing to ever appear in the *Lab News*. . . . Every time Iris writes something, 'she gets wonderful messages from people, and none of the rest of us ever get that,' Frazier laughs."

Of course, she almost wasn't interviewed by RR – she was donating blood when the reporter called.

And we still can't get her to WIS meetings.

* * *

Al Zelicoff (5320) gave a seminar titled "An Epidemiological Analysis of the 1971 SmallPox Outbreak in Aralsk, Kazakhstan" in the Steve Schiff Auditorium last week. It was advertised as a revelation of "how Al used his cunning and medical training to solve this case of international intrigue." And it was well attended in spite of the line at the bottom of the announcement promising "Free samples for the first 100 attendees."

I don't know if she followed through, but Barbara Lewis (1636) said earlier that she planned to go hear Al talk, but not without making sure she was at least number-101 getting a seat.

* * *

Paul Harvey reported on page two or page three, or something, recently that the thermostats in office buildings are frequently fake: They have no impact on the heating and cooling of the building. They are there simply to give workers something to fool with, he said, and make them believe they have control over their environment.

But they w-w-wouldn't do that to us here at S-S-Sandia . . . w-w-would they? (Brrrrrr. . .)

* * *

Charles Shirley (9623) says he gets lots of error messages from computers, but recently found one that hadn't caught his eye before. He was moving a home system and turned it on, thinking all was ready. Not quite. Up popped the message: "Keyboard error or no keyboard present. Press F1 to continue, DEL to enter SETUP."

Hmmmm. . . And how would you do that with no keyboard?

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

Robinson, Woodard update employees Feb. 17, 19

Sandians interested in getting a first-hand report from executive management about progress on important and exciting national security projects at the Labs get their opportunity this month when President Paul Robinson and Executive VP Joan Woodard give their annual State of the Labs presentations.

The California session will be 2-3 p.m. Monday, Feb. 17, in the 904 Auditorium, and the Albuquerque session is 9-10 a.m. Wednesday, Feb. 19, in the Schiff Auditorium. All employees are invited, and seating is on a first-come basis.

(Please note that the Albuquerque session was incorrectly announced as 10-11 a.m. in the Jan. 24 *Lab News*; the correct time for this session is 9-10 a.m.)

Paul and Joan will update employees on technical achievements and discuss some special projects under way for the military, future directions for Sandia, hiring and budget plans, and more. They will also answer employee questions after their presentations. The sessions are scheduled for one hour.

A special presentation has been added to this year's Livermore and Albuquerque sessions. T. J. Allard, manager of the Labs' homeland security liaison office, will talk about how Sandia has organized efforts Labs-wide to pursue new opportunities in this area and to be of maximum service to the new Department of Homeland Security.

An added attraction at the Albuquerque session will be a short presentation by Ireena Erteza (5912) on cutting edge work Sandia is doing in synthetic aperture radar.

Albuquerque-area community leaders have been invited to hear the same basic presentation at the Albuquerque Marriott the evening of Feb. 20.

Institutional Plan wins Award of Distinguishment

Sandia's Institutional Plan for FY 2002-2007 won an Award of Distinguishment in the Society for Technical Communication (STC) Phoenix Chapter's 2002 Technical Publications, Art, and Online Competition.

Institutional plans provide the most comprehensive yearly "snapshot" available of Sandia's major programs, facilities, user facilities, human resources, and budget. The documents also include overviews of the Labs' missions, organization, capabilities, planning functions, milestones, and accomplishments.

The STC Phoenix Chapter will honor award winners at a banquet Feb. 11 in Phoenix. Distinguished Technical Communication award winners have been forwarded to the STC international competition.

Dan Garber, project lead for the last nine institutional plans, says that the award-winning plan was "very good" and he was "pleasantly surprised." But the next one is better.

Dan says, "I think the FY 2003-2008 Institutional Plan we just completed will be the best because it is focused on Homeland Security. 'I'm particularly proud of this one.'"

Arnold Puentes and Juliana Newman of Tech Reps. Inc. work with Dan on the Institutional Plan Team.

New awards site launched

Look behind Sandia's missions and you'll find uncommon levels of scientific and technological expertise. Sandia's employees and teams receive numerous awards for their scientific, technical, and administrative contributions and are highly regarded in the professional community. This is reflected in the redesigned Awards and Accomplishments Web site now offered at <http://www.sandia.gov/news-center/news-releases/awards/index.html>.

If you know about additional awards that should be listed on the site, please contact Michelle Fleming (12640) at meflemi@sandia.gov

Sandia LabNews

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Ken Frazier, Editor **505/844-6210**
Bill Murphy, Writer **505/845-0845**
Chris Burroughs, Writer **505/844-0948**
Randy Montoya, Photographer **505/844-5605**
Nancy Garcia, California site contact **925/294-2932**

Contributors: Janet Carpenter (844-7841), John German (844-5199), Neal Singer (845-7078), Larry Perrine (845-8511), Howard Kercheval (columnist, 844-7842), Will Keener (844-1690), Iris Aboytes (844-2282), Rod Geer (844-6601), Michelle Fleming (Ads, Milepost photos, 844-4902).

Lab News fax **505/844-0645**
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LOCKHEED MARTIN

Employee death



DALE CLAYCOMB

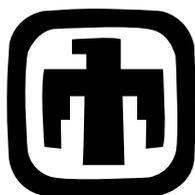
Dale Claycomb of Medical Clinic Dept. 3333 died unexpectedly Jan. 29.

He was 50 years old.

Dale came to Sandia in 1991 as a paramedic after serving in Desert Storm. He was team leader of Emergency Medical Services. Dale was a member of Sandia's Corporate Rescue Recon Team and developed Sandia's

HAZMAT team. He was an instructor at Albuquerque's EMS Academy, which trains fire and rescue personnel. He also taught emergency courses at Sandia and UNM. When not at Sandia, Dale was a paramedic with UNMH's Lifeguard.

He is survived by his children Daniel, David, Sharon, Stephanie, and Alexandria. Coworkers at Sandia Health Services, the Albuquerque Fire Department, UNMH, and the community are grieving the loss of this man they call an extraordinary rescuer.



Site fetes intellectual property inventors

By Nancy Garcia

Sandia/California earned more than \$1.2 million in royalties during fiscal 2002, continuing the upward trend from the early days of intellectual property development just eight years ago, when the site garnered its first royalties, in 1995.*

At a gala winery luncheon for inventors and spouses, some 60 current and former Sandians were honored in January for winning patents or software copyrights. Another 12 co-inventors were recognized who are external collaborators.

The largest royalty-producing intellectual property included a software collection known as Jess (for Java Expert System Shell) by Ernest Friedman-Hill (8964), which brought in \$534,657 last year. In addition, μ ChemLab patent licenses to commercial partners brought in more than \$500,000, noted the keynote speaker at the event, attorney Brad Friedman, who managed intellectual property alliances at Cadence Design Systems and Varian Associates. Jess has 73 licenses and is growing in popularity to the point that it generates up to two licenses a day.

"I applaud you for sharing your achievements in science and technology with the rest of us," Friedman said. "When we look to the future (of intellectual property development), Sandia is there."

Sandia senior managers cited two key purposes for protecting intellectual property developed at the site.

California Laboratory 8000 VP Mim John lauded the group as "some of the most creative folks at our site," whose accomplishments are "far out of proportion to our size." She said the accomplishments will become even more important to the Labs' national security mission.

Dave Goldheim, Director of Corporate Business Development and Partnerships Center 1300, added that Sandia "stands head and shoulders" above the other laboratories in using intellectual property as a key element of collaborations. "I think that will serve our nation exceedingly well," Dave commented.

Mim received a plaque at the event to "cele-



MINGLING — The emcee, playing Einstein, mingled with some of the awardees and their guests. Altogether, the site received 33 new patents and 11 software copyrights in the last fiscal year. (Photo by Bud Pelletier)

brate the power of imagination" from the emcee, who depicted Albert Einstein from his white wig down to the German accent used to introduce the often-turgid titles of last year's patents — a cleverly disguised Theo Pope (8945-2). Mim responded that the plaque was really meant for all the awardees.

In his remarks to the audience, the emcee outlined the progress that the Technology Transfer and Business Development organization (8529) has made over the past year. Establishing business development targets that integrate commercialization strategies, the Business Development Office, he said, is now in a great position to evaluate and exploit all intellectual property developed at Sandia.

Sandia California News

As an incentive to go the extra mile and secure rights to intellectual property generated here, inventors receive from 10-20 percent of royalty revenue. The site division will receive nearly 70 percent of the revenue stream, which is reinvested by the site's Integrated Science and Technology Council led by 8100 Director John Vitko.

For further details, contact the Sandia Technology Transfer and Legal Group from Dept. 8529. Also, see http://www.ca.sandia.gov/industry_partner/ and http://www.ran.sandia.gov/CASBO/sources/royalty_principles.doc.

* Royalties in 1995 totaled \$52, from a hydrogen-getting license that last year brought in \$6,651. "You can find our invention in your home waterproof flashlights and other sealed, battery-operated devices," said Tim Shepodd (8722), co-inventor along with LeRoy Whinnery (8722).

LEAP campaign raises \$235,000

Employee contributions to the Livermore Employees Assistance Program, LEAP, are up this year even though overall participation dropped slightly. The total giving, \$235,000, was up three percent from the previous year, notes outgoing LEAP chair Tony Chen (8726). Per capita giving was up about 10 percent, he adds, although the campaign fell short of its "stretch goal" of \$250,000.

"When we talked to David Rice of the Tri-Valley Community Foundation," Tony says, "he was very excited because overall contributions everywhere are down." Overall, about 58 percent of the regular workforce participated (some five percent less than the previous year).

Against the backdrop of a worsening economic picture, the theme for the recently completed campaign was "Giving From the Heart." Employees were challenged to pledge about 0.6 percent of their salary.

For recipients this year, the LEAP committee chose to emphasize local human service agencies that are supported through the Tri-Valley Community Foundation, the Community Health Charities, and United Way chapters (serving the Bay Area, Stanislaus and San Joaquin counties).

"Employees are spread over a wide area," Tony says, "from San Francisco to the Central Valley." The workplace campaign is an opportunity to be a good neighbor in the community where Sandia is located. Employees may also designate a specific non-profit agency for their donation, Tony says, which allows them to use this campaign to "give where they live."

"People contribute to various charities," he notes. "Overall, Sandians have been very generous."

The charitable campaign has been held annually since 1969. Carolyn Pura (8120), who was co-chair with Tony, will chair the next year's campaign.

To learn more about LEAP agencies, see www.ca.sandia.gov/leap/. — Nancy Garcia

Feedback

Q: It is well known that Lockheed Martin "manages" Sandia. Yet Sandia sets its own priorities and policies, negotiates with DOE directly, and seems otherwise autonomous. What, exactly, does Lockheed Martin do for Sandia? How many millions of dollars does it receive for doing so? Wouldn't this money be better spent in other ways, such as helping California technical staff, whose standard of living continues to decline?

A: Thanks for your interest in Lockheed Martin's management of Sandia. Last year LMC was paid \$17.2 million for managing Sandia. From that fee comes the money to operate Technology Ventures Corporation, Sandia's corporate outreach programs, scholarships to employee's children, 401(K) matching contributions, our employee recognition programs and a host of other programs that benefit our employees and our communities. In a company as large as Lockheed Martin, the Sandia management fee is not even in the noise level of their profits, so they are not managing Sandia for the money. Lockheed Martin views managing Sandia as a national service and is very proud of its partnership with Sandia. Lockheed Martin chairs the Sandia Board of Directors, which provides the corporate oversight for the Labs on key policy matters. The recent pension changes are an example of an action that required board approval before going to DOE. The board provides a "business oversight" to running the Labs. Lockheed Martin also has assigned people to key positions at Sandia to help bring best business practices to our financial, business, HR and communications functions. The outstanding ratings we receive each year from DOE are a validation of the policies and procedures brought from LMC.

To address what seems to be the real issue in your question, "Wouldn't this money be better spent in other ways, such as helping California technical staff whose standard of living continues to decline?" I offer the following. Sandia leadership is aware of the high cost of living at our California site, and we continue to work to find ways to help our employees cope with the hardships caused by the high costs of the area.

In fact, the California Laboratory is leading a study to assess issues specific to that location and how we might best address those issues, particularly the cost of housing, which appears to be the most anomalous factor when comparing overall standards of living. In addition to monitoring attraction and turnover statistics, we continue to conduct compensation surveys each year to assess relative competitiveness in the markets in which we compete for skilled talent. Those surveys indicate our employees, including technical staff, are paid a competitive salary. When you include the full Sandia Total Rewards benefits package of health benefits, flexible work schedules, work environment, job security, education benefits, and the opportunity to do work of national importance, employment at Sandia is very attractive. We probably never will be able to compete with the salaries of Silicon Valley, but we also do not have the employment risks that result in the great swings in employment and layoffs they must endure.

Please understand the Sandia leadership team is constantly looking for ways to make the lives of all of our employees better, and that includes addressing the cost of living at our California site. — Don Carson (12600)

Upgraded ACRR

(Continued from page 1)

tributed to the ACRR restart effort.

"Our turnaround was really fast. And during our DOE Readiness Assessment, we received good reviews," Danny says. "There were no Findings or Concerns, only three Observations, and several Noteworthy Practices."

During the last couple of weeks Ron and his team have been conducting test pulses to make sure the reactor is operating as it should. They

Upgrade Team

Primary Upgrade Team members include: Danny Beets, technical lead; Ron Farmer, facility supervisor; Lonnie Martin, reactor bridge area lead; Rick Gomez, RC- electronics bay lead; and Lance Lippert, reactor console lead (all 6431).

Other major contributors to the project are Norm Schwerts (6433), Kevin Cooley (6432), Sylvia Gomez (9132), and Dave Samuel (2992).

expect to have the reactor available for customer use in early February.

The RC/RC systems were built and tested at ACI before being shipped to Sandia. Sandia reactor operators were trained on the new equipment at ACI. That allowed the reactor to continue operating while the new rod control and reactor console systems were built and tested, reducing down time.

Working as a subcontractor to ACI was Neal Pederson, who owns VI Control Systems. The company wrote all the LabVIEW code for the reactor console computers.

In late January Senior VP Tom Hunter (9000) and VP Bob Eagan (6000) toured the reactor site and had some good things to say about it.

"Everyone in Tech Area 5 should be proud of this upgrade," Bob says. "This was particularly noteworthy because of the intense schedule, incredibly successful readiness assessment, and the great finished product."



VICE PRESIDENTS TOUR ACRR — VP Bob Eagan (6000), left, and Sr. VP Tom Hunter (9000) got a special tour of the upgraded ACRR in late January.

Many of the researchers using the reactor will come from the Defense Programs and Nuclear Weapons Programs Div. 9000, which Tom heads. He notes that the nuclear weapons program relies on the reactor for testing.

What is ACRR?

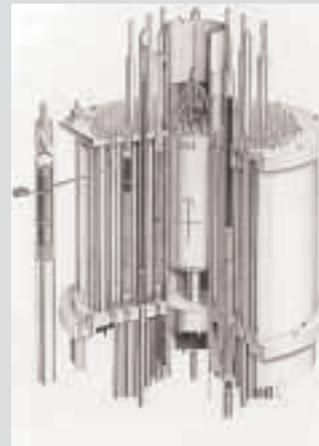
The Annular Core Research Reactor (ACRR) is a pool-type research reactor capable of pulsed operation, steady-state operation, and a tailored transient rod withdrawal operation. The ACRR has a large (23-cm diameter) central irradiation chamber, a neutron radiography facility, and two large (38- and 51-cm diameter) interchangeable fuel-ringed external cavities (FREC).

The annular-shaped core is formed by 236 cylindrical UO_2 -BeO fuel elements arranged in a hexagonal grid around the 23-cm diameter, central irradiation cavity. Two fuel-followed safety rods, three poison transient rods, and six fuel-followed control rods run the reactor. The fuel-followed rods make up part of the 236 elements for the normal core configuration. Additionally, the external irradiation cavities are surrounded with 80 (FREC-I) or 182 (FREC-II) U-ZrH fuel

elements.

The main reactor fuel elements contain a uniquely designed UO_2 -BeO fuel material held with niobium liners inside stainless steel cladding. The fuel is uranium, enriched to 35 percent U with 21.5 weight percent UO_2 and 78.5 weight-percent BeO. The one-of-a-kind BeO fuel elements were designed by Sandia to allow operation at fuel temperatures up to 1,400 degrees C in both the pulse and steady-state modes.

The core is located in an open pool, 3.1 m in diameter and 8.5 m deep, which contains 16,800 gallons of deionized water. The core is cooled by natural convection. The bulk water and the cooling-tower systems are used to maintain the pool water near ambient temperature.



ACRR CUTAWAY: The illustration shows a cutaway view of the ACRR. Visible are the fuel rods extending above the upper grid plate which supports the fuel elements. In the center is a central cavity that is where researchers typically put their experiments. To the left is an enlarged fuel rod with an enlarged fuel pellet.

Wilson

(Continued from page 1)

the months since, Wilson told an audience of Sandians in late January, she is convinced the president's concerns are justified and that she supports efforts — up to and including military intervention — to bring down the Iraqi dictator.

Speaking before a full house at the Steve Schiff Auditorium in response to an audience question, Wilson said there is "strong reason to believe [Saddam] has chemical and biological weapons and is trying to get nuclear weapons. I also believe it is his intention to use those weapons against the United States and our allies."

Wilson, whose well-publicized questions last summer about intervening in Iraq were motivated by concerns about the appropriateness of preemptive military action, said her thinking on the issue has evolved.

'A limited window'

"I don't think we can afford to doubt his [Saddam's] evil intent," she said. "We can't afford to ignore the consequences [of allowing Saddam to maintain stockpiles of weapons of mass destruction. There is a very limited window in which you can justify a pre-emptive strike, but I don't think we can wait to be struck first.]"

Wilson said she still retains hope that military action won't be necessary. "I think all of us hope that Saddam will choose to disarm or choose exile."

Wilson suggested that it may be unrealistic

for the current UN inspectors to find a "smoking gun" in Iraq.

"There is rarely a single piece of information [to make for an open-and-shut case]," she said. When your adversary is trying to keep things hidden away from you, she said, the information and intelligence come in bits and pieces that eventually add up to a complete picture. "I think I've seen enough of it to be very concerned."

Wilson criticized the Iraqi leader's unwillingness to cooperate with the UN inspection regime. "This is not supposed to be a game of hide-and-seek," she said. "It's not simply a matter of finding 12 empty [chemical weapon artillery] shells. It's that those shells are evidence of Saddam's non-cooperation. They are not being forthright; they are not being truthful."

In brief prepared remarks before the Q-and-A session, Wilson acknowledged that delays by Congress in approving the FY02 federal budget may have affected some programs at Sandia. However, she added, the budget — for the fiscal year that began last October — was finally nearing passage. "The Sandia budget will be fine; we worked it hard," she said.

Wilson spoke vigorously in favor of funding for Laboratory Directed Research and Develop-

ment efforts, which she called "high-risk/high-payoff" research. She said she is involved in an ongoing "process of education" for her new House colleagues so that they understand the value of LDRD investment.

Price-Anderson extension

In another area, she said her bill extending the Price-Anderson Act through the year 2017 has passed the House and Senate. Price-Anderson is vitally important for the future of nuclear power in that it "lays a foundation of confidence for the capital markets." Price-Anderson requires nuclear power producers to jointly pay for damages to the public from a severe accident and places a cap on total industry payments. The bill is important for Sandia, she noted, because its provisions cover contractors who manage DOE nuclear facilities.

Wilson said she was glad to have played a part in helping "to get your pension fixed," joking that "it only took two and a half years to get it through the bureaucracy."

In response to a question — "Are the problems at Los Alamos National Laboratory real or are they media hype?" — Wilson said, "You guys [Sandians] are good at these loaded questions! But the answer is, there were problems; they were real. The thing that concerned me most was the firing of the two inspectors."

Wilson praised Sandia's work on behalf of the nation's security, taking special note of the Labs' responsiveness in the wake of the 9/11 terrorist attacks.

"The leadership of this nation knows what a resource we have in Sandia," she said.

— Bill Murphy



REP. HEATHER WILSON

MicroFuze

(Continued from page 1)

Spin forces slide the plate until it snaps into a new location, aligning the fuzing and firing explosives.

Dave Koehler (2614) did the mechanical design of the safe and arm device. "We looked at conventional safe-arm devices to determine their primary functions and thought of different ways we could achieve those functions with MEMS technology," Dave says. He and his colleagues decided on a bulk silicon approach based on size and compatibility, but still had to come up with some new techniques.

"The functional requirements of the design required a combination of fabrication techniques that did not yet exist, so we worked to develop a process that could produce the structures we needed." The design uses a technology called Deep Reactive Ion Etching (DRIE), a two-level mask process, and bonding of pre-processed wafers. The integration of these techniques into a single fabrication process has been the major accomplishment to date, says Dave. "We've ended up with an all-new design space."

Currently, devices fabricated at Sandia are undergoing testing as Dave and colleagues identify areas for design improvement and work on manufacturing issues. "We are still working on a total proof of concept at this stage," Dave says.



SAFE, ARM, FUZE AND FIRE – Darren Hoke (2614) holds the before and after of this important military weapon component. The quarter-inch cube represents the new real estate Sandia designers are targeting using microelectromechanical systems (MEMS) technologies.

(Photos by Randy Montoya)

Overcoming the obstacles

Processing the MEMS device was far from routine, says Darren. "There were difficult problems in pushing the normal production processes. Randy Shul in Microdevice Technology Dept. 1763 helped develop a workable process. "Getting the mechanical structure to do things in a certain way was very difficult," Darren says.

"Basically, we provided the enabling technology, DRIE, for silicon substrates," Randy says. Working at Sandia's Compound Semiconductor Research Laboratory, the process involves actually etching a pattern in one silicon wafer and using fusion bonding to put another wafer on top of it and etch a pattern in that wafer. Sarah Rich (1763) was responsible for the etching. Staff members Lauren Rohwer and Andy Oliver (both 1745) handled the wafer bonding. The work enables vertical integration of two wafers, with different structures on each, using bulk micro-machining techniques.

"This is one component in a much larger system," says Randy. "The component testing is going fairly well. There are still a few things we don't understand, but with a few adjustments in the process flow, we'll be ready for serious prototyping."

Another problem area involves the micro-initiator firing train. That is starting a series of successively larger blasts, beginning with a hole roughly the size of a sharp pencil dot, filled with explosives. "We learned that we are

pushing the size and control boundaries for materials in microprocessing," says Darren. (See "The Explosives Train" below.)

Alex Roesler (2614) and Louis Weichman of Firing Set and Optical Engineering Dept. 2612 are working to integrate components to sense and arm an explosive device by providing signals and power to initiate the fuze. The two are looking at some options including a low-voltage capacitive discharge unit with external power or battery and piezoelectric generation, based on impact. In the latter case, impact compresses a piezoelectric stack to generate power. "This has been done, but we are now looking at single-crystal materials that are relatively new and have much higher energy densities than traditional materials," Alex says.

Sandia is also working with Auburn University researchers on a bridge device made of titanium and boron

that reacts with a current to produce increasing levels of heat leading to sparks.

Microsystems edge

As a part of a Department of Energy and Department of Defense (DoD) agreement, Darren works with a fuze technology coordination group to help provide advanced fuzing technologies. Sandia has programs in place to develop technologies (including MEMS), move them to product reliability testing, and ultimately commercialize them, through DoD suppliers.

While many laboratories are looking at MEMS solutions to these weapon issues, Sandia's microsystems expertise gives it an edge. "We hope to prove the MicroFuze principle by fiscal year end and test it at a DoD fuze laboratory," Darren says. By using artillery shells for proof of principle, a huge database on reliability can be built more quickly. "These shells are manufactured by the tens of thousands," Darren notes. "Then we can move to other weapons."

MEMS may provide 'intelligent' weapon solutions

In addition to the fuzing aspects of weapon control in a high-gravity (1,000 g's), high-spin (2,000 rpms) environment, the US military now is looking to its researchers for intelligent weapons as well. "We learned in Desert Storm that we need weapons that will go to very deeply buried targets," says Darren Hoke (2614). Reaching these targets means even higher acceleration levels. "One of the things in favor of MEMS technology is that the smaller the mass of an object the higher its tolerance."

Weapons that can sense where they are in a building or structure — with techniques such as determining how many voids they have encountered — are a new goal for designers. Existing accelerometers help with this awareness, but they have limitations. Accelerometers "see" shocks and create a pulse. To do so, they need to be powered. Mounting the accelerometers and interpreting signals can both be difficult.

Now researchers are looking at a way to replace them with unpowered MEMS sensors. The sensors would use a sliding mechanism, similar to the MicroFuze concept, to sense shocks. Multiple sensors could work together to sense voids, determine where in a target environment the weapon is, and arm the weapon appropriately.



MACROVIEW OF MICROFUZE— The actual three-layer MicroFuze device designed and fabricated at Sandia is considerably smaller than this macro-model, examined by Darren Hoke (2614). The microsystem approach to sensing acceleration and spin may have other weapons applications in addition to the fuzing system.

The Explosives Train — providing the 'oomph'

To provide the "oomph" for Sandia's new MicroFuze project, Alex Tappan and Steve Harris are pushing the envelope on energetic materials processing — all within a half-inch cube of real estate.

Alex, of Explosives Projects/Diagnostics Dept. 2554, and Steve, of Explosives Components Dept. 2553, are developing the explosives train for the MicroFuze. The train is a series of successively larger blasts, beginning with a hole, smaller in diameter than a paper clip wire, filled with explosives. Alex is looking at the very sensitive primary explosive and Steve the more powerful secondary explosives in the train.

Both are also involved in the electronic elements needed to initiate the train.

"Essentially our role is to try to get away from traditional processing techniques as we miniaturize the explosive," says Alex. Traditional energetic material processing tech-

niques are "too time-intensive and clunky," Alex says. "We need integrated manufacturing techniques."

Steve and Alex are working with Sandia's Ceramic Materials Dept. 1843 on new technologies for material processing while wrestling with extraordinarily tight geometries — a scale where almost no work in energetic materials has been done. "It's a whole different world for explosives," says Steve. "To see any of the parts we work with, you have to look under a microscope. We are used to dealing in small amounts, but these are micrograms of material."

The project started as a Laboratory Directed Research and Development project.

"We've proven about two-thirds of the train and we're now working with a new material that ages better," Steve says. "There are a lot of innovative ideas that we are trying to bring together to make this a success."

Management promotions

New Mexico

Kenneth Alvin from PMTS, Structural Dynamics Research Dept. 9124, to Manager, Computational Solid Mechanics and Structural Dynamics, Dept. 9142.

Ken joined Sandia in October 1994. His career has been in aerospace engineering, where he has focused on computational structural mechanics and dynamics, system identification, uncertainty quantification and validation methodologies, and structural dynamics modeling and simulation.

He has a BS in aerospace engineering from Iowa State University. Ken worked for six years for Harris Aerospace Systems in Palm Bay, Fla., before obtaining his MS and PhD in aerospace engineering, both from the University of Colorado at Boulder.



KENNETH ALVIN

Joseph Jung from PMTS, Solid Mechanics Engineering Dept. 9126, to Manager, Structural Mechanics Engineering Dept. 9127.

Joe joined the Laboratories in 1981 after working at the Forest Products Labs in Madison, Wisc., and Battelle Columbus Labs, Columbus, Ohio.

He started at Sandia in the nuclear safety groups, and has worked on the Yucca Mountain project in the Nuclear Waste Department and also in the Engineering Sciences Center 9100.

Joe's academic background is in computational structural and solid mechanics. Over his Sandia career he has worked to develop finite element methods and support numerous laboratory activities, including PBFA, nuclear waste, and various weapons projects. Most recently he was working to use modeling and simulation to support weapons programs, such as, the B61-11 Qualification and W80-LEP.

Joe has a BS, an MS, and a PhD, all in civil engineering from the University of California/Davis.



JOSEPH JUNG

Eva Wallace from PMLS, Weapons Program Integration Dept. 2102, to Manager, Program Integration Dept. 5903.

Eva was an Air Force acquisition officer and small business contracts manager before joining Sandia in 1992. In the past 10 years, she gained experience as a contracting representative and as an administrative project leader in Logistics, Electronics Subsystems, and Microsystems, as well as a project support team member in Weapons Systems Engineering.

Eva received her BS degree from the US Air Force Academy and her MBA from Wright State University.



EVA WALLACE

Labs Day at the Roundhouse



LABS DAY — Sandia VP Lenny Martinez, left, and Richard Marquez from Los Alamos National Laboratory accepted a memorial passed by the New Mexico House and Senate recognizing the laboratories for their outstanding contribution to science benefiting New Mexico and the nation during Labs Day at the Roundhouse Jan. 29. The memorial read: The Legislature of the State of New Mexico honors and commends the Los Alamos National Laboratory and Sandia National Laboratories for their dedicated service to the scientific and technological communities of the state and the world in meeting the complex challenges of tomorrow." Both laboratories had displays set up in the Rotunda throughout the day. Sandia's exhibit highlighted work in small business, water, homeland security, nanotechnology, the environment, and the Advanced Concepts Group's work.

California

Andrew McILROY from PMTS, Combustion Chemistry Dept. 8353, to Manager, Reacting Flow Research Dept. 8351.

Andy joined Sandia in 1997. His work has been in physical chemistry, combustion chemistry, and laser diagnostics. He has a BS in chemistry from Harvey Mudd College and a PhD in chemical physics from the University of Colorado at Boulder.



ANDREW McILROY

Recent Patents

Kenneth Peterson (14171), Stephen Garrett (5744), Cathleen Reber (5744), and Robert Watson (11500): Gold-Based Electrical Interconnections for Microelectronic Devices.

James Fleming (1749): Lithographic Fabrication of Nanoapertures.

C. Jeffrey Brinker (1846), Carol Ashley (1846), Rimple Bhatia, and Anup Singh (8130): Sol-Gel Method for Encapsulating Molecules.

Rush Robinett II (6200), Kenneth Groom, and John Feddema (both 15211): Control System and Method for Payload Control in Mobile Platform Cranes.

Fred Zutavern, Guillermo Loubriel (both 15333), Malcolm Buttram (15330), Alan Mar (15333), Wesley Helgeson, Martin O'Malley (15333), H.P. Hjalmarsen (9235), Albert Baca (1742), Weng Chow (1123), and G. Allen Vawter (1742): Light Sources Based on Semiconductor Current Filaments.

Coronado Club

Feb. 14: Valentine's Day dinner and dance. Dining at 6:30 p.m., dancing to Midnight Magic at 7:30 p.m. Adults, \$13; children under 12, \$5.

Recent Retirees



Raymond Peabody
43 15322



Kazu Oishi
40 2113



James Solberg
39 1643



Richard Beegle
38 2565



Sam Beard
37 9115



Edward Shoaf
37 5832



James Williams
37 5350



Donald Marchi
35 2553



Thomas Mayer
30 15252



Sally Landenberger
20 9601



Theresa Griego
15 12336

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

MISCELLANEOUS

REDWOOD, 4" x 4" x 10', 12 available, \$10 ea., or \$100 for all. Havo, 281-5300.

ELECTRIC STOVES, GE, 1 white, 1 off-white, good condition, \$60 ea. Gonzales, 296-8006.

DESKS, 1 metal, 1 oak, w/printer stand, \$25 ea.; antique hanging iron light, \$10. Balsley, 254-0782.

"CHERISHED CREATIONS" Arts & Crafts show, Cottonwood Mall, Feb. 7-14, Mall hours, free parking, free admission. Self, 296-4137.

TV, JVC 27120, 27-in., 1 yr. old, like new, \$200; stereo receiver, CD player, 180W channel, \$300 OBO. Wagner, 822-0625.

OLD RADIO GEAR, Hallicrafters, Heathkit: signal tracer, battery eliminator, oscilloscope, misc. transmitting/receiving tubes & coils, make offer. Moll, 299-6497.

BACKYARD/GARAGE SALE, huge, five families, prices negotiable, Feb. 7, 504 Georgia St. SE. Crosby, 260-1070.

PLAYSTATION CONSOLE, 2 memory cards, 1 shockwave & 1 vibrating controller, all hookups, \$40; wanted, moving boxes. Mitchell, 294-2973.

PHOTO PRESS, Seal 110S dry mount, 12"x15" platen, \$250, Olsen 323-6137.

AMERICAN RACING WHEELS, Ford truck, 5, 4-1/2 bolt pattern, wheel locks, \$125 for all; 50-gal. electric hot water heater, \$100. Sears, 891-4409.

DRUM SET, Pacific CX, 5-pc., intermediate professional, double-kick bass, Zildjian cymbals, Gibraltar throne, much more, \$795. Buteau, 856-7705.

BED LINER, Dakota Quad OEM, \$175; Toro snowblower, like new, \$1,200; locking file cabinet, black, legal, \$100. Forslund, 259-9072.

TWIN BED, w/mattress, good condition, \$50; waffle iron, used once, \$20. Anderson, 897-2772.

EXERCISE MACHINE, Health Rider, \$125; Lynx Lady Tigress golf clubs, w/bag, \$125. Roseth, 856-6964.

CONTEMPORARY SOFA, \$300; love seat, excellent condition, \$250; coffee table, solid wood, 2 end tables, \$75 ea. Hassan, 822-9544.

GREAT PYRENEES PUPS, 8 wks. old, purebred, no papers, 3 male, 2 female, \$250 ea. Grieco, 281-8808.

TOY POODLE, AKC, 6 mos. old, stud, cream color, \$400 OBO; Macaw, severe, 17 yrs. old, talks, must be "only child," adult environment, w/cage, \$600. Casey, 610-4327.

SKI MACHINE, NordicTrack Pro, like new, \$300 OBO. Gruda, 291-8433.

WHEELCHAIR, Invacare Model 9000SL, lightweight, like new. \$250. Holle, 281-7460.

WHITE LAB, loveable, playful, friendly, 1-yr.-old female, spayed, shots, needs good home, \$100. Chavez, 833-2123.

CUSTOM DRAPERIES, tan, sliding glass door, selling for cost of dry cleaning bill, \$46. Fuller, 298-3983.

CHILD'S ARMOIRE, antique, beautiful, shelves, hanging space, Burlwood, \$150. Rhodes, 899-5444.

STANLEY GARAGE DOOR OPENER, 12 yrs. old, 2 vehicle remotes, \$30; cable tire chains, fit different size tires, \$10. Northrup, 332-2089, leave message.

GIRL'S BIKES, w/hand brakes, 16-in. \$30, 20-in. \$50; toddler bed, white w/flowers, \$50; gates, \$20. Renk, 242-1277.

SPEAKERS, Fisher Home, \$50 for set; decorative privacy screen, \$40. Welch, 615-0431.

WEIGHT BENCH, full set +300 lbs., gym quality, Powerzone brand, new condition, paid \$600, asking \$400. Otero, 865-4018.

DAY BED, white iron, w/brass trim, trundle, 2 mattresses included, \$250. Garrison, 869-6979.

CAMERAS: 4x5 Linhoff large format, \$450; Nikon N2020 AF, w/Sigma zoom lens, \$250. Jacob, 323-1844.

COMPUTER CASE, BabyAT, upright, w/power supply, excellent condition, \$15 OBO. Sinton, 828-9672.

MANDOLIN, F-style, by Doce, retired Martin guitar maker, excellent action, \$425; Yamaha 12-string guitar, \$225. Newman, 266-6928.

INKJET PRINTER, in factory-sealed box, PC/Mac, USB, Epson Stylus C42UX, \$94.37 from Microwarehouse, asking \$60. Weston, 831-3143.

GUITAR: Epiphone Les Paul Custom, black w/gold hardware, \$350; Peavy amp, \$100. Lee, 797-1992.

HOME GYM, works arms, legs, stomach, etc., worth \$1,400, asking \$600. Sandoval, 866-6991.

TIRES: P205/70R15 radials, good tread, all 4 for \$20. John, 345-4006.

AQUARIUMS, 20- & 29-gal., w/custom-built stand, \$150; 19-in. color TV, \$50.

Pasterczyk, 710-7937.
ENGLISH IVY, healthy roots, easy digging, no limits, free. Horton, 883-7504.

TWIN BED, red metal, complete, \$40; TV cabinet, oak, swivel, \$10; pediatric exam table, antique, \$25. Zamora, 294-3737.

MISS SAIGON, at Popejoy, 2/27, 2 great seats, orchestra center, row G, \$50 ea. Hosking, 823-9512.

PIPE RACK, small pickup, inside measure, 57" W x 73" D, \$125 OBO. Lowrey, 450-4900.

STEREO SPEAKERS, Apogee Acoustics, Scintilla model, large, high quality, full-range ribbon panels, original owner, \$1,100. Van Den Ayile, 898-6474.

MONITOR, 19-in., ViewSonic Model A90, 0.27 dot pitch, max resolution 1600 x 1200, w/manual & software, \$125. Pelletier, 884-3726.

GOLF DRIVER, Cleveland VAS titanium, 8 degree, firm shaft, 4 yrs. old, very good shape, \$75. Branscombe, 881-4589.

EXERCISE CYCLE, Airdynamic, upper & lower body, w/monitor, \$75; coffee table, glass top, black panther, \$150. Sanchez, 898-9598.

MOTORCYCLE JACKET, leather, black, size 42, worn 3 times, \$75. Bohman, 299-1124.

SOUTHWEST AIRLINES TICKET, round trip, valid until 12/27/03, \$300. Benjamin, 869-9922.

DROP-LEAF TABLE, Duncan Phyfe, w/5 lyre-back chairs, solid wood, great shape, \$500 OBO. Schofield, 268-6888.

TRUMPET, w/hard case, \$200; full-size headboard, \$75; sneakers, never worn, 9-1/2, \$20; '03 Hawaii Entertainment Book, \$18. Hoffman, 352-2089.

PRINTER, HP LaserJet Series II, \$25; computer games: Empire Earth, Crimson Skies, Mechwarrior, Combat FS, Knox. Bodette, 275-9722.

FIREWOOD, mixed pinon & juniper, you pick up, \$50 per pickup load. Spires, 286-3459.

COUCH, love seat, chair, ottoman, distressed leather, brand new, medium brown, traditional style, \$3,400. Romero, 286-6325.

VCRs: Panasonic (2); Sony (1), all excellent condition, VCRPlus, cable ready, remotes, & manuals, \$50 ea. Adams, 823-1845.

GIRLS' BEDROOM SET, white, w/twin bed, headboard, nightstand, desk, dresser, mirror, \$400; 2 oak chairs, \$75. Loudermilk, 299-4621.

MONITOR, 17-in., \$25. Ferguson, 286-4390.

PEDESTAL TABLE, w/4 chairs, oak, 48-in. diameter, 24-in. leaf, very good condition, \$450 OBO. Ghanbari, 883-3819.

SECTIONAL, beige & white, like new, must sell, \$400 OBO; new ceramic molds, decorator items, greenware. Cooper, 888-9967.

FUTON, wood base, thick mattress, pillows, green floral design; sleeper sofa, green & white pattern; \$250 ea. Graham, 896-2231.

SOUTHWEST AIRLINES TICKET, valid through 6/1/03, \$290. Baca, 294-0766.

VHS MOVIES: *Top Gun*; *Big Daddy*; *T2*; *Speed*, etc., \$3 ea. Garcia, 292-6930.

TILE, Armstrong commercial vinyl composite, beige, new in boxes, 225 sq. ft., 40¢/sq. ft. Filter, 823-1232.

MOTORCYCLE TRAILER, 3-rail, \$300; black leather chair, \$200; Craftmatic motorized double bed, \$1,800. Campbell, 294-6000.

WATER SOFTENER, Northstar Ultra, 29,000-grain capacity, on-demand electronic control, 5 yrs. old, \$250. Eldred, 281-0224.

SOUTHWEST AIRLINE TICKET, round trip, good until Oct. 2003, \$300. Perrine, 293-1429.

SEWING MACHINE, Kenmore, straight stitch, zigzag, nice cabinet, \$65; Minolta 8mm camcorder, 8X zoom, batteries, cables, \$110. Duvall, 881-4406.

RAT CAGE, FernCage #970, 4-story, white powder coated, 29" x 18" x 24", excellent condition, \$85. Gjullin, 898-6784, www.ferncage.com.

COUCH, dark blue, leather, \$350. Hunter, 865-5745, ask for Becky.

DISHWASHER, Kenmore, small, portable, white, 24-in. wide, front-load, can be built-in, very good condition, \$100. Smith, 858-0225.

BABY/CHILD STROLLER, Aprica, lightweight aluminum, 1-handed open/close, reclining seat, hood, storage basket, excellent condition, \$50. Mulkern, 296-4050.

TIRE CHAINS, PL type, sizes 145-165R13, \$20; recumbent exercise bike, \$10; prices negotiable. Compton, 899-0679.

GUITAR AMP, Crate, CR212, 60W, \$150; GX1200h head, 120W, w/Kustom 412 cabinet, \$400. Gonzales, 238-0662.

WICKER CHAIRS, 2, new, \$30 ea.; men's golf clubs, w/bag & golf cart, \$45; McCullough chain saw, \$75. Gluvna, 884-5251.

How to submit classified ads DEADLINE: Friday noon before week of publication unless changed by holiday. Submit by one of these methods:

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

Ad rules

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

DRILL DRIVER, DeWalt, 18-V, no charger, \$25 OBO; topo maps, 25, \$5. Hall, 298-8617.

LIFT TICKETS, Durango, Purgatory, 12, half price, \$25 ea. Shephard, 856-5762 or 250-4874.

DANISH MODERN CHAIR, low slung, loose cushion, \$50. Blaine, 299-1036.

RETIRES, join us for monthly luncheon, w/Sandia Lunch Bunch. Butcher, 884-4818.

TROPHY MOUNT, 6x6, Bull Elk, full shoulder, perfect condition, \$1,000. Hopkins, 286-7823.

SOFA, antique, wood spindle back & sides, custom cushion & pillows, \$280; Philips 17-in. monitor, \$30. Errett, 858-1013.

KIRBY UPRIGHT, \$50; treadmill, \$75; espresso machine, \$30; velour blanket, new, \$12; large potted plants, \$100-\$250. Hubbard, 291-8463.

DESK, teak, 41" W x 23" D x 28" H, 3 shallow drawers on right, top quality, \$175. Pendall, 265-3008.

SHOE-SHINE STAND, antique, refinished oak, great for recreation room or poolroom. Emery, 345-1568.

TRANSPORTATION

'01 JEEP CHEROKEE SPORT, 4.0 V6, 4-dr., 2WD, PW, PL, PM, CC, 46K miles, only \$11,000. Lucero, 232-2314, ask for Mark.

'96 SATURN, 2-dr., 5-spd., gold, PD, PW, alarm, 85K miles, \$5,000. Silva, 344-6591.

'95 TOYOTA TACOMA SR5, ext. cab, 4x4, PS, PW, PL, AC, AM/FM/CD, good tires, must sell, \$9,500 OBO. Jensen, 710-3341.

'93 MAZDA 626 ES SEDAN, 4-dr., leather, faded paint, 95K miles, \$3,500. Jones, 856-1837.

'99 SATURN SL, 4-dr., 5-spd., 1.9L SOHC, platinum/gray, AC, AM/FM/cassette, dual air bags, ABS, 56K miles, great condition, \$6,800. Baca, 345-6082.

'00 FORD MUSTANG, V6, 5-spd., 17-in. polished aluminum wheels, Borla dual exhaust, loaded, excellent condition, \$13,000. Salas, 459-5974.

'95 CHEVY MONTE CARLO LS, runs great, new tires, NADA retail \$5,000, asking \$4,300 OBO. Dallas, 821-0263.

'99 CADILLAC DEVILLE, white, loaded, oyster leather, NorthStar, under warranty, dealer serviced, 39K miles, \$17,400. Turner, 345-1086.

'01 MUSTANG GT, convertible, special rims, dash cover, tint, 16K miles, very excellent condition, \$20,000. Lucas, 899-6904.

'92 VW JETTA, white, sunroof, AC, PL, PW, alarms, alloys, new tires, 70K miles, \$8,595 OBO. Peterson, 298-1235.

'96 SUBARU LEGACY LS, 4WD, ABS, AM/FM/cassette, 4-dr., 1 owner, 65K miles, perfect condition, retails \$9,660, asking \$9,300. Blewer, 268-9019.

'89 HONDA ACCORD LXI, 5-spd., AC, sunroof, CD, new clutch, water pump, timing belt, no PS, 200K miles, reliable for student, \$1,700 OBO. Rockwell, 203-5967.

'00 FORD F250 SD XLT, Supercab, 4-dr., V8, AT, loaded, toll pkg., 68K miles, \$19,000. Vollmer, 859-1163.

'97 PONTIAC GRAND AM, 2-dr., PW, PL, AC, rear defroster, 94K miles, \$5,000. Medina, 345-2344.

'92 DODGE CARAVAN, new tires & brakes, ultra clean, well maintained, 129K miles, must see, \$1,950. Tonnesen, 254-0390.

'96 CHEVY SILVERADO Z71, 4WD, V8 350, AT, AM/FM/CD, bed liner, matching camper shell, 56K miles, below book, \$14,250. Dwyer, 271-0741.

'90 TOYOTA TERCEL, 4-cyl., 2-dr. coupe, AC, AT, new tires, tune-up, excellent condition, \$1,875. Faculjak, 823-9686.

'00 HONDA ACCORD LX, 4-dr., AT, 4-cyl., PW, PL, great gas mileage, 58K miles, excellent condition, \$12,000. Vanderbeek, 286-4950.

'87 HONDA ACCORD DX, 5-spd., silver, 4-dr., new hoses, timing belt, water pump, tires, 188K miles, \$1,500 OBO. Hefenrichter, 792-9349, ask for Tom or Lindsay.

'98 TOYOTA SIENNA LE, 5-dr., AT, 6-cyl., loaded, silver green, 48K miles, excellent condition, \$14,900 OBO. Umstead, 298-6354, ask for Matt.

'81 MAZDA RX-7, classic, first generation rotary engine, dark red, 154K miles, no rust, \$1,900. Rector, 604-0310.

'92 SUBARU LEGACY WAGON, AWD, AT, AC, PL, PW, runs OK, needs transmission, \$1,490. Pierce, 292-2374.

'89 CHEVY S-10, extended, 4.3 V6, AT, PS, AC, CC, tilt, great shape, 115K miles, \$2,950. Kureczko, 286-4426.

'95 OLDSMOBILE 88 ROYALE, fully loaded, new tires, excellent condition, 56K actual miles, \$7,000 OBO. Martin, 869-1212.

'89 ACURA LEGEND LX, 4-dr., 5-spd. manual, 111K miles, runs great, great gas mileage, \$1,800. Pratt, 256-7408.

'93 NISSAN PATHFINDER XE, 5-spd., red, AT, loaded, 159K miles, very clean, well maintained, regularly serviced, \$4,999. Gaither, 975-1365.

'86 DODGE PICKUP D150, Royal SE, 360cu, AT, power, AC, great condition, shell, 130K miles, \$2,500. Cowen, 292-0948.

'89 FORD ESCORT PONY, 2-dr., hatchback, red, AM/FM/CD, w/detachable face, not perfect, good student car, \$600 OBO. Tyler, 255-4849, ask for Jessica.

'96 HONDA ACCORD EX, 4-dr., 4-cyl., 5-spd., silver, AC, ABS, sunroof, 93K miles, \$7,000. Young, 867-3794.

'92 FORD TEMPO, 4-cyl., 4-dr., AT, white, \$2,000. Rebarchik, 299-1385.

'92 TOYOTA PICKUP DX, 4x4, V6, 5-spd., X-cab, original owner, \$7,500; Lance 5th wheel also available. Bush, 281-3773.

'91 HONDA CRX, 5-spd., AC, AM/FM/CD, excellent condition, all records, 127K miles, 40-mpg, fun car, \$3,200. Sayre, 296-9341.

'96 DODGE RAM 1500, 4x4, tow pkg., loaded, 75K miles, excellent condition, \$13,200 OBO. Martinez, 269-9250 or 907-2632.

'84 FORD BRONCO, full-size, good condition, needs little work, 94K miles, \$3,200 OBO. Marquez, 271-1783.

'95 MITSUBISHI ECLIPSE, beautiful two-tone, special wheels, security, 4-spd., \$4,950. Daniel, 260-0461.

'96 DODGE STEALTH, AT, 6-CD player, 35K miles, very good condition, \$9,500. Ward, 296-2207.

'98 FORD MUSTANG LX, V6, AT, AC, CD, tilt, power, 74K miles, red, \$6,500. Lenberg, 238-0362.

'96 CHEVY CONVERSION VAN, Starcraft, F&R AC, AM/FM/CD/cassette, TV, VCR, 1 owner, always garaged, 46K miles, \$11,000. Trump, 291-1582 or 956-519-8768.

RECREATIONAL

'47 KITT TEARDROP TRAILER, vintage camper, completely rebuilt using original frame, 4x8 platform, sleeps 2, easy-pull, \$2,000. Strong, 861-3725.

'82 HONDA XR 80, very good condition, always garaged, \$350. Peterson, 856-9629.

'99 TROPICAL, 36-ft. motor home, large slide, V-10 Ford, generator, outstanding condition, 24.6K miles, \$68,000. Kist, 241-2105 or 299-6887.

HONDA ATC 350X, 3-wheeler, very few hours, garage kept, fun to ride, very fast, \$1,200 OBO. Harbour, 296-6059.

'00 KAWASAKI VULCAN CLASSIC 1500, red & gold, Cobra pipes, low miles, \$7,600. Sparling, 281-7267.

'00 GEORGIE BOY MOTORHOME, 33-ft., fully loaded, 18-ft. awning, selling because of health, paid \$70,000, asking \$46,500. Tennant, 275-8014.

'02 HONDA 919, "naked" bike, great for commuting, cruising or canyon runs,

\$6,700. Delgado, 797-5209.

'96 HONDA VFR750, Micron pipe, tall windscreen, other accessories, excellent condition, great sport-touring bike, \$4,100. Smith, 828-3903.

'82 SUZUKI GN125 MOTORCYCLE, great condition, comfortable for any level of experience, street legal, \$1,000 OBO. Carrejo, 883-7621.

'78 PACE ARROW RV, 29-ft., Chevy 454, in good shape, new refrigerator, new skylight/vent, \$7,400 OBO. Rivers, 720-4701.

'78 GLASTRON, 18-ft. boat & trailer, I/O, 480 Mercury engine, \$3,600. Drebing, 293-3335.

RACING BIKE, 14-spd., 57cm, specialized Allez, Shimano 105 components, Aero-bars, computer, 2 wheel sets, no pedals, \$300. Gillespie, 899-4084.

GO CART, new tires, tubes, sprocket & chain, spare tires, marine 5-hp B&S engine, \$350 OBO. Nation, 298-5605.

GIRL'S BIKE, full-size vintage Sears, 3-spd., little used, w/bell, basket, chain, etc., \$30. Guilford, 255-6294.

REAL ESTATE

4-BDR. HOME, 1-3/4 baths, 1,900 sq. ft., corner lot, Volcano cliffs (Taylor Ranch), 2-car garage. Krein, 897-2565.

3-BDR. MOBILE HOME, 2 baths, 4 Hills Mobile Home Park, all appliances, needs work, very reasonable. Niper, 299-6290.

2-BDR. MOBILE HOME, 2 baths, completely remodeled, near base, 4 Hills Park area, shed, moving, must sell, \$8,500 OBO. Tom, 453-2131.

3-BDR. HOME, 2-1/2 baths, 2-car garage, 2 living areas, fully landscaped, beautiful

Sandia donates 183 computers to local schools

By Iris Aboytes

"We pore over the machines like mice on a cupcake." That is how Barbara Menicucci, St. Charles School, describes the donated computers received from Sandia.

The K-12 program computer donation program began about 10 years ago with the issuance of federal Executive Order 12999 on Computer Technology for Education. The order streamlined the transfer of excess and surplus federal government computer equipment to the nation's classrooms.

The program was temporarily halted after 9/11, but has begun again. At the recent event, teachers and representatives were able to select from 183 computers. All state-accredited schools are eligible to participate in this program.

"This program is a reinvestment in the community for its initial investment in Sandia Labs," said Phil Rivera, team supervisor of Reapplication Services. "It is also a collaboration among Sandia, private and public schools, and the community to provide the tools for higher education thereby creating a more attractable workforce."

Excess Sandia computers are sanitized using a DOE-approved triple-overwrite process. Computers used in classified environments are not accepted for this program.

At the recent "computer-shopping day" each school that was registered with the program received eight computers—Dell, IBM, Hewlett

Packard, and mostly Pentium 2 or 3 – along with accessories. The computers were worth about \$2,000 each.

In the future, Sandia hopes to donate computers that are totally user-friendly. The plan is to have Windows '98 or 2000 installed in the computers, thereby enabling even an amateur to plug in the computer and start working.

Ed Cardona, Dolores Gonzales Elementary School technology coordinator, says one of the favorite projects of their students is to have their picture taken with a digital camera. Once the picture is scanned, each child sits at the computer and writes a little bio about himself/herself. It is great to see the pride in their faces as they display their masterpieces, he says.

Ed says Dolores Gonzales has a Computer Club. The members are students who would rather go to the computer room than go out to



COMPUTER SHOPPING DAY — Dean McCann, a teacher at Dolores Gonzales Elementary School in Albuquerque, looks over computers he is going to take back to his school. "We really need your help," he says. (Photo by Randy Montoya)

play during recess.

"Sandia's K-12 computer program enables us to have more computers in each classroom," says Ed. "Now when the children ask when are we getting new computers, we can truthfully answer."

Andrei Kozyrev speaks about what the end of the Cold War meant to Russia

Former Russian foreign minister speaks about possibilities and lost possibilities

Andrei Kozyrev speaks about Russia in terms of possibilities — and of lost possibilities.

The former Russian Minister of Foreign Affairs and former member of the Russian Duma (parliament) spoke to a group of about 40 Sandians recently, offering

his views on the collapse of the Soviet Union and rise of the "New Russia." He was hosted by the American Committee on Foreign Relations and the Albuquerque Committee on Foreign Relations.

Among the possibilities he sees is Russia and the US working together cooperatively in the nuclear arena, much as the two countries have partnered on the space station.

A lost opportunity was at the end of the Cold War when he was pushing for a radical reduction of the number of nuclear weapons in both the US and Russia. He seemed to have the attention of both countries' leaders, but then lost it due to the American election and other events.

As Russian foreign affairs minister between 1991 and 1996, Kozyrev was in a key position to see what the end of the Cold War meant for his country.

He saw a people, who as quickly as the opportunity arose, chose democracy.

"At the moment the Russian people got a chance to speak out and the moment they got the chance for democracy, the institution started to be installed," he said. "That's due in great part, of course, to [then USSR president] Mikhail Gorbachev who allowed [democracy] to evolve. He would not guide it to happen, but that was enough for the Soviet system to collapse. People started to vote the communists out of power."

"It took considerable time for Russia to put things in order after the Soviet Union collapsed," he added. "There was shortage of bread



— food — during the 1990-91 winter. We asked the US for humanitarian assistance. . . . We were overwhelmed with problems."

It wasn't until the summer of 1992 when Russia, having taken care of some of its immediate problems, was ready to talk about disarmament and started Strategic Arms

Reduction Treaty (START II) talks with the US. Kozyrev urged both Russian President Boris Yeltsin and then-US President George Bush to sign the treaty. That was no easy task with the US presidential election looming. Bush signed the treaty in January 1993 as a lame duck president.

Kozyrev says he also made sure that President-elect Bill Clinton was well briefed and had full consent and knowledge of the treaty.

More than a decade after the collapse of the Soviet Union and formation of the new Russia, his country continues to struggle.

"Forty to sixty percent of the people still don't have much of the tangible benefits of the breakup of the Soviet Union," he said. "The reform process is slow. . . . It's up to Russia to reform itself."

Russia created an image that everything was OK, when it was not.

But, he noted, Russia is moving in the right direction.

"Are we partners [with other democracies]? Yes, we are. Is Russia on the right track? It is," he said.

He said it's easier to predict what's going to happen in Russia over the long term than the short term.

"In 15 years Russia will be more democratic, have a developing market economy, and be in a good position with the western group of countries," he said. "What will happen in the next five days is more difficult to predict, although [Russian president] Putin is bringing



some stability to the country."

Kozyrev is currently a political and economic analyst. He is the author of the book *The Transfiguration* which examines and advocates democratic and market-oriented reforms in Russia and Europe.

— Chris Burroughs



Photos by Randy Montoya

SWGA meeting Feb. 20

All Sandians (as well contractors, DOE, and military) are invited to a Sandia Women's Golf Association membership drive and meeting Thursday, Feb. 20, at the Coronado Club Zia Room, 5:15 p.m.-7 p.m.

Women and men are invited to join for some fun golf tournaments and golf leagues (9-hole & par 3). Want to learn the game and etiquette of golf? SWGA can provide Beginning and Intermediate classes via Golf Mart for \$100 plus tax for 5 one-hour lessons.

For further information contact Amy Schwabke (2661) at 284-6442 or at awschw@sandia.gov or Lupe Massoth (9524) at 844-5780 or at gmassoth@sandia.gov.

Boating skills class set Feb. 25

The Albuquerque flotilla of the Coast Guard is beginning a nine-lesson Boating Skills and Seamanship course on Feb. 25 at 7 p.m. that will continue each Tuesday for nine weeks. Certificates for satisfactory completion of the course will be presented on April 29.

There will be a nominal charge for the textbooks and workbooks, but the instruction is free. Subjects to be covered include: equipment for your boat, trailering your boat, boat handling, and others.

Call Ben Gardiner at 298-0116 for more information.