

EMCORE, Sandia team up to develop high-speed optical transceiver modules for short-haul communications

By Chris Burroughs

EMCORE Corp. and Sandia have teamed up to develop high-speed optical transceiver modules that promise to make short-haul fiber optic communications faster and less expensive.

Over the past year-and-a-half some 50 Sandians from Centers 1300, 1700, 2300, 2600, 2900, 9100, and 14100 have worked with EMCORE's Fiber Optical Components Division to develop a high-speed parallel array "transceiver." It consists of an array of vertical cavity surface-emitting lasers (VCSELs) on the transmission end and an array of photodiodes at the receiving end of fiber optics.

EMCORE will open a 67,000-square-foot manufacturing plant next month at the Sandia Science and Technology Park to further develop and produce the product. Robert Bryan, former Sandian and current vice president for EMCORE's Fiber Optic Components Division, says the

company has already hired nearly 100 people to work on the project and anticipates hiring "hundreds more" as the product line grows.

"The development of this technology represents a substantial investment for EMCORE in terms of money and time," Bryan says. "We chose Sandia to help with the product development because of the Labs' unique set of capabilities — primarily in the area of microsystems integration — that can't be found anywhere else."

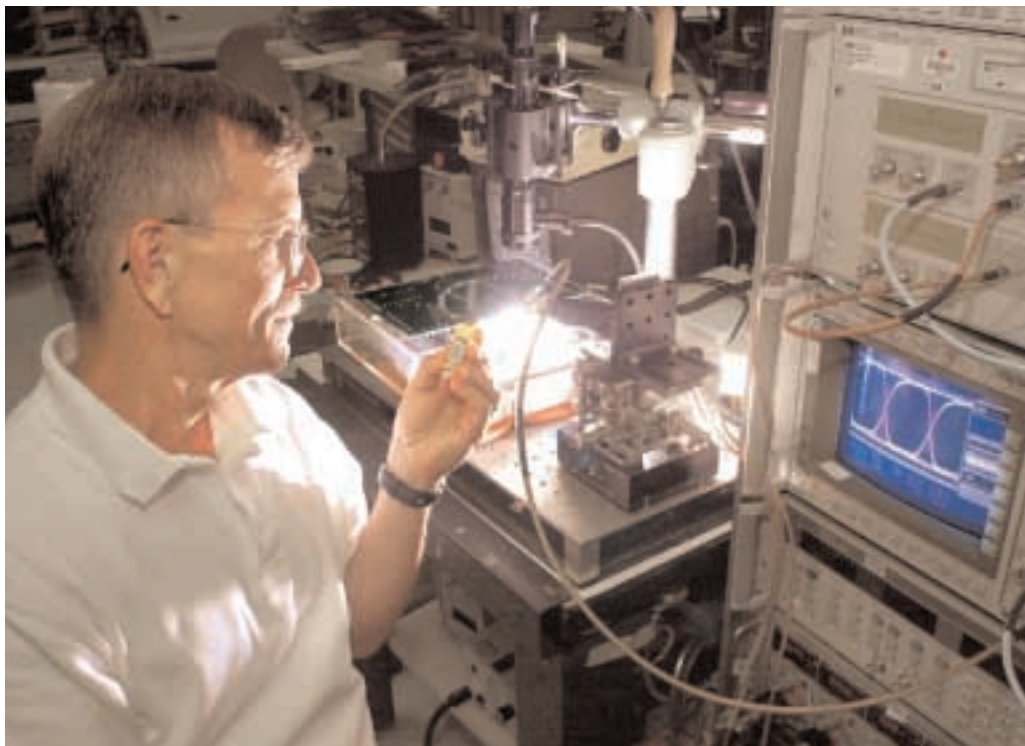
"The development of this technology represents a substantial investment for EMCORE in terms of money and time."

EMCORE is already marketing to potential customers the 12 x 1.25 GB/s transceiver, which has the receiver and transmitter in separate packages, and its cousin, the Very Short Reach OC-192 Parallel Array Transponder, which puts both the receiver and transmitter on one board. EMCORE is the only company in the country manufacturing the transponder.

The market for EMCORE's transceiver and transponder will be Internet service providers which would use the devices for short haul data transfer — distances of 300 meters or less.

Long relationship

EMCORE and Sandia's relationship dates to 1993 and a series of cooperative research and development agreements (CRADAs) and work-for-



RESEARCHER Dave Peterson takes a close-up view of a high-speed optical transceiver module some 50 Sandians from Centers 1300, 1700, 2300, 2600, 2900, 9100, and 14100 helped develop for EMCORE Corp. (Photo by Randy Montoya)

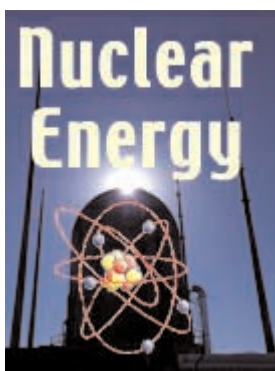
others agreements. Bryan says when EMCORE officials realized they wanted to jumpstart work on the transceiver line, they turned to Sandia, knowing the Labs could "get the new technology up and running quickly."

Sandia's Integrated Microsystems Dept. 1738, under the direction of Manager Mike

(Continued on page 4)

Domenici on nuclear energy

Read what Sen. Pete Domenici, R-N.M., said last week in an exclusive interview with *Lab News* about his views on nuclear energy and possible new related R&D roles for the national labs. Story, page 6.



Labs software makes bomb 'bots smarter

By John German

Some 700 law enforcement officials gathering in Albuquerque later this month will see for the first time a wheeled police robot made smarter with Sandia software.

The prototype robot makes many of the "how to" decisions on its own, freeing up its operator to make the more critical "what to do next" decisions during stressful and potentially dangerous bomb-disablement missions.

Working with a commercially available robot on loan from REMOTEC Inc. of Oak Ridge, Tenn., Sandia automated many of the robot's complex movements while retaining the operator's ability to command the robot's behaviors.

The software, called SMART, for Sandia Modular Architecture for Robotics and Teleoperation, is expected to make police robots quicker, safer, easier to operate, and capable of more behaviors. It also could make available to on-scene commanders a greater number of tools for responding to a wider variety of situations.

"Most importantly, it should minimize 'time on target' for human bomb techs," says project leader Phil Bennett of Intelligent Systems Principles Dept. 15221.

The robot will be demonstrated during the

(Continued on page 5)

Sandia LabNews

Vol. 53, No. 12

June 15, 2001



DisCom² meets critical NNSA milestone System makes it easier for researchers at one nuclear weapons lab to use ASCI computer at another

By Chris Burroughs

A tri-lab project led by Sandia that promises to make it easier for the nation's nuclear weapon laboratories to share powerful DOE Accelerated Strategic Computing Initiative (ASCI) computing resources needed for weapons simulations recently met a critical National Nuclear Security Administration (NNSA) milestone.

After nearly three years of development and deployment, DisCom² (pronounced discom two) — for distance computing and distributed computing — passed its first big milestone with "flying colors," according to the assessment of an external review committee. The distance computing environment is beginning to be used by all three nuclear weapon laboratories, says Art Hale (9220), Sandia DisCom² principal investigator.

DisCom² was initiated in 1998 to extend the environments required to support high-end com-

puting to remote sites and to develop a complex-wide integrated supercomputing environment to support stockpile stewardship.

In other words, Art says, the project was designed to allow analysts and developers at one of the three nuclear weapons laboratories to use a computer at another lab with ease — as close as possible to it being down the hall instead of in

(Continued on page 4)

Cplant™ supercomputer program released to public

A computer program that enables a collection of off-the-shelf desktop computers to rank among the world's fastest supercomputers has been released to the public by Sandia. See Neal Singer's story on page 12.

Power shortfalls spur Californians to spare kilowatt use, search for efficiencies

3

Sandia Security Police Officers stand tall in annual 'Duel in Desert' pistol competition

7



This & That

"Pete's power" – For the past four years, Sen. Pete Domenici has been promoting the expanded use of nuclear power. When he began this in 1997, only a few people paid much attention, but higher fuel prices and electricity shortages in parts of the US are changing that quickly. Some national polls now show that most US residents support that very thing – building more nuclear plants. Sen. Domenici found time in his hectic schedule last week to talk with us about this and some related legislation he's sponsoring. The story, a part of our continuing spring/summer series on nuclear energy, is on page 6.

By the way, if you want to learn more about how nuclear power plants work, here are two web sites. First is the industry-sponsored Nuclear Energy Institute (www.nei.org); after you get there, click on "Library," where you can download a nice primer. Another is on one of every writer's favorite sites, www.howstuffworks.com. If you prefer, go directly to <http://www.howstuffworks.com/nuclear-power.htm>.

* * *

Ray and Rose: parents deluxe – I'm sure many New Mexico residents saw the article in the May 27 *Albuquerque Journal* about the Chavez's – Rose (2660) and Ray (ret., 1993), but people who didn't miss a heart-warming story about what is undoubtedly one of the most dedicated sets of parents ever. Through hard work, considerable financial strain on a middle-class-income household, and personal sacrifice, Ray and Rose put all five kids through private school and then through Harvard, and the kids earned a sack full of honors in the process. The *Journal* article tells the Chavez family story so well, but it almost didn't get told at all because the publicity-shy Ray and Rose had to be strongly "arm-twisted" by the *Journal* before agreeing to do the story. I'm glad they finally agreed – it made for some great reading about some great folks.

* * *

Thanks, severely surveyed Sandians – Employees get surveyed to a near fog at the Labs today. That's why we so appreciate those of you who took time to complete and return our once-every-few-years *Lab News/Daily News* readership survey. Detailed results are on page 8.

We're generally pleased with the results, especially those showing high credibility ratings. Maintaining credibility in company publications isn't easy, because some employees assume company writers and editors are nothing more than "management puppets." While we do work with Sandia management and get occasional guidance, to its credit, management doesn't often tell us what we can and can't print. We appreciate this freedom and how it contributes to our credibility.

* * *

I demand a recount! – One more note about that readership survey: I was crushed to learn the survey shows readership for this column has fallen off a wee bit since 1997. But then I reasoned that's probably because my loyal readers are getting fired, losing their sight, retiring, and even dying off faster than new hires are learning to appreciate my keen insight, sharp wit, candor, accurate reporting, truthfulness/uncompromising integrity, and humility. (Why are we hiring such slow learners these days?)

– Larry Perrine (845-8511, MS 0165, lgperri@sandia.gov)

Look for your personalized Total Rewards Statement

Personalized Total Rewards Statements will be mailed to all regular employees' home addresses by the end of June. Total Rewards is all about your experience at Sandia; it's a total compensation package that encompasses the value of your pay and benefits, work environment, and company-sponsored learning and career development. Benefits Dept. 3341 says the statement captures — all in one place — the full suite of investments that Sandia makes in you.



Once you receive your statement, you can visit the Total Rewards web site for related information, helpful links, and frequently asked questions. Be on the lookout for a Total Rewards teaser on Sandia's home page.

Come find safety at the Home Safety Fair June 20

Free ice cream, lots of safety give-away items, and a chance to gather safety information from a variety of expert sources — it's Sandia's third annual Home Safety Fair, coming to the Coronado Club on June 20, 11 a.m. to 1 p.m. at the pavilion west of the Coronado Club pool, reports Dick Steele (12141), who chairs the Home Safety Fair planning committee.

The event, which began in 1999, has grown each year in the number of safety experts from throughout the city and the number of interested Sandia employees attending.

Although the list wasn't final, more than a dozen safety groups had committed to participating in this year's safety fair at press time. Among the likely participants: the City Fire Department, Bernalillo County Sheriff's Office, America Online, Allstate Insurance, LifeGuard One, New Mexico Poison Control, Fisher Scientific, NMSU Cooperative, and representatives from Sandia's own Safety Engineers, ES&H Coordinators, Pollution Prevention and Emergency Medical groups.

For information, contact Sandia Safety Campaign co-chairs Kerry Sturgis, 844-1529, or Will Keener, 844-1690.

Sandia LabNews

Sandia National Laboratories

<http://www.sandia.gov/LabNews>

Albuquerque, New Mexico 87185-0165
Livermore, California 94550-0969
Tonopah, Nevada • Nevada Test Site • Amarillo, Texas •
Carlsbad, New Mexico • Washington, D.C.

Sandia National Laboratories is a multiprogram laboratory operated by Sandia Corporation, a subsidiary of Lockheed Martin Corporation and a prime contractor to the US Department of Energy.

Ken Frazier, Editor505/844-6210
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 (columnist, 845-8511), Howard Kercheval (844-7842), Iris Aboytes (Milepost photos, 844-2282), Rod Geer (844-6601), Janet Carpenter (Ads, 844-7841).

Lab News fax505/844-0645
Classified ads505/844-7841

Published on alternate Fridays by Media Relations and Communications Dept. 12640, MS 0165



Carbon dioxide-free energy: Photovoltaic systems symposium set for July 18-20 in Albuquerque

With rolling blackouts, domestic energy security and supply, global climate change, and other environmental issues rising to the forefront of the nation's consciousness, the time is right for a symposium focusing on alternative energy options.

Sandia's photovoltaic R&D program is hosting such a symposium: Photovoltaic Systems Technology. The symposium is scheduled for July 18-20 in Albuquerque. Technical content will focus on efforts to improve reliability, increase performance, reduce costs, remove barriers, and grow markets.

Here are some of the topics to be addressed:

- Roadmapping Strategies: Taking PV into the 21st Century.
- Meeting Manufacturing, Marketing, and Research Goals.

- Performance Issues Encountered in Fielded Systems.
 - Testing Protocols for PV Certification.
 - Reliability Issues in a Variety of Applications.
 - PV Opportunities for Rural Co-ops.
 - Getting the Most out of PV Systems.
 - Identifying and Overcoming Barriers to the Technology.
 - Accurately Predicting the Performance of a PV System.
 - Incorporating PV into Government Development Programs.
 - Productive Use Applications.
- The symposium offers an opportunity to learn

about DOE's Systems Engineering Program. The symposium hosts actively invite input from attendees to help shape the future of DOE's national PV program and to participate in a discourse on the state-of-the-art of PV systems technology.

The symposium coincides with the 75th anniversary of historic Route 66 activities, which runs through the heart of the city. Albuquerque is one of the media stopovers for the American Solar Challenge race. The race cars will be passing through Albuquerque July 19-22.

For more information, contact Connie Brooks, cjbrook@sandia.gov (505) 844-4383 or PVSAC@sandia.gov.

Take Note

Retiring and not seen in *Lab News* pictures: Dale Shenk (15322), 35 years; Terry Unkelhaeuser (2521), 37 years; Fabiola Archuleta (10253), 21 years; James Krone (5713), 38 years; and Jo Anne Pigg (7122), 23 years.

Congratulations

To Leslie (7102) and Mike (14186) McReaken, a son, Isaiah Grant, May 13.

To Lynn Hoffman and Tom Hunter (9000), married in Las Vegas, Nev., May 19.

To Michelle and John German (12640), a son, Nathan Riley, May 24.

Power shortfalls spur Californians to spare kilowatt use

Cost, supply concerns redouble energy-saving measures

By Nancy Garcia

The old superstition that electricity leaks out of sockets may seem to have suddenly become true as Californians receive some of their first energy bills since deregulation — in San Diego, where price controls lifted last summer, rates have already tripled.

Even school-age children are becoming more aware than ever. Tracy Walker's (8945) 9-year-old daughter, for instance, wanted to write Gov. Gray Davis to suggest that bikes could be used to generate electricity that could be stored in ceiling wires. Tracy's family lives inland from Livermore in Modesto. "It can be significantly warmer over there," Tracy said about the string of 90-degree-plus days that are typical in summer. His children cool off in the pool. In a concession to energy curtailment, he runs the pool water-treatment pump in off hours (electricity demand peaks in afternoons, 12-6 p.m.). He's installing fans in his children's rooms, leaving off air conditioning at night, and shifting energy-consuming laundry duties to off-hours. "It's more inconvenient than anything," Tracy says.

A directive President George W. Bush issued May 3 has changed energy curtailment at work, too. During Stage 2 and 3 alerts (see box, above center, for definitions), workers who have access to thermostats are encouraged to raise them to 78 degrees. Overall, says Howard Royer (8512), the indoor temperature in office buildings around the site is being raised from 73 to 76 degrees to save electricity.

Electrical use down

In February, after work habits had been changed by more than two weeks of consecutive Stage 3 rolling blackouts, energy usage at the site dropped 6 percent from the previous year, Howard says. Through voluntary measures, the site reduced electrical consumption 3 percent in the 12 months ending March 31, compared to the same period the year before.

In addition to e-mail alerts, the site has launched an energy home page (www.ran.sandia.gov/ctr8500/8512/Conserve) with a hotlink to Howard's e-mail, so he can answer specific ques-



POWER ON THE RANGE — If there can be farms in Berkeley, then why not a mini-power plant in Brentwood? Four photovoltaic panels (on the roof above the windows) produce up to 1.8 kW-hours of power during the summer. Direct-current power is stored in a bank of lead-acid batteries designed for forklifts. An inverter sends alternating current to power appliances in the house. A small diesel generator currently provides backup power.

(Photo by Lynda Hadley)



DON'T TURN OFF THIS LIGHT — Exempt from rolling blackouts because it provides emergency services, the Livermore Fire Station #6 is home to the world's longest-burning light (according to the Guinness Book of World Records), a hand-blown bulb glows around the clock above the fire trucks. The carbide-filament bulb was first installed at the fire department hose cart house in 1901. Barring brief relocations (the last, a 23-minute interval in 1976), it has burned continuously ever since, relying on a back-up generator during power outages. (Its sturdiness is partially due to being rarely switched off and on.) With volunteer support from Sandia, a centennial celebration was held June 8. For details, see www.centennialbulb.org.

(Photo by Dick Jones)

Alert stages

Stage 1: Power reserve is less than 7 percent. No interruptions by the California Independent System Operator are expected, but voluntary reductions are encouraged.

Stage 2: Power reserve is less than 5 percent, and federal facilities in California must curtail energy use.

Stage 3: Power reserve is less than 1.5 percent. Rolling blackouts are likely, and federal facilities in California must curtail energy use. Workers are also encouraged to consider ceasing normal operations and choose less energy-intensive activities, such as holding meetings instead of writing reports.

Sandia CaliforniaNews

tions, as well as links to energy-conservation sites listing electrical savings tips. At work, folks are advised to keep printers and copiers turned off when not in use, as well as computer monitors and hallway lights. They may also shift energy-demanding tasks away from peak usage times.

Meanwhile, rates for natural gas have already doubled. The rising bills served as a reminder to keep the heat low in winter, says Center 8300 Director Bill McLean.

Child of the energy crisis

The Combustion Research Facility, which he oversees, was born in the energy crisis of the 1970s. Skyrocketing electricity rates and rolling blackouts are not quite as severe yet, he says. "There was a rather dramatic limitation on gasoline and long lines at the gas station. It wasn't a matter of choosing to conserve — the energy just wasn't there."

However, research projects at the CRF that support more-efficient industrial or automotive processes that meet environmental needs do help provide part of the solution. "They represent sources of energy where we are able to conserve," Bill says. "We need to increase supply and increase efficiency while decreasing carbon emissions."

A future research thrust being considered for the site involves far-reaching approaches to controlling carbon emissions. This long-term potential energy program emerged at a recent management off-site meeting as a unique technological challenge. Engine Combustion & Hydrogen Dept. 8362 Manager Jay Keller, who is drafting the proposal, says there are opportunities to create and refine interim technologies that will bridge to alternative energy sources that do not release carbon through burning fossil fuel, an important factor in global warming.

On the conservation side, he's become more high-tech at home, such as programming the lights to turn off on their own accord. "We're just going to get a lot smarter about how we use our energy," Jay predicts.

For now, Vice President Dick Cheney has asserted that individual conservation efforts are "personally virtuous, but won't solve the problem."

Still, there are Sandians who enjoy trying alternative energy approaches for utilities or transportation. For instance, Gary Hux (8358) was intrigued enough to complete conversion of a 1959 Fiat to all-electric power about five years ago, tooling around Tracy on power drawn from golf cart batteries that cost less than \$1 a week to recharge. Since it was a small car that lacked seat belts, he sold it when his daughter began driving —



NEW MILLENNIUM GOTHIC — Howard Lentzner (8528) holds part of a wind turbine that he intends to eventually erect for backup power at his new rural home. (Photo by Lynda Hadley)

"I wanted her in a tank," he joked. For the last few months, he's been driving a brand-new Prius, occasionally carpooling into Livermore in this hybrid vehicle. The Toyota Prius combines a small gas motor with battery power (the motor recharges the batteries, which discharge during acceleration or on uphill grades).

The car looks like any new sedan, except for a small screen on the dash that displays the energy consumption. "In five minutes, you can teach yourself how to drive it for the best fuel economy," Gary says. "It takes the cheapest gas you can buy and automatically controls the valve timing and pressure ratio." A few advantages: its efficiency is more than 40 mpg, maintenance is covered for the first three years (plus an 8-year, 100,000-mile warranty on the hybrid system), the 228 flat-profile C-cell batteries of nickel-metal-hydride (stored near the spare tire) allow plenty of trunk space, and he received a \$2,000 federal tax credit because it's an ultra-low-emission vehicle (a \$2,000 air-quality voucher is now available too).

"I get to do my part for the environment," Gary says, "and have a good, clean conscience doing it. It's not like you're losing anything at all — safety or comfort — it's a well-rated, well-designed car." Since his purchase, two others in his building have also bought these hybrid cars.

Going solar

Meanwhile, sheer pragmatism drove Howard Lentzner (8528) to build a passive solar house in rural Brentwood. The property, an old cattle ranch that had been in his wife's family, was far from utility lines. Running in gas and electricity would have been prohibitively expensive. So, Howard and his wife hired a passive-solar architect and created a mini-power-plant of four 120-watt photovoltaic panels. Mounted on the barn roof, the panels charge batteries that supply power to the house via an inverter.

The 1,500-square-foot, two-bedroom, two-bath home faces southeast to catch the winter sun, which warms the concrete slab floor. In summer, the windows are shaded by an inexpensive black mesh designed for dairies. "It really works," Howard says. Insulation comes from double-glazed, low-emissivity windows, and walls and ceiling constructed of material that is like a polystyrene "sandwich" about 7 inches thick. For cooling, high ceilings in a large "great room" have gable windows that increase air circulation.

Howard and his wife helped build the house over the last couple of years, having sold their home in Livermore. "It was helpful to be able to buy energy-efficient supplies off the Internet that you couldn't find at OSH or Home Depot," he says.

"We didn't do this in any altruistic way," he adds. "A lot of people were making jokes about our little power plant. They're not making jokes anymore — I wish I could say we saw this coming."

EMCORE

(Continued from page 1)

Daily, conducted a feasibility study to see what it would take to put together a transceiver device that could be easily manufactured. Based on the report, presented in January 2000, EMCORE officials decided to proceed with the project.

Fifteen months later Sandia and EMCORE have a working transceiver designed for low-cost, high-volume production manufacturing.

The transceiver consists of two parts — a transmitter and receiver. On the outside the transmitter and receiver look alike, but inside they are different.

The transmitter consists of a high-speed driver integrated circuit (IC) and a 12-VCSEL array chip — a type of laser where photons bounce vertically between mirrors grown into the structure and then shoot straight up from the wafer surface. The VCSEL is used to transform electronic signals to optical signals that travel through the fiber optic cables.

At the receiving end is a single chip array of 12 gallium arsenide photo detectors that convert the light back to electronic pulses and a high speed receiver IC to shape the electronic pulses.

Two challenges

Dave Peterson (1738), who led the Sandia high-speed parallel optical transceiver development effort, says two challenges had to be overcome before a device with the potential of easy manufacturing was possible.

Partnership 'win-win' situation for all involved

David Williams, Director of Microsystems Science, Technology, and Components Center 1700, says the Sandia/EMCORE transceiver partnership is a "win-win situation" for all parties involved — including EMCORE, the regional economic environment, and the Labs.

It brings EMCORE a new product line that has potential for great success. It also promises the creation of hundreds of new high-paying jobs for the area.

For Sandia, he says, it has two positive impacts.

First, it provides Sandia components for an advanced computing environment that will be needed by the Labs for high-speed modeling

used in simulating nuclear weapons effects. Sandia, David anticipates, will buy the commercial transceivers and transponders and use them in simulations.

Second, he says that "in design and complexity" the project was much like doing weapons work, and as a result, helped assess how the Labs performs in these critical areas.

"We had to pull 50 to 60 people from across the Labs," David says. "We had limited resources, were under a tight deadline, and had to use the best of Sandia's technologies and skills to result in a highly manufacturable and reliable device. All these aspects are part of nuclear weapons work."

"First the units had to be designed to align the laser arrays and fiber cable to within 10 microns in all three dimensions even though the fiber cable is manually plugged and unplugged multiple times by field service technicians," Dave says. "This was no easy task."

The laser array inside the transceiver must be within microns of — but not touching — the fibers for the device to function.

The second challenge was to meet the high-speed data-transfer requirements while keeping the laser light intensity low enough to meet eye safety certification standards. A unique feed-

back control approach was used to meet these requirements by controlling the laser outputs.

Bryan anticipates that the EMCORE/Sandia-developed transceiver and transponder initiative will be highly successful. This is partly because the demand for the modules exceeds the supply — and the company that can come up with an inexpensive way to manufacture the modules will be the winner.

"I believe in the long run we will be that winner," Bryan says. "Our advantage is that our devices are easier to make and easier to use than others on the market."

DisCom²

(Continued from page 1)

another state or city.

Before DisCom², accessing a computer at another laboratory was clumsy at best. An analyst needed a local account, data transfer was slow, and there was little coordination among the labs of user support and assistance with troubleshooting.

"We found there was inconsistent access to system information, too long file transfer times and limited interoperability of tools, many different systems and policies, and an uncertainty of who supports what in the external parts of the environment," Art says.

Opportunity to share computers

Because DOE felt it could not afford for all three laboratories to have the highest capability ultra-fast computer at any given time, DOE mandated a system be established to give analysts at the different laboratories the opportunity to share ASCI supercomputers.

DisCom² was born.

"DisCom² recognized that the labs would have to share each other's computers," says John Kelly (9904), Sandia ASCI Program manager. "This new model of shared resources gives us a greater return on DOE investments."

John says the cost of installing the highest-end supercomputer at just one laboratory can be as high as \$200 million. That multiplied by three becomes unaffordable. Networking the three labs to use that highest-speed computer costs about \$10 million.

Although that computer cannot meet all three labs' needs for computing capacity, by sharing the very highest-end machine at any given time, the other two labs can rely on less expensive machines for computing capacity, explains Bill Camp (9200), Sandia's leader for strategic computing.

The highest-end machine is then available

"DisCom² recognized that the labs would have to share each other's computers."

for the really challenging jobs that require it, Bill adds.

Steven Humphreys (6535), project lead for the Distributed Resource Management (DRM) portion of DisCom², says the need for easy access between labs grew as the different laboratories obtained varying computing capabilities.

"Six months ago all three labs had similar capabilities — each with computers that had a speed of three TeraOps (three trillion computer operations per second)," Steven says. "That changed when ASCI White, which operates at a speed of 12 TeraOps — four times faster — came on line at Lawrence Livermore."

An even faster computer, the Q Machine that will run at 30 TeraOps, is expected to come on line at Los Alamos in FY2002. The following year, a very high-end installation, RED STORM, is planned for Sandia.

The Distributed Resource Management team deployed the ASCI grid and developed grid services for the tri-lab environment. The ASCI grid is the largest computational grid in the world with more processors — 24,548 — and a higher computer capability than any other. Current ASCI grid services enable both local and remote users to access and use ASCI computer resources using a common set of desktop interfaces. The ASCI grid services include work management resource brokering, resource discovery, and monitoring.

Another essential element to making the DisCom² Milepost a reality was the networking that linked the three weapons laboratories.

"In order to set up the network we had to develop parallel network architecture and parallel data movement applications," says John Naegle (9336), who led Sandia's ASCI networking efforts. "We had to work with vendors to acquire affordable wide area bandwidth providing physical paths connecting the three labs."

High-speed encryptor systems

As part of DisCom², complicated high-speed encryptor systems had to be installed. Developers at Sandia, Los Alamos, and Lawrence Livermore national laboratories worked together to develop hardware and software needed for fast data transfers and easy access to remote computers.

"Being among the first to need this type of encryptor has fostered a very close collaboration between the laboratories and the National Security Agency," says Pete Dean (8903), Sandia's co-

principal investigator for DisCom².

In early April DisCom² team leaders demonstrated to NNSA and an external panel of experts that all tasks for the DOE mileposts were met. This included easy remote access to information about the White ASCI environment; basic data movement between sites at reasonable speeds; remote job submission and monitoring using new grid services and capabilities; and tri-lab coordinated operational support.

Order of magnitude improvement

As an example of the type of progress that was demonstrated, Art says that two years ago when a Los Alamos designer ran a simulation on the machine at Sandia it took a week to move the data back to Los Alamos.

"Today we can move the same amount of data in about six hours. That's over an order of magnitude improvement," he says.

Currently only a handful of analysts at Sandia are using the DisCom² capabilities on a limited basis to do simulations on Lawrence Livermore's ASCI White while the bugs in the system continue to be worked out. Over the next year the DisCom² capabilities will be transitioned into general availability for dozens of analysts at the three weapons laboratories.

This, however, is just the first phase of the project.

"This portion of the project has focused on ASCI White," Art says. "Next we will need to integrate all ASCI resources, including not just the big platforms but also storage, network, and visualization services into one ASCI computing environment."

This NNSA milepost is scheduled for 2003.

Sandia's DisCom² team

Sandians making up the primary DisCom² milepost team include Art Hale (9220), Pete Dean (8903), Len Stans (9336), Jim Ang (9220), Martha Ernest (9336), John Naegle (9336), Tom Pratt (9336), Kathie Hiebert-Dodd (6353), Steven Humphreys (6353), John Noe (9338), Bill Rahe (9332), Mike Vahle (9300), Marty Barnaby (9338), Sue Goudy (9223), Thomas Otahal (9343), Manoj Bhardwaj (9142), Judy Sturtevant (9338), Harvey Ogden (6536), and Lilia Martinez (9220).

Robot

(Continued from page 1)

International Association of Bomb Technicians and Investigators annual in-service training conference June 24-30 in Albuquerque, which draws law enforcement officers from around the world.

REMOTEC is discussing with Sandia the possibility of licensing the use of the SMART software on future commercial robots.

Difficult work under intense pressure

Law enforcement agencies worldwide are welcoming mobile robots into their special ops units to perform tasks that would normally put an officer in danger.

Robots outfitted with cameras, grippers, and other sensors and tools are particularly useful during bomb threat responses because a robot can enter a dangerous area, assess the situation, and handle explosive devices while the human operator is safely behind a control panel hundreds of feet away.

But today's police robots can be difficult to control. A robot's operator, often working under the pressures of limited time and the threat of severe economic consequences associated with mistakes, has to master control levers for each joint of a robotic arm, as well as for a robot's on-board grippers, cameras, and other tools. The operator has to operate the arm while the camera views might be upside down and backwards. Furthermore, the operator has difficulty judging distances through the cameras, which provide little depth-of-field information.

"Sometimes it's like playing a video game with a seven-lever joystick held upside down, with one or both eyes closed, and your boss looking over your shoulder," says Phil. "Operators might think they're about to bump an object but they're really three feet away. Or they don't know if the robot



ROBOT opens a door during a demonstration.

will be able to fit between two cars or climb a flight of stairs. Often they don't accomplish these difficult tasks on the first try. The pressure can be intense."

A SMART-based robot with associated sensors and other tools could be pre-programmed, using software control sequences that allow it to grip tool A or go directly to point X rather than having individual movements controlled separately by the operator.

"That would be useful, for instance, when you need to reach through a car window, grab an object, and back out without whacking the door," he says. "It will free up the human operator to think about what needs to happen and in what order — which is what humans do better than machines — rather than the monotonous and sometimes confusing details of moving joints."

Guarantees a stable system

A robotic system is more than just hardware, adds Phil. When you assemble a robotic system, you need a control system that integrates the hardware components electronically in such a way that you have a stable, useful tool.

SMART's patented control algorithms guarantee that a variety of components, perhaps from different vendors, can be integrated into a single system and work correctly the first time, says SMART's developer, Bob Anderson of Mobile Robotics Dept. 15252.

SMART has been demonstrated on robots used by DOE for accident response and hazardous waste cleanup.

"SMART overcomes obstacles to system stabil-

ity in unstructured environments," says Bob.

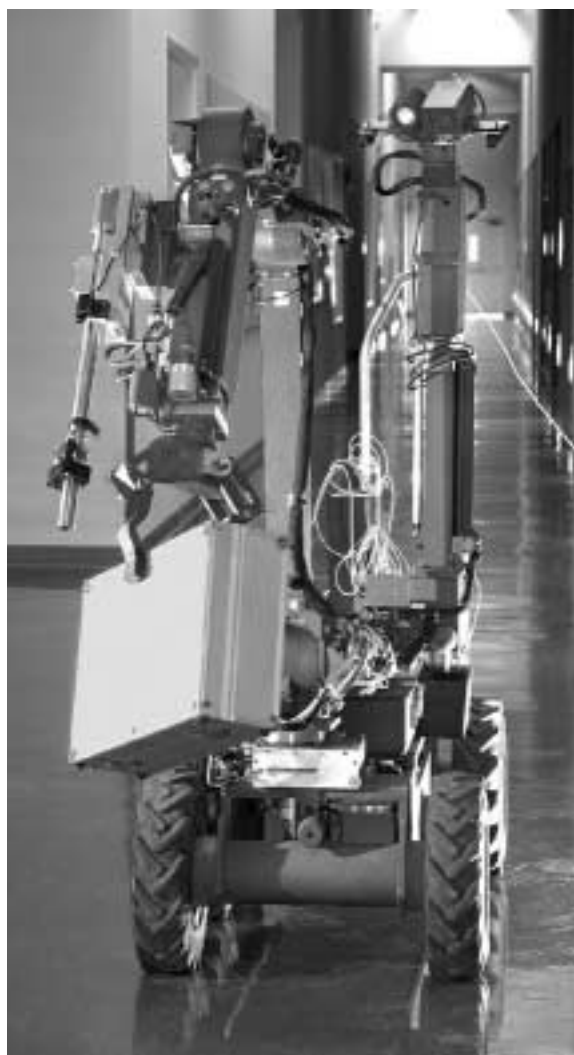
In addition, SMART's "stackable" software modules — one for each robot component or function — enables the rapid assembly of off-the-shelf equipment into a working system.

"That's what has us really excited," says Phil. "A sergeant can look at the situations and problems officers are encountering in the field and essentially add this tool or that behavior to the robot's portfolio without the technical difficulties normally associated with changes to the system."

It also will allow new tools to be integrated into commercial robotic systems perhaps weeks after they are developed or introduced, rather than months or years.

Sophisticated behaviors to come

Prior to incorporating SMART into REMOTEC's Wolverine robot, Phil worked with the FBI to survey law enforcement robot operators across the country to determine which robot tasks and problems officers encounter in the field most



REMOTEC'S WOLVERINE POLICE ROBOT made smarter by Labs-developed software carries a mock suitcase bomb during a recent demonstration at Sandia. (Photo by Randy Montoya)



WANTED: SMARTER ROBOT — In preparation for making a better bomb 'bot, Phil Bennett (left) last year discussed potential improvements with Albuquerque Police Department Detective Wayne Cunningham (center) and Patrolman Stephen Chester. (Photo by Randy Montoya)

frequently.

He also observed the difficulties confronted by Albuquerque Police Department bomb squad members as they practiced dealing with mock explosive devices using their own robot (*Lab News*, May 19, 2000).

The Wolverine now incorporates some of the most challenging and commonly needed robotic tools and behaviors in police work, such as automatic tool changes, tool placement, and bomb-disrupter aiming, as well as telerobotic straight-line movement in all directions.

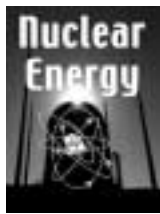
During a demonstration in March at the FBI Hazardous Devices School, the SMART-modified Wolverine shaved minutes off typical bomb responses even with the most skilled FBI robot operators. More evaluations of the robot's effectiveness are being conducted next week.

Phil expects that REMOTEC and Sandia will begin introducing new tools, sensors, and behaviors for additional law enforcement needs soon. Possible new technologies could include path planning, machine vision, proximity sensing, obstacle avoidance, visual targeting, reachability analysis, and automatic calibration, which would enable a variety of new, sophisticated capabilities.

"We could add sensors and software to the robot that would, for instance, tell the operator in advance whether or not the robot is going to be able to fit between the two parked cars, turn left, reach through a window, remove an object, and get out," he says, "and then it could do all that automatically if the operator decides that's the right approach."

Phil hopes law enforcement agencies one day will be able to select and download new behaviors or tool modules from a network or off of a CD-ROM and insert them into their robots' control systems.

Ultimately he believes SMART-based mobile robots could be useful in such areas as emergency response (to clean up a chemical spill, for instance), facility security (to patrol perimeters or respond to an attack), nuclear reactor accident response (to turn on or off a safety valve), combat engineering (to breach barriers, lay razor wire, or remove or emplace an object and get out), urban warfare (to punch access holes in walls or assist the injured), and space (using Earth-supervised robotic manipulators to repair satellites, for example).



Senator Domenici believes nuclear power may be 'poised for a dramatic rebirth'

He says the national labs have a role to play in design, evaluation, prototyping

The Lab News continues its series on nuclear power that began in our June 1 issue. We talked in an exclusive interview with Sen. Pete Domenici, R-N.M., last week about his views on the subject, possible new related R&D roles for the national labs, and the bill he introduced in March, the "Nuclear Energy Electricity Supply Assurance Act of 2001" (Senate Bill 472, see box at end for major components).

As we continue this series, we will soon feature Sen. Jeff Bingaman, D-N.M., talking about his nuclear energy views and a related bill he introduced in February, the "Department of Energy University Nuclear Science and Engineering Act."

By Larry Perrine

Sen. Pete Domenici believes nuclear power must be used in a big way to help the US meet its future energy needs. He has even said nuclear power is "poised for a dramatic rebirth." But he's no "Pete come lately" on the issue. In October 1997, several years before electricity shortages started showing up in parts of the US and before fuel prices began rising steeply, Domenici sounded something of a national alarm about the state of the nuclear power industry in the US. In a speech at Harvard University's Belfer Center for Science and International Affairs, he called for a new national dialogue on nuclear energy issues.

And he hasn't stopped talking about nuclear energy for very long since then, giving major speeches at MIT and Stanford, and frequently talking about it on the Senate floor. For a while, it seemed few people were paying much attention, but electricity shortages in California have changed that quickly, and several recent national polls show that much of the public supports building new nuclear power plants. Nuclear power still has plenty of critics and naysayers, but they seem to be a shrinking minority, the polls say.

Domenici told the *Lab News* that working with the "great scientists" at Sandia and Los Alamos national labs has served him well in his quest to rebuild nuclear energy in the US. "This kept me in touch with people who really understand that nuclear power is very important and a rich source of energy."

Speech was basic underpinning

He says this contact helped him immensely as he prepared his 1997 Harvard speech. "We came up with a text that we thought was the basic underpinning of what we ought to do and what was wrong," Domenici says. "I'm thrilled that the speech was accepted, and the ideas within it were also accepted by a variety of institutions and groups." One of those groups, he notes, is the Nuclear Regulatory Commission (NRC), which Sandia has worked with for years in various ways to help ensure the safety and reliability of nuclear plants (details in June 1 *Lab News*, page 4).

(Note: Anyone wanting a copy of Domenici's landmark Harvard speech via e-mail can request one from lgperri@sandia.gov.)

Domenici says he is confident his Senate colleagues will give a full and fair hearing to the provisions in his Senate Bill 472 (Nuclear Energy

Electricity Supply Assurance Act of 2001) and that at least major parts of it will be passed. For one thing, fellow New Mexico Sen. Jeff Bingaman is now chairman of the Senate Energy and Natural Resources Committee. For another, the bill has important bipartisan support; 17 other senators are cosponsoring the bill, including three Democrats.

"I plan to have a long talk with Sen. Bingaman about this issue soon," Domenici says.

He says the Senate may wind up passing some nuclear energy measures by themselves or perhaps "encapsulated in a broader-based bill with many other things."

"I will do whatever the chairman thinks is best," he says.

Domenici also knows nuclear energy is an integral part of the Bush administration's national energy policy. "The President's plan incorporates a number of things from . . . our papers, and we're very pleased. They are talking about such things as accelerator transmutation and reprocessing, and nobody had dared talk about those at the executive level as short a time as four or five years ago."

The senator says he's glad that the Department of Energy is showing renewed interest in nuclear energy and as a result foresees some additional R&D opportunities for Sandia and



SEN. PETE DOMENICI, one of the nation's most vocal advocates for renewed investment in nuclear energy. (Photo by Randy Montoya)

the other national labs.

"If in fact we move ahead, and I think we will," he adds, "the next generation of nuclear power is going to have to be evaluated, designed, and prototyped. Obviously, much of the information and talent for this resides within the laboratories, so they are going to be used."

Summary of Domenici's nuclear energy bill

Sen. Domenici's Nuclear Energy Electricity Supply Assurance Act of 2001 (S. 472), with bipartisan support from 17 cosponsors, features a number of major components designed to support nuclear energy production, encourage new plant construction, assure a level playing field for nuclear power, create waste solutions, and improve Nuclear Regulatory Commission regulations.

Listed here are the major components of the bill, as summarized on Sen. Domenici's web site (<http://domenici.senate.gov/legislation>).

The complete text of the legislation can be found by going to the Library of Congress page (<http://www.loc.gov>), clicking on the legislative information icon and then typing in the bill number, S. 472.

Nuclear Energy Electricity Supply Assurance Act of 2001 - Price-Anderson Amendments Act of 2001 - Amends the Atomic Energy Act of 1954 to extend the indemnification authority of the Nuclear Regulatory Commission (NRC) with respect to licensees and nonprofit educational institutions. Makes such authority permanent with respect to Department of Energy (DOE) contractors.

- Revises guidelines pertaining to: (1) licensee insurance premiums; and (2) liability and indemnification limits.

- Limits civil penalty for a tax-exempt nonprofit contractor, subcontractor, or supplier to the amount of the performance fee paid by the Secretary.

- Amends the Department of Energy Organization Act to add two Assistant Secretaries of Energy to serve, respectively, as Director of: (1) the Office of Science; and (2) the Office of Nuclear Energy, Science, and Technology.

- Instructs the Secretary of Energy to establish or continue programs administered by the Office of Nuclear Energy, Science, and Technology, including: (1) specified nuclear energy research and technology programs; (2) investments to increase electricity capacity at commercial nuclear plants; (3) continued domestic capability for ura-

anium mining, conversion, and enrichment industries; and (4) university nuclear engineering education research and infrastructure.

- Amends the USEC Privatization Act to prohibit the Secretary from selling surplus natural uranium and conversion services through 2006. Requires the sale of uranium hexafluoride.

- Authorizes the Secretary to proceed to place the Portsmouth gaseous diffusion plant into cold standby condition for a five-year period.

- Mandates a program to: (1) demonstrate the NRC Early Site Permit process; (2) evaluate opportunities for completion of partially constructed nuclear plants; (3) assess opportunities for Generation IV reactors; and (4) research potential licensing issues associated with new reactor technologies and designs.

- Declares electricity generated by a nuclear plant to be an environmentally preferable product. Conditions Federal funding for a domestic or international organization that supports electricity production facilities upon inclusion of emission-free electricity production facility projects that use nuclear fuel.

- Establishes the Office of Spent Nuclear Fuel Research to implement a research and development program pertaining to treatment, recycling, and disposal of high-level nuclear radioactive waste and spent nuclear fuel.

- Directs the Secretary to: (1) conduct an advanced fuel recycling technology research and development program to further the availability of electrometallurgical technology as a proliferation-resistant alternative to aqueous reprocessing in support of evaluation of alternative national strategies for spent nuclear fuel and Generation IV advanced reactor concepts; and (2) establish the Advanced Accelerator Applications Program.

- Amends the Atomic Energy Act of 1954 to: (1) revise certain commercial license requirements; (2) repeal restrictions pertaining to foreign ownership of commercial licensees; and (3) grant firearms and arrest authority to employees of NRC licensees.

For the record

In the June 1 edition of the *Lab News*, the story about the renewed interest in the US in nuclear energy stated that no new nuclear plants have come online since the 1970s. In fact, a number of plants became operational in the 1980s, including, for example, the Palo Verde plant in Arizona (of which the Public Service Company of New Mexico is a part owner). The story should have said that no new plant orders have been placed since the 1970s.



'Duel in the Desert'

Determination and intensity show on the faces of members of Sandia's Security Police Officer pistol team during this year's Security Police Officer Training Competition (SPOTC) May 21-24 at the Live Fire Range in Coyote Canyon. At top, SPO Paul Romero fires off rounds at silhouettes representing terrorists holding hostages. At right, SPO Dan Gutierrez focuses intently on the task at hand and (below right) fires through a window. Below, SPOs Paul Romero, Tommy Serna, Mark Quintana, and Lt. Scott Sanderville (a team coach) make clear they aren't anyone to mess with. Not pictured are team members Joseph Branch, Jeff Chavez, and Ruben Padilla; team coach, Lt. Scott Rogers; team captain, Capt. Willie Johns; and co-captain, Capt. Grant Aguirre. Eighty-five competitors from 17 teams of federal, municipal, county, and state armed security forces tested themselves under a variety of problem-solving situations and scenarios. Sandia's team finished fifth. The competition is hosted by the Nonproliferation and National Security Institute, operated for DOE by Wackenhut Services, Inc.

Photos by Randy Montoya



(Don't) Stop the presses: *Labs News/Daily News* 2001 readership survey results are in, and here they are

Here's what a group of randomly selected employees think about our news publications

Results of the *Lab News/Daily News* readership survey conducted earlier this year indicate Sandians are increasingly pleased with these complementary employee communication tools.

For example, respondents scored each publication higher in readability, credibility, relevance/usefulness, timeliness, and thoroughness than did readers who completed a similar survey in 1997.

And the historically most-popular features in the *Lab News* — Mileposts, retiree photos, Feedback, and human resources-related stories — are bigger hits than ever and significantly ahead of the next tier of items — technical stories, "Favorite old photos," and administrative/management stories. Eighty-three percent of the respondents said they read at least half of each *Lab News*.

The *Daily News*, established in 1996 and thus relatively new to Sandians for the 1997 survey, skyrocketed in all positive indicators. Also, 86 percent of the respondents indicated they read at least half of each issue. The preferred format for reading *Daily News* is through e-mail: 83 percent said they view it that way. It goes daily to all Sandians via e-mail, while also appearing on the internal web (<http://www-irn.sandia.gov/newscenter/news-frames.html>).

Who responded to this year's survey?

This year's survey — sent to 500 randomly selected Sandians (mostly by e-mail) in mid-March — yielded a 52 percent response rate. That was down from a 72 percent return rate in 1997 and 56 percent in 1995.

Those responding this year, however, do closely parallel the Labs demographically. For example, 11 percent of the Labs is "managers or above." Ten percent of the respondents self-identified as members of that group. Sixty-one percent of the workforce are "technical employees or technologists." Sixty-four percent of the survey-takers fit into that group. "Administrative/support" employees represent 28 percent of the staff; 26 percent of those responding fit into that category.

Selected survey results appear below. For complete results contact Rod Geer at 505-844-6601 or e-mail at wrgeer@sandia.gov. — Rod Geer

In general, how do you rate the *Lab News*?

	2001 survey	1997 survey	1995 survey
Excellent	21%	22%	18%
Very Good	52	51	50
Good	23	23	30
Fair	3	4	2
Poor	1	0	0

In general how do you rate the *Sandia Daily News*?

	2001 survey	1997 survey
Excellent	31%	13%
Very Good	44	31
Good	21	44
Fair	4	11
Poor	1	2

On a scale of 1-5, 5 being best, rate the *Sandia Lab News* in terms of the following attributes.

	2001 survey	1997 survey
Readability	4.30	4.15
Credibility	4.23	4.08
Relevance/Usefulness	3.86	3.63
Timeliness	4.05	3.82
Thoroughness	3.86	3.77
Photo/Illustration	4.19	4.13
Quality		
Average	4.08	3.93

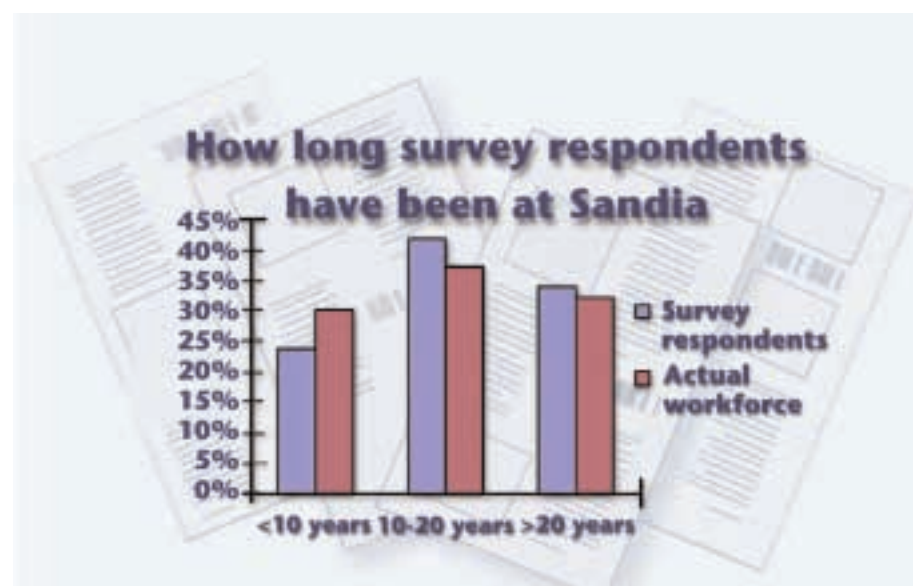
On a scale of 1-5, 5 being best, rate the *Daily News* in terms of the following attributes.

	2001 survey	1997 survey
Readability	4.25	3.88
Credibility	4.14	3.92
Relevance/Usefulness	4.00	3.53
Timeliness	4.52	3.91
Thoroughness	3.72	3.49
Average	4.13	3.75

(Continued on next page)

Charting readership trends

Charts by Janet Carpenter for the *Lab News*



Lab News *Reader Service information*

The *Sandia Lab News* is distributed in-house to all Sandia employees and on-site contractors and mailed to Sandia retirees. It is also mailed to individuals in industry, government, academia, nonprofit organizations, media, and private life who request it.

Retirees (only): To notify of changes in address, contact Diana Mares, Benefits Dept. 3341, at 505-845-9705, e-mail dmmares@sandia.gov, or Mail Stop 1021, SNL, Albuquerque, NM 87185-1021.

Others: To receive the *Lab News* or to change the address (except retirees), contact Iris Aboytes, Media Relations and Communications Dept. 12640, at telephone 505-844-2282, e-mail ioaboyt@sandia.gov, or Mail Stop 0165, SNL, Albuquerque, NM 87185-0165.

Employees: If your Mail Stop is not receiving enough copies of the *Lab News* for everyone, please call Honario Anaya, Mail Services Team 10268-4, at 844-3796. (At Sandia/California contact the Mail Room at 294-2427.)

Web Users: Recent *Lab News* issues (in .pdf format) are on the Web at <http://www.sandia.gov/LabNews>.

Reader survey

(Continued from preceding page)

Please mark an "x" to the right of each of the following types of *Lab News* coverage you usually read. You may make multiple choices.

	2001 survey	1997 survey	1995 survey
Mileposts	87%	80%	74%
Retiree photos	86	78	83
Feedback	86	77	73
Human resources	84	77	Not asked
Technical news	77	76	75
Favorite old photos	76	69	70
Admin./mgmt.	70	67	83
Historical	68	68	Not asked
Labs Accomp. Issue	65	65	Not asked
Classified ads	64	68	66
This & That	59	62	63
State of Labs Issue	57	61	50
Profiles/features	54	53	41
Awards & honors	47	47	52
Security & safety	47	Not asked	Not asked
Comm. support/ outreach	32	32	15
Diversity	27	25	Not asked
Sandia/CA news	25	25	21
Lockheed Martin	14	23	Not asked

The *Daily News* comes in three parts – internal Sandia news, synopses of relevant external news, and announcements. Which part(s) do you usually read?

	2001 survey
Internal news	42%
External news	32
Announcements	25
None	1

Which part(s) of the *Daily News* do you feel are often useful to you in performing your job?

	2001 survey
Internal news	49%
External news	16
Announcements	25
None	10

Cumulonimbus soars



SILVER LINING — Surrounded by luminous, tufted high-desert plants in the Sandia Mountain foothills east of Albuquerque, Ron Hoskie coaxes an early-morning greeting to the sun from his Native American flute. Ron (7842), Dave Fein (1832), Greg Hassig (2564), and Kerry Sturgis (7111) — and non-Sandian fellow musician Paul Thompson — who comprise the group Cumulonimbus, have recently released their first CD, a 16-track collection titled *Rain Brings Changes*. They play a collection of instruments and produce a range of sounds that includes flutes, drums, ocarinas, "frog rasps," jingles, bird sounds, rain sticks, crickets, rattles, tambourine, chimes, whistles, and occasionally a guitar. The music was composed by Ron, Dave, Greg, and Paul Thompson, and Ron wrote the words and lyrics. Ron and Dave provided the music arrangements and direction for the recording. The CD cover photo — of a snowfall over the Sandias at sunset — was made by Sandia photographer Randy Montoya.

(Photo by Randy Montoya)

New questions set benchmark for future surveys

Although most of the survey questions carried over from 1997 and many from 1995, there were some new items. For example, only 12 percent of those responding have begun to read at least portions of the *Lab News* on the web (www.sandia.gov/LabNews/LabNews.html). And 19 percent reported they didn't know the entire text is now on the web.

Another new question showed that 59 percent of the respondents indicated they either always (18 percent) or frequently (41 percent) find the Feedback program "to be useful even though you may not always agree with the questions or the answers."

This survey also included a question about "Your Thoughts, Please," an internal web-based program that permits employees to comment about questions posed each month.

Begun early this year, 38 percent of those responding indicated they weren't yet familiar with it; 11 percent termed it excellent, 22 percent very good, 20 percent good, 6 percent fair, and 3 percent poor.

"Your Thoughts, Please" is reachable on the internal web's NewsCenter at <http://www-irn.sandia.gov/newscenter/news-frames.html>.

The current question, for which responses are being accepted through June 29, is: "How are Sandia's California and New Mexico sites most alike; what truly makes us one lab? What should Sandians in New Mexico better understand and appreciate about Sandians in California (local influences, corporate assets, etc.), and vice versa?"

An extra chance to speak out about Lab News, Daily News

Several opened-ended survey items gave readers an opportunity to offer expanded comments about the *Daily News* or *Lab News*, and they didn't disappoint. More than 300 individual comments came in.

Showing up most often in response to *Lab News* stories that readers would like to see more often were employee profiles/hobbies, Sandia/California news, and technical news accomplishments.

Readers said they could do with fewer *Lab News* stories about Lockheed Martin, diversity-related topics, and use of "Pravda-style journalism."

Responses to an item inviting readers to add any general comments about the *Lab News* and/or the *Daily News* drew a range of opinion. Some of the offerings were contradictory.

For example, about the *Lab News*:

- "Someone needs to rein in the editors. They should not be able to make policy. . . ." vs. "Zero credibility due to management control."

- "Gives a sense of community with parts of the Lab that work on different programs." vs. "Overemphasizes technical environment and tends to validate caste system."

Some suggestions concerning the *Lab News*: "Print in color all the time." "Would like new column — 'Critics' — that identifies, researches, and takes an angle that is critical of a Sandia policy, practice. . . ." "Make an index at end of year of major articles and the date they can be found."

Despite readers' indicating their clear preference for reading the *Daily News* as an e-mail document, the most-often suggested change regarding that publication was to eliminate its e-mail version.

Some comments and suggestions about the *Daily News*: "Like the briefness with option to click the linkage for more info." "Do not let influential personalities use it as their soapbox." "*Lab News* is for leisure reading. *Daily News* is for most info."

"Would like new column — 'Critics' — that . . . takes an angle critical of a Sandia policy, practice. . . ." "Make an index at end of year of major articles and the date they can be found."

Lab News wins Gold Cumbre award; 5 Bronze awards also given Sandia

The *Lab News* has received a first-place Gold Cumbre Award in the annual awards program of the New Mexico chapter of the Public Relations Society of America. The award was for the category internal newsletter-government.

Sandia Daily News, *Sandia Technology*, the Sandia Annual Report, the one-time "Tax Credit Newsletter" (explaining the Laboratory Partnership with Small Business Tax Credit Act), and Sandia's Thunderbird Awards program won Bronze awards in their various categories.

The awards were given at the PRSA New Mexico Chapter annual Cumbre Awards banquet June 1. Cumbre Awards honor "outstanding public relations and communications achievements of New Mexico practitioners." All the publications/programs are carried out within Public Relations and Communications Center 12600.

Feedback

Travel office couldn't agree more: Fee-per-transaction for travel arrangements is bad news for everyone

Q: A recent Sandia Daily News had this item: *"Travel news: Effective April 16 the new discounts negotiated with the five preferred Lockheed Martin airlines went into effect. American Airline's discount went from 25% to 35%, Delta's from 25% to 32%, United's from 29% to 39%, Northwest's from 24% to 32%, and US Airways' from 24% to 35%. These discounts are available only for those tickets booked through SatoTravel. The increase in discounts will offset the transaction fees that Sato is charging for each ticket they book. Fees are \$49 for a call to a Sato agent, \$41 for using ResByWeb to book your ticket, and \$21 for booking an airline ticket through the on-line booking system that will be available in May. Transaction fees will be charged to the traveler's Corporate Credit Card starting in May and will be stripped from the card and paid from overhead for FY01."*

I thought we were receiving some sort of financial benefit (like cash back) as a corporation for using American Express. Now we're getting charged on a per-ticket basis? And, \$49 for the "privilege" of sitting on hold for 20 minutes at a crack, waiting for SATO to answer the phone? \$21 for having them do nothing for my ticket except run a website? It sounds like Sandia is really getting ripped off here. And, like everything else, when this FY ends, the rip-off will undoubtedly be passed on to the line organizations — without a corresponding decrease in our overhead rates. This is nonsense.

A: The Travel and Treasury Services Department completely agrees with your observations. The entire travel industry has experienced unprecedented change in the wake of rapidly developing Internet booking capabilities, electronic ticketing, generally decreasing corporate travel budgets, decreasing airline commissions, and increased competition for travel dollars. These forces, combined with others, have indeed shifted all corporate America from positions of

Feedback basics

Sandians are encouraged to submit questions or suggestions about Sandia through the Feedback system for responses by managers or other appropriate employees.

You will receive a personal response if you provide your name and address with your Feedback question or response.

If you wish to remain anonymous, simply indicate that you do not want your name associated with your question/ suggestion when you send it to us, and the Feedback coordinator will honor that request. When the response is returned to us, we will return it to you, at your home address if you desire.

Feedback questions/comments may be submitted via the internal web Feedback page at <http://www-irn.sandia.gov/corpdata/feedback/fbindex.html>, by mail to MS 0165, or by e-mail to jacarp@sandia.gov. For more information about how the system works, call Feedback coordinator Janet Carpenter (12640) at 844-7841.

revenue-sharing, through cost-sharing, to transaction-fee-based travel services in a period of less than three years. We are working hard to mitigate the impact of these changes on Sandia's travelers and travel budgets.

The recently negotiated airline discounts you cited are expected to reduce the cost of our travel services in FY01 by approximately \$200,000 from FY00 levels. In addition, Southwest Airlines is assisting in Sandia's transition to direct Internet bookings via its SWABiz site, which when fully implemented could absorb up to 50 percent of

our ticket volume and 30 percent of our travel dollars. This move alone will cut travel services transaction fees by approximately half. The SWABiz site is also being augmented to capture management reporting details and to provide a link to Avis, increasing auto rental efficiency. Representatives from Southwest Airlines will be visiting in June to participate in two infosections, wherein use of the SWABiz site and other travel topics will be addressed. Additional details are available on the Travel home page at <http://www-irn.sandia.gov/travel/travelhp.htm>, see "News - Booking Reservations on the Internet," and at <http://www-irn.sandia.gov/pubs/travel/Pages/Publication.2001.05.07.htm#Info>.

— Bonnie Apodaca (10500)

See cell phone rule, other rules being broken? You can help

Q: Sandia states that private cell phones are "not" to be taken into the tech area. I have seen numerous people leave the tech area at night, take their cell phones out of their pockets/purses/briefcases the moment they exit the tech area, and make phone calls. I am sure I am not the only one who has observed this. To be fair, some of the calls are probably business calls made on Sandia cell phones. I have seen one other Sandia rule broken repeatedly because of lack of enforcement. All I can conclude is that Sandia makes rules but doesn't really care if anyone follows them. So, why make rules in the first place?

A: Because it is everyone's responsibility to ensure security at Sandia, it is appropriate for you to question any suspicious activity that you observe. In the instance you cited, you should take one of the following actions to help ensure that security rules are properly followed:

- Ask the person if they are familiar with Sandia's cell phone policy. Tell them that you know they just exited the limited area and are concerned that a security policy may have been violated if the cell phone does not belong to Sandia. Request their permission to see if there is a blue "government property" sticker on their phone. If it is a Sandia-owned phone, then thank them for doing the right thing and waiting to turn it on outside the fence. If the phone is not a Sandia phone (with a government sticker), you should suggest that the individual self-report the incident to the 24-hour Security Incident Reporting Pager at 540-2382. It is important that the incident be reported and investigated.

- If you don't feel comfortable approaching the individual with the cell phone, please contact the Security Incident Reporting Pager at 540-2382 and provide the name of the person (if you know it) and a description of the person and their vehicle. The Security Incident Management Office will determine whether or not it is a Sandia phone and whether a violation has occurred.

The Pro Force does perform periodic random "spot" checks to verify compliance with both Sandia and DOE requirements. However, effective security at Sandia is everyone's responsibility and requires the continued awareness and support of every single person at Sandia. Sandia security requirements regarding cell phones were developed to meet DOE requirements and are necessary for Sandia to handle and protect classified government information. During the summer, Sandia will "roll out" Integrated Safeguards and Security Management (ISSM), which will re-enforce the need for each person to share in this responsibility by both following Sandia security requirements and promptly reporting suspicious activities when observed.

— Al West (7100)

It's okay for Sandians to work with LMC on non-competitive contract extension/renewal

Q: With Lockheed Martin gearing up for its contract renewal process, I notice that a number of Sandia employees are involved in helping the corporation gather information and do other preparation work related to that bid renewal. I'm not talking here about the Lockheed Martin employees who were sent by the corporation to Sandia and could be sent somewhere else at any time at the company's whim. I'm talking about real Sandians at every level from the very highest on down who are actively involved in helping Lockheed Martin in the bid renewal process. I don't understand the propriety of this. Why should a Sandia employee, who is paid by the federal government regardless of what the mandated business cards say, help a private company in the pursuit of its profit-making enterprise? And why should a private company have a special leg-up in the bid process by being able to essentially require Sandians help them in that process? Consider: Lockheed Martin just conducted a major employee survey here with the specific aim of gathering information that it hopes will be useful in its bid process. Now, if that's okay for Lockheed Martin, why shouldn't a Battelle, a UC, or a UNM-UT consortium be able to come in and designate a certain number of Sandia employees to help them conduct employee surveys ad infinitum so they can put together a bid strategy. This use of Sandia employees in an enterprise that serves not the public interest but only Lockheed Martin's interest seems a conflict of interest to me. Am I wrong? Please enlighten me.

A: At the present time we are engaged in activities that are directly related to the existing Sandia contract and to decisions that will be made when the contract term expires in 2003. Our activities are explicitly focused on the non-competitive extension or renewal of the existing contract that are allowable and entirely proper under our existing contract with the Department

of Energy. It is important to recognize that violations of the terms and conditions prescribed in the contract relative to allowable costs would have severe consequences for the laboratory and potentially for our corporate parent, Lockheed Martin. As such we regularly engage our legal and contract staff and our ethics office to ensure we are abiding by all contractual and legal requirements and any ethics considerations as they relate to your question.

There is a significant distinction made for Sandians between a non-competitive extension/renewal activity to continue the current LMC prime contract beyond 2003, and activities which would be part of, or preparatory to, the competitive award of a follow-on (2003 and beyond) prime contract with LMC or another bidder.

Sandians may work alone or in collaboration with LMC to encourage DOE to extend or renew the current prime contract. This is allowable under our existing contract, provided it does not involve, for example, impermissible lobbying. Similarly allowable is work to position Sandia for such a renewal or extension, or to propose or negotiate the renewal/extension. Sandia work which would be performed at the direction of DOE to prepare or collect information to then be used by DOE in connection with its own preparation of a competitive Request For Proposal also results in allowable costs (no such direction has been received from DOE). Sandians are explicitly restricted from formally or informally working on a competitive award for LMC or any other bidder, on laboratory time or using laboratory facilities. No such impermissible activity is going on at Sandia.

— Les Shephard, 12100
Director, Executive Staff Support

Sandia Cplant™ supercomputer program released to public

Software helps desktop computers work together fast

A computer program that enables a collection of off-the-shelf desktop computers to rank among the world's fastest supercomputers has been released to the public by Sandia.

The program, called Cplant™ system software, dramatically extends the capability of researchers to modularly assemble large blocks of off-the-shelf computer components.

The rationale behind this open-source release is to allow researchers free access to the body of research and development that created the most scalable, Linux-based, off-the-shelf computer available, says Neil Pundit, Manager of Scalable Computing Systems Dept 9223.

The hope, says Neil, is that modifications and enhancements made by researchers elsewhere will enrich the system software, and that these improvements will be communicated back to Sandia.

While other cluster software may run faster, none exceeds the Cplant system software's ability to help off-the-shelf processors work together in large numbers.

Sandia's Cplant hardware comprises the largest known sets of Linux clusters for parallel computing. These sets are made up of Compaq Alpha processors and Myrinet interconnects. The largest cluster within Cplant consists of more



than 1,500 Alpha nodes.

Cplant system software is modeled after the system software that Sandia developed for the highly successful ASCI Red supercomputer built by Intel, installed at the Labs' Albuquerque site in 1997, and for several years generally agreed to be the world's fastest computer.

The software can be downloaded from the Cplant web site at www.cs.sandia.gov/cplant.

DOE and the National Nuclear Security Administration (NNSA) funded this research under the Accelerated Strategic Computing Initiative (ASCI). DOE/NNSA expects mutual benefit from this release for the high-performance computing community and the DOE/NNSA ASCI community.

This first open source release of the Cplant system software is named Release 1.0 and totals about 43 MB. Requesters must agree to software licensing terms before downloading. — *Neal Singer*

Weapon Intern video wins major award

A Sandia video titled "The Weapon Intern Program — Training the Next Generation of Weaponers" won Award of Distinction (silver) honors in the national 2001 Videographer Awards competition.

It was produced for John Hogan (2907) and Andy Rogulich (2911) by Myra Edaburn of Video Services Dept. 12610.

"The Award of Distinction is given to projects that clearly exceed industry standards in this competition that helps set the standards for the video production industry," says Myra. "This year there were 2,413 entries from the United States

and several foreign countries."

The Weapon Intern program, which began in 1998, gives selected participants an extensive review of current and past weapon design and technology by mentorship, training, lectures, and site visits. Its purpose is to give a more thorough understanding to the next generation of weaponers on all aspects of this mission for Sandia.

The video can be viewed from the Weapon Intern web site at <http://www-irn.sandia.gov/organization/div2000/ctr2900/grp2910/kmp/intern/index.htm>.

Coronado Club

June 15 — Father's Day dinner; steaks and cigars. 6:30 p.m. Reservations: 265-6791.

June 14, 21, 28 — Bingo: 6 p.m., early bird; 6:15 p.m., regular game. Buffet line and card sales begin at 5 p.m.

June 22 — Kids bingo. Buffet line at 5 p.m. Card sales at 5:30 p.m.

Splash down — Every Thursday and Friday evening all summer long, the pool's open til 9 p.m. Buffet line, too.

Science education excellence coalition meets Saturday

Concerned about scientific illiteracy and science education? Want voters to understand issues of science and technology? Want to help with professional development for area science teachers?

Then you might want to come to the annual meeting of the Coalition for Excellence in Science and Mathematics Education (CESE). It's Saturday, June 16, at 2:30 p.m. at the First Unitarian Church, 3701 Carlisle NE. It's open to all.

CESE is a locally started nonprofit organization composed of interested citizens throughout the state and nation including scientists, engineers, educators, public officials, university faculty, and parents. A number of Sandians are involved. It is nonpartisan and nonsectarian. Its mission is to help counteract the high level of science and math illiteracy in the US.

For further information, visit CESE's web site at www.cesame-nm.org or call Jonathan Weiss (1739) at 845-8213.

Sympathy

To Will Keener (6135) on the death of his mother, Charlene Keener, in Kansas City, Mo., on May 21.

To Sam Varnado (6500) on the death of his daughter, Lisa Varnado Olson, in northern Africa, on May 31.

To Jim Schwank (1762) on the death of his mother, Arlene Schwank, in Albuquerque, on June 2.

To Sylvia Lopez (12335) on the death of her husband, Aurelio M. Lopez, in Albuquerque, on June 4.

Labs recognizes local businesses for superior Just-In-Time service

Sandia has presented awards to several Albuquerque businesses for superior service to Sandia as part of its Just-In-Time (JIT) procurement systems. Companies were recognized in the areas of cost savings, partnership, technical support, innovation, and quality.

Graybar Electric Co., Inc. earned an award for cost savings "for using supply chain strategies to achieve significant cost savings on Sandia's behalf."

Arch Wireless was presented the partnership award "for teaming with Sandia to evaluate and streamline internal processes associated with its contract."

Holman's, Inc. received the technical support award "for its high level of professionalism and continuously going the extra mile to ensure that its customers' concerns are met."

Fastsigns earned the quality award "for its high level of customer service by consistently accommodating the unique needs of Sandia customers."

Abba Technologies, Inc. received the innovation award "for taking on the task of administering Sandia's SmartNet Services for Cisco products."

Electronic Parts Co. was cited as Just-In-Time supplier of the year for excellence in all five areas.

Sandia established its Just-In-Time procurement system in 1985, saving some \$10 million annually through reduced administrative costs. Out of the current 59 JIT contracts, 90 percent were placed with local businesses.

Favorite Old Photo

Jonnie Montoya at Pearl Harbor, 1941



PEARL HARBOR, HAWAII, FALL 1941 — Army Cpl. Jonnie Montoya of Monticello, N.M., was stationed on Ford Island in the center of Pearl Harbor while training to be an Army medic in the late summer of 1941. These photos of the air raid warning bells and the barracks were taken that fall and reviewed by Army censors. Pictures of the ships and the base were not to be taken. Jonnie was wounded in the attack on December 7 and carried a piece of shrapnel in his leg from that day. He went to work in field test at Los Alamos Scientific Laboratory at the completion of the war. His son is *Lab News* photographer Randy Montoya (12640).