A KEY MOMENT during Sandia's recent 60th anniversary celebration in Washington, D.C., came when Labs Director Tom Hunter received a copy of the original Harry S. Truman letter from James Cicconi, a senior executive vice president for AT&T Services Inc. President Truman urged AT&T President Leroy A. Wilson in the May 13, 1949, letter to accept management of Sandia, which sparked the beginning of Sandia becoming an independent laboratory. The letter contained Truman's now often-quoted phrase, "In my opinion you have here an opportunity to render an exceptional service in the national interest." Sandia celebrated its 60th anniversary during a two-hour ceremony Sept. 16 at the Capitol Visitor Center. For more information on the event, see **page 7.** (Photo by Lloyd Wilson)

Keeping the astronauts safe

Sandia's ongoing mission to support NASA's space shuttle flights. Story and photos on **pages 8-9.**

Sandia LabNews

Vol. 61, No. 18 **September 25, 2009**

Sandia National Laboratories

Managed by Lockheed Martin for the National Nuclear Security Administration

A new name, an evolving mission

Integrated Technologies and Systems Strategic Management Group is now National Security Technologies and Systems SMG

The Labs' Integrated Technologies and Systems Strategic Management Group (ITS SMG) is going away. But it's not going far. In fact, only the name will change.

For the past several years, ITS has been responsible for that portion of the Labs' mission work (now more than half) not directly related to nuclear weapons. As of Oct. 1, the ITS SMG will be called the National Security Technologies and Systems (NSTS) SMG.

In a sign of unified executive support, the announcement of the name change was formally made by both Executive VP and Deputy Labs Director for the NSTS SMG Joan Woodard and Executive VP and Deputy Labs Director for the Nuclear Weapons SMG Paul Hommert.

The new name for the SMG, with its emphasis on national security, more effectively and fully reflects the increasingly global scope of its mission and the nature of its work, Joan and Paul wrote in the announcement.

"The term "integrated technologies" now reflects less clearly this group's purpose, capabilities, or customer base, especially with external sponsors and stakeholders," the announcement said.

The announcement emphasizes that the Nuclear Weapons SMG "will retain its title and focus as a singular, enduring mission commitment for the Laboratories' future," adding that the NSTS group "will complement the Labs' missions with exciting and significant contributions to national security in energy security, cyber security, nonproliferation, countering weapons of mass destruction, space, strategic surprise, and domain awareness."

Implementation of the title change in Labs communications and information systems should be completed by the end of the calendar year.

For additional insight into the name change and its significance for the Labs' future, the *Lab News* interviewed Joan and Paul via email. Here are the questions

(Continued on page 5)

Sandia researchers turning algae into energy

Project converts dairy wastes to energy, other products

It's not easy being green. But researchers at Sandia are making green happen. Green — as in algae green.

As part of a project to create fuel out of algae, the researchers are growing green algae in a nutrient-rich liquid chemical equivalent of dairy effluent (the liquid remaining after bacterial digestion of the dairy manure).

(Continued on page 4)

NNSA Defense Programs AWARDS of EXCELLENCE

Two Sandia individuals and nine teams were selected to receive NNSA Defense Programs Awards of Excellence at ceremonies this year in New Mexico on Sept. 2 and in California on Sept. 3. The awards honor exceptional contributions to the stewardship and management of the stockpile. More on pages **12-13.**

Inside . . .

That's that

It's raining outside as I write this. Really coming down. Just a few minutes ago, when it started raining hard enough to make a steady thrumming sound on our roof, colleague Darrick Hurst and I jumped out of our chairs and walked out to stand under the little overhang by our back door. Just watching the rain. Smelling it. Soaking it in (metaphorically speaking, mostly). A uniquely New Mexican thing to do — or at least a desert dweller's thing.

I wonder what Secretary Chu must think when he comes out here in the rainy season and sees a bunch of presumably smart and talented people standing in their doorways, watching. Wonder if he goes back to D.C. shaking his head and saying, "Those Sandians. They don't even have sense enough to come in out of the rain."

* * *

Don't know why, but all of a sudden I'm getting these snail mail invitations — at work and at home — to be enrolled in various "who's who" collections. The mailings sure are a boost for the ego, let me tell you. They invariably use words like "one of a select few," "meet the highest standards," "a global opinion leader," and . . . well, you can just imagine the purple prose these kinds of solicitations employ. But after allowing my vanity to be stroked for a moment or two, I always come back to reality. My feeling about these things isn't unlike that line Groucho Marx used (and which Woody Allen borrowed to such great effect in *Annie Hall*): "I wouldn't want to belong to any club that would have me as a member."

Sorry if I sound cynical, but being invited to be included in a who's who collection seems a bit . . . I don't know, off, somehow. I mean, you don't invite Barack Obama or George Bush to be listed in *Who's Who*. You don't invite Steven Spielberg, Stephen Hawking, Steve Jobs, or Steven Chu. They just are.

A quick look on the web suggests that these who's who lists have really proliferated. Back when the world was young, there was one "Who's Who" — definitive, absolute, and authoritative — and being listed in it was the 20th-century equivalent of having your own entry in Wikipedia.

* * *

While I'm on the subject, mind if I take it a bit further? The publisher of the original *Who's Who* also has a product called *"Who Was Who."* If I'm skeptical about being published in a who's who directory — and I am (see above) — I'm downright opposed to be listed in a "Who Was Who." Not ready for that yet, not by a long shot. Reminds me of the scene in *Tender Mercies*, a movie about a once-huge country music star (Robert Duvall) who has long since been down on his luck and deep into the bottle. In the scene I'm thinking of, an old fan walks up to this character in a grocery story and says, "Hey mister, were you really Max Sledge?" He replies, with not a hint of meanness in him but lots of humility, "Yes, ma'am, I guess I was."

* * *

See Patti Koning's story on the opposite page about Roger Busbee? She highlights something the California site instituted when Mim John was VP: a choice designated parking space for the longest-serving Sandian on the site. With Roger retiring after an unusually distinguished career, that space goes to Dwight Soria (8513), who has 42 years of service. Read the story for the details. I like the idea. The logistics are a lot different, but I wonder if we could implement something similar here.

See you next time.

— Bill Murphy (505-845-0845, MS0165, wtmurph@sandia.gov)

Call for business plans for 17th annual TVC Equity Capital Symposium

Technology Ventures Corp. (TVC) is currently accepting business plans and executive summaries from technology companies interested in presenting at the 2010 Technology Ventures Equity Capital Symposium. For the past 16 years the symposium has served as a vehicle to connect growing and expanding technology companies with venture capital and other equity investors.

The 2010 symposium will be held May 19-20 in Albuquerque. In January, TVC project managers will review submitted business plans and select 15 to 20 plans to present to investors at the event. Preference will be given to opportunities that are based on technology developed at DOE's national laboratories or research institutions.

The submission deadline for business plans is Jan. 8, 2010, but interested companies should contact TVC now for assistance with business plan development.

Sandia entrepreneurs can meet the TVC team and find out what TVC can do to help you create, start, or grow your technology company at a Sandia-specific event Monday, Sept. 28, 11:30 a.m.-1 p.m. in Bldg. 802 Rm. 1123.

Sandians unable to attend the Sept. 28 session are welcome to attend one of two sessions for the general public. They will be held Tuesday, Sept. 29, 11:30 a.m.-1 p.m. or 4:30-6 p.m. at the National Museum of Nuclear Science & History, 601 Eubank Blvd. SE in Albuquerque.

You may also submit three copies of a nonproprietary business plan or expanded executive summary online at www.techventures.org or send to: Technology Ventures Corp., 1155 University Blvd. SE, Albuquerque, NM 87106.

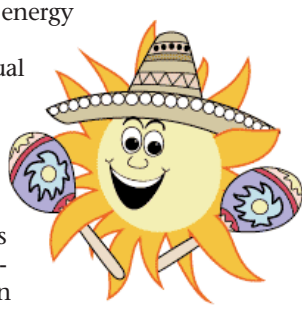
TVC was established by Lockheed Martin in 1993 as part of its successful proposal to DOE to manage Sandia. Its mission: Facilitate the commercialization of technologies developed in national laboratories and research universities to create thriving companies and good jobs in New Mexico. TVC has helped form 102 new business, created over 12,470 jobs and has facilitated over $1.043 billion in funding for its client companies.

Trinity Site tour is Oct. 3

The National Museum of Nuclear Science & History's twice-yearly tour of the Trinity Site National Historic Landmark is scheduled for Saturday, Oct. 3. The tour will include docent talks, walking ground zero, viewing of Jumbo and visiting the McDonald ranch house, as well as a Friday night lecture by University of New Mexico history professor Ferenc Szasz. Tour buses will leave the museum (Eubank and Southern) at 6 a.m. and return at approximately 4:30 p.m.

Participants will be treated to lunch at New Mexico Tech in Socorro. Cost of the tour is $60 per person. Seats are limited so make your reservations early by calling 245-2137 or going to the museum website at http://www.nuclearmuseum.org.

Sandia a major player in 2009 New Mexico Solar Fiesta



Sandia's solar and wind energy groups will be among key exhibitors at the 10th annual Solar Fiesta, to be held at Highland High School (southwest of Central and San Mateo) Saturday and Sunday, Sept. 26-27, from 10 a.m.–5 p.m. The Fiesta is organized by the New Mexico Solar Energy Association and features speakers (including a number of Sandians), workshops, exhibits, a technical symposium, activities for children, a silent auction, and a solar bake-off. A Tesla Roadster will be featured on Saturday from 2-4 p.m. For more information, go to www.nmsea.org/Solar_Fiesta/Solar_Fiesta_2009.

Sandia LabNews

Sandia National Laboratories

http://www.sandia.gov/LabNews

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Sandia National Laboratories is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin company, for the US Department of Energy's National Nuclear Security Administration.

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Lab News fax **505/844-0645**
Classified ads **505/844-4902**

Published on alternate Fridays by Media Relations and Communications Dept. 3651, MS 0165

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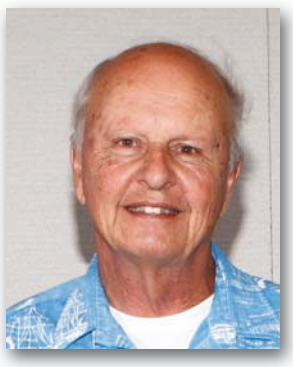
With Roger Busbee's retirement after 48 years, an era comes to a close

By Patti Koning

One of the last, great field engineers has left the building. On Aug. 19, Roger Busbee retired after 48 consequential years of continuous service. He spent all but a few years working with telemetry systems at Sandia/California.

Roger was hired into Sandia in 1961 when the California site was just five years old. His career lasted from the Kennedy to Obama administrations, through eight Div. 8000 vice presidents.



ROGER BUSBEE

"There is no way you ever think you'll be someplace this long," he says. "When you are 20, you don't think more than three or four years in advance."

Earlier this year when Roger was serving on a jury, the judge asked each of the jury members where they worked and how long they'd been there.

"When I said 48 years, his immediate response was 'Well, you wouldn't lie to a judge, now would you?'" Roger says.

Roger was born on Oahu, where his father was stationed as a flight crewman on the Navy's PBY patrol aircraft, just 11 months before the attack on Pearl Harbor. He followed his father into the Navy, but after leaving the service was unable to continue on at Lawrence Livermore National Laboratory (LLNL) where his father worked after retiring from the Navy. A rule in place at the time prevented immediate family from working at the same nuclear weapons laboratory, so Roger headed across the street to the nascent Sandia/California site.

Poseidon, SUBROC, Spartan

In reflecting on his career, Roger considers himself lucky because of the variety of projects he had the opportunity to work on, including the early Navy Poseidon telemetry system (submarine-launched ballistic missiles); the submarine rocket known as SUBROC (an antisubmarine weapon); the Spartan antiballistic missile program; the W82-155MM artillery shell program; the video imaging projectile (VIP); the Atmospheric Radiation Measurement–Unmanned Aerial Vehicle (ARM-UAV); and the Enhanced Fidelity Instrumented (EFI) telemetry for both the W76-0 and W76-1 reentry bodies on the newest Navy Trident II missile.

ROGER in Ponca City for field testing of the ARM-UAV program.

Much of Roger's career was spent in the field conducting tests, and he wouldn't have it any other way.

"I've worked on everything from guns and bullets to reentry bodies to sled track testing — you name it, everything we could do experiment-wise," he says. "I've enjoyed getting my hands dirty — you go out and play, come back and refine, and then go out and do it again. We're little boys with big toys."

To Roger, working in 120-degree heat in Yuma, Ariz., with dust blowing all around is preferable to sitting at a desk.

"If I had to sit inside at a desk it just wouldn't be the same. We used to take our drafting support personnel out to Tonopah so they could see where their efforts were going," he says.

Computer modeling ascendant

As computer modeling has replaced field testing, that type of experience has become a rarity at Sandia.

"Roger is truly an innovative thinker," says Will Bolton (8123), technical director of Sandia's ARM-UAV program. "His approach is to go into the field prepared for anything. It's really a different set of skills, something we are losing as we move away from hardware development."

One example of Roger's quick thinking was his innovative use of a roller skate on a test. When working on a test in 1993, a problem arose getting a battery cable down a long M198 howitzer tube. The tube was too long to simply feed the cable down, so Roger's solution was to attach the cable to a roller skate and send it down the tube.

FILED GUYS — Charles Tapp and Roger Busbee at Edwards Air Force Base for the B83 program in the early 1980s

Tim Tooman (8123) recalls Sandia's first ARM-UAV deployment at Edwards Air Force Base.

"We were ready to initiate the first mission and the telemetry system went dead. It just wasn't transmitting — a major crisis. Everyone was running around like crazy except Roger, who was sitting there as calm as can be, staring at the payload," he says. "Pretty soon he got up, found another antenna, screwed it on, and everything started working. There was no fuss, no accolades."

Cars, especially hot rods, remained a lifelong passion of Roger's. In fact, he timed his retirement so he would leave Sandia a few days before the annual Goodguys Rod & Custom Association West Coast Nationals, giving him some extra time to prepare for the show. Years ago at a Lockheed Martin event in Albuquerque, former Div. 8000 VP John Crawford's wife recognized Roger from pictures and videos of field tests, since he wore a different hot rod shirt in each one.

Sandia California News

The infamous rubber chicken

For anyone who worked on the ARM-UAV deployments, one image comes to mind when Roger's name is mentioned — the rubber chicken. "He made an effort to maintain team spirit within the telemetry group," says Tim. "He wanted to keep his people sharp and tuned in to what was going on in the field."

The rubber chicken began appearing on chairs or hanging over the doorway of people who made mistakes. On a particular occasion with two really big errors, the rubber chicken shot through with two arrows appeared hanging from an antenna. In fact, Roger's mother even made him a rubber chicken flag to fly over the telemetry trailer.

ROGER in Yuma City working on the W82 program in 1986.

Tim says that over the course of the 11 years that he worked with Roger on ARM-UAV, they spent a total of seven months in the field.

"Field work is very intense. Everyone is away from their families and it is not uncommon to work 11 to 13 hours a day, seven days a week," he recalls.

During the long days, weeks, and even months, Will also enjoyed getting to know Roger well.

"He's a fabulous raconteur. He was able to extract an adventure from everything he experienced," he says. "I loved hearing stories out of his teenage years in Livermore — it always seemed like something out of the movie *American Graffiti*."

Free parking

In 2003, then-Div. 8000 VP Mim John presented him with his own reserved parking spot, the only reserved spot besides those for visitors, security, and special needs. Naturally, the parking space was Roger's idea.

"He had the longest service record of anyone on site, so I asked him about making that recognition at Tri-Level," says Mim. "Roger effectively said, 'To heck with that, why don't you offer me something really useful, like a reserved parking spot?'" With Roger's retirement, the parking spot passes to Dwight Soria (8513), who has 42 years of service.

ROGER in front of his reserved parking space.

His career was celebrated at the August 2009 Tri-Level Managers meeting. Mim, who attended the meeting to honor Roger, described him as "the best guy, someone who represents everything wonderful about this lab." Roger, naturally, had the last word, saying, "If I'd known you were going to say that, I would have put it in my PMF, but now it's too late."

Algae work

(Continued from page 1)

The algae are typically cultured for several days, followed by harvesting and dewatering, after which the algal oil is extracted and converted into a biofuel.

"People have been growing algae for centuries for food supplements for use by man and animals," says Cecelia Williams (6313), project lead.

Beginning in the 1950s, algae were also recognized as a potential feedstock for energy and biofuels. Between 1978 and 1996, DOE funded the Aquatic Species Program with $25 million to investigate the production of biofuel from microalgae. That program was terminated in the mid-1990s due to low petroleum prices and other priorities. It has only been in the last few years that algae have received renewed interest as a potential source of fuel.

"People have been growing algae for centuries for food supplements for use by man and animals."

— Researcher Cecelia Williams

IN THE MIDST of algal growth tanks, researcher Brian Dwyer (6732) views a sample prior to a turbidity measurement. (Photo by Randy Montoya)

Recently Cecelia and other Sandia researchers grew green algae in a 12-by-30-foot greenhouse. They started by developing a simulated dairy effluent, a nutrient-rich liquid. The solids from the digestion of dairy manure can potentially be used to develop fertilizer and feed, and the liquid can be a nutrient source for algae

The algae produce lipids, the most useful being neutral oil made up largely of triacyglycerides (TAG) that can be converted to biofuels. The liquid-based algae are "dewatered," followed by post-processing to extract the TAG.

Eliminating problems

Cecelia says that growing algae for biofuels eliminates many problems associated with traditional biofuels.

"The current generation of biofuels [starch-and sugar- based ethanol and oil crop-based biodiesel] rely on the use of commodity crops and therefore compete for use of food crops, primarily corn," she says. "Also, they are very farm-intensive and use a lot of good farming land, fuel and fertilizer inputs, and fresh water."

Algae ponds, on the other hand, can be put on marginal land and grown with non-fresh brackish water, water produced from energy mineral extraction (petroleum, natural gas, coal-bed methane), or nutrient-loaded wastewater from municipal and agricultural sources. The Southwest has the potential for being a leader in manufacturing this new type of biofuel because "it has lots of barren land that can't be used for anything else, lots of sunlight, and a lot of marginal water," Sandia researcher Brian Dwyer (6312) says.

LUCAS MCGRATH (6736) adjusts the nutrient injection ports on an algal tank mixing arm. (Photo by Randy Montoya)

Sandia scientist Ron Pate (6313) notes that Sandia is bringing into play its scientific and engineering expertise to grow and process specific types of algae for biofuels and other useful co-products. Sandia's work in this area ties into broader biofuels efforts supported by DOE's Office of Biomass Program (OBP) that focus on addressing challenges to commercially viable algal biofuels production. This includes Sandia participation in the development of the National Algal Biofuels Technology Roadmap Report, which is still in preparation, and partnering with others on proposals to establish consortia for algal biofuels and for advanced fungible biofuels with potential funding from OBP. The Algal Biofuels Consortium (ABC) specifically proposes a broad-based collaboration with Sandia and other national labs, industry, and university partners that would pursue research and development of algal biofuels as an affordable, scalable, and sustainable solution that can contribute significantly to meeting the nation's transportation fuel needs.

Potential jobs for New Mexico

Cecelia anticipates the Sandia research to have the potential to provide new jobs and economic development to New Mexico, the seventh-largest dairy producing state in the nation. It employs more than 5,000 people and has an annual impact of nearly $2.7 billion.

The 340,000 dairy cows in New Mexico produce large quantities of manure and nutrient-rich effluent water that represent a significant waste management problem and regulatory expense to the state's dairy industry. These and other agri-industrial waste streams represent a valuable and underused feedstock for recycling of energy, biofuels, reusable water, and other co-products. The DOE Algal Biofuels Technology Roadmap currently in draft suggests the use of non-freshwater sources, including agricultural effluent, for algal biomass production. Besides providing a source of non-fresh water and the recycling of needed nutrients, the use of these waste streams in an integrated biorefinery will help alleviate disposal regulatory requirements on dairies and other confined animal feeding operations (CAFOs) in New Mexico and the broader United States.

Making algal fuel competitive

Sandia's greenhouse algae project was conceived by Ron Pate and Kyle Hoodenpyle (Ag2Energy) and has been funded by the New Mexico Small Business Association (SBA) and the New Mexico Technology Research Collaborative (TRC). The SBA funds Sandia to work with the private-sector partners Ag2Energy and the Pecos Valley Dairy Producers (PVDP), one of the largest collections of dairy producers in New Mexico. TRC funding lasted one year, and the SBA funding is in its final year of a three-year funding cycle.

Future money to research dewatering algae and monitoring the health of algae ponds will come from Sandia's internal Laboratory Directed Research and Development (LDRD) program and possibly new direct-funded projects from DOE. This research will also allow the greenhouse algae ponds to support other aspects of Sandia's algae biofuel research portfolio by using the data and information generated from these experiments to evaluate or verify both systems and process models. These models are essential for understanding the economics and risk associated with both the R&D and the up-scaling that will be required to make algae an economically viable fuel source for the nation. The ultimate goal is to make algae-derived biofuels competitive with petroleum-based fuels.

Project partners

Algae project members include Sandia, University of New Mexico, and New Mexico State University. Members are collaborating with A2E and Pecos Valley Dairy Producers (PVDP) to convert dairy wastes to energy and other products.

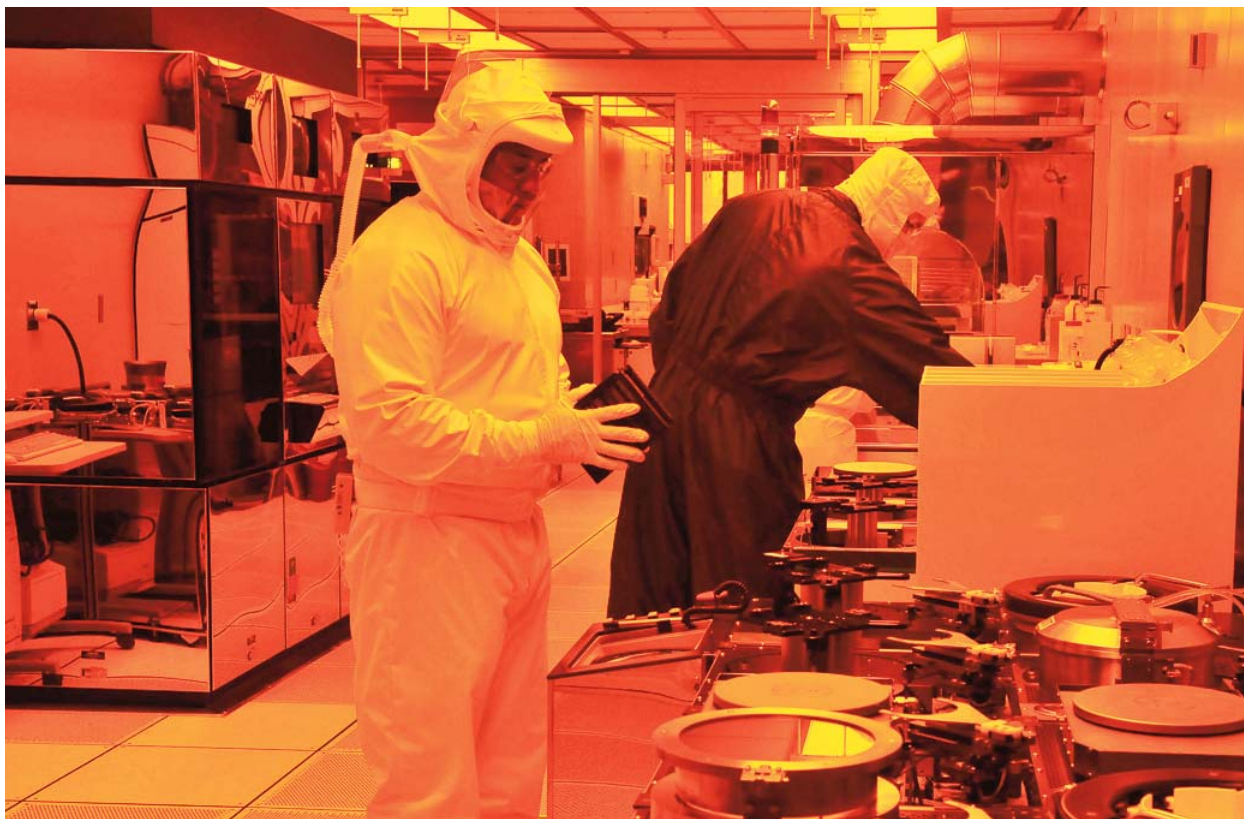
Sandia is responsible for overall project management and reporting and provides technical leadership. As project leader, Cecelia Williams (6313) oversees and coordinates work and contributes to data analysis and assessments. Brian Dwyer (6312) is the lead field engineer to design the algae growth system and automated data collection system, as well as biological testing and field tests. Brian was assisted by Bruce Reavis (4133) on the system design, construction, and upgrading the greenhouse to a BSL1 status and Lucas McGrath (6316) assisted with the design and programming of the automated data collection system. Jackie Murton (8622) cultured the algae and provided stock algae solutions for inoculating the algae tanks in the greenhouse.

The primary role of David Hanson, UNM, was to isolate indigenous algae species and conduct growth experiments over a range of expected growth, nutrient, and environmental conditions. Shuguang Deng of NMSU provided the algae oil extraction and conversion expertise.

As the commercial partner, A2E conducted large-scale algae cultivation field tests and will work with the PVDP to lead business planning and commercialize the system. The PVDP have formed the Pecos Valley Biomass Cooperative (PVBC) to commercialize processes for converting dairy wastes to energy and other products. The PVBC is also exploring options to locate an algae plant in Roswell, N.M., close to the dairies.

Sandia receives DoD "trusted foundry" accreditation

By Neal Singer



A SANDIA PROCESS TECHNICIAN, left, and maintenance technician working one of the lithography bays of Sandia's Silicon Fab. The Silicon Fab was recently accredited as a "Trusted Foundry" by DoD. (Photo by Randy Montoya)

Sandia's silicon fabrication facility in Albuquerque has been accredited by DoD to provide "trusted foundry" services for both unclassified and classified integrated circuits. The foundry accreditation increases the scope of Sandia's existing accreditation for design services. (For that information, see the Sandia news release dated March 12, 2009, at www.sandia.gov/news/resources/releases/2009/trusted_design.html).

Sandia's Category1A status, which requires the most stringent protection measures, was awarded through the Trusted IC Supplier Accreditation Program (www.dmea.osd.mil/trustedic.html) of DoD's Defense Microelectronics Activity (www.dmea.osd.mil/).

The accreditation program is part of DoD's strategy to ensure that electronic components used in US military and national security applications are trustworthy. Certification is necessary because the increasing offshore migration of all sectors of the microelectronics industry comes at a time of increasing demand for high-performance, application-specific integrated circuits (ASICs) from military and national security agencies.

The trusted foundry accreditation is for Sandia's strategically radiation-hardened, 3.3-volt, 0.35-micrometer, silicon-on-insulator (SOI) CMOS process that produces custom low-volume, high reliability ASICs. Sandia's silicon fab is optimized for radiation-hardened, analog and mixed-signal microelectronics, custom digital ASICs, and discrete devices.

Sandia uses 0.35-micrometer geometry to optimize performance for analog circuits resulting in better device matching, higher supply voltages, and broader signal dynamic range than smaller geometry devices. Properly designed and fabricated, larger devices are more likely to continue to perform in extended operating environments including temperature, shock, and radiation.

In support of its primary mission as steward of the US nuclear stockpile, Sandia has developed and delivered microelectronics products for nearly three decades. This expertise has also been applied to other national security needs. These include ensuring the nonproliferation of nuclear weapons and materials, reducing the threat from chemical and biological weapons, and providing advanced custom designs for other agencies like DoD. Sandia's ASIC development team provides custom microelectronics products and engineering services that fulfill the needs of a diverse set of customers.

Sandia focuses on high-reliability custom solutions for high-consequence applications. An efficient ISO 9001-certified process is said to enhance chances for first-pass silicon solutions. "Sandia offers a total supply chain solution for radiation-hardened integrated circuits and microsystems by combining trusted ASIC design and fabrication with other in-house capabilities in packaging, test, failure analysis, and reliability," says Gil Herrera, director of Microsystems Science Technology and Components Center 1700.

For more information or questions, visit www.sandia.gov/mstc or email Trusted_ASIC@sandia.gov.

New name

(Continued from page 1)

and their responses:

Lab News: *Why the name change and why now?*

Joan Woodard: Our work outside the core nuclear weapons program has evolved for many decades. Our first WFO project was in 1950 and our work in energy grew substantially in the 1970s. More recently, as the lab directors and NNSA leadership have been developing strategies for the future, they have identified nuclear security and national security as playing major roles.

JOAN WOODARD

We at Sandia are known for our systems engineering and systems integration. Yet we also recognize that systems are made up of components and the technologies that enable them. Given the direction being laid out by NNSA, the timing seemed right to explicitly emphasize the national security aspect of the important work we do in technologies and systems that occurs outside of our core nuclear weapons program.

LN: *Is there an implicit suggestion in the new name that our nuclear weapons mission is somehow not related to national security?*

Joan: Absolutely not! We, Sandia, are a national security lab with two key missions — the core nuclear weapons mission and national security technologies and systems. I use the word "core," because as long as this nation has a nuclear deterrent and desires Sandia to serve in our roles, this mission will always be a very unique and special one, one that is core to who we are.

Paul Hommert: I am not concerned that anyone would consider work on nuclear weapons to be unrelated to national security. The name change is to emphasize that work on, e.g., energy is national security-related.

LN: *Does the name change pose the risk of making folks in the nuclear weapons group feel they may be getting marginalized a bit?*

Paul: Over the past few years the nuclear weapons community has faced considerable uncertainty and instability related to the lack of a national consensus on the future direction of the weapons program. These factors are real and have an impact in the nuclear weapons area. However, over the past six months we are seeing the beginning of the vigorous and in depth dialog on nuclear deterrence that we as a nation have needed for many years.

I am confident that as that dialog plays out over the next year or so we will see an evolving consensus on the important work that must be done to position our nuclear deterrent for the post-Cold War era. Much of that work will be executed at Sandia. A good example is the work we are beginning on the B61 LEP. Furthermore, I believe that this dialog will bring greater predictability to our nuclear weapons program. This is very important to the broader national security work executed in the NSTS SMG, as our nuclear weapons work underpins much of the capability base so important to our NSTS work. This name change reinforces the complementary nature of our national security mission areas.

Joan: The Labs' roles in nuclear weapons — our five core products, plus manufacturing and high-energy-density physics — all are vital to the national goal of a safe, secure, reliable nuclear deterrent. We will serve in this role with the emphasis of a "core" mission and never allow ourselves to feel or be marginalized.

LN: *Is there any concern that as the NSTS SMG branding effort progresses and succeeds — particularly with our external customers — it could undermine funding support for the nuclear weapons program?*

Joan: Sandia's leadership has an important role to ensure that we always place the necessary priority on the nuclear weapons core mission. One of our board members regularly reminds us that the nuclear weapons mission in the Air Force at the height of the Cold War represented only about 10 percent of its funding, yet it was clear to the leadership and the men and women of the Air Force that it was a singular priority. That is our goal and we should expect nothing less.

Paul: Our funding support for nuclear weapons will be based upon how effectively we convey the important mission elements we must execute in support of stewardship, assessment, and modernization of the stockpile. These are nuclear weapons program obligations that are not impacted by a name for other elements of Sandia's work.

LN: *Is Sandia well-known as a national security laboratory, broadly defined? What recent accomplishments do you think are most telling?*

Joan: In my recent months in this position I have had a chance to visit with program directors, managers, and staff in many key areas, and the list is long — materials advancements in solid-state lighting; development of nanomaterials like nanowires that hold promise for better photovoltaic cells; better batteries; evaluation of architectures and security of smart grid systems; cyber system assurance and red team assessments; analysis of bio threat scenarios in major metropolitan areas including recovery times; and on and on. And of course, the W76-1 LEP program, tremendous advancements on the newly refurbished Z machine, and development of concepts and evaluation tools for advanced surety systems. All of this makes up who we are as a national security laboratory. And we must continually be engaged to demonstrate, explain, and prove ourselves worthy of national support.

LN: *Does this change mean more to internal or external audiences?*

Joan: This name change is really for both, but particularly for new people at the Labs and new to government positions. It will help us define who we are and how we can and do serve the nation. We need to continue to advance the understanding of national laboratories, their relevance today, both for the core nuclear weapons mission and for the continually evolving national security threats and challenges we face as a country.

LN: *Do you foresee a time in the future when nuclear weapons will cease to be the Labs' primary mission?*

PAUL HOMMERT

Paul: As long as our country possesses nuclear weapons Sandia's role in nuclear weapons will constitute a special commitment by this Laboratory. The depth of that commitment cannot be measured by dollars. For example, our role in nuclear safety is a special mission assignment unique to our laboratory. It constitutes a sacred responsibility in which the nation places in us its trust. No matter how large our other efforts on behalf of the nation's national security challenges become, our support of our core nuclear weapon responsibilities remains a fundamental, deep, and unwavering commitment for the Laboratory and obligation to our fellow citizens.

Labs custodians form front line against H1N1 at Sandia

By Rachel Kolb

Flu season is approaching, accompanied by anxiety about the H1N1 virus. But for Sandia's cleaning professionals in Custodial Services Dept. 4848, a unique and thorough cleaning system is working hard to keep all disease at bay.

Sandia has been using its Operating System One (OS1) cleaning system since 2000, according to Michael Carson, manager of Custodial Services. The Labs has found the process both effective and efficient.

"The Custodial Services Department is committed to using the best cleaning practices that the cleaning industry has to offer," Michael says of OS1. "We are committed to cleaning for health first and then appearance." Effective cleaning that includes preventative maintenance, says Michael, is the core of establishing and maintaining good indoor environmental quality.

Workplace cleanliness matters

The New York City Department of Health and Mental Hygiene, among other authorities, asserts that workplace cleanliness and good maintenance practices can promote health and help prevent the spread of diseases such as H1N1 in offices and public places.

Chris Romero (4848-6), operations team supervisor for Custodial Services' cleaning teams, says that OS1 has several advantages over the traditional zone cleaning process used throughout most of the country.

"In zone cleaning, one person has one floor of a building and does all the work for that space," says Chris. "This means there must be equipment on each floor, and the cost is higher. In team cleaning, there are specialists for each area, and all our professionals work as one team."

Each OS1 team includes four duty specialists. The first, the light duty specialist, performs tasks such as emptying trash, picking up objects from the floor, and cleaning contact points with a microfiber cloth and chemical solution.

The next specialist, the restroom specialist, uses germicidal solution in various concentrations to clean the toilets and urinals, sinks, mirrors, smooth surfaces, and floors in all restrooms. Because they regularly handle and mix chemicals, custodians wear goggles and nitrile gloves as personnel protection equipment, says Chris.

The SuperCoach

The vacuum specialist uses a backpack and SuperCoach vacuum to clean microbes off the floor. "The SuperCoach is a high-filtration vacuum with better performance than a regular vacuum," Chris says. "There are four filters — a paper filter, a cloth filter, a dome filter, and a diffuser — and they pick up 99.9 percent of contaminants."

CUSTODIAN DIEGO GONZALES with the high-filtration SuperCoach vacuum cleaner. (Photo by Randy Montoya)

In addition to cleaning the floor, Chris says vacuuming improves air quality and makes indoor space healthier for occupants and cleaners.

The last specialist, the utility specialist, helps control dust and dirt as it enters the building by maintaining the walk-off matting at all entryways. This specialist also takes care of stairways, takes out the trash, spot-cleans chairs and carpets when needed, and does other heavy floor care like buffing and mopping.

With 11 cleaning teams that regularly clean 356 buildings and 3.4 million square feet of Sandia space, Custodial Services is confident that the OS1 cleaning process is a strong asset to curbing the spread of disease.

"The effectiveness of OS1 is that it works on a comprehensive schedule, and it's also systematic," says Michael. "The key is cleaning contaminated areas, not cross-contaminating, and using effective chemicals that don't harm the environment." All of the chemicals that Custodial Services uses on a daily basis are Green Seal approved.

A commitment to education

Another important element of the OS1 cleaning program is a commitment to education. "The education process is the most important in dealing with any virus — from washing hands and covering mouths to cleaning contaminated areas," says Chris.

Sandia's Custodial Services cleaning professionals undergo 16 hours of training when they are first hired and obtain new training each month. The training, Chris says, teaches the workers not only how to clean, but why to clean — emphasizing how their efforts help enable the Labs' mission by ensuring a clean and safe work environment.

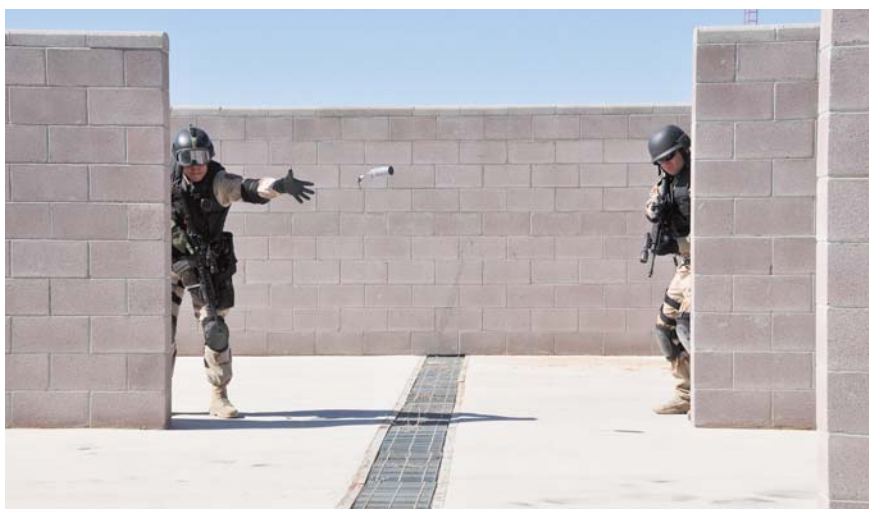
In the event that a virus does spread, Custodial Services is ready to step up its operations.

"When we have warning of a virus outbreak, we increase the frequency and intensity of cleaning," says Chris. "We have been informed that a virus can live up to 24 hours on a dry surface." Increasing the use of germicidal solution, Chris explains, is one step that could help eliminate potent viruses.

As part of Sandia's contingency plan to prepare for any potential pandemic virus outbreak, Custodial Services has ordered additional germicidal solution to kill the H1N1 virus. Custodial Services is also ordering additional chemicals to address cleaning common areas that could become contaminated with the virus. The additional chemicals, says Michael, are kept in a bulk storage area in case there are problems receiving products due to reduced shipping during a virus outbreak.

"Appropriate use of germicidal solutions, prioritization of custodial job assignments, planning, and diligent cleaning practices will go a long way toward keeping any epidemic in check," says Chris.

Sandia flash-bang technology licensed to subsidiary of BAE Systems



SANDIA SECURITY POLICE OFFICERS test a previous generation of Sandia-developed diversionary device technology, which has been licensed and refined by BAE Systems' Safariland subsidiary. (Photo by Randy Montoya)

By Rachel Kolb

The nonexplosive fuel-air diversionary device technology developed by Sandia and licensed to Safariland LLC last year is on its way to mainstream use.

The diversionary device, also known as a flash-bang, is a less-than-lethal technology used to temporarily distract or disorient an adversary. After a pin is pulled, the device is activated and a loud sound and bright flash of light ensues. Military and law enforcement personnel use the flash-bang to facilitate operations such as hostage rescue, room clearing, and crowd control.

Safariland, a subsidiary of BAE Systems, a large security, defense, and aerospace corporation, has been subjecting the flash-bang to modifications and beta testing, according to Mark Grubelich (6331), who innovated the device at Sandia.

The modifications include adjusting the geometry of the body to a hexagon instead of a cylinder, so that the device will deploy in a specific spot instead of rolling across a surface.

"With the new shape, if you throw it up on a staircase, you don't have to worry about, like Wile E. Coyote, it rolling down and exploding in front of you," says Mark.

Safariland, through its Defense Technology brand, is interested in altering the flash-bang so it can be launched from a firearm like a conventional grenade.

Sandia has little ongoing role in the development of the flash-bang, although it continues to do work in the area of breaching technology and is currently expanding on the original patent.

"We provide consultation if they need help, but Safariland is responsible for bringing it to market," says Mark. "The license is from the Labs so our role is getting smaller and smaller."

Paul Cooper (5435), who is retired from Sandia but still does some contractor work, is one of the creators of the original Mk141 flash-bang diversionary device, whose design Mark built on when developing the current flash-bang. Paul says the major benefit of the current flash-bang is its safety. While previous designs used exploding pyrotechnics or explosives with very high source-pressure and were associated with several disabling accidents, the current flash-bang is much less dangerous, and is therefore applicable to a wider range of operations.

> *"With the new shape, if you throw it up on a staircase, you don't have to worry about, like Wile E. Coyote, it rolling down and exploding in front of you."*
>
> **— Researcher Mark Grubelich**

Sid Heal, the retired commander of the Los Angeles County Sheriff's Department (LASD) and a longtime proponent of nonlethal technology, is one of several prominent figures in law enforcement who is eager to see the flash-bang in action.

"This thing is long overdue," says Heal. "I am so happy that it is finally getting out to the folks who truly need it."

Heal says that the current flash-bang is less likely to throw fragments from its own components and less likely to throw loose objects near the ignition point when it is thrown in a house. He expects that it will displace conventional devices because it is safer — and probably cheaper.

"We'll be able to use it in circumstances in which we've never before been able to use flash-bangs," says Heal.

Safety, Mark says, has been the entire purpose of developing the flash-bang.

"What I really would like to see is reducing the hazard to the operator," he says. "We could reduce the accidents that happen in deployment and training. I would like to see us slowly replacing the existing explosive devices on the market with safer fuel."

A step toward more efficient fusion

New Sandia fusion proposal marries Z's electric pulse with laser preheating and magnetically contained plasma; increased efficiency sought over other concepts

By Neal Singer

An efficient way to harvest energy from a staccato, nanosecond burst of controlled fusion reactions was proposed in two Sandia technical papers and a number of related technical posters presented at the sixth international conference on Inertial Fusion Science and Applications (IFSA 2009), held two weeks ago in San Francisco.

The new ecumenical Sandia approach combines the Laboratories' staple of extremely powerful, fast pulses of electricity with laser preheating and fuel magnetization, ordinarily thought to be the provenance of plasma-confining tokamaks and most recently ITER, the huge international thermonuclear experimental reactor under construction in southern France.

Research led by Steve Slutz (1684) suggests firing a burst of laser energy to preheat a deuterium-tritium plasma initially contained by a tiny metal tube (technically called a liner) that has been magnetized by external field coils. Almost immediately, a 26-megaamp electrical pulse from Sandia's Z machine would further energize the plasma and amplify the magnetic field within the fuel. The resultant magnetic fields would confine and compress the heated plasma so that its isotopes fuse. They also are expected to keep alpha particles, composed of two protons and two neutrons, from leaving the mix so that their energy heats the plasma for further fusion. (This form of magnetic confinement would only be for nanoseconds rather than minutes, as ITER hopes to do.)

Idea minimizes power losses

"The basic idea of magnetizing fuel in an inertial fusion liner was first proposed decades ago," says Steve, "but the combination of a laser to preheat the fuel and the power of Z were unavailable until recently."

Sandia supercomputer simulations have indicated that the method could achieve efficiencies greater than 3 percent from wall-plug electricity to input into the plasma.

The method minimizes power losses inevitable when converting energy from one form to another with the aim of eventually producing fusion. Today's approaches to inertial fusion involve many such conversions, including NIF's use of electricity to power lasers, and then convert infrared light to ultraviolet; Z's use of electricity to ionize wire arrays to form a plasma that then collapses to produce X-rays; or in the kinetic energy lost in both NIF and Z when X-rays ablate matter from a fusion capsule's surface to drive, rocket-like, the remaining surface inward to fuse atoms.

It's a question of economy, says Steve.

Consider that if the 0.15 megajoules of laser energy expected to enter a target capsule releases a fusion output of 10 to 20 megajoules, there would be dancing in the streets by physicists (figuratively speaking) at the achievement of this high yield. The capsule would have released roughly 100 times more energy than was put into it. But to the lay person, since the beams originate from a 400-megajoule capacitor bank, the process would seem an overall loss: 400 megajoules in, 20 out. The problem occurs because only 0.04 percent of the initial energy enters the target (0.15 divided by 400).

The idea of Steve, Mark Herrmann (1680), and their team is to minimize the number and types of power conversions to achieve higher efficiencies. They would use lessons learned from laser and pulsed power efforts. The result ideally would be efficient enough to produce a net overall power gain.

That said, the IFSA conference was devoted overwhelmingly to examining methods that might produce fusion itself rather than in improving the efficiency of the overall process.

Particularly notable was the impressive effort toward fusion made by the researchers at the National Ignition Facility (NIF) at Lawrence Livermore National Laboratory. (Other national labs, including Sandia, played a role in building sensors and other parts of the machine.) NIF management has proposed a high-yield fusion shot by the end of 2010.

"After 49 years, all the elements of ignition are in place," NIF director Ed Moses told the assembled audience of 400 scientists.

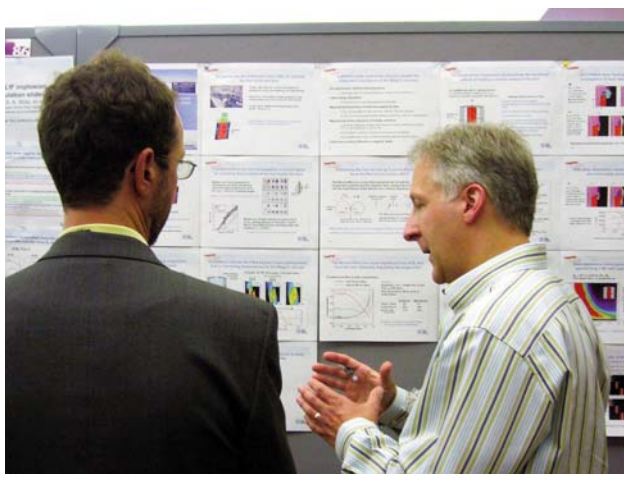
Researchers from around the world presented ideas on modifying inertial fusion targets' density, size, shape, temperature, and the velocity and frequency of light or ions striking them.

"It's right that there's so much money and attention given to lasers and NIF," says Steve. "NIF is clearly the next step. There's no reason for DOE or anyone else to put in big bucks to create a more efficient process for inertial confinement until we prove that it works at all."

That, he says, would be putting the cart before the horse. "First NIF must show that high-yield inertial confinement fusion is possible. It's very important that NIF succeed because it will show that it's possible to compress a pellet using inertial confinement methods."

When it does, he says, scientists, engineers, and technicians at Z may have the next step half-completed, using a magnetically insulated, preheated plasma that would be much more efficient.

Inertial confinement typically applies a burst of energy — whether generated by electricity, light, or heavy or light ions — to compress a pellet filled with deuterium and tritium ions until they fuse. If the proper conditions are met, the pellet will ignite — achieve ignition, in the parlance of the trade — to release more energy than it absorbs, roughly following Albert Einstein's famous equation, $E=mc^2$.



ROGER VESEY (1684, right) explains to Ogden Jones of Lawrence Livermore National Laboratory the progress made on integrated target designs for pulsed power-driven liners containing magnetized and preheated fuel.

Magnetic confinement, used by tokamaks and in particular by the upcoming ITER machine, creates a standing plasma confined by magnetic fields over relatively long periods of time – perhaps as much as 15 minutes.

The Sandia group proposes to use a sleeve (visually, a tube) less than a centimeter long, closed at both ends to maintain a deuterium-tritium (DT) mix. A single laser's pulse, two Helmholtz coils, and Z's enormous amperage should do the trick of producing more efficient fusion. Implosions would occur at 100-300 nanoseconds rather than the 10-30 microseconds proposed in earlier scenarios involving inertial fusion using magnetized fuel. Higher fuel densities will aid in trapping alpha particles. A sufficiently thick sleeve wall should maintain its integrity until the implosion is complete.

Peering into the maelstrom

In another paper presented with a separate poster at the IFSA conference, Kyle Peterson (1684) and Dan Sinars (1683) used a crystal as though it was sunglasses to transmit only a few selected frequencies to see into the maelstrom of Z when it fires. The enhanced view showed that sausage-like Rayleigh-Taylor instabilities predicted by LASNEX code were accurate; thus the code's veracity under these circumstances was established. A logical extension of the work is that the validated code may be used with provisional confidence to aid in design of the cylinder's dimensions, materials, electrical current requirements, firing time, and pulse-shaping in creating a system that mitigates instabilities past the point of energy generation.

A third poster by Ryan McBride, Mike Cuneo (both 1683), Christopher Jennings (1641), and Eduardo Waisman (1683) showed that a hollow metal torus that acts as a 2:1 current transformer when inserted in the transmission line of Z could amplify the current delivered to the liner. This should increase Z's electrical current flow to target from 26 megaamps to 40 megaamps, providing additional experimental capability.

Sandia marks 60th anniversary with activities in Washington, D.C.

Sandia National Laboratories celebrated 60 years of exceptional service in the national interest during a two-hour celebration Sept. 16 at the Capitol Visitor Center in Washington, D.C. The celebration included remarks from a host of VIPs about Sandia's significant role in helping to protect Americans at home and abroad. Sandia President and Labs Director Tom Hunter welcomed attendees and introduced the speakers, who included NNSA Deputy Secretary Daniel Poneman, AT&T Senior Executive VP James Cicconi, Sen. Jeff Bingaman, D-N.M., Sen. Tom Udall, D-N.M., Sen. Byron Dorgan, D-N.D., Rep. Martin Heinrich, D-N.M., and Rep. Jerry McNerney, D-Calif. The day before, on Sept. 15, Sandia held a press briefing at the National Press Club in Washington with technical presentations by Sandians Larry Walker, Jose Zayas, Russ Skocypec, and Dan Carroll.

Said Poneman of Sandia's many contributions to national security throughout its 60-year history, "This is where they take an idea and turn it into a result. And that's what we're all here to honor and respect."

LARRY WALKER (2900), right, talks with visitors to Sandia's 60th anniversary celebration at the Capitol Visitor Center in Washington, D.C., about technologies Sandia has developed for national security applications. Displays and technology demonstrations depicting some of Sandia's key national security work were part of the event.

Keeping the astronauts safe

Sandia technology and expertise helps NASA monitor integrity of space shuttle fleet in orbit

Story by Bill Murphy

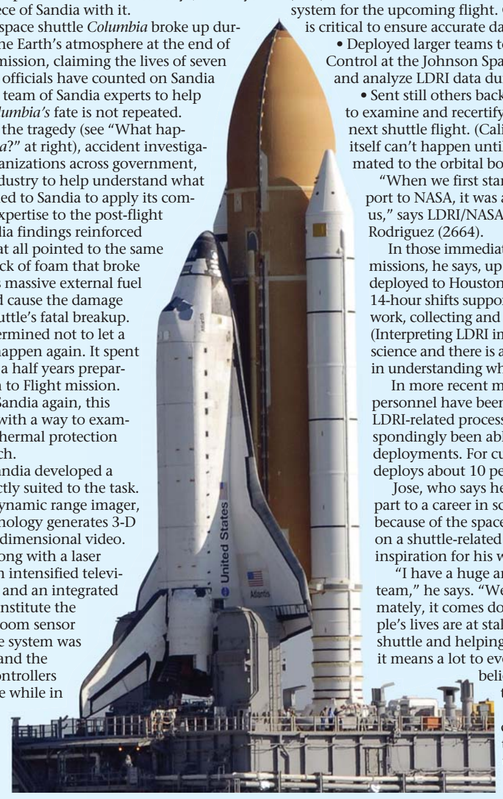
Whenever the space shuttle flies these days, it always carries a piece of Sandia with it.

Ever since the space shuttle *Columbia* broke up during reentry into the Earth's atmosphere at the end of its January 2003 mission, claiming the lives of seven astronauts, NASA officials have counted on Sandia technology and a team of Sandia experts to help make sure the *Columbia's* fate is not repeated.

In the wake of the tragedy (see "What happened to *Columbia*?" at right), accident investigators called on organizations across government, academia, and industry to help understand what happened. It turned to Sandia to apply its computer modeling expertise to the post-flight inquiry. The Sandia findings reinforced other analyses that all pointed to the same conclusion: A block of foam that broke from the shuttle's massive external fuel tank could indeed cause the damage that led to the shuttle's fatal breakup.

NASA was determined not to let a similar accident happen again. It spent the next two and a half years preparing for the Return to Flight mission. And it turned to Sandia again, this time to come up with a way to examine the shuttle's thermal protection system after launch.

In response, Sandia developed a technology perfectly suited to the task. Called the laser dynamic range imager, or LDRI, the technology generates 3-D images from two-dimensional video. The LDRI unit, along with a laser camera system, an intensified television camera unit, and an integrated digital camera, constitute the shuttle's orbiter boom sensor system. The entire system was developed to expand the ability of flight controllers to scan the shuttle while in orbit, looking for damage from launch, micrometeorites, or impacts from space debris.



Sandia's LDRI Orbiter Inspection System (LOIS) project is executed under the Defense Systems & Assessments program. It is led by Monitoring Systems and Technology Center 5700 and supported presently by persons from Centers 400, 2600, 9300, and 10600.

The LDRI, with its 3-D capability, enables mission controllers and flight directors to make informed decisions about the integrity of the spacecraft.

In each of the 15 shuttle missions since the 2005 Return to Flight shuttle mission, Sandia has:

• Deployed two-person teams to Kennedy Space Center (KSC) before each shuttle launch to calibrate the LDRI system for the upcoming flight. Calibration of the device is critical to ensure accurate data.

• Deployed larger teams to Houston to Mission Control at the Johnson Space Center to download and analyze LDRI data during the mission; and

• Sent still others back to KSC after each flight to examine and recertify the LDRI device for the next shuttle flight. (Calibration of the device itself can't happen until the LDRI unit is actually mated to the orbital boom sensor system.)

"When we first started to provide this support to NASA, it was a huge undertaking for us," says LDRI/NASA project lead Jose Rodriguez (2664).

In those immediate post-Return to Flight missions, he says, up to 20 Sandians would be deployed to Houston, working 12-hour to 14-hour shifts supporting the LDRI imaging work, collecting and analyzing the 3-D data. (Interpreting LDRI imagery is an art as well as a science and there is a learning curve involved in understanding what the data is telling you.)

In more recent missions, Jose says, NASA personnel have been trained in many of the LDRI-related processes and Sandia has correspondingly been able to scale back on deployments. For current missions, Sandia deploys about 10 people to Houston.

Jose, who says he was inspired at least in part to a career in science and technology because of the space program, says working on a shuttle-related project has been an inspiration for his whole team.

"I have a huge amount of pride in this team," he says. "We all understand that, ultimately, it comes down to the fact that people's lives are at stake. Working on the shuttle and helping keep the astronauts safe; it means a lot to everyone. You wouldn't believe the dedication of this team."

Jose notes that under current national policy the space shuttle is scheduled to make its last flight just one year from now, in September 2010. And, says Jose, Sandia will be there, on the scene for each of the remaining seven planned missions.

After the shuttle era, is there a role for the LDRI technology in space? Jose thinks so.

"We've had some talks with NASA about post-shuttle applications," he says, "but nothing definite has been decided."

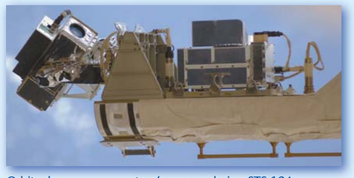
And if NASA were to offer to train Jose as a mission specialist to support some future space-based LDRI deployment, would he go for it?

"Where do I sign up?" he says.

The Laser Dynamic Range Imager (LDRI) is a LADAR device developed by Sandia National Laboratories for the US space shuttle program. The sensor was developed as part of NASA's Return to Flight effort following the space shuttle Columbia disaster to provide 2-D and 3-D images of the thermal protection system on the space shuttle orbiter. The LDRI generates 3-D images from 2-D video. Modulated laser illumination is demodulated by the receive optics, and the resulting video sequences can be processed to produce 3-D images. The modulation produces a flickering effect from frame to frame in the video imagery.

As part of the orbiter boom sensor system, the LDRI is mounted at the end of the boom on a pan-tilt unit (PTU) along with an intensified video camera (ITVC). Each mission, the LDRI is the primary sensor for scanning the reinforced carbon-carbon panels on the leading edge of the shuttle's wings and nose and is capable of seeing damage as small as a 0.020-inch crack. An earlier version of the LDRI originally flew as a DTO on STS-97. (Source: Wikipedia)

The LOIS team takes a break during STS-114 (Return to Flight Mission) for a team picture. Many different organizations across the Labs have contributed to the success of the LOIS project. Back row: Steve Gradoville (5533), Dan Talbert (5711), Erik Fosshage (424), Colin Smithpeter (5354), John Sandusky (5711), Steve Lebien (5919). **Middle row:** Patricia Tempel (2622), Megan Resor (5736), Dave Karelitz (9326), Chuck Graham (5339), Cristina Montoya (9341), Mark Heying (2664), Linda Gilkey (10626), Joel Jordan (separated from Sandia), Bob Habbit, (5711, project manager), Larry Dalton (ret.). **Bottom row:** Bob Nellums (5711), Matt Montano (5356), Gus Rodriguez (5737), Richard "Tap" Taplin (2664, project "heart and soul"), Todd Pitts (5711), Tom Casaus (2541), Jose Rodriguez (2664, project lead) (Photo courtesy of Sandia LDRI team)

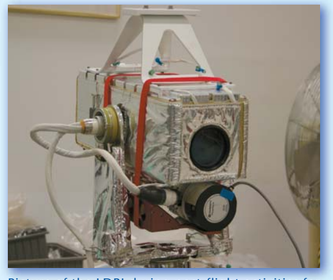


Orbiter boom sensor system's sensors during STS-124. (Photo courtesy of NASA)

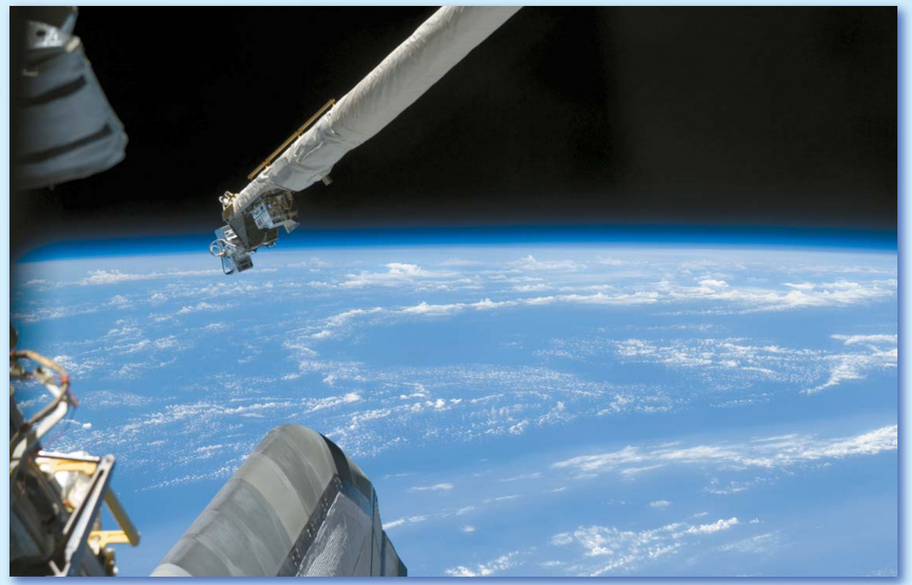
Dennis Clingan (2617) and Erik Fosshage (424) examine the LDRI during post-flight activities for STS-121. (Photo courtesy of Sandia LDRI team)

Jose Rodriguez (2664, project lead) kneels next to the LDRI at the Orbiter Processing Facility (OPF) for space shuttle *Discovery* during preflight activities for STS-119. (Photo courtesy Sandia LDRI team)

Todd Pitts (5711) stands next to the LDRI in the payload bay of space shuttle *Endeavour* at Launch Complex 39A (LC-39A). (Photo courtesy of Sandia LDRI team)



Picture of the LDRI during post-flight activities for STS-117. Test equipment is used to measure the output power of the LDRI's laser after each mission. (Photo courtesy of Sandia LDRI team)



Picture of the LDRI (mounted at the tip of the orbiter boom sensor system) inspecting the starboard wing of space shuttle *Discovery* during STS-124. The LDRI is the prime sensor for inspecting the RCC of the space shuttle during mission operations. (Photo courtesy of NASA)

Dennis Clingan (2617), Jose Rodriguez (2664), and Erik Fosshage (424) pause for a photo in the "white room" of LC-39A. (Photo courtesy of Sandia LDRI team)

John Sandusky (5711, standing) oversees data intake operations during STS-115. Sitting (front to back): Mark Heying (2664), Bob Nellums (5711), Simon Hathaway (2623), Dave Karelitz (9326) (Photo courtesy of Sandia LDRI team)

Members of the LOIS team examine LDRI video of the reinforced carbon-carbon (RCC) starboard wing of space shuttle *Atlantis* during STS-117. Left to right, John Sandusky (5711), Tom Casaus (2541), Patricia Tempel (2622) (Photo courtesy of NASA)

Members of the LOIS team take part in a discussion during STS-116. Standing in picture: Bob Habbit (5711), Todd Pitts (5711). Sitting, (back to front), Bob Nellums (5711), Megan Resor (5736), Simon Hathaway (2623), Dave Karelitz (9326) (Photo courtesy of NASA)

Gus Rodriguez (5737) monitors LDRI video downlinked from space shuttle *Discovery* during STS-116. (Photo courtesy of NASA)

Bob Nellums (5711) and Dave Karelitz (9326) examine video data from space shuttle *Atlantis* during STS-125. (Photo courtesy of NASA)

Brenna Hautzenroeder (2623)

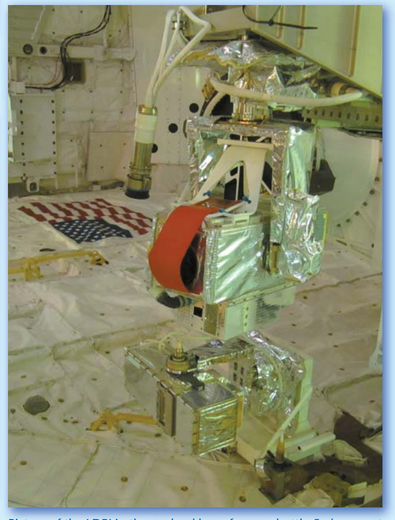
Megan Resor (5736)

Bob Habbit (5711, project manager)

Simon Hathaway (2623)

Dave Karelitz (9326)

Jose Rodriguez (2664), stands in front of space shuttle *Atlantis* during its rollout from the Vehicle Assembly Building (VAB) to Launch Complex 39A (LC-39A) at the Kennedy Space Center (KSC) in Florida. (Photo courtesy of Sandia LDRI team)



Picture of the LDRI in the payload bay of space shuttle *Endeavour* at Launch Complex 39A (LC-39A). Note, space shuttle *Endeavour* is vertical in this picture. (Photo courtesy of Sandia LDRI team)

What happened to Columbia?

To understand why Sandia has become a vital partner for NASA in ensuring the safety of shuttle missions, it's important to know what happened to *Columbia*.

The space shuttle's huge external fuel tank is covered with dense insulating foam designed to keep ice from building up on the tank, which is filled with fuels at cryogenic temperatures. About 80 seconds into *Columbia's* last mission, when it was accelerating through Mach 2 at an elevation of 66,000 feet, a briefcase-sized piece of that foam broke off and struck the shuttle wing's leading edge. At supersonic speed, that chunk did considerable damage to the wing's insulating material, a reinforced carbon-carbon (RCC) material designed to protect the shuttle during the incredible heat buildup that occurs during reentry.

With the integrity of the RCC material breached, the shuttle was unable to withstand the 2,500-degree reentry temperature. It broke up in the skies over Texas.

Safety Fair promotes safety awareness at work and home

By Bill Murphy • Photos by Randy Montoya

Did you know that your sleep habits have a lot to do with safety? Or that how long you wash your hands can have a real impact on whether you'll contract H1N1 (or other illnesses)? Do you know how to use a fire extinguisher properly and safely?

Those are among the things the approximately 2,000 attendees learned at the Sandia Safety Fair, an annual event that highlights safety in all its aspects, including some (like sleep) that you may not have considered as safety issues.

The Safety Fair's stated intent is to "promote increased awareness of situations in our everyday lives — both at work and at home —that can be potentially harmful to our physical health and mental well-being."

The 2009 Safety Fair featured some 50 exhibitor booths distributed throughout the Steve Schiff Auditorium lobby and in an adjacent tent. Exhibitors included safety-related organizations from within and outside Sandia, including other government agencies and private-sector companies.

The Safety Fair wasn't just about looking and listening. There was some "doing," too. Andrew Leyba from Emergency Operations Dept. 4136 was on hand just south of the exhibitor tent to offer basic hands-on fire extinguisher training to all comers. (Yes, there is a right way and a wrong way to use a fire extinguisher; Andrew shows you how to do it right.) Andrew had some advice to go along with the training: For home safety, make sure to check that the charge on the fire extinguishers in your kitchen, your garage, and by the fireplace (you do have fire extinguishers around the house, don't you?) have not expired.

Andrew and his colleagues in Dept. 4136 are available to provide special fire safety training to groups throughout Sandia. For information contact the department.

Private-sector companies were a significant presence at the Safety Fair. Fisher Scientific, for example, has been an exhibitor at the fair for several years. It is a JIT supplier for both chemicals and safety-related gear. Company reps John Sikora and Alfredo Garcia say they enjoy the event and find it useful for their business. Because many of their customers work in restricted areas, John says his usual contact is by telephone and email. The fair, he says, gives him a chance to meet customers in person.

The free handouts — mousepads, popcorn, knit caps, erasers, and superballs, to name just a few of the many freebies at the fair — grabbed and held the attention of goodie bag-laden attendees. The various complimentary items did more than fill goodie bags though; they caused folks to stop and talk and perhaps take away a few valuable safety messages.

And that, says Safety Fair organizer Willie Johns (4122) is what it's all about. "We want people to be safe here at the Labs and at home. We want you back — and so does your family."

WAKE-UP CALL ON SLEEP — A University of New Mexico Hospital representative discusses sleep issues with attendees at the annual Sandia Safety Fair. Sandia's Healthcare and Support Services Dept. 3334 also had a sleep-related exhibit that emphasized the safety-related importance of good sleep. Pete DelMarcelle (3334) said the one best thing individuals can do to foster better sleep is to keep their breathing passages clear at night using such aids as Breathe Right-type strips and widely available nasal rinses.

SPO MICHAEL PADILLA tries on a pair of safety glasses, one of many free safety-related items distributed at the fair.

The Safety Fair featured a booth dedicated to matters related to influenza safety practices.

Turning an idea into an event

Safety Fair coordinator Willie Johns (4122) says he was pleased with the attendance and the diversity of exhibitors, adding that he was especially proud of the Sandians who worked to make the event possible.

"We had a wonderful team of people — Sandy Portlock, Whitney Faust, Randy Fellhoelter, Adam Garcia, Andy Zeitler, Sandra Jiron, and many support personnel — who worked extremely hard to put this year's Safety Fair together in a short period of time," Willie says. "The team did an outstanding job. Many thanks. you all."

SAFETY FAIR attendees learned the right way to apply CPR at one of several hands-on exhibits at the fair.

Your Health. Take Charge.

Open Enrollment 2010

Benefits Choices 2010 Open Enrollment for Employees

• Nonrepresented (nonunion), MTC, and OPEIU represented employees — **Oct. 19-Nov. 4, 2009 (5 p.m. MST)**

• SPA represented employees — **Dec. 1-3, 2009 (5 p.m. MST)** (This change is due to union contract bargaining)

Effective Jan. 1, 2010, the UnitedHealthcare Standard PPO Plan will be eliminated for nonrepresented employees. During open enrollment this year, all nonrepresented employees currently enrolled in the UHC Standard PPO Plan will need to "Take Charge" and select a different medical plan for coverage in 2010. Employees who take no action will be automatically enrolled in the new Sandia Total Health with Health Reimbursement Account for 2010. For information on the new plan, go to HBE's "Take Charge" website at http://hbe.sandia.gov.

Detailed information on 2010 changes will be published in the Benefits Choices 2010 Open Enrollment newsletters. For nonrepresented, MTC, and OPEIU represented employees, these newsletters will be sent out by Oct. 9. SPA employees will receive a newsletter after contract bargaining is finalized in November.

Employee benefits fairs

This year, the Health, Benefits, and Employee Services Center will be hosting several benefit fairs for employees. Come and ask your benefit questions of the Sandia health plan vendors and/or the benefits staff.

New Mexico —
- Wednesday, Oct. 21, Steve Schiff Auditorium lobby, 10 a.m.-2 p.m.
- Thursday, Oct. 22, Employee/Spouse Fair at the UNM Continuing Education Conference Center, 1634 University Blvd. N.E., 10 a.m.-2 p.m.
- Wednesday, Oct. 28, Steve Schiff Auditorium lobby, 10 a.m.-2 p.m.

California —
- Monday, Oct. 26, 904 Auditorium, 10 a.m.-2 p.m.

Employee presentations

Benefits Choices and "Nuts and Bolts" of Sandia Total Health for nonrepresented employees — Hosted by HBE

The one-hour presentation will consist of a 30-minute overview of Benefit Choices 2010 Open Enrollment, followed by a 30-minute segment covering the "Nuts and Bolts" of Sandia Total Health, Health Reimbursement Account, health assessment, and biometric screening. A question-and-answer session will follow.

New Mexico —
- Wednesday, Oct. 21, Steve Schiff Auditorium lobby, 11 a.m.-noon
- Thursday, Oct. 22, UNM Continuing Education Conference Center, 11 a.m.-noon
- Wednesday, Oct. 28, Steve Schiff Auditorium lobby, 11 a.m.-noon

California –
- Monday, Oct. 26, 904 Auditorium, 11 a.m.-noon

Employee presentations

Benefits Choices for represented employees — Hosted by HBE

The presentation will consist of a 30-minute overview of Benefit Choices 2010 Open Enrollment. A question-and-answer session will follow.

New Mexico —
- Wednesday, Oct. 28, Steve Schiff Auditorium, 10-10:30 a.m.

Flexible Spending Accounts for all employees — PayFlex and UnitedHealthcare FSA Accounts

New Mexico —
- Wednesday, Oct. 21, Steve Schiff Auditorium, 1-2 p.m.
- Thursday, Oct. 22, UNM Continuing Education Conference Center, 1-2 p.m.
- Wednesday, Oct. 28, Steve Schiff Auditorium, 1-2 p.m.

California —
- Monday, Oct. 26, 904 Auditorium, 1-2 p.m.

Remote locations (NTS, Tonopah, Amarillo, Carlsbad, and Washington, D.C.) will be connected via video link to all presentations above (excluding represented employee presentation).

Flexible Spending Accounts — An FSA is a key to tax savings

It's time again to begin a thorough calculation of your anticipated health care or day care Flexible Spending estimates. Visit https://www.payflex.com/mypayflex/ to view the Eligible Expense Items and use the Educational Tools and FSA calculator to help you with this estimation process. Remember these accounts have a "use it or lose it" rule, so you only want to consider predictable expenses and don't want to overestimate.

* * *

Considering retirement in 2009 or 2010? If so, you may want to attend a Retiree Open Enrollment presentation to learn about the medical plans offered to

Benefits Choices 2010 Open Enrollment for Retirees, Surviving Spouses and COBRA participants

• Benefits Choices 2010 Open Enrollment for retirees, surviving spouses, and COBRA participants is **Oct. 26-Nov. 10**.

Detailed information on 2010 changes will be published in the Benefit Choices 2010 Open Enrollment package sent to all participants' home addresses the week of Oct. 19.

Surviving spouses, long-term disability terminees, and COBRA participants will receive the Benefit Choices 2010 Open Enrollment package directly from UnitedHealthcare Business Services (Sandia's surviving spouse, long-term disability terminee, and COBRA administrator) the week of Oct. 19.

Retiree/Surviving spouse open enrollment presentations

This year, the Health, Benefits, and Employee Services Center will be hosting several benefit fair/presentations for retirees/surviving spouses. Note: The presentation focus is on Benefit Choices 2010 Open Enrollment and will have very limited information on the 2011 changes.

Albuquerque – NEW LOCATION

All presentations will be held at the UNM Continuing Education Conference Center, 1634 University Blvd. NE.

Pre-Medicare presentations

• Thursday, Oct. 29	8:30-10 a.m.
• Wednesday, Nov. 4	10:30 a.m.-noon
• Monday, Nov. 9	8:30-10 a.m.

Medicare primary presentations

• Thursday, Oct. 29	10:30 a.m.-noon
• Wednesday. Nov. 4	8:30-10 a.m. 1-2:30 p.m.
• Monday, Nov. 9	10:30 a.m.-noon 1-2:30 p.m.

Livermore

All presentations will be held at the Doubletree Club Hotel, 720 Las Flores Road, Livermore.

Medicare primary presentation

• Tuesday, Oct. 27	8:30-10 a.m.

Pre-Medicare Presentation

• Tuesday, Oct. 27	10:30 a.m.-noon

More information

Open Enrollment website (employees and retirees): http://hbe.sandia.gov

Sandia Laboratories Customer Service
(NM) HBE Customer Service http://hbe.sandia.gov
505-844-HBES (4237) or 1-800-417-2634, ext. 844-HBES (4237)
Hours: 7:30 a.m.-5 p.m. MDT

Health Benefits Employee Services
HBE
Your Health. Take Charge.

NNSA Defense Programs Awards of Excellence

Two individuals and nine teams were selected to receive NNSA Defense Programs Awards of Excellence at ceremonies this year in New Mexico on Sept. 2 and in California on Sept. 3. The special guest speaker was William Goodrum, NNSA's assistant deputy administrator for Science, Engineering, and Production Programs.

The NNSA Defense Programs Awards of Excellence were created in the early 1980s to give special recognition to those at the laboratories and plants directly associated with the stockpile modernization program. Today, the awards honor exceptional contributions to the stewardship and management of the stockpile.

Individual winners

Photos by Lloyd Wilson and Randy Wong

Allison Davis (414) received her award while on assignment in Washington, D.C. Allison is recognized for vital and lasting contributions to NNSA Weapon Quality Assurance. Her outstanding technical expertise and significant contributions to the NNSA weapon quality community made Allison an indispensable asset to the Nuclear Weapon Surety and Quality Division (NA-122.1) as well as the Office of Military Application and Stockpile Operations (NA-122). Allison provided a wealth of experience to the NNSA weapon quality assurance program during a period of significant turmoil and transition. Her steadfast commitment to mentoring those charged with executing the administration's weapon quality assurance initiatives serves as clear evidence of her strong leadership and commitment to excellence.

Kevin Eklund (2111) is recognized for outstanding technical leadership of Sandia's responsibilities in successfully achieving the B61 ALT 357 Life Extension Program (LEP). Kevin led the majority of the qualification testing for the ALT 357. He worked effectively with Los Alamos National Laboratory to define the full scope of test objectives, designed the number of tests to be as efficient as possible, and led the performance and completion of the tests. He is recognized as Sandia's expert in B61 earth penetrator technology. His role in the B61-11 development, as well as his current assignment as B61 weapon systems lead, has resulted in significant, continuous contributions to the B61 nuclear weapons program.

Team winners

The Advanced Radiographic Technologies Team

The Advanced Radiographic Technologies Team is recognized for the development and demonstration of a pulsed-power driven, electron-beam diode X-ray source suitable for full-scale core punch radiography. Flash X-ray radiography is an essential diagnostic used to image material under extreme dynamic conditions in the primary certification process for nuclear weapons. A long-term goal within nuclear weapons is the development of brighter X-ray sources to enable the imaging of more dense objects with increased resolution. The team utilized theory, simulation, advanced diagnostics, and state-of-the-art pulsed-power engineering to achieve a brighter X-ray source for use in flash X-ray radiography. The work — completed in collaboration with the UK's Atomic Weapons Establishment (AWE) — satisfied a DOE level-2 milestone and met the requirements set by AWE to provide flash core-punch radiography for hydrodynamic experiments.

Bryan Oliver, team representative (1645), Steve Cordova (1645), Kelly Hahn (1645), Mark Johnston (1645), Joshua Leckbee (1645), Isidro Molina (1645), Timothy Jay Webb (1645), Nichelle Bruner (5444), Darryl Droemer (1649), Raymond Gignac (1649), David Johnson (1645), Salvador Portillo (5443), Tobias Romero (1645), Dale Welch (1645), Frank Wilkins (1649), Derek Ziska (1645), Ian Crotch (AWE), James Threadgold (AWE)

The W87 Joint Test Assembly Team

The W87 Joint Test Assembly Team delivered on schedule to the NNSA the first W87-JTA4 production unit, which was successfully launched aboard a Minuteman III ICBM. The team's goal was to deliver the most war reserve-like joint test assembly built to date and to utilize an advanced, distributed telemetry system and a high-fidelity rigid body sensor package that measured reentry dynamics. The delivery of the first JTA4 production unit was a culmination of a five-year development program. The project included close multiagency interaction, communication, and cooperation. The success of the JTA4 first production unit is attributed to the dedication of the team as it worked tirelessly to resolve production, interface, delivery, and test issues.

(Team photo on next page)

Benjamin Markel, team representative (8224), **R. Mark McConkie, team representative** (8231), **Anthony S. Tafoya, team representative** (5334), Marco Alvares (8231), Scott Anderson (2951), Derek Baptist (8135), William Beenau (2913), Kurt Berger (8244), Richard Berget (1733), Cynthia Blain (5339), Robert Brandt (8531), Thomas Brewer (421), William Cain (4225), Joe Chiu (422), Seung Choi (8229), Jeffrey Christensen (1733), Thomas Clark Jr. (8133), Albert Eras Jr. (2952), Ronald Farmer (421), Ernest Garcia (2614), Allanah Rose Gerrard (8243), Steven Grieco (421), Gordon Grimm (1733), Joel Groskopf (8123), Gerald Gurule (421), Bruce Hamilton (2951), Julia Hammond (2614), Daniel Hardin (8231), Donald Hardy (2547), Keeven Hurtt (5334), Gary Kirchner (8135), Kevin Lam (8135), Hoi Sze Judy Lau (8224), James Lauffer (8231), Shanon Ledger (8531), Micah Lillrose (2661), Deborah Linnell (8236), Jennifer London (5343), Delia Madrid (1653), Mark Martin (2553), Kyla Martinez (2992), Marcus Martinez (5334), Alfredo McDonald (8230), Karen McGee-Ryno (8531), Quenton McKinnis (8231), Paul Mendes (8236), Carol Michaels (422), Douglas J Miller (421), Timothy Mooney (2138), Dennis Mowry (2952), Michael Newman (2112), Brian Oden (8224), Robert Oetken (8244), Jerrod Peterson (8133), Andrew Petney (5334), Michael Plowman (425), Kenneth Pohl (1749-2), Marc Polosky (2614), Thomas Prast (8135), Cary Lynn Pratt (421), Larry Lee Pucket (2992), Danny Rey (2732), Lee Rieger (414), Jeffrey Robinson (422), Fredd Rodriguez (5572), Kathryn Romero (2434-1), Glenda Ross (8243), Tracy Sanchez (5334), John Sarsfield (5334), Catherine Schmitz (8236), Curtis Specht (8231), Kiet Tieu (8135), Roger Tilley (8231), Etta Tsosie (5341), Janet Tucker (5334), Justin van Den Avyle (2547), George Vernon (2617), Michelle Vinson (2992), Dale Walker (8231), Randy Williams (1732), Anthony Wingate (422), Phil Abel (2998), Peter Biggs (422), Agapito Chapa (5334), Mark Claudnic (8243-1), Don Kasberg (8224), Ragon Kinney (5334), Stew Kohler (5334), Paul Lowe (8135), Ernie McNabb (421), Patrick Sanchez (2553), Ellis Sykes (422), Barb Yerganian (422), Bruce Alquist (Kansas City Plant), Tim Arasmith (Kansas City Plant), Wendy Baca (NNSA), Jono Blackwell (Pantex), Haley Burke (Pantex), Carl Cardwell (Y12), Annie Carroll (Pantex), Terry Davis (Kansas City Plant), Brad Elwell (DoD), Bill Faust (Kansas City Plant), Karen Geisler (Kansas City Plant), Chris Gillihan (Kansas City Plant), Chase Grafton (Kansas City Plant), Guy Hardy (Pantex), Tom Healy (LLNL), Ron Honig (Kansas City Plant), Stewart Iverson (Jaguar Precision Machining), Paul Jarnevic (Kansas City Plant), Bert Jorgensen (LLNL), Mike Kelley (Pantex), Vance Lamborn (DoD), Brad Maples (Pantex), Dan Martin (Pantex), Cliff McFarlane (DoD), Leroy Miller de Romero (Jaguar Precision), Charlie Miller (Savannah River Site), Leonard Moore (Kansas City Plant), Louis Moreno (Kansas City Plant), Jay Pape (NNSA), Jennifer Rice (Savannah River Site), Richard Santa (Kansas City Plant), Jimmy Schlabaugh (DoD), Larry Sheets (Kansas City Plant), Harvey Simpson (Kansas City Plant), Eric Smith (DoD), Larry Snow (Y-12), Jess Squires (LLNL), Dennis Terrell (Pantex), Bryon Thompson (Kansas City Plant), Leslie Twite (Kansas City Plant), Erich Villanueva (NNSA), Jason Wingett (Kansas City Plant), Mike Woelfle (Pantex), Steve Yakuma (LLNL)

The B83 Joint Test Assembly (JTA) 1B Flight Test Team

The B83 Joint Test Assembly (JTA) 1B Flight Test Team is recognized for successful accomplishments in the hardware development, production, and execution of the B83 DJTA 1B flight test. The high costs of security required to conduct special nuclear material (SNM) flight tests at the Tonopah Test Range, led the NNSA to cease SNM flight tests. Lawrence Livermore National Laboratory (LLNL) requested a highly instrumented final SNM flight test to collect data to further its computational simulation capabilities. Data provided from the test flight allows LLNL not to require future SNM flight tests. The B83 DJTA1B Team, under a very tight schedule constraint, developed and produced the needed flight test hardware, executed the flight test, and provided the results to LLNL. The team's results increased the quality of LLNL's simulation capabilities and provided cost savings to NNSA.

Barry McLaughlin, team representative (8237), Lisa Andersen (8226), Scott Anderson (2951), Christopher Boswell (8531), Daniel Brown (2951), Stephen Eisenbies (8237), David Faucett (2662), Patrick Keifer (8223), Ming Lau (8237), Bryn Miyahara (8226), Steven Neely (8237), Michael Neuman (8237), Phil Reyes (2662), Gregg Stanger (8237), Leroy Whinnery Jr. (8223), Walter Wolfe (1515), Joel Baca (NNSA), Peter Biggs (422), Kevin Brown (2617), Aaron Machado (8243-1), Michelle Bruns (NNSA), Mike Danforth (LLNL), Alonzo Everhart (Pantex), Jeffrey Harrison (LLNL), Chris Hoops (Pantex), Anthony Lee (LLNL), David Longinotti (LLNL), Brent Stephens (Pantex), Bernard Whitaker (NNSA)

The IGTS Thermoelectric Power Source Team

The IGTS Thermoelectric Power Source Team is recognized for collaborating across NNSA sites to demonstrate a functioning gas transfer system (GTS) thermoelectric power source. Sandia/New Mexico and Sandia/California successfully demonstrated a new long-life power source concept that converts waste heat from the decay of tritium in a GTS into electricity using advanced thermoelectrics. A milestone was achieved when a prototype IGTS was filled with tritium at the Savannah River National Laboratory (SRNL). This fulfilled an NNSA multisite performance incentive milestone to partner with SRNL on tritium-loading of a prototype unit. The IGTS team showed exceptional leadership in developing relationships with SRNL staff and solving difficult programmatic hurdles. The team's dedication was instrumental in pulling off this challenging, cross-site research activity.

Steven Rice, team representative (8224), Douglas Adolf (2453), Jeff Jorenby (8224), Gary Simpson (8226), Scott Whalen (2547), Philip Zablocki (8226), Joseph Navajosky (Savanah River Site), Lee Nigg (Savannah River Site)

NNSA Defense Programs Awards of Excellence

(Continued from preceding page)

The MC4379A Timer Product Realization Team

The MC4379A Timer Product Realization Team established and qualified in-house manufacturing processes and delivered 17 mark quality units in less than eight months. Starting with no defined manufacturing space, tooling, or process equipment, the team leveraged the existing Center 2700 Quality Management System to develop and qualify new processes to produce 17 mark quality, in-house fabricated explosive components, surpassing initial delivery goals. The team exceeded the 18-month product realization goal by more than 5 percent while maintaining the highest level of product quality, culminating with a first time defect-free product acceptance by the customer. These MC4379A timers will enable W78 neutron generator shipments to the DoD customer at least five months before an external supplier would be able to produce mark quality timer assemblies.

Muhammad El, team representative (2714), Barbara Allison (2433-4), Miguel Atencio (1521), Margaret Baca (2433-4), Susan Fae Ann Bender (251), Steve Buckles (2554), Andy Charley (2454-1), Porfirio Diaz (2433-4), Richard Diprima (2734), Maria Galaviz (2730), Scott Gillespie (421), Sergio Gonzalez (2719), Pierrette Gorman (2732), Adam Jimenez (2552), Moses Jones (2714), Paul Lefebre (2433-4), Sarah Leming (1521), John Lopez (2714), James Lucero (2714), Ronald Martinez (2554), Leanna Minier (2554), Rosa Montoya (2554), Kenneth Morris (2717), Gregory Neugebauer (2732), Therese Ordonez (2732), Lenore Partridge (2719), Susan Pollard-Walker (2717), Gary Pressly (2734), Kent Robbins (2542-1), William Silva (2433), Terrance Smith (2996), Pamela Walker (2714), Paul Headley (2552), Duane Richardson (2553)

The MESA Application-specific Integrated Circuit (ASIC) Trusted Design Accreditation Team

The MESA Application-specific Integrated Circuit (ASIC) Trusted Design Accreditation Team is acknowledged for achieving Category 1A trusted supplier accreditation for integrated circuit design services through the DoD Trusted Supplier Program. The trusted supplier accreditation activity addresses significant concerns associated with the rapidly decreasing number of US-based microelectronics suppliers and the growing issue of widespread counterfeit microchips. This accreditation requires improvements in the quality methodology and well-defined security and configuration management systems for both classified and unclassified design work. The team met security requirements defined by the National Security Agency's Trusted Access Program Office. Meeting these criteria means the Sandia integrated circuit design team demonstrates high levels of quality and security control.

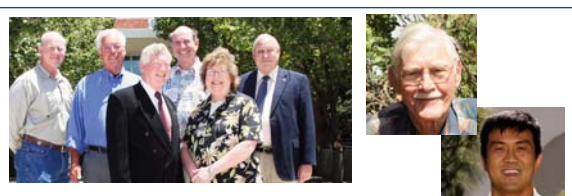
Tracy Peterson, team representative (1748), James Dishman (1711), Richard Dondero (1748), Rita Gonzales (1735), Vivian Kammler (1735), James Ewers Levy (1735), William Miller (5917)

NNSA Defense Programs Awards of Excellence

Quasi-Isentropic Dynamic Compression of Ta to 4Mbar Team

Material properties under high pressure and high strain are important for material science. The Quasi-Isentropic Dynamic Compression of Ta (tantalum) to 4Mbar Team team developed a highly precise capability on the refurbished Z machine that allows innovative, 4Mbar (i.e., high pressure) quasi-isentropic dynamic material measurements that are of relevance to the nuclear weapons program. Many previous high-pressure compression processes do not involve fully developed shocks as those established with most impact events. The team's technique allows the first measurements of tantalum to 4Mbar under dynamic quasi-isentropic loading, with adequate accuracy for comparisons to impact data at these stress levels. Los Alamos National Laboratory generated and provided an equation-of-state for tantalum and the tantalum target material, both used by Sandia. Sandia researchers defined a reference principal isentropic and designed, fielded, and analyzed the experiments on the refurbished Z. This technique resulted in higher certainty in predictions of weapon behavior.

Jean-Paul Davis, team representative (1646), **Marcus Knudson, team representative (1646), Raymond Lemke, team representative** (1641), Michael Desjarlais (164), Clint Hall (1646), Keith Lechien (1671), Thomas Mehlhorn (1640), Jason Podsednik (5916), Timothy Pointon (1654), David Seidel (1654), William Stygar (1671), Mary Ann Sweeney (167), Devon Dalton (1646), Charles Meyer (1646), Anthony Romero (1646), Dustin Romero (1646), Dave Funk (LANL), Rusty Gray (LANL), Carl Greeff (LANL)



The Sandia Weapon Intern Program

The Sandia Weapon Intern Program (WIP) is recognized for the completion of the Weapon Intern Program's first decade of sustaining nuclear weapon knowledge for future generations of weaponeers. On Aug. 28, the program graduated its 10th class. Extensive training is provided to representatives from around the nuclear weapons complex and DoD. The program aims to make the interns aware of the complexity associated with weapons design, the partnerships required to deliver a product, and the processes, design considerations, and tradeoffs in designing weapons. These graduates move into leadership positions with a more complete nuclear weapons knowledge base than their peers. WIP constantly reviews and updates its curriculum to meet the needs of the nuclear weapons community as expected from a variety of stakeholders, customers, and participants.

Elizabeth Connors, team representative (2916), John Hogan (521), Edith Johnson (4232), Stanley Kawka (2916), Sharon Mackel (1685), Tina Newlander (2916), Barbara Reser (2916), Andrew Rogulich (223), John Shaw (9711), Paul Yoon (8229), Ben Benjamin (ret.), Ray Bland (ret.), Brian Bopp (ret.), Al Hachigian (ret.), William Patterson (ret.), Harold Rarrick (ret.), Byron Ristvet (DTRA), Leon Smith (emeritus retiree), Harold Walling (ret.), Vernon Willan (ret.)

The Z Laser Trigger System (LTS1) Team

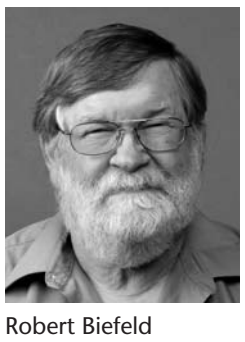
The Z Laser Trigger System (LTS1) Team is recognized for developing and implementing a novel primary-trigger generator that substantially increases the reliability and timing accuracy of the Z pulsed-power accelerator. The LTS 1, developed by Mark Savage and colleague Brian Stolzfus (both 1671), shows a clear example of rethinking a fundamental system and making it better. The new laser-trigger generator receives a low-voltage signal from the control room and produces a high-voltage pulse that initiates the firing sequence for Z's 36 Marx banks. The LTS only requires maintenance once every five shots (an improvement factor of five over the former system), and the result is a substantial increase in the reliability and timing accuracy. The LTS 1 has raised the standard for pulsed-power system performance and provides an excellent example of concept, theory, and experiment being combined into a working system to benefit the nuclear weapons community.

Mark Savage, team representative (1671), Brian Stoltzfus (1671)

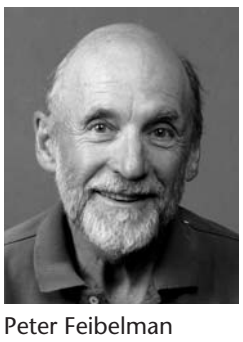
The W87 Joint Test Assembly Team

Mileposts

New Mexico photos by Michelle Fleming



Robert Biefeld
35 1126



Peter Feibelman
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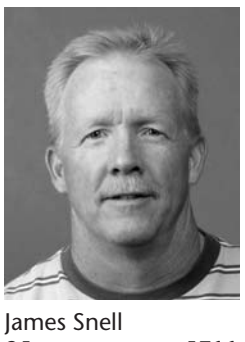
Carol Ashby
30 11500

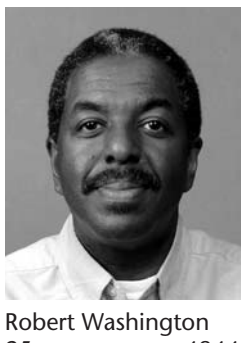
Philip Georg
30 5632

Curtis Gibson
25 5343



James Snell
25 5711

Charles Walker
25 2452



Robert Washington
25 4844

John Feddema
20 5535

Linda Jaramillo-Alfaro
20 3002

Loula Killian
20 10669

Dianne Sanchez
20 4853

Daniel Stephens
20 4827

Marsha Lou Strauch
20 10011

Carter Grotbeck
15 5579

Curtis Ober
15 1433

The content here is taken directly from past issues of the *Lab News*.

50 years ago . . . Sandia's "Sphere of Science" geodesic dome is being dismantled this week and is well on the way toward another New Mexico State Fair. The geodesic dome will be erected again on the Fair Grounds and will feature new and improved displays. A temporary theater will be added to the dome, capable of seating 70 persons. The "Sandia Story," 30-minute color movie telling of the work and mission of the Corporation, will be shown continuously during the week of the Fair — Sept. 26 to Oct. 4. The Sandia exhibit was one of the State Fair's most popular attractions last year. During the week some 82,000 persons visited Sandia's dome.

EXHIBITS for Sandia's "Sphere of Science" display are prepared for the New Mexico State Fair.

40 years ago . . . A Sandia advance in the field of thermionic conversion may pave the way for a breakthrough in space power systems. Provided certain heat-containing materials problems can be solved, the use of chemically vapor deposited (CVD) rhenium on thermionic emitter and collection plates (electrodes) should make possible nuclear space power generators that are twice as efficient as the SNAP generators now in use. Ed Burgess, Space Power Research Division 5321, is credited with the theoretical development of the new kind of electrodes. In general terms, a thermionic converter works on the principle that electrons excited by a heat source can be emitted from one surface and collected on another cooler surface. Scientists in Planetary Quarantine Department 1740 believe they have discovered **an improved method of spacecraft sterilization.** The new method, which involves the simultaneous application of heat and radiation, is being developed by a project group headed by Marcel Reynolds (1742). Tom Burford (1700) had the original idea on which the studies are based. The new sterilization technique results from synergistic effect of combining heat and radiation — applied simultaneously they are much more effective in killing bacteria than when used singly or in sequence.

Ed Burgess (5321) studies emission rates for different electrode materials using this plasma anode tube.

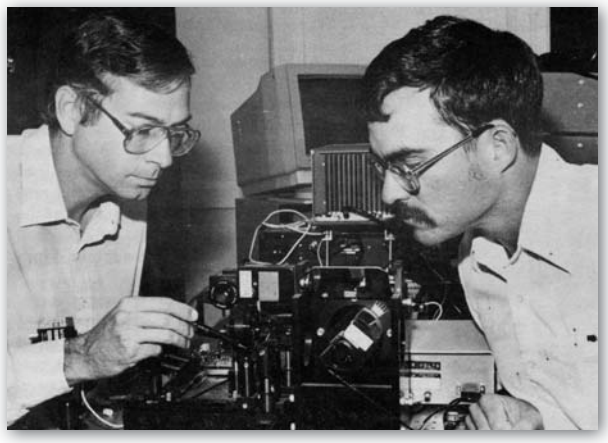
30 years ago . . . With the recent Phase 3 authorization for engineering **development of the W85 and W86 nuclear warheads** for the Army's Pershing II surface-to-surface missile system, both Sandia and Los Alamos Scientific Laboratory are getting underway a three-to four-year effort to provide an air burst/surface burst warhead (W85) and an earth penetrator warhead (W86) for the system. The Pershing II is a two stage rocket system launched from a mobile launcher. The W85 warhead will be based on an adaptation of B61-4 components to be compatible with the Pershing II system. **A portable viscometer which measures rheological (flow) characteristics of drilling mud** under simulated borehole conditions as deep as 20,000 feet has been developed by Sandia Laboratories. Laboratory and field tests with water and oil-based muds of known viscosity show that the instrument, basically a rotational viscometer, can provide on-site measurements within two centipoises (cp) of known value. (Viscosity is measured in cp units).

PERSHING II missile system is shown during final advanced development testing at White Sands.

BOB REINEKE (4735) pours drilling mud into the test cell of a newly developed portable viscometer.

"For shallow wells with low temperatures and pressures, viscosity measurements performed at atmospheric conditions are satisfactory for predicting drilling mud performance," said Bob Reineke of Drilling Technology Div. 4735. "However, with the increased interest in drilling geothermal wells and in drilling oil and gas wells to greater depths, it becomes important to measure and evaluate rheological properties of drilling fluids under increased temperature and pressure."

20 years ago . . . Sandia's Exploratory Systems Development, Dept. 9100 and Components, Dept. 2500 have taken advantage of recent developments in solid-state lasers and fast gallium-arsenide integrated circuits. The result is a **laser radar that can "see"** for about 50 meters. As later generations of the system become more compact and powerful, it could let a "smart" weapon automatically recognize a target. There are further possibilities. "Although the original idea was intended for attacking high-value military targets," says Mark Grohman (9127), project leader for development of the laser radar, "we're finding more and more potential applications in other areas." As examples, intrusion detection, robotic vision, collision avoidance, and autonomous vehicle control.



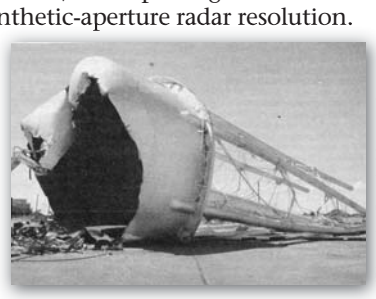
MARION SCOTT (2531, left) and Mark Grohman (9127) inspect the optics of the Sandia laser radar. Most of the electronic components are hidden behind the optics.

10 years ago . . . Lynx, a new fine resolution, real-time synthetic-aperture radar (SAR) system, was unveiled during a ceremony in Albuquerque. Designed to be mounted on both manned aircraft and unmanned aerial vehicles (UAVs), the 115-pound SAR is a sophisticated all-weather sensor capable of providing photographic images through clouds, in rain or fog, and in day or night conditions, all in real time. The SAR produces images of extremely fine resolution, far surpassing current industry standards for synthetic-aperture radar resolution.

(Photo by Randy Montoya)

SAR SCIENCE – Sandia researcher Bill Hensley checks the Lynx synthetic-aperture radar (SAR) installed on a General Atomics I-GNAT unmanned aerial vehicle.

The **Sandia water tower**, a landmark on the Sandia — and Albuquerque — skyline for 50 years, was pulled down into a dust-spewing crumpled heap Saturday, August 28, to make room for a storm water holding pond as part of a project to upgrade the Labs' storm sewer water management system.



(Photo by Randy Montoya)

SANDIA WATER TOWER

The gears of society need to be oiled

By Iris Aboytes

"We did not make a big deal out of giving," says retiree Jim Mitchell of his fellow Sandians. "We all gave. We knew it was part of the Sandia ethic."

Jim came to Sandia in 1961 and retired in 1992 as manager of the Public Relations Department. He had worked for Ted Sherwin, one of the Employee Contribution Plan architects. "Ted was a great motivator," says Jim. "We did not think of not giving. We just did. It made good sense. One can't have people stumbling, they have to be fed."

JIM MITCHELL

As a child Jim remembers the first time he saw anybody down and out. He grew up in the Dust Bowl in Oklahoma during the Depression. It was about 120 miles to Amarillo, 250 miles to Oklahoma City, and 400 miles to Denver. His family lived on a farm in the middle of nowhere. One day a man came walking up to the house. He was hungry and asked Jim's mother, who had grown up on a nearby homestead, if he could have something to eat. "You can't come in," she told him. "Wait by the windmill and I will bring you some food." She brought him out beans and cornbread.

Jim and his brother Maurice were outside and talked with him. "We were pretty shy, but the man did all the talking anyway. He said he'd been to New Mexico or Arizona, or someplace like that, where he had visited an Indian ruin that had a hole in the roof through which the sun shone only one day a year. I was pretty impressed. That was nearly 70 years ago, and I still remember that sentence. The man ate his food and then went on his way.

"Unfortunately, there are always some people who for one reason or other aren't capable of taking care of themselves," says Jim. "They can't. With the economy the way it is today, many people are strapped for money. Their needs are critical. Some people who live normal lives are just not prepared.

"Burnout for donors is understandable," says Jim. "Every year we go through the same thing. But this is an old, old problem: The Bible says that the poor are always with us. They can't help themselves. Poverty and ill health never go away."

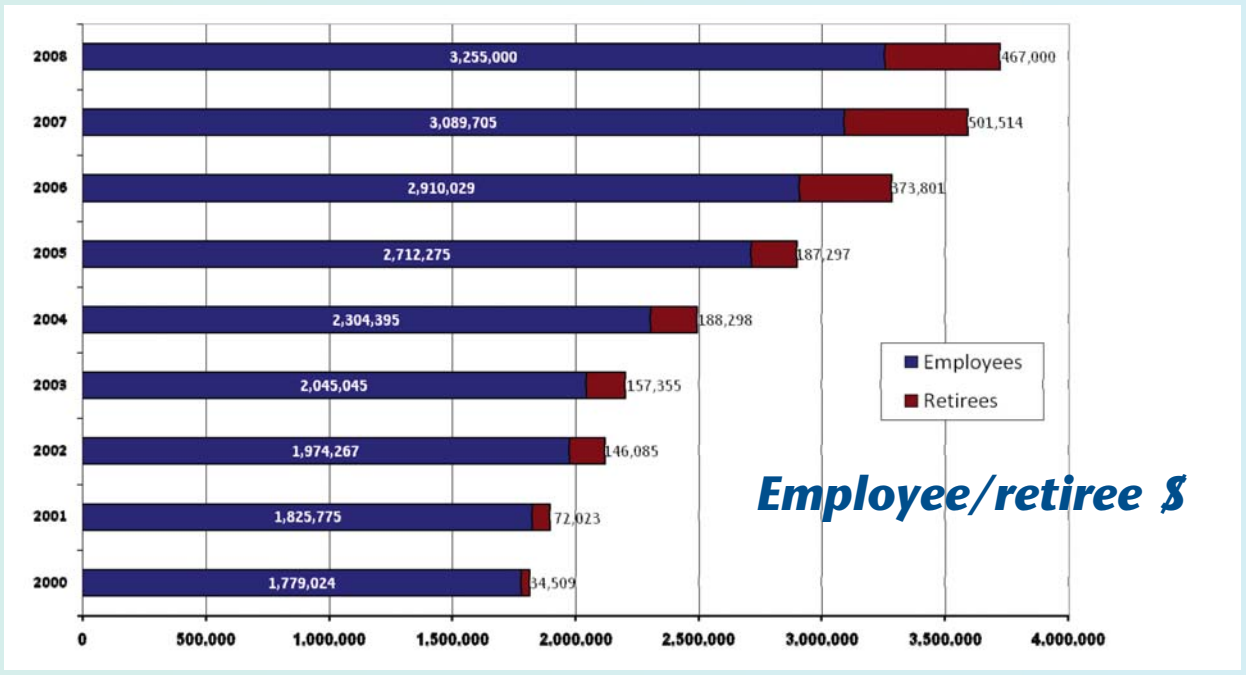
One day Jim received 17 requests through the mail for money. Others arrive by phone and, of course, there is organized TV soliciting.

"There is clearly a lot less money available for charity this year while at the same time needs are greater," he says. "A group effort, like the one at Sandia, is the most efficient way to help. It is the most effective way to do the most good.

"It has been many years since we've seen such hard economic times," he adds. "It takes a group effort to make a difference. The gears of society need to be oiled; a little oil can go a long, long way. If people fall down, we have to do our best to pick them up."

Sandia's secret weapons

Francisco Figueroa, former Sandia VP, used to say that retirees were Sandia's secret weapons. The following secret weapons are serving volunteer positions with the United Way of Central New Mexico: John Stichman, Herman Mauney, J. Pace VanDevender, Art Verardo, Harold Foley, Jennie Negin, Mary Jane Hicks, Paul Stanford, Karen Sine Pound, Goldie Piatt, C. Mark Percival, Susan Harris, and Juanita Sanchez.



Employee/retiree $

If you can't feed a hundred people, then just feed one.

Sandia's Employee Caring Program
Oct. 5-Oct. 23

Mother Teresa said "If you can't feed a hundred people, then just feed one." Through Sandia's Employee Caring Program, Sandians have fed many people. Because of today's economy, many more need to be fed.

This year's Employee Caring Program begins on Oct. 5. Giving is your personal choice. For information on participating, go to http://give.sandia.gov.

ECP campaign runs Oct. 5-23

Hardin Field Activities

Tuesday, Oct. 6
11 a.m. – 1 p.m.

ECP Dunk Tank
Bring a box of diapers or wet wipes to receive pitching balls for the dunk tank. If you forget to bring diapers, balls may be purchased — three balls for $5. All proceeds benefit Cuidando Los Niños. Diaper sizes 5 and 6 are needed.

HBE Fun Run & Walk Events
Join the HBE Preventive Health Team in supporting the annual ECP campaign Tuesday, Oct. 6, 11-12:30 p.m. HBE will be hosting a Fun Run/Walk at Hardin Park and optional blood pressure checks to support this worthy cause.
All participants may enter their name in the HBE Preventive Health prize giveaway bowl. The one-mile fun run starts at 11:15 a.m. and the one-mile fun walk starts at noon

Other ECP Activities & Booths
- Enjoy hamburgers and hotdogs by Sodexho Roving BBQ
- Visit with Sandia Laboratories Federal Credit Union at the SLFCU booth

Sandia strives to be a valued and responsible corporate citizen and community partner. Our strategy integrates our people, resources, and technology to improve the quality of life in our communities. The mission of the Employee Caring Program (ECP) is to facilitate employee financial donations to the community through the United Way. Working with the United Way allows us to help those most vulnerable in our community.