

# Army and Air Force to acquire Sandia Gauntlet body armor for 'field evaluation'

**Sandia to validate Kevlar material for large-scale production**



GAUNTLET DEMO — New Mexico Army National Guard Sgt. Jeffrey Conley (top) demonstrates the Sandia Gauntlet. In foreground is Staff Sgt. Will Romero. (Photo by Randy Montoya)

By Michael Padilla

The Sandia Gauntlet body armor created at the Labs is one step closer to bringing additional protection to those in combat.

The Army Rapid Equipment Force and the Air Force Protection Battle Lab are acquiring the Sandia Gauntlet body armor for "field evaluation." The Army will acquire 10 sets of the Sandia arm protection system, and the Air Force will acquire 50 sets. In addition, the Air Force has requested the balance of the Sandia inventory of an early version for training purposes.

Last year Sandia researchers conceived the concept of shoulder-to-hand protective sleeves for military personnel riding atop Humvees and other military vehicles during combat operations. The idea was to protect the entire length of a soldier's arm, including the hand, from blast and debris effects created by indirect hits from rocket propelled grenades (RPGs) against vehicle doors and turrets. The materials used in the original protective sleeve design were surplus, government-owned Kevlar, and thin, carbon inserts.

A Sandia-wide team was formed to transition the concept to the military. The team was able to balance the need for urgent delivery of protective equipment to soldiers in the field with the need to ensure that the delivered product met minimum

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## Sandia, UT unveil agreement for close strategic partnership

Sandia and the multicampus University of Texas System have announced an expanded relationship. The announcement came last Thursday after the UT System Board of Regents unanimously approved a new memorandum of understanding between the system and Sandia.

The MOU calls for —

- UT System to develop and implement an independent peer review process for what Sandia calls its science, technology, and engineering foundation.

- Joint development and implementation of "strategic program areas that enhance" Sandia's broad missions in national security, which are in addition to ongoing activities.

- Increased interactions and collaborations between individual staff, faculty, and students at Sandia and UT System academic and health institutions.

Sandia President C. Paul Robinson noted that Sandia has been working for many years to establish and maintain strategic partnerships with outstanding national institutions in academia, industry, and the government.

"This action strengthens one such strategic relationship, which was created several years ago between the University of Texas System, including its medical research institutions, and Lockheed Martin Corporation and Sandia," Paul said (*Lab News*, April 2, 2004). "It will allow Sandia to further develop its people and enhance its technical abilities to better meet the national challenges we face."

Mark Yudof, chancellor of the UT System, said the agreement represents a "tremendous opportunity to advance the strong, existing relationship between our System and one of

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# Sandia LabNews

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## Texas police, border agents using Labs' sniffer to nab drug traffickers

**Drug task force credits Hound with helping save lives**

By John German

On a South Texas highway one Saturday afternoon in August, a sniffing device developed at Sandia helped law enforcement officers quickly identify an unknown liquid, hidden in a false compartment under a car seat, as methamphetamines.

In the Kingsville, Texas, living room of a single mom last February, officers used results from the device to turn a young life around, coaxing a teenager to confess that he was addicted to cocaine and prompting his entry into a drug rehab program.

The incidents are two of many that demonstrate the usefulness of the Hound hand-held sniffer for helping stem the flow of illegal drugs northward into the US, say members of the South Texas Specialized Crimes and Narcotics Task Force. In a few cases the officers credit the device with saving lives. (See "Report from the front lines of the drug war" on page 5.)

Sandia loaned the Task Force one of its prototype Hound systems in November 2003

as part of a field trial to evaluate the system's value in drug detection. Since then the Task Force has used the Hound at border checkpoints to help screen hundreds of vehicles per day for illegal drugs.

The loan of the Sandia system to the Task Force was made possible through funding from the National Institute of Justice.

### Drugs in fingerprints

The Hound system includes a front-end sniffer developed by Sandia for sample collection and a commercial chemical detector, says Dave Hannum of Contraband Detection Dept. 4118-2, one of the developers of the Sandia pre-concentration technique that makes the Hound highly sensitive.

Although the approach was originally developed at Sandia to improve sample collection for the detection of explosives, the switch from explosives to drugs is relatively simple within the commercial detector, he says.

The sniffer works by drawing a bathtubful

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Sandia VP Jim Tegnalia appointed new director of DTRA

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Sandia-designed geothermal tools help earthquake researchers

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Nine Carlsbad students honored at Go Figure math banquet

## What's what

Last issue's flashbulb vignette – probably an urban legend, about microwave experiments setting off a truckload of photo flashbulbs – generated a couple of responses.

Retired Sandia photographer Oscar Goodwin e-mailed that while he was working in the photo department of H. Cook Sporting Goods in 1953, a well-known Albuquerque photographer named George Kew bought a case of flashbulbs for a job at the Museum of Santa Fe.

Kew, who drove a Porsche convertible, put the flashbulbs in the back and, with the top down, started to Santa Fe. "As he passed the microwave relay towers north of Albuquerque," Oscar wrote, "the whole case of flashbulbs went off. Luckily he had a fire extinguisher (and) another car that stopped had one also. They put the fire out, but it destroyed his rear seat."

And Marion Wilde (5932) wrote that 30-plus years ago a radar-technician friend of his was stationed at an air force base in Texas. He was tuning a radar one day and had it "aimed at the BX, which was pretty close by. People started running out of the BX, (which) caught his attention. When he finished servicing the radar, he stopped in at the BX to ask what happened, and was told that all the flashbulbs on the shelf had fired at once."

So maybe the story about the truckload of flashbulbs was apocryphal – and maybe not.

\* \* \* \* \*

"Yarnin'" was the word the old mountain men used to describe their tall tales and I think I was being "yarned" several years ago by a then-retired Los Alamos old-timer who had been involved in photographing the atmospheric tests in Nevada.

There was little to do outside the actual test preparations, he said, and so a lot of non-working time was spent playing cards and discussing various topics of interest. One of the latter was the eternal debate about how much vermouth went into the perfect martini and how it was added – dripped, poured, whispered, or spritzed. In one of those discussions, the consensus was that only a tiny cloud of vermouth should be spritzed onto the surface of the already chilled, poured, and olived martini.

Inspired by this consensus, the story went, one of the wags managed to secretly attach a small container of vermouth to the device that was to be detonated in the next day's test. And as parties to the in-joke for years afterward, those who had reached the consensus would make their martinis up to the vermouth stage, then wink at each other slyly as they held their glasses aloft to allow a whisp of the vaporized vermouth to settle on the surface of the cocktails.

Well, it's a fun little story, anyway – don't you think?

\* \* \* \* \*

In the category of odd terms, Protocol's Paula Schoeneman (12115) was mildly surprised and amused recently when she e-mailed a large file to a United Kingdom address and was informed by a disembodied e-mail entity somewhere that the file was too big so it had been "parked."

Would that be the Great and Powerful E-mail Entity's version of a time-out for a kid?

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

## Sandia VP Jim Tegnalia named DTRA director

Sandia VP Jim Tegnalia (15000) has been appointed director of the Defense Threat Reduction Agency. The announcement, long expected internally at Sandia, came Feb. 8 from the Department of Defense and DTRA, headquartered in Fort Belvoir, Va.

Labs leadership and the Sandia Corporation Board of Directors will soon name a replacement for Jim's position.

The DTRA appointment was welcomed by Sandia's top two executives.

"This is a very important position — one that has great influence on reducing threats to our national security — and Jim Tegnalia is the perfect candidate for this assignment," says Labs Director C. Paul Robinson. "The position requires a broad perspective of science and technology in support of our military forces. It is vital for the NNSA labs to keep that important link with DoD."

"We will miss Jim and wish him well during his term in this important position," says Labs Deputy Director Joan Woodard.

DTRA is a DoD combat-support agency with an annual budget of \$2.6 billion and a military/civilian workforce of about 1,890. It focuses on reducing the threat of weapons of mass destruction through a combination of advanced technology programs and innovative operational methods.

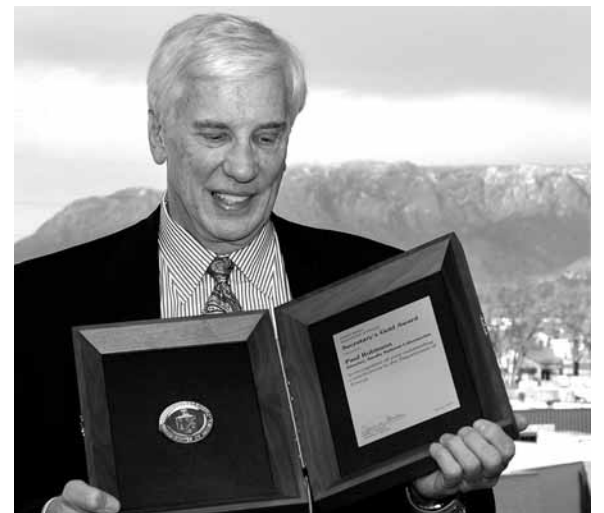
"The appointment of Jim Tegnalia as the director of DTRA is another significant step in transforming how we defend against the threat of weapons of mass destruction," said Dale Klein, assistant to the secretary of defense for nuclear and chemical and biological defense programs. "He brings exceptional talent, skills, and management experience to this new role and responsibility."

Jim has been Sandia's VP for DoD programs since February 1999. He also headed Sandia's Emerging Threats Strategic Management Unit.

But that was his second Sandia stint. He first came to Sandia in 1993 as executive VP and deputy director when Martin Marietta Corp. (now Lockheed Martin) became the Labs's management and operating contractor on Oct. 1, 1993. He had come out of the Martin Marietta system but also had already served as deputy director and acting director of DARPA, the Defense Advanced Research Projects Agency. He'd also been an assistant undersecretary of defense.

Later Jim left Sandia to become vice president, Business Development, for the Energy and Environment Sector of Lockheed Martin Corporation and in 1996 president of Lockheed Martin Advanced Environmental Systems, Inc. He returned to Sandia in August 1998. Jim has served as chair of the Army Science Board and has received the Civilian Meritorious Service Medal and the Senior Executive Service Meritorious Service Award.

## Paul Robinson receives DOE's highest honorary award



Sandia President C. Paul Robinson has been awarded the Secretary's Gold Award, DOE's highest honorary award. The award, given by former DOE Secretary Spencer Abraham on Jan. 26, cited Paul's "outstanding leadership." Among the other nine recipients of the award were NNSA Administrator Linton Brooks and former Sandian Margaret Chu, current director of DOE's Office of Civilian Radioactive Waste Management.

## Sandia LabNews

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Ken Frazier, Editor . . . . . 505/844-6210  
Bill Murphy, Writer . . . . . 505/845-0845  
Chris Burroughs, Writer . . . . . 505/844-0948  
Randy Montoya, Photographer . . . . . 505/844-5605  
Nancy Garcia, California site contact . . . . . 925/294-2932  
Contributors: Janet Carpenter (844-7841), John German (844-5199), Neal Singer (845-7078), Larry Perrine (845-8511), Howard Kercheval (columnist, 844-7842), Will Keener (844-1690), Iris Aboytes (844-2282), Michael Padilla (284-5325), Rod Geer (844-6601), Michael Lanigan (844-2297), and Michelle Fleming (Ads, Milepost photos, 844-4902). Dept. 12651 Manager: Chris Miller (844-0587).

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## Five Communicator Awards go to Video Services Dept.

Video Services Dept. 12653 won several awards in the 2004 Communicator Awards competition. The Communicator Awards is an international awards program founded by communications professionals to recognize excellence in the communication field. "Working Together" produced for the Quality Engineering Department and "Just Peachy" produced for Public Relations and Communications each won a Crystal Award of Excellence (the highest award for the best in the field). "WWII Airplane Nose Art" won an Award of Distinction as did "After Sandia," an interview with Ben Benjamin about his life as a retiree. "State of the Labs 2004 show opener" earned Honorable Mention.

### Lab News Reader Service

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

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**Web Users:** The *Lab News* is on the web at [www.sandia.gov/LabNews](http://www.sandia.gov/LabNews).

# R&D Focus Symposium highlights four research areas

## *Diesel emissions, optimization, nuclear weapons safety, carbon nanotube electronics get spotlight*

By Nancy Garcia

A spectrum of research that California Laboratory VP Mim John said “keeps us at the top of our game to do the very best to keep the nation secure” was presented Jan. 26 at the fourth R&D Focus Symposium.

The symposium is organized by the DMTS community to update new and accelerating projects and stimulate new ideas and interactions.

### Clean diesels still elusive

First up was Paul Miles (8362), who spoke about “Clean Diesel Engines in the 21st Century — Don’t Hold Your Breath!”

“Diesels have changed,” Paul said. “They don’t smell anymore, they’re quiet, they start in cold weather, are economically attractive, and get roughly 30 percent better fuel economy. . . . So why aren’t we all driving diesels?”

The answer, in part, is due to increasingly stringent emissions regulations. When California’s LEV II emission regulations came into effect in 2004, for example, new Volkswagen TDI diesels could no longer be legally sold. In 2007, federal Tier II regulations will come into effect, and diesel engine manufacturers will need to meet similar emissions regulations in all 50 states.

In the long-term, hydrogen-powered vehicles may become the ultimate solution, “but we won’t see significant market penetration for many years,” Paul cautioned. “Meanwhile, diesel

and hybrid technologies are a key part of a sensible national energy policy.”

Industry is responding to tightening emissions regulations aided by a scientific base provided by Combustion Research Facility (CRF) research, Paul said, that guides engine designs and operating strategies. One approach to lowering diesel combustion emissions is to employ low-temperature combustion, which generates less soot and smog-producing NO<sub>x</sub>. CRF researchers are providing a physical picture of fuel-air mixing processes and quantitative data that support development of diesel combustion models that will be used for design optimization.

“Low-temperature modes of combustion appear indispensable for meeting 2007 regulations,” noted Paul. “Cost and performance are still a challenge, but the payoff is enormous.”

### Sim-based optimization accelerates

Next up was Tamara Kolda (8962), whom Mim said had had “a pretty amazing year.” Tamara won a Presidential Early Career Award for Scientists and Engineers and was a member of a research team that won an R&D 100 award.

Tamara’s talk urged listeners to “Put Optimization in Your Toolbox.”

“We’ve really started to change the landscape for what you can do in simulation-based optimization,” she said. “My goal is to get the user out of the picture and let the user make more efficient use of time.”

Simulation software provides parameter fitting for optimal design in a number of applications — and she is always looking for new problems to solve. Users working with Tamara tell her how to score parameters, with a lower score being a better one. To find the best parameters, she and colleagues adapted a 50-year-old pattern-search method that is easy to parallelize.

She compared the pattern-search method to imagining a skier who’s blind on a hill, trying to figure out which way is downhill. The more optimal choices have lower scores.

An example of the advantage was dropping the time to optimize a circuit from eight hours, in which three parameters were scored by hand, to 30 minutes, in which 17 parameters were analyzed on the Cplant cluster. Likewise, using an asynchronous mode shortened a biochemical analysis from nearly two days to a mere 15 minutes by efficiently spreading out the use of the simulator.

Already optimization has been applied to forging analysis, microfluidics, groundwater modeling, batch-fed fermentation, microfluidic mixing, wildfire modeling, and processing imaging. Tamara invites potential users to contact her to collaborate on applications in new areas, as well.

### Nuclear weapons safety under review

The third presenter was Lisa Brown (8222), who hired into Sandia slightly more than two years ago and spoke about “Reevaluating Nuclear Safety and Security in a Post-9/11 Era.”

“The idea that nuclear weapons are an attractive terrorist target is incredibly scary,” she said. “The consequences of an unauthorized detonation, whether from an accident or a terrorist, are unacceptable.”

Just three months after 9/11, the Nuclear Posture Review released a reevaluation of needs for a post-Cold War nuclear stockpile. In general, Lisa said, “the world’s changed and we need to change with it.” Safety and security needs must be reevaluated as the characteristics of tomorrow’s nuclear deterrent are being formulated.

One safety objective is to enable the warhead using positive confirmation that the authorized target location has been reached. Making strides toward that goal, Lisa has developed a method to generate safety signals based on location. She also formulated a way to wirelessly transmit safety signals that is robust to dropouts and reduces dependency on latency.

Although there are currently no new requirements for weapon design, she added, optimizing designs for increased safety and security could be a politically palatable way to exercise the weapons complex, enable responsiveness, and preserve knowledge.

### Carbon nanotubes for electronics

The final speaker, Alec Talin (8764), spoke about “The Promise and Challenge of Carbon Nanotube Electronics.”

“Carbon nanotubes offer a lot of advantages in terms of performance for microelectronic devices,” he observed. Intel and IBM are investigating them as potential next-generation devices for making faster, higher-power transistors with less demanding lithography. On the other hand, he said, controlling synthesis and separation are major challenges.

Depending upon their folding symmetry and radii, they have different electrical properties — either semiconducting or metallic.

First observed within soot, they are typically grown by chemical vapor deposition. The nanotubes can be conveniently suspended by allowing single-stranded DNA to coil around them, keeping them separate. Placing a suspension droplet between two gold electrodes and applying a field creates a field-effect transistor with a very narrow gate. However, decreasing the spread and contact resistance is desirable.

The circuits have a variety of potential applications, not the least of which is for sensing, Alec said.

# Sandia California News

## *Students, parents enjoy Family Science Night*



THE MAGNIFICENT 700 — Students and parents at Arroyo Seco Elementary School in Livermore enjoy a Family Science Night sponsored by Sandia last month. Some 700 adults and children signed in at three elementary school science nights held in Livermore in January.

(Photos by Randy Wong)

## Gauntlet

(Continued from page 1)

standards for protection. The newest generation of the Sandia Gauntlets includes the latest version of commercially available Kevlar with a camouflage pattern, Velcro attachments to aid in connecting the sleeves to vest protection equipment, and additional layers of carbon fiber inserts to meet Army requirements for protection against small-arms fire.

Within the next two months, Sandia will also assist the military by validating commercially available Kevlar material. If the military decides to equip its forces with the gauntlet sleeves, Sandia will assist in identifying a commercial supplier for the Department of Defense (DoD).

### Project inception

Sandia researcher Jim Purvis conceived the project during an overseas trip in late 2003 after reading an article about a soldier who lost his arms during combat in Iraq. Purvis said he knew that something should be done to extend the protection from the vest to the arms.

Soon after, the technical requirements of the idea were discussed with several other Sandia experts. Purvis teamed up with Jack Jones (6955), Larry Whinery, and Richard Brazfield (both 2111) to construct a prototype.

Jack was instrumental in getting the project started.

"This project has been a high priority for all who have been involved since the inception of

the idea for the gauntlets," Jack says. "If the Sandia Gauntlets can protect just one soldier, sailor, airman, or marine from losing an arm, then the effort put forth will be worth it."

### Sandia testing to validate protection standard

While the original concept showed merit in early, limited tests, Sandia was committed to using its engineering and technology expertise to confirm that gauntlets would meet minimum military standards for protection. Under time pressure and with a limited budget, Sandia's Explosive Applications Dept. 15322 planned a validated test program using coupon-size articles of Kevlar and carbon inserts. The test program included test setup with armor and witness plate placement, flash X-ray radiography instrumentation, projectile and breach loading, and post-test processing of the data to monitor projectile flight, degree of yaw, and velocity.

The controlled test series completed at Sandia's Explosives Applications Laboratory characterized the ballistic limit of the Sandia Gauntlet against different-sized fragment masses.

Sandia engineer Vanessa Berg (15322) led the testing.

"The experimental results indicate that the Sandia Gauntlet affords equal or better protection against light, high-velocity fragments when compared to the minimum criteria for the standard body armor," Vanessa says. "The current gauntlet design has a 28-layer carbon fiber insert which provides protection that exceeds the minimum criteria at all standard fragment sizes tested."

The Sandia Gauntlet meets the same standard as that for the Interceptor body armor.

Additional testing is planned to characterize the complete statistical distribution of penetration versus velocity for various fragments. Other effects to be evaluated via modeling or experimental testing include very large, energetic fragments produced from munitions such as the 155mm and 152mm artillery shells, indirect RPG hits, or traditional small arms projectiles. Evaluation also excluded variations in fragment impact angle, multiple fragment impacts, and combination fragment-blast damage.

"All of these phenomena could be accurately predicted via a mature computer model or a robust test program," says Vanessa.

### Putting capability in the hands of the warfighter

Sandia's VP for DoD Programs Jim Tegnelia (15000) said the gauntlets will significantly make an impact on those in combat.

"Moving forward with the Sandia Gauntlets has been a high priority for Sandia during the last six months," Jim says. "We have been working with the Army and Air Force to ensure that all military requirements are met. This project is truly an example of how Sandia responds to the needs of our nation and to the safety of our soldiers."

"We appreciate the generous support of all Sandians involved with the project, DOE, Lockheed Martin, US Representative Heather Wilson, and all others who have been instrumental in this project."

## UT/Sandia MOU

(Continued from page 1)

the country's premier national laboratories. This is a great opportunity for our faculty, our students, and our researchers to be involved more directly in the unclassified, cutting-edge science and research being conducted by Sandia National Labs. Managing the peer review process of this research is an honor and significant contribution to the vital role that Sandia plays in its service to the nation. . . ."

The five-year agreement states that UT System has agreed to develop, perform, and be accountable for the peer review process of the Sandia Assurance System for Science, Technology, and Engineering.

The reviews will cover the effectiveness of the unclassified research for Sandia's Laboratory Directed Research and Development Program, the Research Foundations of the Nuclear Weapon Program, and research sponsored by DOE's Office of Science as well as Sandia-based science, technology, and engineering research sponsored by other agencies.

A newly designated UT System position on the Sandia Board of Directors will organize and lead technical reviews of Sandia's Science and Technology Foundations, working through a newly formed subcommittee of the Mission Committee of the Sandia board. This subcommittee will be made up of at least two Sandia board members and at least two advisors from universities, two from industry, and two from government agencies or other federal or national laboratories.

As part of this activity, the UT System will open an office at Sandia. The office will be staffed by Oct. 1.

Another key aspect of the MOU will add to ongoing Sandia/UT System activities by undertaking joint technical research projects and collaborations that take advantage of their complementary competencies in simulation engineering, high-energy-density physics, sustainable energy security for transportation, and in health security.

The MOU calls for Sandia and the UT System to use joint appointments so Sandia scientists can serve as staff for graduate programs at UT institu-

tions and UT faculty, staff, and students can have long-term involvement in Sandia research programs. In addition, the UT System plans to have its professors provide both on-site and distance education courses to Sandia personnel.

The UT System has 15 campuses, including nine academic and six health institutions, and an annual operating budget of \$8.5 billion. With more than 76,000 employees, the UT System is one of the largest employers in Texas.



## Feedback

### Readers ask questions about vehicles parked for extended times and out-of-network insurance

**Q:** What is Sandia's policy on vehicles left in parking lots for an extended period of time? What about vehicles that are parked illegally? I come to work early in the morning and see vehicles that remain in parking lots for several weeks at a time. One vehicle in particular has a for sale sign on it from the KAFB "Lemon Lot" that expired in June. This car is moved every couple of days to a different but nearby parking space apparently to not draw attention to it. With parking spaces at a premium, it seems pretty selfish for some people to park cars here that should be left at home.

Who do we call to report vehicles parked illegally? I see one vehicle parked at the end of an aisle every day, creating its own parking space. The problem is the vehicle parks very close to the car parked legally at the end of the aisle. I feel sorry for the owner of the vehicle parked legally because the door dings from this car must be adding up quickly!

**A:** I certainly agree with you that in today's tight parking environment people taking advantage of the system should be stopped. If you observe a vehicle parked illegally or suspect abuse of the system please contact the Security Desk Lieutenant at 844-3155 and report the violation. It is quite helpful if you provide the base decal number when you call. Open parking spaces are available 24/7; Attachment A to CPR 400.3.11 (<http://www-irn.sandia.gov/iss/CPR400.3.11/cpr400.3.11a01.htm>) lists all parking require-

ments. Overnight parking is discouraged and vehicles left for extended periods of time will be investigated as abandoned vehicles.

— Ed Williams (10864)

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**Q:** How does our medical insurance provider define "out-of-network"? At one point I asked a Mutual of Omaha representative what would happen if I were injured or sick in an area where there were no Mutual of Omaha providers. I was told that in that case, co-pays would revert to in-network status. But I have never been able to find out exactly what that means. I was in a traffic accident in Deming and apparently that was in-network even though the only hospital in Deming is not a M of O provider, because I paid out-of-network charges. How do I find out how far away I have to be to a provider in order for the out-of-network charges to kick in? (This is going to be important information for retirees who are moving out of the New Mexico area, too!)

**A:** If there are in-network providers and facilities within 50 miles and you choose to utilize an out-of-network provider or facility, it will be paid as out-of-network. When there are no providers of medical facilities within 50 miles of where you are, services will be paid at the in-network level of benefit, regardless of where you receive services. If you find yourself in an emergency or urgent care situation while traveling for example, you may access any facility closest to you and it will be covered as in-network regardless of network availability in the area.

— Larry Clevenger (3300)

# Drug Hound

(Continued from page 1)

of air through its nozzle, trapping heavy organic compounds in the air on a filter, then heating the filter and redistributing the collected compounds into a smaller air sample. The compounds are identified in a commercial ion mobility spectrometer-based detector that is part of the system.

It's the equivalent of netting hundreds of fish in a vast ocean, then releasing those fish into a pond and fishing for them, with highly increased odds.

The Hound system can detect narcotics in nanogram concentrations, says Dave, which means it identifies drug residues left in fingerprints on objects touched by drug users, such as door handles, steering wheels, and locker latches.

Sandia pioneered the preconcentration approach in the mid 1990s and has since developed a family of explosives-detection systems based on the technique, including hand-held detectors, vehicle detection systems, and a walk-through portal that can sniff trace amounts of explosives on people's skin and clothing.

A commercial version of the portal is now being used to screen airline passengers at a checkpoint at New York's John F. Kennedy airport as part of a Transportation Security Administration pilot project.

## Eye-opening experience

During the field trials, the Task Force is incorporating the Hound into border checkpoint screening procedures, using both drug-trained dogs and the Sandia sniffers to canvass a selection of vehicles that was diverted by officers into a secondary screening area, says Task Force Commander Jaime Garza.

Task Force officers also respond to requests from the local sheriff's department and US Border Patrol agents to investigate suspicious vehicles and items, Garza says.

"There are not enough good things I can say about this tool," Garza says.

He says the Hound system has on numerous occasions helped officers detect covert narcotics shipments in vehicles at checkpoints; locate nitro, heroin, cocaine, and marijuana in middle schools and high schools; seize drug money going south into Mexico; and in one instance build a case against a suspect involved in a nightclub shooting on whom gunpowder residues were found several hours, and showers, after the shooting.

"The Hound system is performing very well," Task Force officer Richard Kirkpatrick wrote to Dave in a February 2004 progress report. "We continue to operate and implement the detector with our main focus on drug detection."

Prior to the field trials, Dave traveled to Kingsville to conduct training sessions with



DRUG SNIFFER — Dave Hannum demonstrates use of the Hound system, which includes preconcentration technology developed at Sandia, on a bag of white powder. The hand-held system, originally developed for explosives detection, also can detect and identify illegal drugs. The South Texas Specialized Crimes and Narcotics Task Force is using a Sandia prototype to catch drug smugglers. (Photo by Randy Montoya)

*"The Hound system is performing very well. We continue to operate and implement the detector with our main focus on drug detection."*

Task Force narcotics officers. Since then he's returned to the area to consult with US Customs agents about a possible future use of the Hound to search incoming ships from Mexico.

Even with the help of the latest tools, he says, only a few of the estimated 100 daily drug shipments through the area are detected.

"It was truly an eye-opening experience to learn about the magnitude of the drug problem that is happening every day in that part of Texas," Dave says. "One Hound system cannot even put a dent in that drug pipeline. It is a tool that can clearly help officers detect and correctly identify certain illegal substances that they have to deal with on a daily basis."

He says the information gathered during these trials is being used to improve the Hound for drug detection applications. Commercialization efforts are under way.

Just last month officers used the Hound system to discover and quickly identify ecstasy pills on board a public school bus transporting high school students from an event where the students were mingling with college-age students.

With the Hound the officers were able to begin to locate the source of the drugs immediately.

"Without the ability to rapidly identify the pills as ecstasy on the scene, this could have been a three-week or three-month wait" for lab results, Garza says. "This is a small rural town. Many people had no idea."

## 'A life saver'

Although the Hound isn't a silver bullet for the drug problem, says Dave, the Task Force has documented situations this past year where the use of the Hound has helped to save lives.

In the case of the concealed under-seat compartment packed with bottles full of liquid methamphetamines, the identification capability turned out to be a life saver, according to Jose Ibarra, assistant commander of the Task Force.

When Texas Department of Public Safety officers punctured one of the plastic bottles containing the liquid, Ibarra wrote in a letter to Sandia, the substance reacted to air and began to crystallize. Officers were not sure what they were dealing with and contacted the Task Force, which used the Hound to identify the liquid meth, which is highly toxic and flammable, then called dispatch for a HazMat response.

"The Task Force is very grateful to have received this system for testing," Ibarra wrote. "Our officers were able to detect a very toxic material which could have had dire effects. Because of this tool, we were able to detect the hazardous material and handle it with all the necessary precautions....I feel that on August 7, 2004, it truly saved the lives of several officers."

"I am proud and grateful that Sandia has helped make this happen," adds Dave.

## Report from the front lines of the drug war

The following is from a letter to Dave Hannum from Richard Kirkpatrick, an officer with the South Texas Specialized Crimes and Narcotics Task Force, who is the primary user of the Hound system:

"Approximately one week ago, we had received a phone call from a concerned parent. This parent, a single mother, having received news her son was caught at school with a small amount of marijuana in his vehicle, asked us to speak to her and her son. She explained to us she had a hard time believing her son was involved in any type of drug activity. The son told his mother and us it was his friend's drugs...that happened to fall on the floorboard of his truck.

"We explained to the mother we could use the Hound system to check his hands and wallet to detect illegal drugs and identify the substance. Our first test using the swipe method of the young man's driver's license revealed significant peak for cocaine. Initially the young man protested to his mother he had never been around illegal drugs or used them. After about 30 minutes the young man broke down, cried, and told his mother he has a serious addiction to cocaine.

"In short, gentlemen, we strongly believe the South Texas Specialized Crimes and Narcotics Task Force using the Hound system saved a life that day. This young man is now in a drug rehabilitation program."

# COTS program helps Sandia designers shop for commercial off-the-shelf parts for weapons

**Not just for weapons: Joint team finds, qualifies best, least-expensive technology for other systems, too**

By Neal Singer

Sandians who want to buy the latest electronic technology and save money to boot now have help in finding the best parts for their needs, says Ray Heath (1734).

The capabilities and expertise of Sandia and Kansas City Plant component engineers are now available to all Sandia design engineers.

These component engineers are concluding efforts to select the best, least-expensive electronic parts for the W76-1 and W80-3 Life Extension Programs. Through a four-year effort, these seasoned searchers have developed expertise and a proven methodology to help designers identify, procure, test, and qualify better commercial parts for weapon and other national security systems.

## Spend \$2 instead of millions

"The benefit of going to COTS [commercial off-the-shelf] parts is that instead of spending millions to develop a specialized component for high-reliability systems, we are able to select and qualify a part off-the-shelf that may cost \$2," says Ray.

Many COTS electronic parts are developed faster, with better funding, than even a good large laboratory can compete with, says Art Minser (1734). The parts are made in high-volume, fully automated fabs using tightly controlled processes. The results can be more reliable than custom-built, low-volume parts.

"The electronics industry has changed," says Julio Marchiondo (1734). "Most of our parts used to be built to order, a very expensive process. Industry was willing to do this because the military once purchased a majority of all electronic parts. Now there are large industries that make use of IC technologies — computers, automobiles, and cell phones. The military market share has declined dramatically to less than one percent. We're no longer in the driver's seat. The new commercial technologies that now drive the weapons community feature tiny integrated circuits many times smaller than a few years ago. Texas Instruments [for example] doesn't want to interrupt its high-volume production to make a relatively few parts for us. We decided we had to develop a process to analyze and utilize high-tech commercial products."

It's prudent, then, say these engineers, to buy what industry builds, even if it means adapting Sandia designs to meet Sandia needs, rather than build custom parts on all occasions.

## The big culture change

Nevertheless, "Accepting outsourcing is a big culture change," says Ray.

"We didn't do this because we would rather buy," says Julio. "I think we were really forced into it. There is a paradigm shift going on. It's not that we are incapable of producing these parts, we are just incapable of doing it in a cost-effective way. And we're not alone. Most military contractors are doing something similar."

Sandia, Julio says, leverages what contractors have available, just as Sandia collaborates with private companies to build the world's fastest supercomputers.

On the other hand, "There will always be some custom electronic parts in nuclear weapons," says Ray. "No one will ever be able to build a nuclear weapon from totally commercial parts. Unique requirements such as nuclear radiation necessitate the custom radiation-hardened integrated circuits built at Sandia."

Other systems that require the latest electronics technology also could use these newly developed processes, says Julio. Sandia engineers have already used some to select and qualify electronic parts for satellite systems.

## Defining requirements

The Sandia-developed process helps the design engineer define what requirements a component must meet. Then he or she and component engineers work together to decide whether a custom part is needed or whether the off-the-shelf market can produce a likely fit. Initial manufacturer and reliability assessments are performed before any parts are purchased. If this analysis is positive, actual parts are purchased and tested.

"Designs are negotiated around system requirements and what's available commercially," says Ray.

To get around the problem of using parts outside their designated performance parameters or in a degraded mode due to special environments, COTS engineers characterize and model the parts. Customers adjust their designs to meet system requirements yet still function reliably.

*"No one will ever be able to build a nuclear weapon from totally commercial parts. Unique requirements such as nuclear radiation necessitate the custom radiation-hardened integrated circuits built at Sandia."*

Statistically significant samples of all parts are tested and fully qualified before insertion into weapons systems.

Because of the short lifecycle for many COTS parts and to help assure consistency in performance, the group recommends buying enough for the life of a program. The low cost of COTS parts makes this strategy feasible, says Ray.

## Parts-testing (gasp!) also outsourced

Another cultural problem, the parts engineers point out, is that outsourcing has become necessary not only in parts buying but in parts testing.

"Our testing used to be done at the Kansas City facility, but due to funding cuts and footprint reduction, much of the testing is now outsourced to third-party test houses," says Ray. New sampling and test specifications have been written for COTS parts, some of which are no bigger than a comma on this page. The review and approval of test results from the third-party test houses has been automated, as have the parts data and the status of engineering releases. All data and associated analyses are electronically archived to make them searchable and available for future applications.

"The full process takes about a year. A fully qualified COTS part is about 20 times less expensive than a fully qualified custom part," says manager Paul Plunkett (1734).

More information on Sandia's formally named "War Reserve Commercial Off-the-Shelf Process (WRCIP)" can be found on Sandia's internal web. Under "Engineering and Manufacturing," pull down the menu titled "Pick an engineering resource" and open "COTS component information."

## State of Labs talks next Monday and Wednesday



Employees interested in hearing a live Labs-wide annual progress report and getting questions answered from executive management will have that opportunity next week when President Paul Robinson and Executive VP Joan Woodard give their annual State of the Labs presentation.

Paul and Joan will talk to Sandia/California employees first, 1-2:30 p.m. Monday, Feb. 21, in the 904 Auditorium. The Albuquerque session is 9-10:30 a.m. Wednesday, Feb. 23, in the Schiff Auditorium. Seating is on a first-come basis.

The Feb. 23 session will be video linked live to Sandia's Carlsbad, N.M.; Washington, D.C.; and Nevada offices. Employees at those locations will receive specific information from their managers.

With a theme of "From Nanotechnology to the Stars," the presentation will feature a wide range of the Labs' work. Beginning with nanotechnology, where new materials designed molecule by molecule can benefit humanity, the address expands into Sandia's defense and energy contributions, including recent major progress in fusion energy. The talk then extends into interplanetary space, where Sandia contributions are helping ensure the success of NASA missions.

The formal presentations will last about one hour. Paul and Joan will then respond to employee questions.

The State of the Labs presentation will also be given to invited Albuquerque-area community leaders the evening of Feb. 24 at the Hyatt Regency hotel.

# Sandia-designed geothermal tools help earthquake researchers, earn global reputation for reliability

**Resilient downhole tool in place in Long Valley, California; Japan, Australia, San Andreas Fault may be next**

By Will Keener

Instruments designed and built by members of Sandia's Geothermal Research Dept. 6211 are playing an important role in earthquake research around the globe. In fact, one such instrument, located 200 feet below the surface in a geothermal well in Central California's Long Valley Caldera, recorded the devastating tsunami-causing 9.0 magnitude earthquake near Sumatra on Sunday, Dec. 26.

Technologist David Chavira and engineers Joe Henfling and Randy Normann (all 6211) are building a series of increasingly resilient and sensitive instruments that are being used by the US Geological Survey and others to study a number of earthquake-related phenomena.

Sandia engineers, who have worked for decades with the geothermal resources experts around the US, have gained a reputation for building reliable instruments that can operate in the high-temperature and high-pressure environments of a geothermal reservoir, explains Randy. Sandia-designed instruments hold the unofficial record for the longest high-temperature monitoring in a geothermal well — a year at 193 degrees Celsius — and continue to push the envelope to provide scientists with better data, he says.

## Extremely accurate

Using 32-bit pressure sensors and temperature sensors with a relative resolution of less than .01 degree C makes the Labs' instruments extremely accurate, Randy says. "We can monitor extremely small temperature and pressure changes in these reservoirs."

Sandia began working with the USGS two years ago on a program to monitor geothermal wells, which contain water in the pore spaces between grains in the hot rock. Unfortunately, Labs researchers missed an opportunity for Dec. 26 quake data from a deeper geothermal well in the same area because they pulled the probe from the well for inspection days before the giant earthquake — the largest in the world since 1964.

Using pressure and temperature tools to analyze earthquake data shows potential because reservoirs can sometimes be five to 10 miles long, creating a much larger area of sensitivity to the waves generated by quakes than the relatively small area used by seismic detectors. "We also have the potential to put tools much deeper in hotter zones below the reservoir where the rock is very hot," says Randy.

## Long Valley Caldera

California's Long Valley is one of several places where distant earthquakes are registered



**DOWNHOLE TOOL** — Joe Henfling fields one of Sandia's high-temperature downhole tools, now in demand for science and energy projects around the globe. (Photo by Randy Montoya)

through a phenomenon called remotely triggered seismicity, Evelyn Roeloffs, a Vancouver, Wash.-based USGS geophysicist says. Large earthquakes, sometimes far away, create waves that cause bursts of micro-earthquakes in the area. Some persist for days after other seismic activity has returned to normal. "How is it that seismic waves trigger these bursts of earthquakes?" she asks.

"We have a history of monitoring in Long Valley," she says. "In the past, we couldn't record the pressures frequently enough to determine if there was any response to seismic activity. Now we are recording temperatures and pressures once every 2.5 seconds. We want to see if we can get better timing of the pressure changes in the rock relative to the seismic activity and if there are temperature changes."

Sometimes pressures in the fluids in the reservoirs increase after earthquakes and movements

in the rocks can be measured. "If we could put tools in deeper and hotter wells, we could get better information," Roeloffs says.

## Under the sea

At New Mexico Tech in Socorro, geophysicist Harold Tobin is also discussing a deeper and hotter regime for the placement of Sandia's geothermal tools.

"We are still in the planning stages, but in about a year and a half we are going to start a big drilling project to bore into a tectonic feature similar to the one where the Sumatra earthquake occurred," says the associate professor. "The site is off the coast of Japan in the Nankai Trough Seismogenic Zone. The target is six kilometers beneath the ocean's floor in water two kilometers deep, in a subduction zone where some of the largest earthquakes on the planet have been generated. In 1944 and again in 1946 the quakes generated significant tidal waves, or tsunamis, as well.

"We are looking to place instruments in the fault zone to better understand the precursors of earthquakes and to learn about the physics of these zones in terms of storing stress and releasing it as the plates slip and displace. We will need instruments that can withstand temperatures of 150 to 180 C, which are well up in the range where normal electronics don't work."

Basically, scientists understand that the friction between two moving rock faces causes them to stick and build up pressure until it overcomes the friction, moving the rock and creating an earthquake. "There's a theory that the pore fluid pressure in the rocks affects this dynamic," Tobin says. High water pressure may push faces apart, allowing slippage of the rock faces. "When earthquakes happen may be governed by fluid pressure, which is why the instruments down hole are so important."

## More projects

Sandia is also working with the USGS and other research groups on a project called "SAFOD," San Andreas Fault Observatory at Depth. The goal here is also to place instruments within a moving fault. Funding allowed Phase 1, drilling to three kilometers, to be completed last summer. This summer the well will be drilled to 3.2 kilometers and a suite of instruments installed.

Stanford professor Mark Zoback, a principal investigator on SAFOD, says the instruments will be placed in an area identified as a center of numerous small earthquakes. "The instrumentation is going to have to take a severe shaking and temperatures of about 135 degrees C," he said during a talk last week at Sandia.

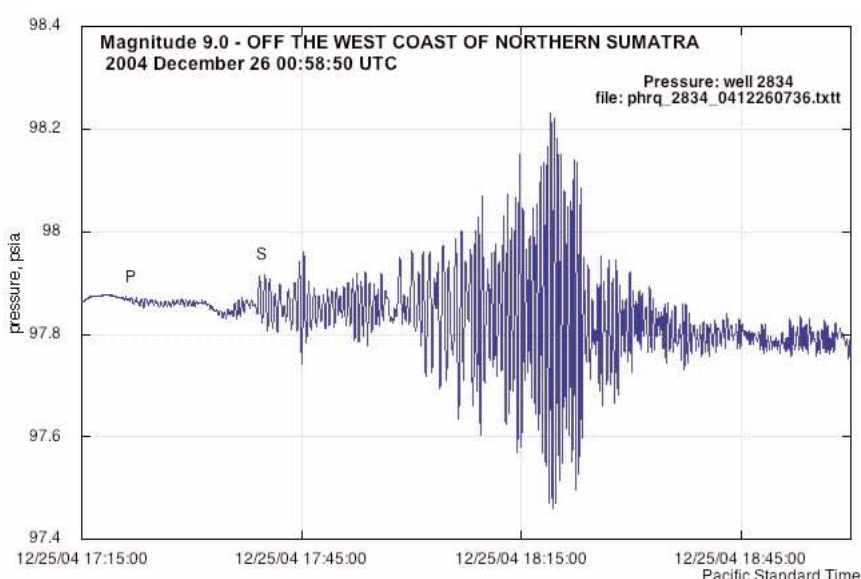
"We are currently attempting to identify commercially available electronic components and sensors for an affordable instrumentation for the SAFOD project," says Randy. Other instruments will be installed in pipes across the fault. The idea is that the shearing action of the two plates moving in different directions will ultimately destroy them, sending never-before-seen fault movement data in the process.

Another Sandia-designed tool is being refurbished after two years and prepared to go into a Navy-owned geothermal well in California.

## Monitoring in Australia

Sandia has been asked to monitor a production flow-test in Australia at a depth of 13,000 feet at 260 degrees C. "We've got a tool that can run to 275 degrees C for several weeks in our test ovens," says Randy. The idea is to produce fluids from the reservoir as would be done in the operation of a geothermal-electric power plant. "They want to produce thousands of gallons a minute while we monitor what happens to the bottom hole pressure and temperature levels in the reservoir," says Randy. "That will help them decide if they want to actually build the plant."

## Portrait of the Sumatran killer earthquake



Waves from the disastrous tsunami-producing Dec. 26 earthquake off the west coast of Sumatra were recorded using Sandia-designed instruments in a geothermal reservoir in Long Valley, Calif. Waves marked P and S on the graph travel through the core of the earth and register first. Amplitude increases to the right on the graph reflect the contribution of later-arriving Rayleigh waves, which travel in the earth's near-surface, explains USGS geophysicist Evelyn Roeloffs.

# Third CINT users workshop proposes 'Discovery Platform' MESA microsystems tools to aid nanoscale research

By Neal Singer

If there was a message from the third CINT users workshop, held in late January at the Marriot Pyramid in Albuquerque, it was that the integration of microdevices to aid explorations of the nanoscale is no longer just a good idea — it is happening. That effort is being led, at least in part, by the joint Sandia/Los Alamos Center for Integrated Nanotechnologies.

"I have been to many nanocenters," said Dennis Donaldson, general managing partner of XetaComp Inc., "but I have never seen the organization and facilities coming into play that I see here." XetaComp, in Edmond, Okla., is involved in custom nanoparticle development.

The program — the last headed by CINT

*"These people are the best in the world. They could go anywhere. They come here because there's something here for them."*

Terry Michalske

founding Director Terry Michalske, who received what Sandia VP Pace VanDevender described to the audience as "a substantial promotion" in moving on to head the Biological and Energy Sciences Center 8300 (*Lab News*, Feb. 4) — filled the conference center with approximately 200 participants who asked useful technical questions of each presenter.

"These people are the best in the world," said Terry of workshop participants, in an impromptu *Lab News* interview during the meeting. "They could go anywhere. They come here because there's something here for them."

## CINT a 'portal'

Pace described CINT — a non-defense-oriented, DOE Office of Science-funded program — as "our portal to the wider scientific community," and so the questions demonstrated.

The workshop program focused on external research currently exploiting the "jump-start" CINT User Program. ("Jump-start" refers to the early access granted external researchers to facilities at both LANL and Sandia before doors are even hung, so to speak, on dedicated CINT facilities expected to open at both labs in early 2006. The hit-the-ground-running approach has already

produced high-profile papers in prominent publications, says User Program manager Neal Shinn.)

In a departure from the conventional focus on Labs-based capabilities, a new CINT concept called a Discovery Platform was launched in a keynote presentation by Cornell University researcher Harold Craighead. Craighead, who has an international reputation, demonstrated how Cornell microstructure systems — some remarkably simple in design — can be used as experimental tools to measure and further reveal physical properties of materials at the nanoscale.

Sandia staff scientist Bruce Bunker (1116) expanded on this idea. He spoke of making available to external researchers a suite of mass-produced microsystems tools he formally called Discovery Platforms. These would help researchers without the resources of the two giant labs to investigate the nanoworld. Bruce presented an overview of how this could be done.

The process includes providing CINT users with standard substrates, structured materials, and premade microscale chips and devices, some of which will be fabricated in Sandia's half-billion dollar MESA facility. An expanding suite of Discovery Platforms would provide miniature, self-contained experiments for a variety of test functions at the nanoscale that CINT clients might want to perform but be unable to do, because of the cost of building test instruments from scratch.

## Microsystems and nanoresearch

As Bruce put it, "Microsystems provide unique opportunities for conducting basic research studies of nanomaterials — to probe the nanoscale — but the process is expensive." He said that Sandia and Los Alamos "have a lot of capabilities developed for specific programs — but not anything anyone here [in the audience] could jump in and use today."

Recognizing that problem, he said, CINT intended to provide users with "miniature experimental labs to physically and chemically analyze the properties of nanomaterials, whether mechanical, electrical, optical, or chemical." Teams of CINT scientists from LANL and

Sandia, working with interested external researchers, will conceive and design the platforms, which will be available through the CINT User Program to scientists across the Labs and externally.

Ideally, these Discovery Platform chips (now in the first stages of design) would have multiple in-out ports, be standardized, readily available, rugged, robust, and widely compatible, with standardized substrates for self-assembled monolayers and flat surfaces for adsorption slides involving biomaterials. There would also be structured materials like photonic lattices for optical interconnects, filters, and switches.

"We're going to try to be helpful to everyone by developing Discovery Platforms that are truly user-friendly experimental modules," he said.

Capabilities of such microdevices, he said, should include thermal stimulation capabilities for rapid, high-resolution temperature control for syntheses, reconfiguration, activation and decomposition of nanomaterials.

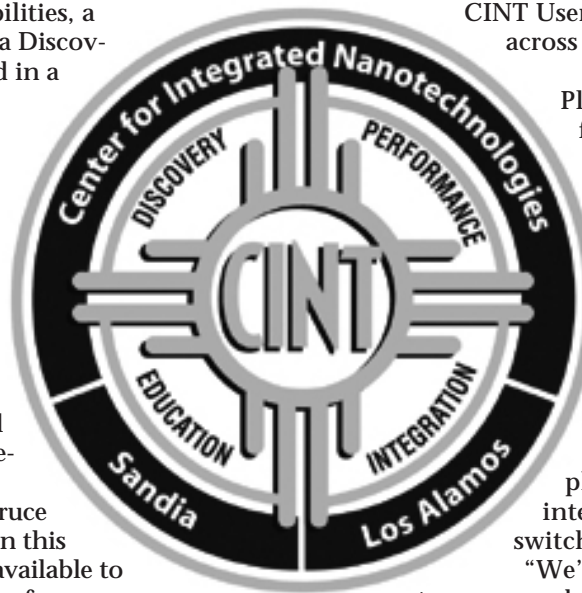
He relaxed his audience — after a technical description of one version of Sandia's micro hot-plate — by asking, "We got this great tool and what are we going to do with it, make microtoast?" Then he got back to work, describing the potential value of the tool as part of a Discovery Platform.

CINT participants and presenters came from a wide variety of institutions, including Johns Hopkins, the University of Illinois at Urbana-Champaign, Harvard, various University of California sites, Northwestern and other Big Ten schools of the Midwest, and the universities of Florida, Minnesota, Oregon, and New Mexico.

Programs at the CINT Center — physically still in the construction stage along Eubank Blvd, along with a structure rising at LANL — were jumpstarted by funds from DOE's Office of Science.

To date, the jumpstart program has attracted 188 "user" proposals from 93 institutions in 34 states and seven countries.

Project approval is based on external scientific evaluations by leading scientists from outside the laboratories, combined with availability of CINT capabilities and resources.



## Go Figure! Nine Carlsbad students honored at Mathematical Challenge Competition first sponsored by Sandia/Carlsbad

The nine high scorers of the first annual Go Figure Mathematical Challenge in Carlsbad — along with their parents, math teachers, and principals — were honored at a recognition banquet Jan. 13 at the Waste Isolation Pilot Plant (WIPP).

Paul Shoemaker, acting director of Nuclear and Risk Technologies Center 6800, presented awards to the 7-12 grade students, giving each a copy of the book *Algebra through Problem Solving* and a WIPP commemorative salt-core plaque. Lloyd Piper, deputy manager of DOE's Carlsbad Field Office, also participated in the ceremony. Parents and teachers made brief comments about the students as each was honored.

Sandia/Carlsbad sponsored its first Go Figure Mathematical Challenge at Carlsbad High School Oct. 30. Go Figure is a series of math problems that test a student's ability to think mathematically and to solve problems.

Of the 16 participating students, nine distinguished themselves as high achievers and were honored at the banquet. They were Kevin Park, 7th grade, first place; Stephanie Magby, 8th

grade, honorable mention; Benji Buell, 8th grade, first place; William Rodriguez, 9th grade, first place tie; Kirby Witte, 9th grade, first place tie; David Park, 10th grade, first place; Scott Kardos, 11th grade, first place; Sean Sullivan, 12th grade, honorable mention; and Nicholas Stucky-Mack, 12th grade, first place.



STUDENT WINNERS in Go Figure competition in Carlsbad, N.M.

Several Sandians volunteered, making the exam and recognition banquet happen. Carlsbad volunteers were Angela Guerin, Stephanie Lopez, Carol Streber, and Sherry Stone (all 6820), Joe Kanney, Jennifer Long, Eric Vugrin, and Kay Vugrin (all 6821), Randy Roberts (6822), and Paul Shoemaker (6800). Bart Buell (6821) coordinated the Carlsbad efforts.

"Go Figure is a wonderful way for Sandia to promote the teaching of math and science, and teachers present at our awards ceremony were energized by the fact that someone took the time to acknowledge and reward academic achievement," Paul says.

The Go Figure Mathematical Challenge is funded by DOE. Sponsors include Sandia, Los Alamos National Laboratory, and Lockheed Martin.



# Sandia Gold President's Quality Awards

The descriptions of these four teams that won Gold Awards in the Sandia President's Quality Awards competition were not printed correctly in the Feb. 4 Lab News due to a production error. Here is the correct information.

## Diabetes Pilot Project Team



DIABETES PILOT PROJECT TEAM

The Sandia Diabetes Pilot Program was designed to remove barriers to diagnosis and treatment, to provide convenient access to health care and education, and to work closely with physicians and health plan providers. A team of health care professionals, specialists, case managers, and community providers were unified by a commitment to provide the best in evidence-based care. Outcome measures and data analysis were tracked throughout to show quantifiable return on investment.

Team members: Debra Menke (3331), Renee Holland, (3331), Deirdre Anderson (3331), Patricia Bowles (3332), Callie Butler (3331), Robyn Carr (3331), Edward Cazzola (3331), Larry Clevenger (3300), Linda Duffy (3330), Eileen Gonzales (3331), Catherine Anne Gray (3331), Neil Kaminsky (3331), Gerard Kerbleski (3331), Gigi McKenzie (3330), Marti Ann Peters (3331), Arlene Price (3331), William Talley (3331), Lisa Teves (3331), and Virginia Valentine (3331).

## Corporate Education, Development, and Training (CEDT) Reporting System Team

The CEDT Reporting System provides self-service web access to training reports. It provides users with tools to monitor training and compliance by individual, organizations, or to the entire laboratory. It also provides a mechanism to report compliance data to Lockheed Martin and DOE.

Team members: Lorraine West (3551), Linda Stackpole (3520), Ruth Aragon (3551), Alan Armentrout (3551), Lisa Barham (3551), Jessie Black (9521), Tara Camacho-Lopez



CEDT REPORTING SYSTEM TEAM

(3551), James Finch (2913), Juanita Padilla (3522), Lynne Powell (3551), Constance Rush (3551), Edward Saucier (3551), Peggy Sisneros (3520), Dana Tidwell (3551), and Peggy Underwood (3520).

## W80-3 Abnormal Environment ASC V&V Milestone Team



SOME OF THE W80-3 ABNORMAL ENVIRONMENT ACS V&V MILESTONE TEAM MEMBERS

The W80-3 Advanced Scientific Computing Verification and Validation Milestone Team developed and applied computational models to predict the response of W80-3 components and subsystems under abnormal conditions. This project relied on a strong partnership between analysts, experimentalists, statisticians, and code-developers. Controlled experiments provided data to validate the models.

Team members: Paul Spence (8754), Martin Pilch (9133), James Henry Aubert (1811), Jose Barela (14131), Amanda Barra (9116), Bennie Belone (9132), Thomas Bickel (1200), Ben Blackwell (9115), Barry Boughton (9116), Jo

Bridge (14131), Johnny Casias Jr. (9112), Jaime Castaneda (9112), Raymond Cote (9112), Neil Davie (9134), Daniel Dawson (8754), Jay Dike (8774), Kevin Dowding (9133), Ken Erickson (9112), Victor Figueroa (9132), John Garcia (8512), Walter Gill (9132), Sylvia Gomez (9132), Louis Gritz (9132), Arne Gullerud (9142), Kenneth Gwinn (9126), Charles Hanks (9132), Wahid Hermina (9110), Eugene Hertel Jr. (9116), Daniel Wayne Hester (9132), Michael Hobbs (9116), Roy Hogan, Jr. (9116), Polly Hopkins (9114), Patricia Hough (8962), Jill Hruby (8700), Tina Huber (1811), Michael Jew (8774), Justine Johannes (9112), Joseph Jung (9127), Bruce Kistler (8774), John Korellis (8754), James Richard Koteris (9142), Marvin Larsen (9117), Sangwook Lee (8754), Ken Lee (8754), Monica Martinez-Canales (8962), Sam McFadden (8754), Hal Morgan (9140), Jaime Moya (6310), Jim Nakos (9132), John Oelfke (9112), Jake Ostien (8774), Michael Prairie (2520), Daniel Ramirez (6784), Vicente Romero (9133), Edward Russick (1811), Armando Saenz (9132), Simon Scheffel (8754), Jean Sena (9122), Trè Shelton (2991), James Stewart (9143), Gerald Stoker (9122), Amy Sun (9114), Kyle Thompson (14131), Paul Thompson (14131), Steven Trujillo (9112), Michael Vahle (5500), Vernon Wallace Jr. (14131), Kenneth Wilson (8770), and Steven Younghouse (9122).

## W87 Body Section Processing Team



W87 BODY SECTION PROCESSING TEAM

The W87 Life Extension Program involved assembly into an Mk21 body section. Due to past production issues, there was a shortage of War Reserve body sections. This team devised a process, and reworked previously rejected body sections, rendering them suitable for production. The team's efforts enabled the successful completion of the Life Extension Program.

Team members: Veronica Harwood (8231), Lee Rieger (12342), Christopher Binns (8762), Linda Domeier (8762), Marion Hunter (8762), Patrick Keifer (8762), Robert Oetken (8231), Don Osbourn (82363), Bud Pelletier (8528), Kit Schmitz (8236), Lynn Shackelfoot (8523), and Dale Walker (8231).

## Feedback

### Q-cleared bike commuter finds personal searches 'discriminating'

**Q:** I would like to have the process for personal searches explained as I find this practice very discriminating. I am in a building outside the tech area and I ride a bike to work, as a consequence I find myself constantly being searched — three times in the last month alone. I have had my pack searched when entering the building to the point of opening lunch containers. It's hard to "Have a nice day!" after having your lunch rifled through. I have on occasion been intentionally held up leaving the building long enough to miss the Eubank Gate, causing me to have to ride two miles out of my way (to which I have a witness). I am told this policy is uniformly applied, yet I see women walk by with purses unchecked. I have also spoken to many individuals who have worked here 20+ years and never been searched because they reside inside the tech area, even though they can come and go through unmanned turnstiles. This is demoralizing. As a Q-cleared, polygraph employee I have fewer rights than a criminal since I am assumed guilty until my lunch proves otherwise. Who sets the guidelines for this process and monitors compliance? How many guards get their lunches searched? What does all of this prove? What documented evidence shows that it serves any benefit?

**A:** Being subjected to random inspections certainly can be viewed as a frustration, or even harassment, when the purpose and methodology is unknown. The Protective Force tries very hard to ensure a fair and balanced approach to inspections. A Random Search Generator application was developed to remove subjective and redundant tendencies with regard to inspection locations. Eighty-three inspection locations (gates, turnstiles, and building entrances) were loaded into the application. The application randomly selects ten locations and times to conduct inspections each day. Of those ten, five are for entry inspections and five are for exit inspections.

All employees, regardless of position or department, are subject to inspection. The likelihood of being selected for multiple inspections depends on several factors. Although the Random Search Generator removes much of the subjectivity, it may select the same location for several different time slots in

one day. Similarly, if a person frequently enters or exits an area, chances of encountering an inspection are higher. In actuality, inspections should convey a sense of security that weapons or other dangerous items cannot be easily brought into our work areas. Random inspections are conducted to fulfill several requirements. At Sandia National Laboratories, inspection requirements come from DOE order and Sandia CPRs. The DOE Physical Protection Manual 473.1-1 (available online) specifies the entry and exit inspection requirements for DOE areas. The following excerpts are from DOE M 473.1-1:

"c. Exit Inspection Procedures. Personnel, vehicles, and hand-carried items, including packages, briefcases, purses, and lunch containers, are subject to exit inspections to deter and detect unauthorized removal of S&S interests from security areas."

"d. Inspections. Personnel, vehicles, hand-carried items, and packages entering or exiting the PPA are subject to inspection to deter and/or detect unauthorized introduction of prohibited articles and removal of Government assets."

"4. Entry/Exit Inspections. The following S&S requirements apply to entry and exit inspections. The inspection process must be documented in the SSSP or security plans and validated."

In addition, CPR400.3.11, Access Control <<http://www-irrn.sandia.gov/iss/CPR400.3.11/cpr400.3.11.htm>>, states, "Individuals entering or leaving Sandia-controlled premises are subject to search of their person, hand carried items, and vehicle."

The Sandia National Laboratories Protective Force is responsible for carrying out these requirements in both Technical Areas and elsewhere on Sandia property.

Inspections have become a part of life at Sandia and they serve a very real purpose. In a post 9/11 environment, inspections keep us all safer and detect or deter theft and espionage.

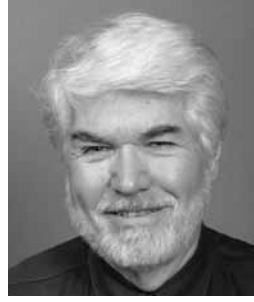
— Mark Jamsay (4211)

# Mileposts

*New Mexico photos by Michelle Fleming  
California photos by Bud Pellittier*



John Brainard  
35 2564



Gary Jones  
35 1313



Jerry Adams  
25 2997



Pauline Dobranich  
25 4142



Gary Fischer  
25 15234



Brad Godfrey  
25 9741



Michael Orrell  
25 2132



Carlos Quintana  
25 9617



Michael Rouse  
25 10756



Arlee Smith  
25 1128



Lorraine Solanos  
25 42331



Linda Stackpole  
25 35201



John Zich  
25 14100



Jim Beals  
20 10822



Stan Fraley  
20 5003



Charles Lloyd  
20 9724



Carol Murray  
20 2553



Kevin Boyack  
15 9212



Laurence Brown  
15 12125



John Burns  
15 5923



Beth Dick  
15 10515



Donald Dietz  
15 2913



Duane Dimos  
15 1803



Mark Harris  
15 5736

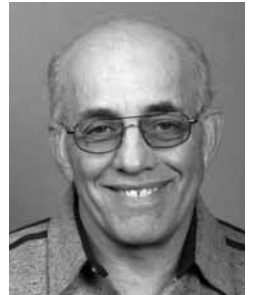


Gregory Madrid  
15 4153



Robert Pierce  
15 2356

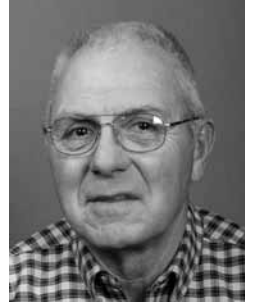
## Recent Retirees



Bill Bonahoom  
33 2612



Kenneth Boldt  
28 6927



John Eisenberger  
26 10864



Bill McClean  
26 8300



Don Meeker  
25 8772

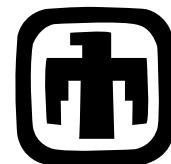


Catherine Rosul  
20 1734



## Retiree Deaths

- Marvin O. Aaron (age 83) . . . . . Dec. 3
- Ralph Wardlaw (72) . . . . . Dec. 3
- Edward P. Darnell (89) . . . . . Dec. 7
- Helen E. Gelwicks (90) . . . . . Dec. 10
- Hazel C. Minter (82) . . . . . Dec. 11
- Carl J. Bachmann (87) . . . . . Dec. 14
- Ellis L. Roper (90) . . . . . Dec. 15
- Joseph M. Ralls (83) . . . . . Dec. 16
- Edith F. Jolly (96) . . . . . Dec. 17
- M. R. Gutierrez (86) . . . . . Dec. 18
- Elaine A. Coons (88) . . . . . Dec. 19
- Erhard T. Eisenmann (71) . . . . . Dec. 21
- Lee G. Radosevich (66) . . . . . Dec. 22
- Thomas F. Laney (79) . . . . . Dec. 23
- Oreste Ganzerla (81) . . . . . Dec. 24
- Chandler C. Smith (86) . . . . . Dec. 24
- Benjamin M. Cordova (89) . . . . . Dec. 25
- Joseph P. Darginis (84) . . . . . Dec. 27
- Donald D. Knott (83) . . . . . Dec. 29



## Sympathy

To Janet Iafonaro (14433) and Frederick Apodaca (9622), on the death their father, to Carl Iafonaro (14414-1) on the death of his father-in-law, and to Monica Iafonaro (2956) on the death of her grandfather, in Albuquerque, Jan. 2.

# Mikhail Gorbachev gave family key that opened the door to freedom . . . and led one member to Sandia

By Iris Aboytes

Bubble gum wrapped in Donald Duck comics is what Zack Dorosh of WR Mechanical Design Dept. 2997 recalls as his first taste of freedom.

Zack was born in the northwestern part of the Ukraine, east of Poland. He lived there until he was eight years old, 15 years ago.

"My father dreamed of coming to America since he was 16," says Zack. "When Mikhail Gorbachev came into power, my dad's strong desire for religious freedom gave him what he had been waiting for — the key that opened the door to total freedom."

Before he could get the key, he had to raise 2,000 rubles (about \$2,200). The KGB required an under-the-table fee for allowing him to renounce his citizenship. It took only one week for the churches near their residence to raise the money. His dad would finally escape the constant KGB threat for not being a communist.

## Discovering chewing gum

Zack, along with his parents and 10 brothers and sisters, ages 1-1/2 to 16, boarded a train with other religious refugees. For Zack, it was an adventure. Their first stop was in Warsaw, Poland.

"Reaching Warsaw, my brothers and sisters and I discovered gum," says Zack. "Inside the wrappers were comics. We loved the comics. We collected glass bottles that were strewn around and sold them to buy the gum. It was shocking, we could get five pieces for 25 cents. We each got a little piece. Gum had been a very expensive delicacy in the Ukraine."

They had a one-day layover in Warsaw until their next train ride.

In Vienna, Austria, there were no established refugees' quarters so they stayed in an old unused chocolate factory. The floor of the factory was covered in a thin layer of chocolate. The refugees scraped the floor so they could put their mattresses down. They were in Austria for 27 days.

It was there that Zack first realized "I am going to America." He could hardly wait. In America he would be able to eat all the pineapple he wanted, drink a whole Pepsi, and be rich. Fruit had been very expensive in the Ukraine. Sometimes he would share a little piece of banana with his brothers and sisters. In America he would be able to eat a whole banana by himself and eat all the fruit he wanted.

From Austria the refugees went to Aprilia, Italy, about an hour south of Rome. There they were housed in a town-home refugee community during their 2-1/2 month stay. "We played all day," says Zack. There was no school. Across from where we lived was an open field where

flea markets and bazaars were held. Vendors would pay us for helping them fold clothes and get their goods ready for the markets."

"In the big open fields we found lizards," says Zack. "There had been no lizards in the Ukraine. At first we freaked out and ran away from them. After a while, we began to catch the little ones."

While they were in Italy his father thought they might be sent to Canada, but Canada was not receiving refugees so they got the call to go to America.

## Temporary housing in Philadelphia

Upon reaching New York they got news that a Christian college in Philadelphia was offering temporary housing for refugees fleeing from Europe. So to Philadelphia they went. They were there for two months. The other four refugee families that traveled with them had found sponsors within a month. "My parents were both very worried, but they had faith that a miracle would happen," says Zack, "and it did."

They received word from a church in Trafford, Pa. (a suburb of Pittsburgh) that they had a house for a family of 13. So to Trafford the family went.

"Our new home was wonderful," says Zack. It was a two-bedroom house with a big back yard. The four older boys shared one bedroom and the four older girls the other one. The remaining three siblings and his parents slept in the living room. In the Ukraine they had lived in an apartment on the ninth floor so they did not have a back yard.

"Let me tell you about our car," says Zack. "It was furnished by the church. It was white with an eagle on the hood. It looked real cool."

They had arrived in Philadelphia in October, so first on the agenda was making sure all the children were enrolled in school. They attended English classes in the morning and regular classes in the afternoon. "I loved it," says Zack, "I would study — to me it was play — on a computer. If I spelled three English words correctly, a little fire engine would come on the bottom of the screen. I loved the noise it would make as I would try to spell as many words as I could. Our teachers told us to watch TV to learn English, so we watched TV."

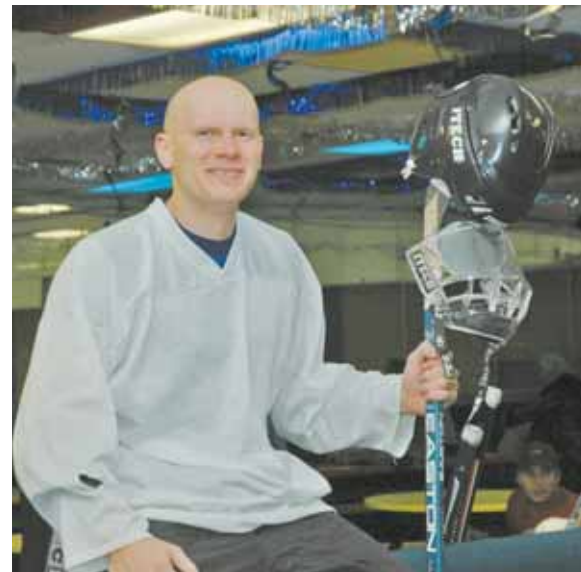
## 'Not easy for my father'

"It was not so easy for my father," says Zack. He worked as a painter during the day and took English classes at night. Since he had refused to register as a communist in the Ukraine, he had not been allowed to attend a university. He had gone to trade school to become an electrician. An accident there had left him blind in one eye.

Now in America his father made sure all the children would attend a university. All 11 children have degrees or are in the process of getting them. "My dad is my hero," says Zack. "Had it not been for his strong religious convictions and desire for a better life for his family, we would not be enjoying these precious freedoms."

"Little by little, we all became very comfortable and embraced the culture," says Zack. "America is after all one big melting pot and — it accepted us. After two years, I did not need a language tutor. My biggest struggle became what to do when I grew up."

Zack's parents still live in the same house they settled in 15 years ago. Their English is



UKRAINIAN-BORN Sandian Zack Dorosh coaches Little League roller hockey. (Photo by Bill Doty)

much improved.

"They visit with my maternal grandparents often," says Zack. "After all, they just live about a mile from my parent's house. You see, they came to this country about four years after we did."

## 'Everything comes from freedom'

"Everything comes from freedom," says Vitalij Dorosh, Zack's father. "In the Ukraine if you agreed, you had freedom; if you disagreed, you had no freedom. With freedom come choices and responsibilities. I pray that God gives my children the wisdom to work hard and make the right choices and accept the responsibilities. Even though I am a foreigner, I feel more welcome in this country than I did at home. I feel very proud that Zack works for Sandia and makes the security of America a priority."

Zack loved his shop classes, so mechanical engineering became part of his life. Zack went to Penn State and got a degree in mechanical engineering technology. He says the recruiters brought him to Sandia, where he does mechanical engineering design work. "I feel very proud," says Zack. "I feel that I am doing a great service to this country. I want to keep it safe from anyone's abusive powers."

In his spare time Zack is immersed in sports. He plays soccer, softball, and volleyball and coaches Little League roller hockey. He also attends a local church and mentors young kids.

## Feedback

**Q:** I recently contacted Fidelity to arrange automatic partial payments on a 401k loan (i.e., payments in addition to those deducted from my paycheck to pay off the loan faster). The customer service representative informed me that the Sandia plan does not allow partial 401k loan payments, though it does allow a loan to be paid off in full. This surprised me because I could not see how allowing extra loan payments would adversely affect Sandia in any way. Why does the Sandia plan not allow this option? Are there plans to make this option available in the future?

**A:** Thank you for bringing this point to our attention. Sandia's current arrangements for processing loan repayments were initially based on systems limitations at Fidelity. However, Fidelity has since enhanced their loan processing systems and may be able to accommodate some types of extra or off-cycle loan repayments. We will pursue with Fidelity their current capabilities to determine if more flexibility can be added to the loan repayment requirements. Since the loan feature is part of the design of the savings plans, any changes to that feature must ultimately be reviewed and approved by Sandia's Board of Directors, DOE, and the Internal Revenue Service.

— Bonnie Apodaca (10500)



ZACK DOROSH is the little guy at front left, seen with his Mom and Dad and brothers and sisters in this family photo from the Ukraine. Three other siblings were born later.