



AS THE SUN moves lower in the sky, shadows grow longer, but light still glints from Sandia's solar tower and we know that holidays, and longer days, cannot be far behind.

(Photo by Randy Montoya)



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# Sandia LabNews

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## New DOE rule requires random drug testing of all cleared employees and contractors

**Fifty percent of Q and L population to be tested annually — or 30 employees a day**

By John German

All Sandia employees and contractors who hold Q- or L-level security clearances soon will have a 50 percent-per-year chance of being randomly selected for a drug screening. Testing could begin as early as January.

Once notified, a Sandia clearance-holder will be required to report to a testing facility within two hours and provide a urine sample. Selections will be made randomly from a Sandia badge-holder database. Sandia's Health, Benefits, & Employee Services group will manage the selection and screening process.

Specimens will be sent to a certified lab for assaying. Drugs being screened include marijuana, cocaine, opiates, phencyclidine, and amphetamines.

The new requirements will apply to all cleared

employees and contractors as soon as DOE officially directs the Labs to implement the policy. This could occur in the next few weeks. (The effects of the new requirements will be negotiated with Sandia's bargaining units soon.)

### Expanded DOE requirement

The policy change came to the Labs in a recent memorandum from Energy Secretary Samuel Bodman directing DOE sites to begin random drug testing for all positions that require access authorizations. The decision was based on a DOE task force review completed in February and a desire to ensure the safety and security of workers, DOE sites, and surrounding communities, according to the memorandum.

"I have determined that all federal and contractor

positions that require a security clearance (Q or L) and all employees in positions that currently have security clearances have the potential to significantly affect the environment, public health and safety, or national security," he said. "Therefore, all such positions will be considered to be Testing Designated Positions (TDPs), which means they are subject to applicant, random, and for-cause drug testing."

The TDP designation has, in the past, applied to positions in which an employee or contractor would, if impaired, pose a special risk to others, to national security, or to the environment. Truck drivers transporting hazardous cargo are an example. The DOE decision expands the TDP designation to anyone holding or applying for a clearance.

*(Continued on page 4)*

## Sandia's Sunshine to Petrol project seeks fuels from thin air



SUNSHINE TO PETROL PROTOTYPE — Sandia researcher Rich Diver assembles a prototype device intended to chemically reenergize carbon dioxide into carbon monoxide, which ultimately could become the building block to synthesize a liquid combustible fuel. (Photo by Randy Montoya)

By Chris Burroughs

Using concentrated solar energy to reverse combustion, a Sandia research team is building a prototype device that is intended to chemically "reenergize" carbon dioxide into carbon monoxide using concentrated solar power. The carbon monoxide could then be used to make hydrogen or serve as a building block to synthesize a liquid combustible

***"Liquid Solar Fuel" is the end product — the methanol, gasoline, or other liquid fuel made from water and the carbon monoxide produced using solar energy.***

fuel, such as methanol or even gasoline, diesel, and jet fuel.

The prototype device, called the Counter Rotating Ring Receiver Reactor Recuperator (CR5, for short), is expected to break a carbon-oxygen bond in the carbon dioxide to form carbon monoxide and oxygen in two distinct steps. It is a major piece of an approach to converting carbon dioxide into fuel from sunlight.

The Sandia research team calls this approach

*(Continued on page 4)*

# What's what

Well, preparing for goodbye to Sandia and colleagues at the end of the month started me thinking about goodbyes from lots of other places and people and work in my life. There've been a lot of them - not unusual for news people.

There have been goodbyes to my childhood home, Yale, the Air Force, the University of Kentucky, The Associated Press bureaus in Louisville and Boston, and United Press International's Albuquerque bureau. There were goodbyes to the editor's chairs of the *Las Cruces Sun-News* (twice), *Valencia County News-Bulletin*, *The (Orlando) Sentinel's* Daytona Beach bureau and *Seminole Sentinel* in Sanford, and to shorter stints with both the *Albuquerque Journal* and *The Albuquerque Tribune*, and some freelancing here and there.

Shuffled into the mix, there were goodbyes after a couple of years as PR guy for NASCAR, five years as a bank marketing officer in Belen, and a year in the PR group at Los Alamos.

A lot of the work in all those places was pretty mundane, but there are some memorable "snapshots." In no particular order:

- Part of an afternoon at Bethune Cookman (then) College in Daytona Beach with the great Joe Louis, quiet and dignified, with hands that made mine look like a child's

- Part of another sunny afternoon in the dusty plaza of the aged, nearly blind Frank Brito's hacienda in Las Cruces, absorbing his memories as one of the last survivors from Teddy Roosevelt's Rough Riders

- Chatting, along with other reporters, with a bushed Sen. George McGovern in trousers, socks, and a T-shirt, drink in hand, perched on the edge of a dresser in a Concord motel room at the end of a day's campaigning for the New Hampshire primary

- Drugstore milkshakes, lunches, and lots of laughs with the peripatetic "Jungle Jack" Hanna as he launched his career at the truly tiny Sanford, Fla., zoo, and we barnstormed the community for money to expand it into a 100-acre-plus park

- "King Richard" Petty walking into a big NASCAR party at a beachfront Daytona Beach hotel, flashing his dazzling smile and saying to the rookie PR guy who'd not yet seen a race, "Hey, man, we like talking to you; you'll believe anything we tell you"

- Sitting on the pit wall at Darlington Raceway in South Carolina with a laughing Marty Robbins pointing out the gouge and stain where his car hit the grandstand wall to end that season of racing and send him back to the stage

- A wiry Hans Bethe loping down the Otowi Building ramp from the Los Alamos National Laboratory cafeteria, wispy white hair waving with each long stride

- Edward Teller perched on the edge of a table in a LANL auditorium, talking about Brilliant Eyes and Brilliant Pebbles, and treated like a rock star as he nibbled a cookie and sipped coffee after a talk in an Air Force Research Lab auditorium on Kirtland AFB

Now it's time to go sailing. (For a guy with two boats, it certainly ought to be!)

Yeah, I know; I said I was retiring last year. But this time I mean it. Probably.

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



HOWARD KERCHEVAL

## Employee death

### Dustin Locke was 'the best kind of friend'



DUSTIN LOCKE (left) and CHRISTIAN STOEHR

Dustin Locke (5631) died Nov. 11. He was 26 years old and had been at Sandia just over four-and-a-half years. He is survived by his parents, Steve and Tonya Locke of Battlefield, Mo., and sisters Heather and Emilie.

Dustin joined Sandia as a student intern in the Center for Cyber Defenders. His exceptional computer skills, teamwork, and outgoing nature made him a "must-hire," says his manager, Roxana Jansma.

Dustin completed a double major in computer science and computer engineering at University of Missouri-Columbia in 2003 and an MS in computer science from Washington University in St. Louis in December 2006. He had aspirations to earn a PhD and a private pilot's license.

Dustin was a valued technical staff member who achieved a great deal at Sandia, Roxana says. He made important technical contributions through innovative software design and analysis techniques with key applications for national security. As an example of his promise, Roxana cites his work on a tool that automates the analysis of computer network intrusions.

"Dustin was an outstanding team member who worked very well with others," Roxana says. "He was a highly regarded technical leader who motivated others with his friendly, capable style."

Christian Stoehr, Dustin's roommate, work colleague, and friend, says, "He was extremely intelligent, an excellent cook, a good musician, and had a razor sharp wit that kept all those around him in high spirits. He was the best kind of friend that anyone could ask for."

"As his manager," Roxana says, "I was proud to watch him blossom in his job, as he worked hard to learn and grow. Dustin cannot be replaced."

# Sandia LabNews

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## New federal credential badge replacement program delayed

Everyone with a security clearance at Sandia will soon be required to exchange his or her badge for what is called the new "federal credential" (*Lab News*, Aug. 31). However, various factors have delayed the originally planned start date at Sandia. Dept. 4230 Manager Sally Uebelacker, who is coordinating Sandia's implementation, now anticipates that the federal credentials will be issued to Sandia workers beginning in February 2008.

Because Sandia will be among the first federal facilities to adopt the new credential, there have been few lessons learned to assist us with our implementation, Sally says. However, she notes, complications at another DOE facility were responsible for the recent delay at Sandia and throughout the DOE complex. The new credential has now been successfully tested at DOE's Germantown facility and at the Forrestal Building in Washington, D.C.

Four credentialing centers will eventually be established in the Albuquerque area, including (initially) two at the Innovation Parkway Office Complex (IPOC) and one at NNSA. When one or more of those credentialing centers has become fully operational, Sandia will begin a "pilot phase." You may begin seeing the new credential on-site beginning as early as this month. Within the next year, each cleared member of the workforce will receive an email notification from USAccess (a US General Services Administration program) with instructions to schedule an appointment at a credentialing center.

For updates regarding the credentialing project at Sandia, visit the Sandia New Mexico Badge Office website and click on the HSPD-12 icon ([www-irm.sandia.gov/security/program/badgeoffice/hspd12](http://www-irm.sandia.gov/security/program/badgeoffice/hspd12)).

# Lowering the rate of bioaerosol detection false alarms the focus of fluorescence-based bioaerosol sensing project

By Mike Janes

Commercially available, fast-response bioaerosol detectors that can help guard against bioterrorist strikes in large public spaces face a significant hurdle: false alarms. Simply put, facility managers responsible for airports, train stations, sports arenas, and other venues will be loathe to install biodetection systems until they can be fairly certain that the hardware won't alarm without cause and force unnecessary evacuations.

But a Sandia project, led by Tom Kulp (8368) and funded by the Department of Homeland Security, promises to answer the question of why false alarms occur and how to reduce them. The project, currently called Enhanced Bioaerosol Detection System (EBADS), aims to do just that — enhance the performance of bioaerosol detectors, specifically those based on laser-induced fluorescence (LIF).

EBADS literally takes a second look at what is in the air when an LIF sensor signals an alarm and determines if there is sufficient bioaerosol present for concern. If successful, EBADS could be paired with existing sensors for a more refined and commercially deployable detector system.

The project is a multilab effort involving Sandia, Lawrence Livermore National Laboratory (LLNL), Oak Ridge National Laboratory, and Pacific Northwest National Laboratory. Work began in 2005 as a follow-on to Sandia's PROACT (Protective and Responsive Options for Airport Counter-Terrorism) program. (See May 2, 2003, and Nov. 25, 2005, *Lab News*.)

Initially, various sensors were deployed in the PROACT testbed to understand the false-alarm rate. The testbed included the LLNL Bioaerosol Mass Spectrometer and a selective particle collector that Sandia and Yale University assembled.

"The first phase focused on understanding the problem," says Tom. The multilab EBADS team collected particles present in the air when a false alarm occurred and analyzed them in the field and in the lab.

The researchers came to the conclusion that existing sensors don't discriminate well between biological and nonbiological particles. If that capability could be enhanced, the result might be a sensor system with significantly fewer false alarms.

The goal, says Tom, is not to identify particles, but to determine within one to two minutes if there is an unusual amount of biological aerosol in the air — sufficient information to know you've got something to worry about.

This project is unique in that it seeks to develop a method, not produce a physical tool. "We are proving a methodology, which would then be implemented with the assistance of industry," he explains.

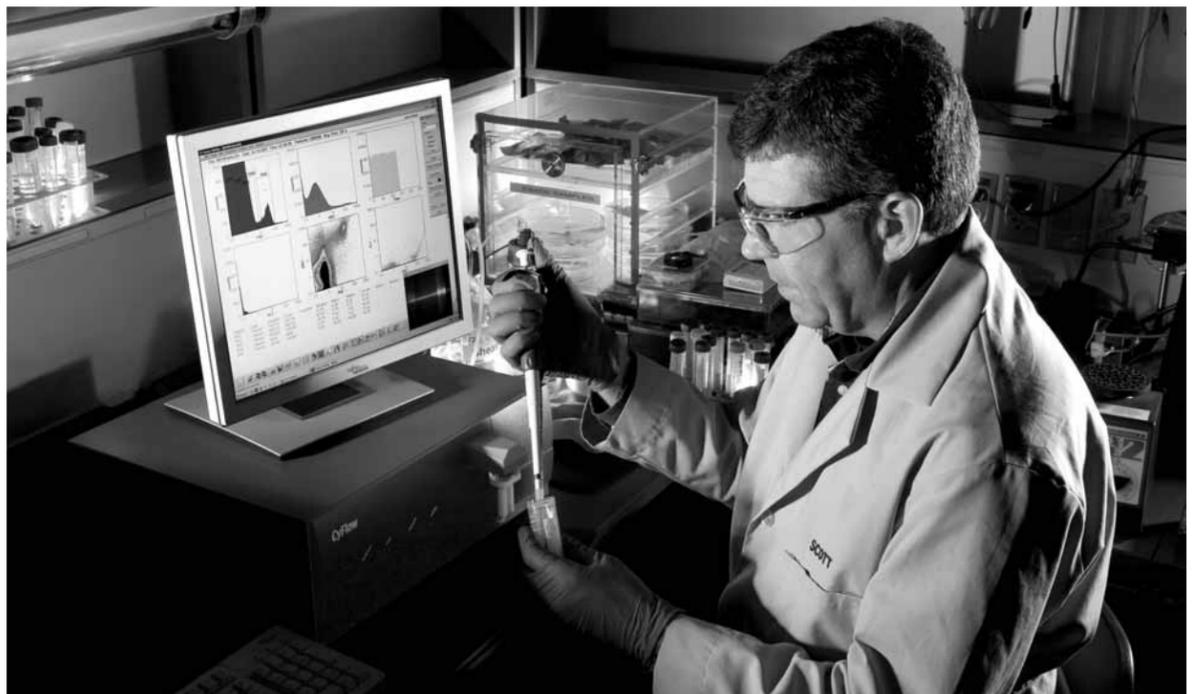
At the end of the study phase last year, Sandia and Oak Ridge researchers determined that a staining process could be used to double-check false alarms. Tom explains that there are two ways to do this — either by impacting and measuring the particles on a surface, or by measuring the particles in a flowing mode.

Sandia went with the flowing mode, in part because of the availability of commercial equipment. The method uses a flow cytometer, a tool widely used in lab analyses in a number of fields including molecular biology, pathology, immunology, plant biology, and marine biology.

The method is fairly simple. The cytometer pulls in aerosols, which swirl through a cyclone while being immersed in a solution containing a fast-reacting stain that couples to the particles.

The liquid then flows through a very fast laser zone at a rate of 5,000 particles per second where the proteins are measured. Particles with proteins light up. The system will determine whether there is cause for alarm, based on the distribution of fluorescence.

In the second phase of the program, the Sandia and



SCOTT BISSON (8368) prepares samples for a flow cytometer. The cytometer, seen here sitting underneath a computer monitor, is a central element in the Enhanced Bioaerosol Detection (EBADS) program and will be integrated with an aerosol collection system to analyze potential bioaerosols on a single particle basis for detect-to-warn applications. (Photo by Randy Wong)

## Sandia California News

Oak Ridge groups tested 18 blind samples from the Edgewood Chemical Biological Center. The method correctly determined with each sample whether there was cause for alarm.

In February, the method will get a real-world road test. Aerosol-into-liquid collectors will be deployed alongside the existing sensor system and take in samples with each alarm, which are expected to occur about once a week. The collectors will be deployed for one month each in an office building and major US



BOB CROCKER (8125) collects a sample from an aerosol-to-hydrosol collector developed by Texas A&M and the University of Texas. The collector is part of the Sandia EBADS apparatus to be used in field trials this spring. (Photo by Randy Wong)

subway station and airport.

The samples will be sent back to Sandia, where they will be run through the method to distinguish false alarms from true alarms. If successful, the group anticipates working with an outside partner later next year to develop a tool that employs Sandia's methodology.

### Employee death

Chuck Cadden's career made impact across weapons complex

Charles "Chuck" Cadden (8724) passed away on Nov. 24. He is survived by his wife Michelle, daughter Kate, 18, a student at Diablo Valley Community College, and son Patrick, 14, a freshman at San Ramon Valley High School. His extended family was able to spend the Thanksgiving holiday with him.

Chuck had a 14-year career at Sandia, working in materials science on brazing research. He began his career as a member of the technical staff in 1993 and was promoted to manager of Engineered Materials Dept. 8724 in 2001. He also managed the Handling Gear Engineering and Gas Transfer Systems departments.

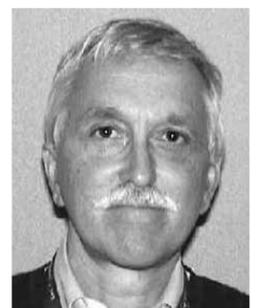
Chuck was a member of the American Welding Society (AWS) for his entire professional career and served on several committees associated with advancing the science and technology of brazing. In 1998 and 2001, he was presented with the AWS Robert Peaslee Award, a highly regarded honor in the field of brazing.

"There is no question on the technical and professional impact that he had in the area of joining that cut across Livermore, Albuquerque, and the rest of the nuclear weapons complex," says Michael Hosking, manager of Joining and Coating Dept. 1813.

Chuck attended the Rensselaer Polytechnic Institute in Troy, N.Y., receiving his BS in materials engineering in 1979 and MS in materials engineering in 1981. He held professional staff positions at both Cabot Corporation (now known as Haynes International) in Kokomo, Ind., and the Allison Division of General Motors in Indianapolis prior to joining Sandia.

"Chuck was an inspiration to all who worked with him," says colleague Jim Handrock (8230). "His dedication to the mission of the laboratory and his technical expertise were exemplary. He will be sorely missed both as a colleague and a friend."

Outside of work, Chuck was very active in local youth sports and coached a number of teams, including baseball and lacrosse.



CHUCK CADDEN

## Sunshine to petrol

(Continued from page 1)

“Sunshine to Petrol” (S2P). “Liquid Solar Fuel” is the end product — the methanol, gasoline, or other liquid fuel made from water and the carbon monoxide produced using solar energy.

CR5 inventor Rich Diver says the original idea for the device was to break down water into hydrogen and oxygen. The hydrogen could then fuel a potential hydrogen economy (*Lab News*, Feb. 3, 2006).

The Sandia research team came up with the idea to use the CR5 to break down carbon dioxide, just as it would water. Over the past year the researchers have shown proof of concept and are completing a prototype device that will use concentrated solar energy to reenergize carbon dioxide or water, the products of combustion. This will form carbon monoxide, hydrogen, and oxygen, which ultimately could be used to synthesize liquid fuels in an integrated S2P system.

Co-researchers on the project are Jim E. Miller (1815) and Nathan Siegel (6337). Project champion is Ellen B. Stechel, manager of Sandia’s Fuels and Energy Transitions Dept. 6338.

Ellen says that researchers have known for a long time that theoretically it might be possible to recycle carbon dioxide, but many thought it could not be made practical, either technically or economically.

“Hence, it has not been pursued with much vigor,” she says. “Not only did we think it was possible, the team has developed a prototype that they fully anticipate will successfully break down carbon dioxide in a clever and viable two-step process.”

Ellen notes that one driver for the invention is the need to reduce greenhouse gases.

“This invention, though probably a good 15 to 20 years away from being on the market, holds a real promise of being able to reduce carbon dioxide emissions while preserving options to keep using fuels we know and love,” she says. “Recycling carbon dioxide into fuels provides an attractive alternative to burying it.”

Funding for Sunshine to Petrol comes from the internal Laboratory Directed Research and Development (LDRD) program. The research has attracted interest and also some funding from DoD/DARPA.

“What’s exciting about this invention is that it should result in fossil fuels being used at least twice, meaning less carbon dioxide being put into the atmosphere and a reduction of the rate that fossil fuels are pulled out of the ground,” Rich says.

As an example, he says, coal would be burned at a clean coal power plant. The carbon dioxide from the burning of the coal would be captured and reduced to carbon monoxide in the CR5. The carbon monoxide would then be the starting point for making gasoline, jet fuel, methanol, or almost any type of liquid fuel.

The prospect of a liquid fuel is significant because it fits in with the current gasoline and oil infrastructure. After the synthesized fuel is made from the carbon monoxide, it could be trans-



RICH DIVER checks out the solar furnace that will be the initial source of concentrated solar heat for the CR5 prototype. Eventually parabolic dishes will provide the thermal energy. (Photo by Randy Montoya)

ported through a pipeline or put in a truck and hauled to a gas station, just like gasoline refined from petroleum is now. Plus it would work in ordinary gasoline and diesel engine vehicles.

Jim says that while the first step would be to capture the carbon dioxide from sources where it is concentrated — e.g. power plants, smokestacks, and breweries — the ultimate goal would be to snatch it out of the air. A S2P system that includes atmospheric carbon dioxide capture could produce carbon-neutral liquid fuels.

“Our overall objective with this prototype is to demonstrate the practicality of the CR5 concept and to determine how test results from small-scale testing can be expanded to work in real devices,” Jim says. “The design is conservative compared to what might eventually be developed.”

Rich says the prototype should be completed by early next year. He hand-built the precision device in a shop at Sandia’s National Solar Thermal Test Facility and is now waiting on a few parts to finalize it.

Initial tests will break down water into hydrogen and oxygen. That will be followed by tests that similarly break down carbon dioxide to carbon monoxide and oxygen.

Besides having a nearly completed prototype, the research team has already proven that the chemistry works repeatedly through multiple cycles without losing performance and on a short enough cycle time for a practical device.

“We just now have to do it all in one continuous working device,” Nathan says.

## The Counter Rotating Ring Receiver Reactor Recuperator: How it works

Operation of the CR5 is similar to a combustion engine. However, instead of converting high-temperature thermal energy into mechanical work — like a car engine — it converts the high-temperature thermal energy into chemical work. The chemical reactions form carbon monoxide from the carbon dioxide.

About the size of a beer keg, the CR5 prototype consists of a stack of rings made of reactant ferrite material, rotating close together in opposite directions. Concentrated solar heat is reflected through a small hole onto one side of the stack of rings. The side of the rings in the sunlight is hot, while the other side is cooler.

As the rotating rings pass each other in between these regions, the hot rings heat up the cooler rings, and the colder rings cool down the hot rings. This arrangement results in limiting the heat lost from the system and reducing the energy input required from the sunlight, making the device efficient.

In the first step of a two-step process the ferrite material gets very hot and oxygen is released. In the second step, carbon dioxide passes by the rings on the cooler side causing a chemical reaction to take place. This allows the ferrite material to grab an oxygen from the carbon dioxide. The result is that carbon monoxide is released and the ferrite material is restored to its original form, completing the cycle. A set of similar chemical reactions would be used to separate oxygen from hydrogens in water.

Initially a large solar furnace located at Sandia’s National Solar Thermal Test Facility will be the source of the concentrated solar heat. Eventually the CR5 research team envisions parabolic dishes, similar to the engines operated by Stirling Energy Systems (SES) at the facility, providing the thermal energy.

“We see fields of 25,000 of these dishes producing carbon monoxide covering five square miles,” says CR5 inventor Rich Diver.

## Drug testing policy

(Continued from page 1)

Sandia’s current policies require drug testing for all new job applicants prior to employment, as well as for reasonable suspicion — meaning an individual can be tested following a work-related accident or after exhibiting behaviors that lead management to conclude a person is impaired.

In addition, people in certain high-risk positions, such as those in the Human Reliability Program because of their job duties or access to sensitive information, will continue to be subject to random testing at a 100 percent rate (everyone is tested once per year).

Los Alamos National Laboratory has had a random drug testing program in place for cleared workers since earlier this year.

### The process

The first notifications to randomly selected Sandians could begin in January, says Linda Duffy, director of Benefits and Health Services Center 3300.

If a lab result indicates the presence of drugs in a specimen, the clearance holder will have an opportunity to discuss the results with a Medical Review Officer (MRO). The MRO will determine whether the result

is positive or negative. (Note: Some prescription medications fall within the drug categories being screened; the confirmed illegal use of prescription medications will result in a positive test determination as well.)

The immediate consequences of a confirmed positive drug test include the worker’s badge being confiscated and the person being removed from his or her TDP duties. Other disciplinary actions would follow, possibly including termination. Contractors will be removed from the performance of the Sandia contract.

Failure to report to a testing center within two hours of notification or refusal to provide a specimen will result in consequences equivalent to those for a confirmed positive drug test.

The expanded DOE requirement for random screenings translates to, on average, testing an additional 30 people every work day, says Linda. Certified onsite testing centers are being established at Sandia/New Mexico and Sandia/California and, for other sites, at government or private medical facilities.

### Seeking help

Dr. Edward Cazzola, Sandia/New Mexico Site Occupational Medical Director, adds that seeking help is the best option for someone with a drug or alcohol problem.

“By using drugs illegally you risk your own health

and safety and the safety of your coworkers and the public,” he says.

Sandia employees can access benefits through their health plans, available at [www.sandia.gov/resources/emp-ret/spd](http://www.sandia.gov/resources/emp-ret/spd). Substance abuse services also are available in the local yellow pages, local health department, or via the Department of Health and Human Services treatment facility locator: <http://findtreatment.samhsa.gov>.

More information about the new random testing policy, including options for drug dependency intervention and prevention, are available at [http://www-irm.sandia.gov/HR/HR\\_Service\\_Changes/change\\_pages/drug\\_testing.html](http://www-irm.sandia.gov/HR/HR_Service_Changes/change_pages/drug_testing.html)

### Other provisions of the expanded DOE policy:

- As of Nov. 1, DOE was not accepting clearance request packages without drug testing results. This includes initial (new) clearances, reinstatements, and upgrades. It does not include reinvestigations. Processing of some clearances has been delayed until Sandia can comply.

- All applicants for security clearances who have used illegal drugs during the 12 months prior to completing their Federal Questionnaire for National Security Positions will be disqualified from consideration until they can demonstrate 12 consecutive months of non-use.



MIKE STARR, ES&H COORDINATOR FOR CINT, works in the facility's mechanical room. Mike says because CINT is located off base, building occupants must adhere to existing ES&H and security procedures for all activities, but sometimes with a different approach due to the building's location. This is particularly true in the area of hazardous waste pickup. (Photo by Randy Montoya)

## CINT ES&H coordinator faces unique challenges due to facility's off-site location

By Chris Burroughs

As ES&H coordinator for the year-and-a-half-old CINT Core Facility north of the Kirtland Air Force Base Eubank Gate in Albuquerque, Mike Starr (1131) faces some challenges that are unique to the facility.

"Because CINT is off base, we have to adhere to existing ES&H and security procedures for all of our activities, sometimes with a different approach due to our location," he says.

For example, there is a difference in the way hazardous waste is picked up. On-base pickup involves a hazardous disposal request followed by waste pickup. Because waste generated at CINT has to be transported on public roads, specific Department of Transportation (DOT) rules must be followed, making the waste removal somewhat more complicated.

"When picking up hazardous waste material at CINT, waste disposal personnel require us to complete a Waste Description and Disposal Request (WDDR) form, which is standard. They come out to package the waste, and a hazardous waste manifest is created. The waste is then picked up about two weeks later," Mike says.

### *What it takes to be an ES&H coordinator*

Mike Starr, ES&H coordinator for CINT, says he fell into the health and safety field while in the Air Force at Kirtland where he worked in bioenvironmental engineering.

After four years in the military, he joined Sandia in 1993 as a radiological control technician. Since then all

his jobs at the Labs have been safety and health-related.

He was named CINT ES&H coordinator about halfway through the building process. In addition, about one-third of his time is spent as ES&H coordinator for the Molecular and Computational Biosciences programs in various buildings.

The DOT requires that special labels be placed on all the containers. Only then will the waste be transported to a facility on base.

Chemical delivery has similar requirements.

The 96,000-square-foot CINT Core Facility is the only research center run jointly by Sandia and Los Alamos national laboratories. It is one of five Nanoscale Science Research Centers funded nationwide by the DOE Office of Science to operate as national user facilities.

CINT houses low-vibration laboratories with sensitive microscopes for materials characterization, chemical/biological synthesis labs, and a clean room for nano/micro fabrication and integration. The work

focuses on discovering unique properties of nanostructured materials and exploiting these novel properties through the integration of nanomaterials into larger structures and systems. Since its official opening in 2006, CINT has accepted more than 175 user proposals from scientists at universities, private companies, and national laboratories to conduct research at the facility. When the CINT Core Facility is at full capacity it can accommodate 150 users, staff, and support personnel.

"CINT was designed to have many different users and visitors from Sandia, Los Alamos, and the scientific community," Mike says. "They all must be ES&H trained to use the equipment. A lot of the users don't have access to online training courses, so I provide training material to them when they arrive here and ensure it gets completed."

While researchers from Los Alamos and Sandia are currently trained in similar areas — e.g., lasers, chemical use, hazardous materials — ES&H material may not have been presented in the same way at the two national laboratories, potentially causing confusion.

"I've been working with LANL ES&H in the development of a Training Equivalency/Reciprocity ES&H program between Sandia and Los Alamos to ensure that people are trained consistently at their respective institutions," Mike says. This could become a model for greater ES&H training consistency across the DOE laboratory system and the adoption of best practices for the benefit of all, he says.

Another of Mike's tasks is to make sure people are ES&H-trained for their specific equipment as new laboratories open up. One special feature of the building is that access to individual laboratories is controlled by badge readers linked to a centralized access control database. Mike will not allow users swipe access to laboratories until he is sure they have received proper training. Other duties include helping scientists identify potential hazards when they obtain new equipment and pointing them to the correct locations in the ES&H manual to learn appropriate hazard controls.

### *SWAN conference draws nearly 200 participants*



A Sandia Women's Action Network (SWAN)-sponsored conference drew nearly 200 women Nov. 29 in an event designed to help participants better achieve their goals.

"We are pleased at the number of women who wanted to attend," says Georgianne Smith (3550), SWAN cochair. "It shows that this type of event was needed."

Also serving as cochair was Judy Moore (5633).

The all-women conference was the first held at Sandia by SWAN since 2000. The organization has cosponsored similar conferences with sister laboratories (Los Alamos and Lawrence Livermore in 2002 and Los Alamos, Lawrence Livermore, and Lawrence Berkeley in 2004).

Identical sessions were held in the morning and afternoon and featured a motivational talk by internationally recognized director, actress, and storyteller Arina Isaacson (in photo at left) and breakout sessions on "Doing the Right Thing and Achieving All Your Goals," "Creating Your Path at Sandia," and "Unleashing Your Own Power/Finding Your Passion."

# Joint Sandia/NASA inspection system successfully helps complete shuttle mission to space station

**Repair made to torn solar panel; node delivered to space station**

By Michael Padilla

A Sandia team of engineers was instrumental in the success of the most recent space shuttle mission. Sandia



MEMBERS OF SANDIA'S LOIS TEAM monitor data during space shuttle mission STS-120 at NASA's Mission Control Center in Houston.

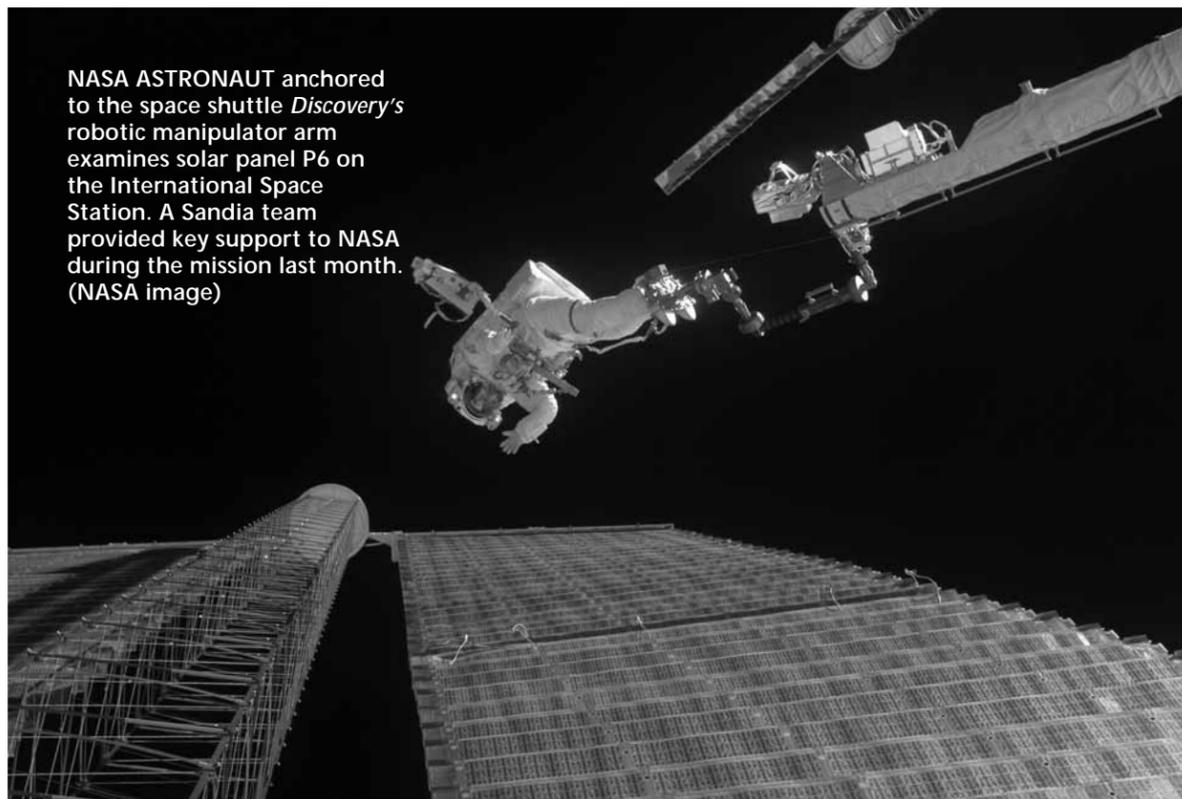
has played an important role in every shuttle flight since the return-to-flight mission following the *Columbia* accident.

The joint Sandia/NASA Laser Dynamic Range Imager Orbiter Inspection System (LOIS) team successfully completed all Orbiter Boom Sensor System (OBSS) inspection activities on NASA space shuttle mission STS-120 last month.

STS-120 was the 23rd shuttle mission to the International Space Station (ISS). The mission delivered the Harmony node to the space station and made a critical repair to the torn P6-truss solar panel.

Bob Habbit (5718) says the mission marked many firsts for the joint Sandia/NASA team. These included the inaugural flight of LDRI Flight Unit 3, the first operational use of the new data processing software/hardware suite, and transfer of the bulk of the data processing workload to local NASA operators.

The tear in the P6 solar panel of the space station



NASA ASTRONAUT anchored to the space shuttle *Discovery's* robotic manipulator arm examines solar panel P6 on the International Space Station. A Sandia team provided key support to NASA during the mission last month. (NASA image)

resulted in another first, says Bob. OBSS was developed post-*Columbia* to enable on-orbit inspection of the shuttle's thermal protection systems (TPS). The OBSS in conjunction with the ISS robotic manipulator enabled the astronauts to implement the repair of the P6 solar panel.

The successful operation of Flight Unit 3 after its exposure to unusual temperature extremes during this unplanned use of OBSS made it possible for a nominal pre-reentry inspection of the orbiter's TPS, assuring the safe return of the crew and *Discovery*.

"The tear had to be fixed in order to complete the extension of the solar array," Bob says. "The repair was a high priority."

Failure of the repair attempt would have required jettisoning the P6-truss assembly. This unplanned repair required around-the-clock mission planning and analysis by NASA Engineering with support from the Sandia engineering team.

"Several NASA senior staff remarked that this effort was akin to Apollo 13," says Bob. "While the crew was not in immediate jeopardy, implementing the repair required the crew to operate in a very hazardous environment."

Sandia will continue to maintain ownership for operational execution and supply onsite expert support in Mission Control Center in Houston through the life of the Shuttle program.

Mission execution requires 24/7 support, and the Sandia team adjusts their schedules to meet the needs of the

***"When situations arise the team works around the clock until the problem is solved," Bob says. "This project execution would not be possible without the extensive teaming across the laboratories. I have been particularly impressed and proud of how the laboratory mobilizes to meet national needs."***

— Bob Habbit

## Sandia's Pro Force team gets new uniforms



SPO OFFICER II Terry Keim models the new uniform that will become standard issue for Sandia's Protective Force later this month. The Pro Force will transition during the holiday break to the new three-color desert BDU uniform. The switchover will occur Monday, Dec. 24. According to Capt. Steve Sweet, the Pro Force is transitioning to a new uniform to enhance the professional image of the team and reduce recurring costs. Says Steve: "I feel that the new uniform is a welcome change and the Pro Force seems to be happy with the choice of uniform." (Photo by Randy Montoya)



Sandia security forces training in the 1950s.

NASA and the astronauts, Bob says.

"When situations arise the team works around the clock until the problem is solved," he says. "This project execution would not be possible without extensive teaming across the Laboratories. I have been particularly impressed and proud of how Sandia mobilizes to meet national needs."

"The Sandia LOIS development team greatly exceeded our sponsors' expectations. All team members took personal responsibility and ownership for the deliverables, working many extra hours on their own accord."

### Sandia's Laser Dynamic Range Imager Orbiter Inspection System team

John Sandusky (5718, project manager), Dennis Clingan (2618), Larry Dalton (2622), Erik Fosshage (12343), Steve Gradoville (2661), Simon Hathaway (2623), Brenna Hautzenroeder (2623), Bob Habbit (5718), Mark Heying (2664), David Karelitz (9326), Bob Nellums (5718), Eric Ollila (2623) Dave Peercy (12341), Todd Pitts (5718), Gus Rodriguez (5715), Jose Rodriguez (2664), Megan Resor (2622), and Daniel Talbert (5718).

# Christmas present becomes hobby for Sandian David Haygood

By Iris Aboytes

In most homes during the holidays, beautifully wrapped presents are exchanged. The presents contain what givers hope are surprises for loved ones. Eight years ago David Haygood's (4844) wife Donna gave him a kit for a Piper J3, a remote controlled airplane.

As a youngster David enjoyed putting together small model airplanes. In a conversation with his wife, he



FIRST PLANE — David Haygood's remote-controlled Piper J3, a present from his wife Donna.

told her he might enjoy working on model airplanes as a hobby. The hobby appeared that year for Christmas.

It took him about two weeks to put his plane together, and his feet have not been on the ground since. His Piper J3 weighs nine pounds and has a wing span of 81 inches.

"It was wonderful when my instructor took it out for the maiden flight and it flew," says David. "My solo flight was awesome. It soared 500 feet in the air.

"I was hooked," he says. "It is an affordable hobby. I don't play golf. I just fly planes. My older brother Chuck also started flying planes. We went nuts. I have 14. Most of them are war birds [WWII planes]."

David's favorite planes are an AT-6 Texan with a 103-inch wingspan weighing 38 pounds, a P-47 Thunderbolt with an 85-inch wingspan weighing 85 pounds, and a P-39 Air Cobra with a 67-inch wingspan weighing 67 pounds. They are all scaled planes with

retractable landing gear and navigation and landing lights.

The model planes can be incredibly realistic. For example, 11 remote control planes were constructed for the movie *The Aviator*. The replica of the legendary *Spruce Goose*, the plane built and piloted by Howard Hughes, had a 25-foot wingspan, weighed 375 pounds, and flew with electric motors.

Pilots operated the planes from a virtual cockpit on the ground, monitoring everything from air speed to engine temperature as the planes flew to distances between seven and 10 miles.

David belongs to the Albuquerque Remote Control Club based at George J. Maloof Memorial Air Park.

"Safety is flying's biggest element," he says. It takes about three months to get familiar with all the safety practices.

"My 10-year-old son Matthew flies a trainer that he



READY TO FLY — David Haygood and his son Matthew with the "Dragon Lady," one of David's 14 remote-controlled airplanes.

built himself," says David. "I guess you could say it is a family affair."

Every year the day before Mother's Day is Kids' Day. Kids get to fly planes with a seasoned pro using a buddy box (two transmitters hooked together that enables a seasoned pilot to take over if a student pilot gets into trouble).

"I am so glad Donna and I had our what-you-would-like-to-do discussion," says David. "I get to fly planes, I get to feel the rush, and for a little while, I get to feel like a kid again."

# Take my hand, I will help keep you warm

Story by Iris Aboytes  
Photos by Randy Montoya

It is a cool and dreary day as I look out my office window. I try to get my thoughts together to write a *Lab News* story on Sandia's Shoes for Kids program. What could I possibly write that I have not written before? What could I write to make you feel the total impact of the program?

Growing up, most of us have heard stories from our parents and grandparents. "I had to walk a mile to the school bus." "I walked in waist-deep snow." To date, I have not heard — "I walked without shoes."

For 50-plus years, Sandia's Shoes for Kids program has provided shoes to needy kids. Students selected by APS teachers arrive at Mervyns and for a little while they run around looking for that special pair of shoes.

Their faces are not unlike our own children's faces — some full of mischief, some quiet and shy. Their eyes sparkle as they select shoes that address their needs and personalities. Some little girls like the sparkly boots that

big girls wear; others like Cinderella slippers. Little boys see themselves as the next Kobe Bryant, so basketball shoes are their number-one choice.

Their stories begin to emerge as they explain why the pair of shoes they are wearing is two sizes too big or why it is two sizes too small. Some wear cleverly disguised shoes. Because of the wear, shoes stay on their feet by sheer desire as straps of leather drape over their feet.

The stories don't dampen the atmosphere as shoe-fitting is in full swing. Do they know they are poor? No, they just think Sandians are cool to buy them new shoes. Some wonder why their friends did not get to come.

Carrying their shoes, they board the bus to go back to school. Their innocence and captivating smiles leave us feeling magical. Each week for 22 weeks another bus-load arrives.

Sandians have held many children's hands. But it is the hearts of Sandians who have been warmed.

To find out more about the Shoes for Kids program go to <http://ln.sandia.gov/shoes-for-kids> or contact Patty Zamora at [pgzamora@sandia.gov](mailto:pgzamora@sandia.gov).



**"Our Hearts Warm Kids Feet"**

Center 3500 "Socks for Kids"

December 3-17, 2007

Please join us in supporting the "Shoes for Kids" by donating socks for children in:

- Kindergarten through fifth grade
- Any children's size (ages 5-10)
- Any color/design for girls and boys



You may leave your sock donation with any 3500 assistant (Bldgs. 750, 800, 802, 832, 856, 10510, 10520) or hang your socks on "The Wall of Socks" in Bldg. 8005 / Rm 1080. 'Tis the season — Happy Holidays! Thank you!

— Center 3500 Assistants