Sandia, Intel dedicate world's fastest supercomputer

Teraflops 9,072-processor supercomputer now fully up and running at Sandia

By Chris Miller

The full complement of 84 cabinets that compose the teraflops high-performance ultracomputer — the fastest computer in the world — is now operating at Sandia.

The Intel massively parallel computer was developed under direction of DOE for the Accelerated Strategic Computing Initiative (ASCI), a 10-year program designed to develop the higher-resolution, three-dimensional physics modeling needed to evaluate the aging nuclear stockpile without actual testing.

The teraflops (which stands for one trillion floating point operations per second), is made up of 76 actual computer cabinets with 9,072 Pentium Pro processors and has nearly 600 billion bytes of memory. The remaining eight cabinets are called disconnect cabinets and separate the machine so that classified and unclassified calculations can be run at the same time.

The entire computer consists of four rows with 21 cabinets in each row. It covers about 1,600 square feet in Bldg. 880, enough to fill a moderate-sized home.

The computer is capable of up to 1.8 teraflops, or floating point operations per second. It would take someone operating a hand-held calculator about 57,000 years to calculate a problem the teraflops computer could compute in one second.

This is the same computer that achieved the one-trillion math-operations per second computing milestone last December in a test demonstration at Intel's Beaverton, Ore., plant (Lab News, June 26, 1997). (Continued on page 4)

SUPERCONNECTIONS — Michael Hannah (4418) inspect cables in one of the eight disconnect cabinets that are part of the new Intel teraflops supercomputer in Bldg. 880. (Photo by Randy Montoya) (Continued on page 4)

Teraflops ribbon-cutting, media event

“Teraflops 9,072-processor supercomputer marked by ribbon-cutting, media event

By Ken Frazier

“This is a momentous occasion.”

“It’s the biggest day in the history of supercomputing.”

The official inauguration of the teraflops supercomputer at Sandia June 11 was a celebration of an achievement that not long ago had been called impossible. Now it’s seen not only as a strong contributor to national security but as a stepping stone to still more supercomputing power (hundreds of teraflops) in the near future.

The four stately rows of high-standing cabinets in an efficiently refrigerated computer room in the east side of Bldg. 880 have a scale that seems appropriate to their task but a visual ordinarieness that belies their significance. With broadcast and print media in attendance and accompanied by the roar of powerful air conditioning equipment, officials representing the three main institutions behind the achievement — DOE, Sandia, and Intel Corporation — snipped a blue ribbon and talked about past and future.

Gil Weigand, Deputy Assistant Secretary for Defense Programs at DOE and who offered the “momentous occasion” comment, championed teraflops (trillions of operations per second) computing and created DOE’s Accelerated Strategic Computing Initiative (ASCI). Himself a former Sandia computer scientist and manager at a time when the Labs was pioneering massively parallel computing in the face of vociferous outside opposition, Weigand said the teraflops initiative goes back to 1989. He praised the huge number of people who brought (Continued on page 4)

Sandia’s ‘Revolution in Engineering’ goes to D.C. June 26

Sandia is going to Washington — big time! Sandia engineers will be in Washington, Thursday, June 26, to demonstrate how high-performance computing and science is providing a tool to engineer products — from weapons products to consumer products faster, better, and cheaper.

Titled “Leading the Revolution in Engineering,” the daylong event will be held for media, industry, academia, representatives of Congress and their staffs, and other government agencies.

The revolution is defined as using the power of high-performance computing (such as that provided by the teraflops "ultracomputer") and science-based algorithms to move engineering from a lengthy test-based design, prototype, test, and (Continued on page 5)

Sandia wins eight R&D 100 awards

As we went to press, the Lab News learned that Sandia has won eight R&D 100 awards, either individually or jointly.

The winners were: high-performance storage system, Aztec software library, nonvolatile field effect transistor memory, Fibermetrics F30 optical probe, GEOS/SEIS minihole seismic blast initiation system, biological microcavity laser, CLIP-C closed-loop induction process controller, and PQ 2000 power quality system.

More on these in our next issue.

Robinson promotes Internet as tool to foster Russian defense conversion

Concept emerged during trip to Russia with Sen. Jeff Bingaman

By Bill Murphy

The Internet, with its unparalleled capability to facilitate interactive global communication and its potential for fostering new modes of commerce, may be the next tool of choice for Russian weapons labs as they advance their defense conversion agenda.

That is one of the outcomes of a recent visit to Russia’s nuclear weapons research laboratories and other locations by US Sen. Jeff Bingaman and Sandia Labs President C. Paul Robinson. Also part of the delegation were International Security Programs Center 5300 Director Tom Sellers, Sandia Russian expert Patricia Newman (5331), several Senate staff members, DOE official Mike McClary, and Los Alamos scientist Mark Mullen.

The Russian trip came about, Paul said in an interview with the Lab News, at the request of Sen. Bingaman, who, with the retirement of Sen. Sam Nunn, is picking up significant new Armed Forces power (Continued on page 6)

Radiation detector work earns Sandia’s first Discover award

Agreement transfers integrated micromachines to industry

Labs’ PV systems power Salinas national monument facilities

(Continued on page 4)
**This & That**

**Nap time at Sandia?** — I saw on TV several weeks ago that some work environment experts are now touting the value of short office naps, saying they refresh you and improve your productivity. I'm thinking about submitting this as a possible topic for Paul Robinson's next round of employee dialogue sessions (see page 6) to see what he thinks about the possibilities at Sandia. Maybe Paul and the VPs could sanction employee naps at their next SQCL meeting. (Several VPs reportedly nap during those meetings, but I hesitate to publish names.) I suggest 10-11 each morning and 2-3:30 each afternoon.

**Good news for "open network" employees — Sandians who don't have access to our Internal Web but who are hooked to the EON (External Open Network) or CON (California Open Network) can now access employee information. See the new Employee Locator link on your open network home pages; it gives you employee phone numbers, fax numbers, e-mail addresses, department numbers, titles, and more.**

Why we limit employee information on the External Web — As Sandia's External Webmaster, I hear from Sandians and people elsewhere asking why we don't offer more information about employees and organizations. All we provide from our regular External Web (EW) employee locator site (http://www.sandia.gov/cgi-bin/emplloc) is an employee's phone number, e-mail address, fax number, and mail stop (provided only after someone types in your name). So, if someone outside the Labs knows your name and needs to contact you, they can find out how by using the employee locator, but they can't find out any more about you from the EW. That's really what we intend, for security reasons.

Some Sandians working from home computers or elsewhere say they sometimes need to find employees' organizations, building and room numbers, and more via the External Web. For reasons stated above, we can't do that, but it is possible for Sandians who have a genuine need to access this type of information to connect to the Internal Web remotely; if you believe you have such a need, contact the Corporate Computing Help Desk at 845-2243.

**A golfing incident?** — If you like strange glances and goofy questions, come to work with a black eye or cut on your face. I came in on a recent Monday with a one-inch-or-so cut and two stitches on my forehead. After several explanations that no one seemed to believe, I started telling everyone I was injured in a “golfing incident.” I said I told my wife (Renae, 6001) to get herself in the kitchen and fix my dinner, after which she promptly hit me with her nine iron. Some people seemed to believe that, but I admit now that I stretched the truth a bit. She only threw a golf ball at me. I must work on my quickness!

— Larry Perrine (845-8511, MS 0167, lperrine@sandia.gov)

Lynn Jones returns as Laboratory Services VP

Lynn Jones, who has been on leave of absence from her position as VP of Laboratory Services Div. 7000 since last fall, will return to that position on July 1.

During her leave, Lynn headed the Lockheed Martin team formed to respond to a DOE Request for Proposal to rebid the contract for the environmental management program at the three DOE facilities in Oak Ridge and at the Los Alamos and Savannah River sites. Lockheed Martin, however, recently elected not to rebid that contract.

During Lynn's absence from Sandia, J.D. Martin served as acting vice president of Div. 7000. He retired June 5.

**Congratulations**

To Amanda and Alan (1275) Righer, a daughter, Nicole Hae-Jee, born Sept. 27, 1996, arrived Feb. 3.

To Mary Sheldon (14303) and Louis Gonzales, a son, Jaylen Luis Gonzales, April 8.

To Lauren Dyer and Dave (5511) Swahlan, a daughter, Amy Elizabeth, May 2.

To Angie and Craig (6614) Parr, a son, Alexander Mitchell, May 2.

To Shurette Riley (4423) and Jason Osheroff (4423), married in Albuquerque, May 25.

**History book copies expected by July 21**

Barring any unforeseen problems, the new general history of Sandia, titled *Sandia National Laboratories: A History of Exceptional Service in the National Interest*, is due from the printer on July 21. Deliveries will be made soon after that to those who ordered copies. The people in Sandia's History Program thank you for your patience. If you have questions, please contact Carl Mora at 844-8011, Rebecca Ulrich at 844-1483, or Myra O'Canna at 844-6315.

—Bill Murphy

**New 14000 Deputy VP to serve as neutron generator production manager**

Lenny Martinez, Director of Product Line Realization Center 14400, has been named Deputy Vice President of Division 14000, where he will serve as production manager. Division 14000 has primary responsibility for manufacturing neutron generators, a role it assumed as part of a DOE consolidation process that closed the neutron generator production facility at Pinellas in Florida.

Lenny brings to his position 22 years of experience in a wide variety of manufacturing functions, including general and international management. Before coming to the Labs, Lenny was production manager at Digital Equipment Corporation's Albuquerquque plant and was General Manager of Digital de Mexico.

Although the deputy VP title is not widely used at Sandia, it is not unprecedented, either. When former Finance VP Gary Riser first came to Sandia, he served as deputy to VP Paul Stanford.

**More deputies?**

Sandia President C. Paul Robinson says the Labs may see more deputy VPs in the years ahead.

"I've always been a believer in deputies," he says. "Particularly in an area of transition, it's a good way to do business. We hired Lenny originally with the intent that he would manage Sandia's neutron generator production. What happened, though, is that there was a longer run-up of production than we had anticipated."

"At this point, we are well into that transition to full production. We felt, and Gary Beeler [Division 14000 VP] felt, it was time for Lenny to take on the overview look instead of just carrying out his director's responsibilities that he was doing. We took this step to get him ready to perform the job as our production manager, the job we always had in mind for him."

Lenny's manufacturing experience covers a wide variety of functions, including production operations, materials management, finance, and technology management — including quality and general plant management.

In his career achievements include developing and expanding a manufacturing system's output tenfold while reducing nonmaterial spending. This manufacturing system achieved world-class cost-competitiveness on the price-volume curve for like products.

As General Manager of Digital de Mexico, Lenny oversaw commercial sales growth of 30 percent and manufacturing export growth of 136 percent.

**A production background**

Lenny's educational background includes degrees at the DeVry Institute of Technology and the University of Phoenix. He completed the Executive Management Education program through the Institut Privé d' Enseignement Superieur (INSEAD) and recently earned an MS in management from Stanford University.

"Particularly, it's been very good having Lenny as we move in production folks from Pinellas," she says. "Lenny has really helped us make sure we don't create a two-caste system here, with R&D on the one hand and production on the other."

"The effect he's having on morale out there [in Division 14000] is great, I'm delighted to have him step up to the wider job."
Ralph James’ detector work wins 1997 Discover Magazine Award for Technological Innovation

Materials scientist receives Sandia’s first prestigious ‘Academy Award of Technology’

By Nancy Garcia

Already recognized as an authority with one of the longest lists of scientific citations in his field, Ralph James of Materials Processing Dept. 8230 will soon receive attention from some 7 million members of the general public who are expected to read about his 1997 Discover Magazine Award for Technological Innovation in the July issue of the magazine.

James is the first Sandian to win recognition in this event, now in its eighth year. One of eight winners, he was recognized for development of radiation detectors that can distinguish between different isotopes and operate without cumbersome cooling systems at a fraction the size of current devices. Ralph is a solid-state physicist who has researched this area over the last decade. He leads a team that has pioneered the understanding of crystals of a novel semiconductor, cadmium zinc telluride, that creates an electrical signal that is a signature for gamma rays.

His award was presented in a gala ceremony the night of May 31 at Disney World’s Epcot Center by Miss America Tara Holland and retired astronaut Story Musgrave, who is credited with fixing the Hubble Space Telescope. Earlier that evening, Secretary of Energy Federico Peña met with Ralph and six other finalists from DOE laboratories. Ralph was accompanied by research team member Richard Olsen (8230) and Integrated Manufacturing Systems Center 8200 Director Al West representing California Laboratory 8000 VP Tom Hunter.

Before and after the ceremony, Richard and Ralph helped staff a two-week display at Epcot on the detector technology. The display has also been staffed by Elene Cross, Jim Lund, and Bruce Breuett of Dept. 8230 and Tony Sorensen of Health and Safety Dept. 8421. Sandia’s work will be featured until next year, along with other winners at an Exhibits hall at the science and technology park.

Among DOE labs, Oak Ridge and Pacific Northwest had also winning entries this year. The 33 finalists were drawn from more than 5,000 nominations that were either invited by the magazine editors (as was Ralph’s), sent in by various institutions, or submitted by readers.

The ceremony honored eight individuals altogether in seven categories. An independent panel of judges selected Ralph’s work with cadmium zinc telluride radiation detectors from among five finalists in the “sight” category. In the “environment” category, retired Sandian Thomas Brunelle was a finalist for his 25-year advocacy on behalf of the molten salt technology used to store heat in the Solar Two power plant operated by Southern California Edison. The Solar Two project is also profiled in the July issue of Discover.

Winners received advance copies of the magazine, which was due at newsstands June 13. Although the award singles out individuals for recognition, all the technologies involved represent team efforts. In Ralph’s case, progress has accelerated in the last three years, drawing on efforts of many Sandians.

The scientific community has been waiting for years for this technology to work, Ralph said after the event. “It’s really an enabling technology that’s going to allow a lot of new things to be accomplished.”

In addition to being able to distinguish special nuclear material and address the threat of nuclear smuggling, arrays of these sensors can image tumors that have been labeled with a radioactive tracer for more precise surgical treatment.

Ralph said a medical imaging device being evaluated by the Food and Drug Administration has been produced by Digirad Inc. of San Diego. It would permit surgeons to see cancerous tumors about 100 times more distinctly. With this ability, he said, surgeons could verify removal of invasive fingers and boundaries of solid tumors, while sparing as much healthy surrounding tissue as possible.

The threat of nuclear smuggling

Work is continuing on growing large, flawless crystals of cadmium zinc telluride to detect weak sources of nuclear radiation at distances. Medical imaging applications require crystals roughly 500 square millimeters or larger in area (about an inch square), while nuclear monitoring requires crystals of only 25 square millimeters.

The prestigious recognition, Ralph said, “affirms US concerns over finding technology to try to address the threat of nuclear smuggling.” Already, stored nuclear pits of dismantled weapons are being monitored with sensors placed directly on the storage drums. Any change detected by these devices, which can operate some five years without maintenance, would turn on other sensors and notify security staff. Use of these sensors to count radioactive decays is being shared with the former Soviet Union to increase global security, he said, although systems to identify specific isotopes may be restricted.

Other uses for the sensors include environmental monitoring and cleanup, such as the potential to track and identify stored wastes at the Hanford facility. These crystals may also be applied to the identification of nonradioactive materials. This works by combining a semiconductor X-ray sensor with a small, natural source of gamma radiation to excite molecules of an unknown material and identify it through X-ray fluorescence. This way, it is possible to identify and quantify 80 different elements — almost the whole periodic table. Ralph believes that current materials-identification sensors could be made more affordable by using cadmium zinc telluride. Ralph’s work has led to several patent applications. They are motivated by a desire to protect Sandia’s ability to continue researching this field.

“Entrepreneurs see a need and try to fill it,” Ralph said. “I think as an innovator, I’m more interested in creating a need, . . . benefitting society is an elemental component of doing research, for me.”

Recent Retirees

Larry Borello 2265
Jan Collins 8411
Jackie Garrett 8812
Jack Pons 8240

Supervisory appointment

RALPH CLARK to manager of Engineering for Instrumentation Systems Dept. 8411.

Ralph joined Sandia at the California site in July 1966 as an MTS electrical engineer in the Test Department. Next he moved to the Exploratory Systems Department, where he was responsible for electrical system design on the Noisetip Recovery Vehicle program.

After that he was with the B87 project group working on electrical components for the Modern Strategic Bomb. Then for 10 years he was part of the Telemetry and Instrumentation group as lead telemetry design engineer, mostly involving flight testing of the W87 warhead for the Peacekeeper missile. For the past five years he has been lead electrical engineer with the W87 project group.

Ralph’s education includes a bachelor’s degree in electrical engineering from Oregon State and then a master’s in the same field from UC Berkeley, earned while he was working at Sandia. He was named a DMTS in 1995.

He and his wife, Ruth, are active in the First Presbyterian Church of Livermore. He enjoys camping, boating, tennis, and woodworking. They have two sons, one married, the other a senior in college.

Congratulations

To Kim (2262) and Tim (8713) Sheppard, twins — a daughter, Kayla Hope, March 23, and a son, Ryan Spencer, March 24.

To Michelle and Danny (8812) Berncat, a son, Devin Connilee, Feb. 27.

To Melanie (8100) and Glenn Arace, a daughter, Alyssa, March 29.
Teraflops

(Continued from page 1)

Dec. 20, 1996. That demonstration, however, was achieved using 7,264 Pentium Pro processors on 57 cabinets, or three-fourths of the full machine.

Computational stockpile testing

"Teraflops computing and ASCI provide an extraordinary opportunity for the three weapons laboratories in DOE to work together on behalf of the science-based stockpile stewardship program," says Sandia President and Laboratory Director C. Paul Robinson. "It is a very important step in shifting from a test-centered program to a computational-centered program."

The teraflops computer ushered in a new era in which high-fidelity 3-D simulations will enable scientists to reach the eventual goal of designing a safe, secure, and reliable nuclear deterrent without underground testing. Sandia scientists and engineers already have been using the computer to calculate stockpile-related problems.

"The outstanding applications software development skills of Sandia and our DOE partners complement Intel Corporation's superb computer hardware capabilities to create a dynamic combination that promises to revolutionize computational science in many disciplines," says Bill Camp, Director of Computational Sciences, Computer Sciences, and Mathematics Center 9200.

The $55 million teraflops computer and its more powerful successors under the ASCI program are needed to simulate the complex 3-D physics involved in nuclear-weapon performance and to accurately predict the degradation of nuclear weapons components as they age in the stockpile. Powerful multi-teraflops computers also will permit analysts to quickly run full-system 3-D simulations of complex accident environments, such as an airplane crash followed by a fuel fire.

The fastest computer prior to the completion of the teraflops was a special-purpose Japanese Hitachi computer that reached the 368 gigaflops (billion floating point operations per second) mark, a record that stood until last December's achievement of 1.06 teraflops. Sandia scientists have since achieved 1.28 teraflops and just recently 1.338 teraflops on the new ultracompact and expect that to go higher in the near future.

The ability to set an almost impossible-seeming goal and then to achieve it is a kind of "demonstration-based deterrence" that serves the nation's security and future well, Weigand said. "It is a demonstration of your will and your ability."

"This is currently the largest supercomputer ever built and in operation," said Bill Camp, Director of Computational Sciences, Computer Sciences, and Mathematics Center 9200. "Up to this point, Bill said, "It's the biggest day in the history of supercomputing." He expects more to come.

"The computer's maximum theoretical output is 1 trillion operations per second. Bill said it has achieved 1.338 teraflops on test problems. But he said it has already been used to carry out a number of real applications in which it operated generally at 300 to 500 billion operations per second over periods of many hours. He and Weigand emphasized its crucial importance in working on what

Media event

(Continued from page 1)

to realize a "new type of computing" and proved everyone wrong who said a trillion operations per second would never be achieved.

When the trillion-operations-per-second goal was set in 1989, Weigand said, that power was a thousand times beyond the then-current capabilities.

"It was an eight-year program. A lot of people thought we were out of our minds and they were right," Weigand said. "It is the supercomputer's day and we are using it."

"This is not my dream," he said. "That's theirs. They achieved goals greater than could have been expected just a few years ago." He said they proved the naysayers wrong. They made it work, they created the software; they set the records. "It is an enormous achievement.

Three problems already attacked by teraflops computer

Sandia scientists and engineers have achieved the following calculations so far on one-fourth to three-fourths of the full teraflops supercomputer:

- 100 million-cell calculation models performance of ballistic weapon system: Sandia scientists Martin Kipp (9232) has completed an unprecedented 100 million-cell CTH code calculation that modeled the performance of a ballistic weapon system employed in the contact fuzing mode. Never before had the computing capability (memory size) been available to model, in 3-D and with greatly enhanced resolution, the entire region of interest in the weapon for this critical accident. These recent calculations with the teraflops machine have demonstrated that Sandia scientists are now beginning to be able to address issues involved in certification of fuze performance in a single, full-system simulation of the event. This is an important aspect of DOE's Accelerated Strategic Computing Initiative (ASCI), designed to provide the higher-resolution, three-dimensional physics modeling needed to evaluate the aging nuclear weapons stockpile without actual testing.

- The problem to simulate the several "time races" involved in the fuzing and firing of the weapon, evaluating the vulnerability of critical fuzing components to impact and primary explosive detonation shocks. Certain components, such as neutron generators, must be isolated from shock damage long enough after impact (fractions of a millisecond) to perform their respective function in the firing sequence before being destroyed by the impending nuclear blast. The safety margin for component survival will depend strongly on such things as the impact velocity, angle, and target materials. Numerical simulations, tied to limited test data, can provide detailed performance evaluations for system impact conditions that cannot be tested.

- Computer model of comet striking the ocean shows teraflops capabilities to DOE: At the request of DOE for the dual purpose of generating unique data for visualization techniques and to assist in installation testing of the new teraflops computer, Sandia scientist David Crawford (9232) performed a computational simulation involving a 100-gigabyte code called TPH shock physics hydrocode. The calculation, consisting of 54 million zones, ran for 48 hours on 1,500 processors of the teraflops.

The problem modeled a one-kilometer comet, weighing about 1 billion tons, traveling 60 kilometers a second, and striking the Earth's atmosphere at a 45 degree angle. The calculation showed that the threat to the ocean would be vaporized by the tremendous energy of the impact and ejected into suborbital ballistic trajectories that reenter worldwide. The result would be devastating tidal waves and a cloud of water and debris enveloping the globe that would affect the Earth's climate (Lab News, April 25, 1997).

Taking in the T-FLOPS — Ken Lord, senior on-site analyst from Intel Corp., pauses between two rows of cabinets that are part of the new Intel teraflops supercomputer in Bldg. 880. (Photo by Randy Montoya)

Weigand called "tough and challenging national security problems" in a climate in which weapons in the stockpile be assured to be safe and reliable but no further nuclear tests are authorized. High-performance supercomputing simulations are the best alternative.

"It is being used to carry out re-design of major components in nuclear systems," Bill said.

"It's a tremendously momentous occasion," said Dick Ammerman, program manager for Intel's Scalable Systems Division in Beaverton, Ore. Intel has announced that the teraflops machine will be its last supercomputer, having decided to focus on its mainstream computer-chip businesses, but Weigand assured everyone that future DOE-sponsored supercomputers for a long time to come are likely to have "Intel inside."

Can-crushing problem shows power of 'measured scalability': A large group of Sandia scientists including Steve Attaway (9118), David Gardner (9221), and Bruce Hendrickson (9226) recently developed and demonstrated software that is the first to enable large finite-element models to be run efficiently on hundreds or thousands of processors in distributed-memory parallel computers such as the teraflops. Called the Parallel Material Contact Software, it enables scientists and engineers to perform computer analyses of larger, more complex systems than ever before, faster than ever before, and with greater accuracy. The ability to distribute a problem to great numbers of processors on a parallel computer is called scalability.

The software has been used to simulate the crushing of a thin-walled cylinder by an inclined block. As the can crumple, the buckling and consequent material contacts are computed dynamically. Running on 312 processors, with each processor handling 1,875 hexahedral elements, scientists are simulating a model with almost one million elements.

The Parallel Material Contact Software is currently used at Sandia in the PRONTO3D, JASSD, and ALEGRA computation mechanics codes and is enabling scientists and engineers to conduct finite-element simulations of unprecedented resolution in such areas as nuclear stockpile stewardship problems, reservoir modeling, and structural dynamics problems.
The day when automobiles and other vehicles are made safer by tiny machines each no bigger than a thumbnail is approaching more rapidly than one might think. A nonexclusive agreement signed between Sandia and Analog Devices Inc. of Woburn, Mass., is expected to help stimulate production of a new generation of very small consumer and military devices, such as antitamper, antiskid, and active-vibration-control systems.

"Devices we envision represent a second silicon revolution," says Paul Sudip, 81, manager of the Laboratories' micromachine effort. "We're not simply adding more, smaller transistors to a chip. We are adding functions that sense and act."

**May be Sandia's largest partnership**

While the exact business terms of the agreement are proprietary, because of market size the nonexclusive license is anticipated to be the largest partnership of its kind ever signed by Sandia. It inaugurates a substantial multiyear business relationship between Sandia and Analog. The specific market for micromachine-based inertial sensors worldwide is estimated to be $3.8 billion, says Sudip.

"Traditionally, the focus of the microelectronics industry has been to continue to pack more transistors onto a chip, leading to more powerful computers," he says. "This agreement will break this trend by focusing on the development of chips with not only electronics but also small machines. These give chips the ability to sense where they are and what is going on around them."

The long-term license involves transfer of Sandia's intelligent micromachine technology to Analog Devices. Several published market studies project this industry to reach $8 billion to $12 billion by the year 2000, says Angelo Salamone (4211), who manages commercial business relationships for the Lab's microelectronics defense technology transferred to industry.

"The up-front money will help transfer technology from Sandia to Analog," he says. "Royalty payments will help pay for future research."

Funds from the Defense Advanced Projects Research Agency will aid in the cost of transferring the technology. "Ordinarily, DARPA funds industry to do high-risk, high-payoff projects," says Paul. "In this case, if the Air Force needs, say, an accelerometer, it'll be able to buy one from Analog."

"Analog uses micromachines to signal when a vehicle is undergoing sufficiently rapid and sustained deceleration for the airbag to deploy. The company is a pioneer in the development of commercial products based on micromachined devices. Researchers at the University of California at Berkeley's Sensor and Actuator Lab, credited with making some of the earliest known micromachines, also will be involved in designing new, smarter products. Because batches of silicon micromachines can be fabricated through manufacturing techniques already widely used to make integrated circuits, micromachines are far cheaper than the complicated multimetal constructions originally necessary to signal an airbag to inflate. Rather than being made individually, micromachines can be fabricated quickly and cheaply by the thousands. Moreover, the machines have so little weight, they are less likely to be damaged by sudden deceleration, because force is proportional to mass—which, in this case, is almost nonexistent. This license represents the latest of more than 180 commercial agreements successfully concluded to transfer Sandia's computational defense technology to private industry," says Angelo.

**Sandia to D.C.**

(Continued from page 1)

refine as a simulation-based process that creates virtual reality designs and tests through computer simulations, says Sudip.

"We will use the computer to simulate, refine, and optimize the performance of systems across their life cycle. Experiments will be used to validate and create these simulations," says Russ Skocypec (9000). "Actual tests of complete products will be minimized."

Demonstrations are planned in the areas of oil and gas exploration and production, crash-and-burn system response, manufacturing, and computing for insight—how computer modeling and simulation are helping us understand the role of high-performance computing in ensuring the safety, reliability, and security of the nation's nuclear stockpile. The demonstration will show how Sandia is using high-performance computing to make products more quickly, more uniformly, and with fewer defects. The presentation will also show how Sandia is using high-performance computing to create simulations of catastrophic events such as an aircraft crashing with a nuclear weapon aboard.

"Computing for Insight—Chuck Meyers (4523), David Crawford (9232), and Carl Diegert (9215) will discuss how sandia scientists are creating simulations from massive amounts of data, either computationally generated or measured, that allow them to see how an event unfolds, such as a one-kilometer comet crashing into the Atlantic Ocean (Lab News, April 25).

"Instead of waiting until the event happens, this calculation permits predictions. We are using high-performance computing to make predictions, then repeating the process to refine the predictions, thus getting better results. The day when automobiles and other vehicles are made safer by tiny machines each no bigger than a thumbnail is approaching more rapidly than one might think. A nonexclusive agreement signed between Sandia and Analog Devices Inc. of Woburn, Mass., is expected to help stimulate production of a new generation of very small consumer and military devices, such as anti-tamper, antiskid, and active-vibration-control systems. Devices we envision represent a second silicon revolution, says Paul Sudip, 81, manager of the Laboratories' micromachine effort. We're not simply adding more, smaller transistors to a chip. We are adding functions that sense and act.

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The long-term license involves transfer of Sandia's intelligent micromachine technology to Analog Devices. Several published market studies project this industry to reach $8 billion to $12 billion by the year 2000, says Angelo Salamone (4211), who manages commercial business relationships for the Lab's microelectronics defense technology transferred to industry. The up-front money will help transfer technology from Sandia to Analog, he says. Royalty payments will help pay for future research.

Funds from the Defense Advanced Projects Research Agency will aid in the cost of transferring the technology. Ordinarily, DARPA funds industry to do high-risk, high-payoff projects, says Paul. In this case, if the Air Force needs, say, an accelerometer, it'll be able to buy one from Analog.

Analog uses micromachines to signal when a vehicle is undergoing sufficiently rapid and sustained deceleration for the airbag to deploy. The company is a pioneer in the development of commercial products based on micromachined devices. Researchers at the University of California at Berkeley's Sensor and Actuator Lab, credited with making some of the earliest known micromachines, also will be involved in designing new, smarter products. Because batches of silicon micromachines can be fabricated through manufacturing techniques already widely used to make integrated circuits, micromachines are far cheaper than the complicated multimetal constructions originally necessary to signal an airbag to inflate. Rather than being made individually, micromachines can be fabricated quickly and cheaply by the thousands. Moreover, the machines have so little weight, they are less likely to be damaged by sudden deceleration, because force is proportional to mass—which, in this case, is almost nonexistent. This license represents the latest of more than 180 commercial agreements successfully concluded to transfer Sandia's computational defense technology to private industry, says Angelo.
Employees invited to suggest topics for July dialogue sessions

Sandia President Paul Robinson invites Sandians to suggest topics they would like to hear discussed at the next round of employee dialogue sessions July 28-31.

Suggested topics and questions can be e-mailed to Paul's assistant, Jane Elson, mjelson@sandia.gov, or mailed to her at MS 0101. Anonymous suggestions are welcome. If you prefer to submit suggestions anonymously via e-mail, send them to Larry Perrine (12640) at lperrine@sandia.gov; he will remove your name and then forward your suggestion(s) to the president's office.

Paul's main topics will be announced in the July 18 Lab News; please submit suggestions by no later than Tuesday, July 8, to allow Paul time to determine his main topics and for the Lab News to meet its copy deadline. Although Paul may not be able to cover every topic/question submitted in the one hour allotted for each session, he will cover those issues that are of the greatest interest Labs-wide.

The dialogue schedule:

Monday, July 28, 1:30-2:30 and 3-4 p.m., Sandia/New Mexico's Technology Transfer Center (Bldg. 825)

Tuesday, July 29, 2-3 p.m., Sandia's Carbld, N.M., large conference room

Wednesday, July 30, 1:30-2:30 p.m., Albuquerque BDM Bldg.

Thursday, July 31, 8:30-9:30 and 10-11 a.m., Sandia/California's Bldg. 904 Auditorium

Maybe the cities ought to stay closed for now. Even though we've done a lot in lab-to-lab programs trying to teach methodologies for securing nuclear materials, we have not made huge inroads into the percentage of material that needs to be locked up. So far, we've just begun to scratch the surface. There's still a lot of material that needs to be locked up, needs to be protected.

These considerations, Paul said, presented the Russians with a classic Catch-22: "If you want to work on the Internet and the marketplace if you are in a closed city, industry is not going to travel out there [to the Ural cities if closed]."

"The Internet just might be the best solution," Paul said. He noted that at a recent Microsoft conference on the future of the Internet, a lot of questions were asked about when companies will be able to actually make money and carry out real commerce in a significant way through the Internet.

"I think we have a great prototype with the [Russian] label," Paul said. "We've seen that individuals will be able to propose work, get contracts, carry out work, and deliver thought-work products— all through the Internet. If ever there was a better case to try it, I don't know what it would be."

Paul noted that the Russian labs have access to the Internet and the information superhighway with Sandia on security processes. As a result of that collaboration, with its use of satellite-based communications and data exchanges, Paul said, the Russians are beginning to see what a powerful tool a modern computer communications capability can be.

Initially, Paul said, the leadership at Arzamas had been more wary than their counterparts at Chelyabinsk of working with Sandia to establish satellite-based video and Internet connections. However, after a New Mexico-Chelyabinsk demonstration teleconference (Lab News, June 6) turned heads and got tongues wagging in Moscow, the Arzamas leadership had a change of heart, he said. Arzamas's perspective on the utility of the Internet also got a boost, Paul said, when it proved useful in helping to resolve— almost instantly— some of the post-Accident questions that emerged in the wake of an accident that involved a minor release of cadmium. During the emergency, the Internet provided the information they urgently needed for medical treatment.

"Now," Paul said, "Arzamas is equally excited about using the Internet as a tool that will let them get started on conversion, while keeping their closed cities closed until they get the [special nuclear] material locked up."

Architect of reform

In addition to visiting Russia's key weapons labs, the delegation met with Yegor Gaidar, one of the chief architects of reform in Russia, and now the head of a small think tank in Moscow. Although he is not in the government, Paul said he believes Gaidar, whose office is very close to the Kremlin and receives tight, state-provided security, remains a true individual who really believes in the reforms they've got to do.

"Gaidar told us that military are still operating their own collective farms to produce food exclusively for the military."

Reviewing Sandia's programs

One of the very high motivations for making the trip to Russia, Paul said, was to give him a chance to look at the programs Sandians are involved in, including the International Science and Technology Center programs, various official laboratory-to-laboratory efforts and collaborations, and, probably most important in Paul's view, the MPC&A— Materials Protection, Control, and Accountability program.

"I must tell you, my admiration for the individual Sandians and their work, for military, and for the military visits to the laboratory, is enormous. It is a confirmation that I've been doing a huge barrier to any industrial visitors."

"But here is the convincing argument to them, are based in so-called "closed cities," a relic of the Cold War era," Paul said. "He [Sen. Bingaman] asked for Sandia's help in coming up to speed on what's going on in Russia. One of our suggestions was, 'Well, there's nothing like seeing it for yourself to really understand.'"

"The Russian weapons facilities, specifically Chelyabinsk and Arzamas, Paul said, are based in so-called "closed cities," a relic of the Cold War era. Although much of Russian society is opening up, the secret cities are still closed, and the people who live there — Russian counterparts of Sandians, Los Alamosans, and their families — want to keep it that way."

"I was a little surprised by that," said Paul, "but then, having lived in Los Alamos for a bunch of years, maybe not too surprised."

Paul said the residents of Chelyabinsk and Arzamas perceived that beyond their fences social conditions are deteriorating. In particular, Paul said, they see that crime is a growing problem in the rest of the country while in the closed cities there essentially is no crime.

"But here is the convincing argument to me," Paul said. "The whole issue of [special nuclear] material protection would get a lot more fragile if there were active organized crime components within their cities, which could very well happen if the cities were opened."

"And so I thought, 'Maybe they're right."

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Hal Post (6218) examines a photovoltaic module similar to those used in the PV array that powers the visitor's center at Salinas Pueblo Missions National Monument. In the background are the ruins of the old mission church of San Buenaventura which dominate the ridge overlooking the visitor's center. The church was built by Pueblo Indians and Spanish settlers in the mid-1600s.

Photos by Randy Montoya

Sun power reigns for Salinas Pueblo Missions National Monument visitor center — with Sandia’s help

By Chris Miller

When Hal Post (6218) saw the woman peer through the brush and wonder aloud about the large photovoltaics array some 30 yards from the visitors' path, he was absolutely delighted. For it's notice that Sandia photovoltaics scientists and engineers are hoping the photovoltaics system will get. And what better place to be noticed than a national monument that attracts nearly 70,000 visitors each year, despite its relative isolation 26 miles south of Mountainair, N.M.

"This is a national park and it's a perfect place to put something like this," Hal says. "Nobody wants to see powerlines overhead, or hear and see smoking diesel engines generating power in a remote location. Our national parks should be kept as pristine as possible, and renewable energy sources help to keep them that way."

The photovoltaics array, which consists of 24 Solarex MSX-60 modules, each with a rated output of 60 watts, is powering the new visitor center for Salinas Pueblo Missions National Monument. The center is located at Gran Quivira, one of three units that make up the national monument. The monument features stone-and-adobe walls built by the Anasazis between A.D. 700 and 1300 and representing the earliest stage of the pueblo society. They are intermixed with the ruins of mission churches built by Spanish colonists in the early 17th century.

The Gran Quivira Unit of Salinas Pueblo Missions National Monument was established in 1909 and covers 610 acres. It is operated by the National Park Service.

The new 1,800-square-foot, $275,000 visitor center replaces one built in 1935 and is scheduled to be formally dedicated in ceremonies on June 26. Sandia photovoltaics engineers, including Hal and Mike Thomas, also of Photovoltaic System Applications Dept. 6218, will be there to recognize Sandia's contribution to helping expand the use of renewable energy technologies.

The Salinas Pueblo Missions National Monument photovoltaics system is a direct result of DOE's Renew the Parks program with the National Park Service. It is the outcome of Sandia's growing partnerships with the Interior Department's National Park Service and Bureau of Land Management, the Department of Agriculture's Forest Service, and the Department of Defense. Sandia assesses what these agencies have done so far with photovoltaic solar systems as well as the potential for their expanded use.

Hundreds of existing systems have been identified, with the level of satisfaction at more than 96 percent, and a tremendous interest has been expressed in expanding the use of these systems within the agencies, says Chris Cameron (6218).

(Continued on next page)
Physicist Richard Garwin wins presidential Fermi Award
Pioneer IBM researcher and Sandia consultant honored

By Ken Frazier

Physicist Richard Garwin, whose contributions to the nation's defense research span virtually the entire Cold War period and the years since then, has won the presidential Enrico Fermi Award, the White House has announced.

Garwin, Fellow Emeritus at IBM Research, Yorktown Heights, N.Y., and since 1995 a consultant to Sandia, will receive a $100,000 honorarium and a gold medal. The Fermi Award is the government's oldest science and technology award.

The White House said the award honors Garwin's "contributions to a wide range of problems in science, technology, and national security policy." It added: "These achievements have been as diverse as fundamental physics of condensed matter, elementary particles and fields, nuclear weaponry, gun and bomb sights, and practical applications such as laser printers, computer touchscreens, medical imaging equipment, the global positioning system, and superconductors."

He was cited also for his participation in the "formulation of national security policy. He continues to provide technical and policy advice across the field of national security and arms control."

The Fermi Award, which dates to 1956, honors the memory of Enrico Fermi, leader of the group of scientists who on Dec. 2, 1942, achieved the first self-sustained, controlled nuclear reaction at the University of Chicago. Among the award's first recipients were physicists J. Robert Oppenheimer, Ernest Lawrence, Hans Bethe, Edward Teller, and Robert Oppenheimer.

Garwin received his Ph.D. in physics from the University of Chicago, where he worked with Fermi. He spent most of his career at IBM and was a consultant to Los Alamos National Laboratory until 1993. He became a consultant to Sandia in 1995.

"He's a consultant to me for most of my professional career," says Sandia President and Laboratory Director C. Paul Robinson. "He really is one of the brightest folks in the country."

"He's not always right. We disagree a lot on philosophy, particularly on defense policy. But he is a physicist's physicist. If you would like a program reviewed and a falsifiable flaw that might exist uncovered, he is your man."

Two other researchers also won the 1997 Fermi Award: cell biologist Mortimer Elkind of Colorado State University and oncologist R. Rodney Williams of the University of California at Los Angeles, who are sharing the award for their work describing the response of normal and malignant cells to ionizing radiation, thus providing the scientific basis for radiation therapy of cancer.

I am honored to recognize these researchers," President Clinton said in announcing the awards on June 11. "Their lifetime work provides an example of how science benefits the work and personal lives of Americans on a daily basis. These three men can inspire the young people of this nation who want to pursue a scientific career."

Clinton approved the awards upon the recommendation of the secretaries of energy after an evaluation by a screening panel and an interagency awards committee. DOE administers the awards for the White House.

Energy Secretary Federico Peña will present the awards at a ceremony in Washington July 24.

Salinas monument

(Continued from preceding page)

Sandia's Photovoltaic Systems Assistance Center recently won a 1997 National Park Partnership Leadership Award with the Denver Service Center of the National Park Service for "Resource Stewardship and Preservation," which came directly as a result of its work under "Renew the Parks."

Monument Superintendent Glenn Fuller and Facility Manager Mike Schneegas say the partnership with Sandia has helped the National Park Service plan greater efficiency into the building. In fact, the visitor center reportedly achieved an 80% increase in efficiency at the National Park Service facilities that include sustainability in planning, design, construction, and operation. The building has motion-sensor lights, is situated to take advantage of winter sunlight, and even has floor and wall tiles made from recycled car windshields. The PV system will operate a swamp cooler, lights, and a computer for word-processing and e-mail, as well as an interactive computer display that will allow visitors to call up desired information about the monument.

"This has been teaching us to be conservative with our energy resources," Fuller says.

Adds Schneegas, pointing to the ruins: "What we've done is essentially what those people did centuries ago — rely on the power of the sun and be efficient in conserving energy resources."

The photovoltaics system, Hal says, will provide on average between 7.3 and 8 kilowatts of AC electrical energy per day from April through September, and about 5.5 kW per day during the remaining months.

"With minimal air conditioner use, the PV system supplied a large portion of the total load during the summer months and nearly all the load during the winter months," Hal says. "The park will control this fraction based on just how much electricity they use, primarily for lights."

Cost of the PV system is about $18,000, which includes a five-year full-service agreement. The cost was split about evenly between the National Park Service and Sandia, through DOE's Renew the Parks effort.

Salinas monument actually still is connected to an electrical grid that can provide additional power when needed. The solar PV system also includes a backup DC battery with AC converter that can provide uninterruptible power in emergencies.

The monument can sell electrical power generated by the PV system back to the grid when it is generating more power than needed. Fuller says the National Park Service's goal is to break even and end up paying nothing for electricity.

Because of the initial design and the availability of an electrical grid, Hal says the project initially won't be cost-effective. But he adds: "The project's valuable in that its decision to move toward sustainable energy generation in the park and the interpretive benefits of demonstrating renewable energy to the visiting public."

Central New Mexico Electric Co-op helped put the service package together. Direct Power and Water Corp. of Albuquerque installed the PV system.
Sandia developed system could lead to more efficient movement of cargo across the US-Mexico border
System encompasses entire process from factory to factory

By Bill Murphy

The charge from Sen. Pete Domenici in 1994 was straightforward, but that doesn't mean it was simple. Find a way to expedite the movement of freight across the US-Mexico border.

Sandia, with funding from the New Mexico Highway Department and the Federal Highway Administration via the New Mexico-based Alliance for Transportation Research, took on the challenge.

Less than three years later, New Mexico's senior senator was at the border crossing at Santa Teresa, N.M., near El Paso and Juarez, to display the results of his mandate and Sandia's efforts.

During a demonstration and press briefing, Domenici, joined by Rep. Joe Skeen, R-N.M., and other officials, was shown Sandia's ATIPE system — Advanced Technologies for International Intermodal Ports of Entry. Sandia developed ATIPE from the ground up, adopting existing technologies and creating new ones, merging them into a seamless whole designed specifically to expedite the movement of commercial traffic back and forth across the border more safely, securely, and efficiently.

ATIPE, says project manager Brad Godfrey (SS04), is built on three technologies: An automated tracking system, a process map that shows all the steps in shipping goods across the border, and a collaborative information system.

The process map methodology was developed in Environmental Information and Technology Center 6600 for the demand-activated manufacturing application that is sponsored for the ATIPE program. The process map shows the entire shipment process. The map reads like a flow chart. It depicts all the steps involved in both the physical handling of the material (like the truck moving across the border, paying tolls, being weighed), and the informational part of the process (filling out the forms, the permits, the reports, and making sure US and Mexican customs have all the paper work they need to approve a border crossing).

The process map, based on hundreds of interviews by Center 6200 personnel with affected parties on both sides of the border, is so detailed and thorough, Brad says, that it has been a revelation to many of those involved in the drug interdiction efforts. As a result, we've designed the information system to be not only collaborative, but also secure — it's smart enough to respect and protect the proprietary information of each stakeholder.

That's another key reason why Sandia is in this. We have all sorts of information-security expertise developed for our primary nuclear weapons mission.

A total systems approach

According to Brad, ATIPE's beauty is that it takes a macro-oriented, total systems approach to the issue of commercial border traffic. And because ATIPE expedites movement of "good guys" between Mexico and the US, the system by default enables both Mexican and US border officials to spend more time on their real mission: interdiction of contraband, including illegal drugs.

"Where our project is different from most border projects is that we didn't focus exclusively on the border crossing itself," Brad says. "We took the whole process from factory to factory; we took the process back several steps. If you focus only on the border, your options are fairly limited as to how you're going to expedite traffic. You're essentially focusing on just one little part of the process — basically two or three boxes out of 60 on the process map.

Twice as much traffic

If the ATIPE system were adopted at the border, how effective would it be in actually speeding up movement of freight? An analysis performed by Science Applications International Corporation (SAIC) found that if half of the shipments crossing the US-Mexican border used these technologies, the average waiting time for all trucks could be cut in half. The same analysis showed that the Sandia technologies the ports of entry could handle twice as much traffic as the present maximum without having to add personnel or infrastructure.

According to Brad, the Alliance for Transportation Research (Sandia, Los Alamos National Laboratory, University of New Mexico, New Mexico State, and the New Mexico Highway Department) may seek additional funding to further refine the ATIPE system prior to any attempts to commercialize it. Even at its current stage of development, Brad says, shippers, carriers, brokers, and other affected parties are impressed with ATIPE's capabilities and eager to have it become available for widespread use.

And Sen. Domenici, who kicked off the whole effort, is clearly impressed with the outcome.

"This technology is truly a step in the right direction," he said at the Santa Teresa demonstration. "By using the ATIPE system at our international borders, we will not only be expediting the border crossing process, but also giving our customs officials an important tool in the drug interdiction efforts."
It's automatic: New System Management Server software enables near real-time profile of Labs' computer base

Attention, Windows 95 and Windows NT users: Don't sound the alarm when — not if — a new message appears on your computer screen sometime soon. You haven't caught a virus, and the millennium bug hasn't taken a bite out of your system.

The screen you'll see (if you haven't already) indicates that the Labs' new Microsoft Systems Management Server (SMS) software is being installed on your computer.

It's all automatic and is being installed initially on all Windows 95 and Windows NT computers connected to Sandia's Internal Restricted Network.

The SMS software enables system administrators to collect data about the computer hardware on the network. As such, says Jay Smith of Laboratory Computing Dept. 4911, SMS is "a powerful asset-management tool." Once the software is installed on a computer, system administrators can use SMS to keep running tabs on such things as: computer processor type (i.e., Pentium, 486, Pentium Pro), installed memory, hard disk size, cards installed, and more.

Jay notes that the SMS installation represents the first time at Sandia that computer software has gone automatically to a large number of computers without a human being installing it.

SMS is part of Sandia's plan for automatically keeping software up-to-date. The goal is to be able to install software Labs-wide automatically from a server on the network, so that a computer-support technician doesn't have to visit each computer.

Why? Jay explains: "Suppose it takes 15 minutes to install the latest version of Word or Excel on 8,000 computers at Sandia; by the time we're done, we would have invested 2,000 hours on the process, the equivalent of one person working full-time for a year. We can put that time to better uses.

"We also need to be able to do updates more quickly than the weeks or months it takes individually, because we can't afford to have periods when part of the Labs may be creating memos or spreadsheets in file formats that are incompatible with the software being used by the rest of the Labs."

While remote software deployment is a goal, SMS will not be used for that purpose — currently another program called EDM, which will work in conjunction with SMS, does that.

Common Operating Environment

The software to be automatically updated is that defined in the Common Operating Environment (COE). The COE is a corporate initiative that establishes a Labs-wide standard for 32-bit computers required to work with some of the network-based corporate business applications. The COE is aimed at ensuring that Sandia's personal computers (PCs, Macs, Unix) can work together without unnecessary barriers of incompatible software.

Because the SMS software gathers technical data about the Labs' installed computer base, Jay says, it will be an especially useful tool for making cost projections. If the Labs decides to upgrade to a new version of Office, for example, it will have the data to determine which computers will have to be upgraded or replaced to make the transition possible. And the information about the installed base of computers will always be current: When the system is fully operational, SMS will update the Labs' Network Information System database about the configuration of computers every seven days.

"Here's another way the Labs can tap into SMS's capabilities: The software can let computer-support technicians connect to a computer and troubleshoot it remotely. Although there are no immediate plans to use that capability, it can ultimately result in a much more efficient use of the Labs' Computer Support Unit of maintaining every desktop [computer] in the system," he says.

Jay acknowledges that some Sandians who have heard about the SMS process are concerned that it represents an invasion of the individual's workspace, or even an invasion of privacy. In response, Jay notes that SMS "has nothing to do with waste, fraud, and abuse."

SMS, he says, does not tell system administrators what files or applications are installed on a given computer.

"I can't use SMS to determine if you're running a home business from your computer," he says. "As a Sandian, it's still up to you to use it [your computer] in an appropriate, work-relevant manner. SMS does nothing to change that."

—Bill Murphy

Recent Patents

James Nelson and Kenneth Gwinn (both on entrepreneurial leave), Daniel Luna, Donald McBride, and Larry Whinery (all 9116): Structurally Efficient Inflatable Protective Device.
MISCELLANEOUS

BABY ITEMS, Cozy Cottage Bed, Graco high chair, 39x29x79, after 6 p.m.

CABLE BOX, 10 in. Industrial, very good, excellent condition, original box, $60.

COUCH & LOVESEAT, maroon & white striped, 8x5x3, $150 each. Capt., 890-5868.

FURNITURE, light maple color, Simplicity, chair, $25, high back, all chair, excellent condition, Luna, 892-80-68.

OFFICE DESK, $50, queen-size bookcase headboard, $35; $80 for both. Woodheadboard; collectors' items to match. Clarita, 833-2842.

DINING TABLE, Scandinavian design hardwood, 42x60, oval, $225. Waukegan, 891-1197.

HUGE WROUGHT-IRON GATES, doors, & SEWING MACHINE. $10 each. 294-04-05.

HOOVER UPRIGHT VACUUM, CABLE-NELSON PIANO, BABY ITEMS, Miscellany, less than 2.25. Rarely used. 881-6808.

$125. Walther, 293-1204.


881-6808.

809-1734.


881-6808.

809-1734.


881-6808.
**Sandia News Briefs**

**Robert Waters to study weapons sites in the former Soviet Union**

Robert Waters, a Ph.D. candidate at the University of California, Berkeley, was selected by the United States Department of Energy to conduct research at 11 of the former Soviet Union's nuclear weapons sites. His work will focus on understanding the most effective ways to secure these sites and prevent the proliferation of knowledge and technology related to nuclear weapons.

**Sandians win DOE Meritorious Service Medals**

Sandians David Caskey, Donna McConnell, and Terri Olsoaga (all 5824) have been presented DOE's Meritorious Service Award as members of the Task Force on Nuclear Material Protection, Control & Accounting for Russia, the Newly Independent States, and the Baltics. The award was presented by Mike McClary, Director of the Russia/NIS Nuclear Security Task Force. The three Sandians were among 27 task force members from DOE, national laboratories, and DOE contractors to receive the award.

**Retiree deaths**

Betty Gray (68) ......... 3531 ......... April 23
William Pawley (73) ......... 3155 ......... April 24
Hannah Widdowson (42) ......... 4552 ......... April 25
Frank Dain (79) ......... 1124 ......... April 26
John Russell ......... 7141 ......... April 27

Organization numbers indicate retirees' positions at the time of retirement and may not correspond to present-day organizations.

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**Probe News**

**Coronado Club**

**Sandia Night at The Beach June 21**

On Saturday, June 21, 7:30 p.m.-midnight, Sandia and DOE employees and their families and friends can slip, surf, slide, and float their way through the second annual SERP-sponsored “Sandia Night at The Beach Waterpark.” Tickets can be purchased at the SERP office and are $3 per person for the evening in advance or $5 at the door.

The Beach Waterpark is located at the corner of Montgomery/Montano and I-25. The Beach features a variety of waterslides (three new ones), water-filled 'river' that encircles the park, regulation-sized beach volleyball courts, and a kiddie pool with a number of pint-sized attractions. Mrs. normally available as a rental item, will be available to use free of charge. Lifeguards will be on duty, and the facility is handicapped-accessible. This year, The Beach will also evaluate the effectiveness of alternative concepts for remediation. IIASA is a nongovernmental organization that conducts scientific studies on environmental, economic, technical, and social issues. Water currents leads projects that evaluate disposal options for DOE's low-level and mixed low-level wastes.

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**Fun & Games**

**Volleyball** — The Carrie Tingley Hospital Foundation is gearing up for the third annual Sandia Volleyball Tournament scheduled for Saturday, July 19, in Albuquerque’s South Valley, ¾-mile north of Rio Bravo on Broadway SE. More than 250 teams are expected to get down and dirty to play volleyball in a foot of mud and raise money for the special-needs children of Carrie Tingley Hospital. The 12-member teams must have eight players on the court at all times, four of whom must be female. All players must be 18 or older to play. The fund-raising goal for this event is $75,000. Players raising sponsorship money are eligible for prizes, including two free round-trip airline tickets anywhere Southwest Airlines flies. The basic registration fee is $220 for a team of 12. Registration plus 12 shirts is $270 per team. Entry forms can be picked up at the SERP office and are 28-page Sandia "annual report" for 1996, won first place in the Annual Reports, Government category. The new photo-rich publication is intended to provide yearly, comprehensive information about Sandia’s contributions to national security to stakeholders in government, industry, and academia. Team members are Bruce Fetzer, Julie Clausen, Linda Doran (both 12620), Toby Dickey (12620), and Randy Mouya (12640).

The Sandia Lab News won first place in the Internal Newsletters, Government category. Three Lab News issues were submitted for judging: Feb. 16, 1996 (Labs Accomplishments issue); Nov. 22, 1996; and Dec. 6, 1996. Team members come from throughout Dept. 12640 and (California) Dept. 8802.

Other Sandia entries recognized include:

- Robotic Manufacturing Science and Engineering Laboratory (RMSEL) dedication ceremony, second place, Special Events and Observances, Government. Team members included Julie Clausen, Bruce Fetzer, Mike Lanigan (12680), Carl Hamberg (9601), Bobbi Burpo, Deborah Payne (both 12670), Laurie Butterworth, Laurie Bergeron (both 9600), Chris Miller (12640), and Randy Montoya.

Inside Sandia, honorable mention, External Newsletter, Government. Team members include Julie Clausen, Toby Dickey, Tammy Locke (12620), and Mark Poulsen (former Sandian).

- 1996 Week of Caring, Martineztown House of Neighbors Services, honorable mention, Special Events and Observances, Government. The 1996 Week of Caring Steering Committee and many Sandia volunteers were involved.

- Members of PRSA’s chapter in Tulsa, Okla., judged the New Mexico entries based on each publication’s or event’s stated objectives, creativity and judgment applied in selecting strategies and techniques, effective use of budget, quality of material produced, relationship to audience, general impact, and technical quality.

**Honoring Professional Excellence process set up for nationally recognized Sandians**

Honoring Professional Excellence is a new recognition process for Sandia employees who have received national or international awards. A committee of division representatives chaired by Nina Chapman, HCR Customer Service Manager to Division 1000, developed the recognition criteria and process to honor those who have excelled and been recognized nationally or internationally for their accomplishments.

The recognition process will take place yearly at the Fall Leadership Forum. The vice president's administrative assistants will coordinate the submission of nominations for their respective divisions during June for the time period August 1996 through July 1997.

Bob Eagan, Division 1000 VP, has championed the process to "recognize those employees who have made outstanding contributions and bring national or international recognition to Sandia.

The "Professional Excellence Recognition Process" will honor Sandia employees who have received major external national or international recognition for research, engineering, or professional contributions, such as:

- Specific professional or technical achievement
- Breakthrough technology
- Unique expertise or achievement
- History of exceptional performance in a professional field (outstanding contributions)
- Serving as a president of a national or international organization of high value to Sandia
- Service on a "US Presidential committee"

If you have questions, call Nina at 845-6520.