

Back in space: Sandia assists with NASA *Discovery* return-to-flight projects

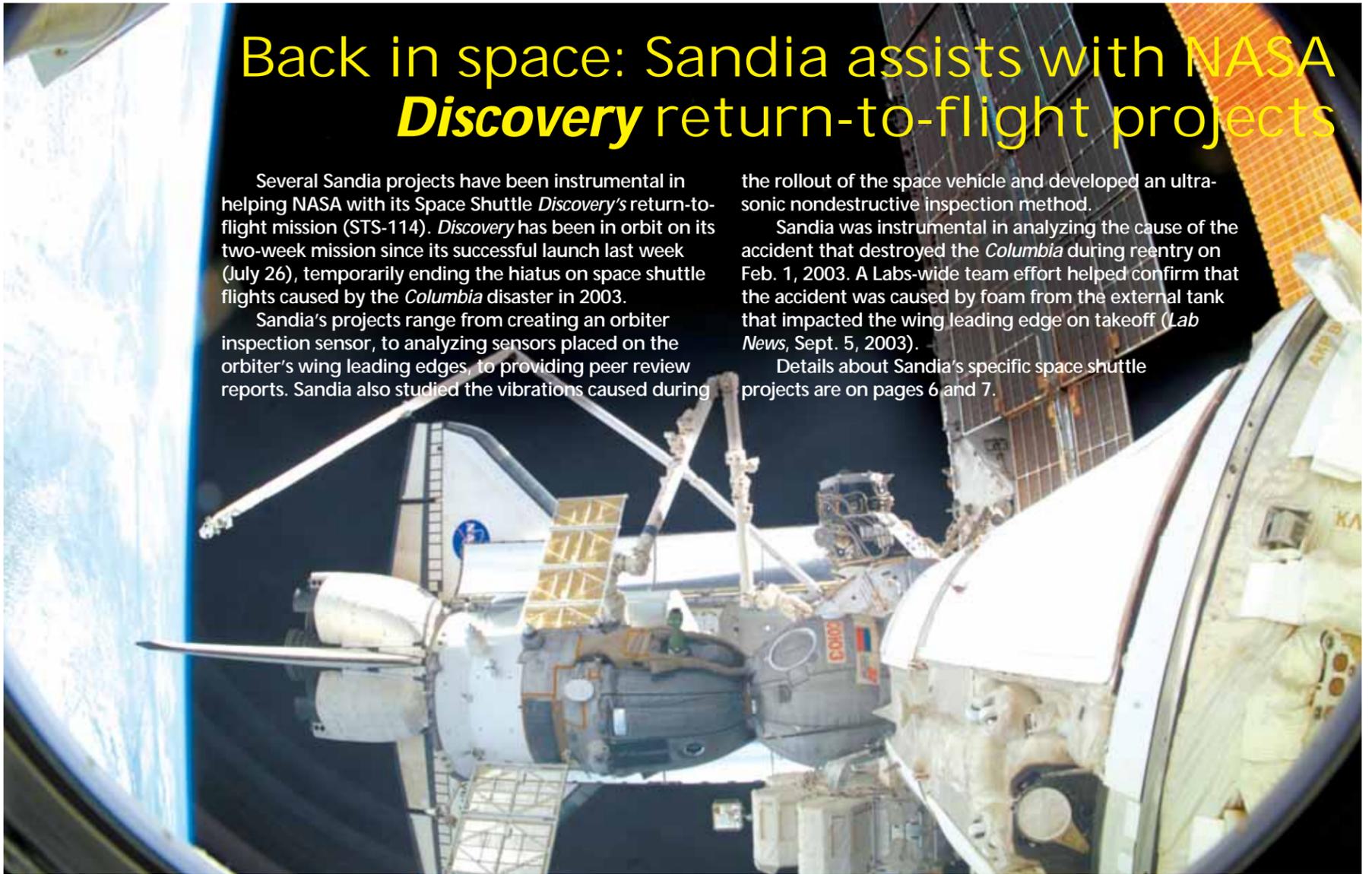
Several Sandia projects have been instrumental in helping NASA with its Space Shuttle *Discovery*'s return-to-flight mission (STS-114). *Discovery* has been in orbit on its two-week mission since its successful launch last week (July 26), temporarily ending the hiatus on space shuttle flights caused by the *Columbia* disaster in 2003.

Sandia's projects range from creating an orbiter inspection sensor, to analyzing sensors placed on the orbiter's wing leading edges, to providing peer review reports. Sandia also studied the vibrations caused during

the rollout of the space vehicle and developed an ultrasonic nondestructive inspection method.

Sandia was instrumental in analyzing the cause of the accident that destroyed the *Columbia* during reentry on Feb. 1, 2003. A Labs-wide team effort helped confirm that the accident was caused by foam from the external tank that impacted the wing leading edge on takeoff (*Lab News*, Sept. 5, 2003).

Details about Sandia's specific space shuttle projects are on pages 6 and 7.



RETURN TO FLIGHT — Space shuttle *Discovery* is seen on its fourth day in orbit docked at the International Space Station. *Discovery*'s seven-person crew, under the command of Eileen Collins, flew the first shuttle flight since the *Columbia* disaster more than two years ago. Several Sandia projects over the last two years have helped NASA in its return-to-flight efforts. The shuttle's robotic arm, seen clearly in this image, was used to deploy a Sandia-developed laser imager during the flight. Immediately in front of the *Discovery* is the Russian Soyuz spacecraft, also docked at the station. (NASA photograph)

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President Bush coming to Sandia Monday

Sen. Pete Domenici, chairman of the Senate Energy & Natural Resources Committee, announced Tuesday that President Bush will come to Sandia National Laboratories to sign the bipartisan Energy Policy Act of 2005 on Monday, Aug 8.

"Before we put the energy bill together, President Bush promised me that he would sign it in New Mexico," said Domenici. "I'm pleased to announce today that he has kept that promise and will be visiting our state next week." Sen. Jeff Bingaman, D-N.M., will also attend.

More details were to come. Full coverage of the visit will appear in the next *Lab News*.

WILDFIRE 2

Sandians' fight of grass fires 'a choreographed ballet of experience'

By Chris Burroughs

For four days in mid-July, Sandia Facilities employees and Kirtland Air Force Base personnel fought the effects of severe thunderstorms including lightning-started fires that needed to be kept away from buildings.

The first and largest fire began about 5 p.m. July 14 with a lightning strike north of the KAFB golf course. The fire quickly spread due to

(Continued on page 5)

Two Sandia microChemLab technologies soon to search for toxins in nation's water supplies

By Chris Burroughs

Two Sandia technologies, both based on microChemLab, are expected to soon be checking for toxins and harmful bacteria in the nation's water supplies.

The microChemLab, officially called μ ChemLab, is a hand-held "chemistry laboratory." The liquid prototype was designed and built at Sandia/California, while the μ ChemLab that takes measurements in the gas phase was developed at Sandia/New Mexico.

The μ ChemLab, electronics, and sample collector weigh about 25 pounds and fit into a box the size of a small suitcase. The only external parts of the two sensor technologies are water collectors. The units are completely portable.

"Our goal is to place these sensors within utility water systems and use them to quickly determine if the water contains harmful bacteria and toxins," says Wayne Einfeld (6245), who heads the Sensor Development Focus Area within Sandia's Water Initiative (www.sandia.gov/water). "This on-site monitoring approach would replace current utility monitoring systems that require water samples to be sent to laboratories for analysis, which sometimes takes days for results."

The United States has more than 300,000 public supply water wells, 55,000 utilities,



JAY WEST calibrates an instrument as part of a project to determine the steps necessary to identify toxins in drinking water. (Photo by Bud Pelletier)

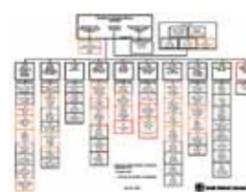
120,000 transient systems at rest stops or campgrounds, and tens of millions of hydrants. Up until now, real-time, remote water quality monitoring for toxins has been very limited.

The liquid μ ChemLab is currently being tested at the Contra Costa (Calif.) Water Utility, says Jay West (8324), California principal investigator. Specifically, the team is testing to determine the steps necessary to identify toxins in

(Continued on page 4)



Combustion research at California site on the high road to ultra-low emissions. Story on page 3.



New org chart shows consolidation and restructuring designed to serve Labs' mission. See chart on page 9.

What's what

New York City was a pleasant surprise for *Lab News* editor Ken Frazier and his family, there several weeks ago on family vacation to show their young granddaughters the big city. They found New Yorkers friendly and cheerful, the streets and subways clean, and the entire atmosphere inviting.

Ken also experienced an "it's a small world" moment. Walking up Broadway one morning to meet a colleague, at about 75th Street he passed walking the other way a young man with the sun-bronzed face of the Southwest and wearing a bright red New Mexico Lobos sweatshirt.

"Are you from Albuquerque?" Ken asked. He was, the young man answered, although he lives in Manhattan now. "How did you know?" he asked. Then looking down, "Oh, my sweatshirt!" Both were mighty surprised to run into fellow New Mexicans so far from home.

* * *

About ending those sentences with prepositions. . .

Kathy Champney (3820) e-mailed recently praising the *Lab News* staff for "writing, editing, and producing such a quality paper," but wondering, tongue-in-cheek, how it escaped notice that a sentence in a photo caption ended with a preposition.



THE SORT OF ENGLISH up with which we will not put!

"I can't help remembering my middle school English teacher's rather humorous admonition: 'Never end a sentence a preposition with,'" she wrote.

Always anxious to entertain ourselves, we passed around all the wisdom about sentence-ending prepositions we could muster. And the discussion ended with the equally tongue-in-cheek admonition from the master of the English language, Sir Winston Churchill: "This is the sort of English up with which we will not put!"

* * *

And while we're on language, the origin of familiar phrases is always interesting. Here are some that dropped into the e-mailbox recently.

In English pubs, ale is ordered by pints and quarts. When customers got unruly, the bartender would yell at them to mind their pints and quarts and settle down. That's where we get the phrase "mind your Ps and Qs."

Also in "merrye olde Englande" many years ago, pub frequenters had a whistle baked into the rim or handle of their ceramic cups. When they needed a refill, they whistled for service and "wet your whistle" entered the language.

And allegedly, a new game created in Scotland was called Gentlemen Only Ladies Forbidden, which gave us the sport - and the word - golf.

Similarly, in the glory days of the British Empire, and well before the invention of air conditioning, people made the trip from England to India and back on ships. Because of the latitudes of their routes, the left (port) side of the ship was cooler on the voyage east and the right (starboard) side was cooler on the return trip. Thus the phrase Port Out Starboard Home, which morphed into the word for luxurious accommodations - posh.

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

News briefs

Mary Crawford, Ireena Erteza selected for NAE Frontiers of Engineering program

Sandia engineers Mary Crawford (1123) and Ireena Erteza (5937) have been selected to participate in this year's National Academy of Engineering Frontiers of Engineering program.



MARY CRAWFORD

This program brings together some of the best young engineering talent in the country and includes discussions on hot topics in the field, according to an NAE announcement. The three-day event Sept. 22-24 at GE Global Research Center in Niskayuna, N.Y., will feature 88 engineers ages 30 to 45 who are performing cutting-edge engineering research and technical work in a variety of disciplines. They will explore aspects of ID and verification technologies, the engineering of complex systems, engineering for



IREENA ERTEZA

Michael Vittitow, Larry Perrine, Randy Montoya receive STC 'Distinguished' award for Sandia 'Overview' booklet

Michael Vittitow (3654), Larry Perrine, and Randy Montoya (both 3651) have received a Distinguished Technical Communication award from the Society for Technical Communication (STC) for the "Sandia National Laboratories Overview" booklet. The award was in the Promotional Materials category of STC's international technical publications competition. STC announced the results July 25. In addition, Randy's widely published "SnifferStar" photograph received an Award of Excellence in the Photograph category of STC's international technical art competition. The STC, a professional organization of technical writers, editors, illustrators, managers, and educators headquartered in Arlington, Va., presented 109 awards in 32 categories.

Feedback

Q: Everywhere one turns around at Sandia, there is construction along with the accompanying construction noises. As I sit at my desk in Bldg. 892, there is a noisy droning sound that has been going on for at least two hours. The only time it's gone is when the men are taking a break to eat their lunches. There are machinery sounds, noise from sidewalks being sawed . . . All these noises become distracting, even with earplugs. Is there any relief coming up from these things? Can some of this be work be done at night when no one is here?

A: We do have a significant number of infrastructure projects under way at this time. Completion is scheduled for summer of 2007. It would be unsafe to conduct this work during the nighttime. If you contact Telecon, 844-4571, in the future, we will send someone over to test the noise levels and provide PPE (Personal Protection Equipment) if required.
— Lynnwood Dukes (10860)

Retiree deaths

Raymond L. Brin (age 83)	May 30
Floyd M. Mciver (84)	May 31
Sandra A. Spraggins (42)	June 4
Robert G. Newman (88)	June 5
Polly P. Horne (88)	June 7
Robert E. Hofford (83)	June 8
Joseph G. Melograne (76)	June 9
Preme Ulibarri (79)	June 9
James C. O'Neal (83)	June 13
John C. Zimmerman (74)	June 14
Harvey M. Miller (80)	June 20
Jose A. Silva (77)	June 21
William A. Gardner (85)	June 22
John Richard Ames (81)	June 24
F. M. Brewster (86)	June 25
George D. Cosgrove (78)	June 28
Clifford A. Olson (90)	June 29

Sandia LabNews

Sandia National Laboratories

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Employee death

Myron Garcia of Manufacturing Processing Department 2431 died July 29 of pancreatic cancer. He was 50 years old.

Myron was in the Metal Trades Council and worked with repair and calibrating trades. He had been at Sandia for 29 years.

He is survived by his wife Carletta and sons Zachary and Spencer.



Lab News Reader Service

Retirees (only): To notify of changes in address, contact Carol Wade, Benefits Dept. 3332, at 505-845-9705, e-mail cawade@sandia.gov, or Mail Stop 1021, Sandia National Laboratories, Albuquerque, NM 87185-1021.

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Labs' engine research aims high: Reduce US oil imports 30 percent while achieving ultra-low emissions

By Nancy Garcia

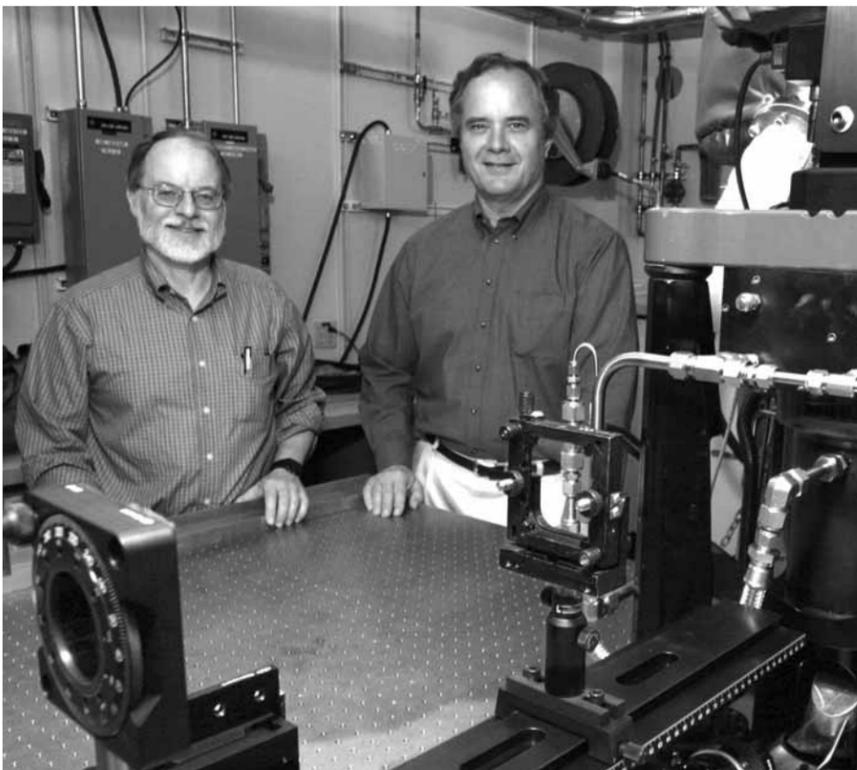
Among the hardest and most challenging problems facing the national labs are the issues of energy security and environmental quality. Ground transportation consumes the largest share of oil in the US, and to meet the demand, oil imports have reached the highest levels in history. To help reduce this dependence on foreign oil, promising new combustion strategies for efficient, clean engines are being explored at the Combustion Research Facility (CRF) in Center 8300 through a \$6 million engine-combustion research program. The work is funded 90 percent by DOE's Office of FreedomCAR and Vehicle Technologies (OFCVT) and 10 percent by private industry.

"Our research is providing the science base needed by industry to develop higher efficiency, emission-compliant engines," says Dennis Siebers, who manages Engine Combustion Dept. 8362. "There's a significant potential for improving the fuel efficiency of engines while simultaneously reducing their pollutant emissions." Moreover, he added, "Such improvements in fuel efficiency will contribute to a direct reduction in greenhouse gas [CO₂] emissions."

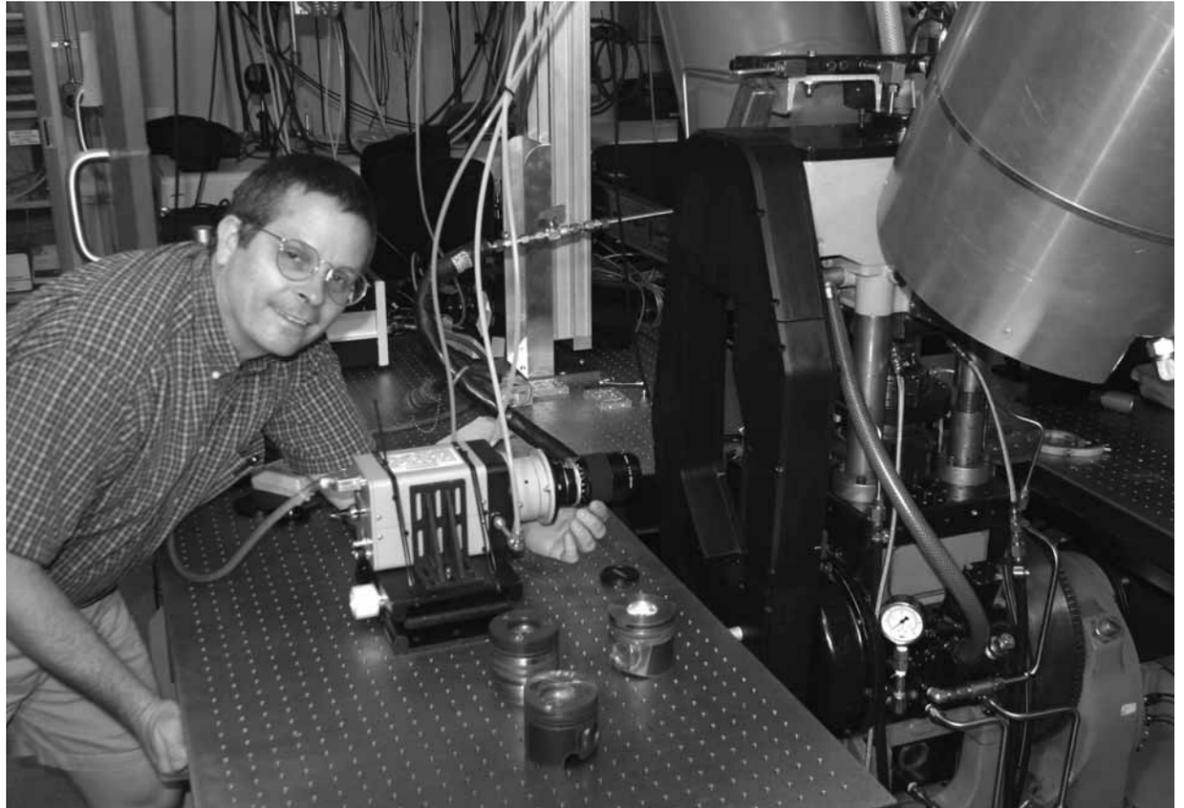
To achieve these goals, the engine research at the CRF is focusing on new combustion strategies that will allow high-efficiency, clean engines. Also included is research on fuels for these engines from both traditional and alternative sources. The new combustion strategies fall into a class being referred to as low-temperature combustion (LTC). In simple terms, LTC is combustion under conditions that are fuel-lean enough (or sufficiently dilute with recirculated exhaust gas) to avoid soot formation and the high combustion temperatures that lead to significant nitrogen oxide (NO_x) formation.

Unique capabilities, new strategies

Sandia has been conducting engine-combustion research in collaboration with industry for more than 25 years. The research has led to a suite of advanced optical-diagnostic tools for analyzing the combustion in an operating engine, and to the advancement of predictive computer models. This research has impacted industry's design and development process, contributing significantly to the efficiency and emissions improvements of engines that are currently in production. As Dennis summarizes, "We bring capabilities that are unique in the world for helping industry develop new combustion strategies for high-efficiency engines."



JOHN DEC, left, and Dennis Siebers pose in John's lab, one of eight CRF engine labs.



PAUL MILES in his research laboratory at the Combustion Research Facility. Paul is among a team of Sandians who are breaking new ground in emissions research. (Photos by Bud Pelletier)

Patrick Flynn, former vice president of research at the country's largest diesel engine manufacturer, Cummins, Inc., comments: "I feel that these tools provided by the CRF will play an ever-increasing role in engine design evolution." The application of these tools and the expertise of CRF researchers, three of whom have been elected fellows of the Society of Automotive Engineers, are central to the new research efforts on LTC.

The low-temperature combustion research at the CRF is being conducted as part of a broader DOE program. Because of its established reputation, Sandia was recently tasked by DOE OFCVT to create and lead a memorandum of understanding (MOU) surrounding the overall research efforts. The MOU involves five national labs (Sandia, Lawrence Livermore, Los Alamos, Oak Ridge, and Argonne) and 10 engine manufacturers (Cummins, General Motors, Ford, Daimler-Chrysler, Caterpillar, Detroit Diesel, International Truck, Mack/Volvo, John Deere, and General Electric). The research is conducted in collaboration with several universities (Stanford, MIT, University of California at Berkeley, University of Wisconsin, University of Michigan, Pennsylvania State University, University of Illinois, and Wayne State University).

50 percent better mpg by 2012?

The DOE low-temperature combustion program covered by the MOU targets a 50 percent improvement in fuel efficiency in the light-duty sector (automobiles, SUVs, and pickups) by 2012 and a 30 percent improvement in heavy-duty trucks by 2013. With complete market penetration, these efficiency improvements would reduce US oil use by 4 million barrels per day or oil imports by one-third from their present levels. The improve-

ments would also translate directly to a 9 percent reduction in the total US greenhouse gas emissions. Even greater reductions in oil use are possible through further improvements in engine efficiency and through the use of these high-efficiency engines in hybrid-electric vehicles.

"Two factors have made the low-temperature combustion techniques practical to consider now: the advent of onboard computers and electronic fuel injection," Dennis says. "These allow for real-time control of potentially unstable combustion conditions that can arise with the advanced strategies. It's possible that cycle-by-cycle, or even cylinder-by-cylinder control will be necessary to implement low-temperature combustion," he says. "This dictates the need for a fairly comprehensive understanding of the in-cylinder processes." As a national laboratory tackling tough technical problems, Sandia is playing a vital role.

Reducing emissions a challenge

In addition to reducing fuel consumption, the new LTC engine concepts are being driven by the need to reduce pollutant emissions. Stringent new emission regulations call for a factor of 10 reduction in soot and NO_x by 2010. "Those regulations are really challenging," notes John Dec (8362), who is working on clean combustion concepts for high efficiency engines in one of Sandia's eight engine labs, adding that meeting the current emission regulations on high-efficiency diesel engines "took 20 years and a lot of work."

Fairly good aftertreatment options exist for controlling soot from high efficiency diesel engines, but NO_x aftertreatment for diesel exhaust is difficult. This is because the exhaust contains excess oxygen, which makes conventional automotive catalytic converters ineffective. Special "lean-NO_x" catalysts have been demonstrated, but they have reliability problems and are expensive, sometimes costing as much as the engine itself.

"You'd like to take care of the NO_x problem at its source," John said, "and that means lowering the combustion temperature."

To accomplish this, John's research centers on a concept that combines some of the advantages of gasoline engines (which have premixed fuel and air with no soot emissions) and diesel engines (which have high efficiencies due to their high

(Continued on next page)



RESEARCHER Curt Mowry (1722) tests typical Sandia tap water for trihalomethanes. (Photo by Bill Doty)

Water research

(Continued from page 1)

drinking water, as well as expanding its capabilities as an autonomous monitor. The device is presently collecting and analyzing a water sample every 30 minutes and reporting results via a real-time data link to researchers at Sandia.

CRADA partners have long experience

Sandia's cooperative research and development agreement (CRADA) partners in the California endeavor are CH2M Hill, a leading US engineering firm, and Tenix, an Australian engineering services company. CH2M Hill is a global engineering and construction management firm with particular expertise in sewer and wastewater treatment design. Tenix is an engineering services and technology company with more than 30 years' experience in water supply, sewerage and drainage infrastructure, and defense.

The California μ ChemLab identifies proteins by separating samples into distinct bands in seconds to minutes. Separations occur in channels as narrow as a human hair coiled onto a glass chip about the size of a nickel.

Curt Mowry (1764), principal investigator for the New Mexico project, says his team is seeking to develop a device that detects trihalomethanes, undesirable byproducts of the chlorination process used to control the bacterial content of water. Trihalomethanes, which form naturally when surface water is treated with chlorine, are

highly carcinogenic and can have adverse liver and kidney effects. The New Mexico project is funded through Laboratory Directed Research and Development (LDRD) resources allocated through Sandia's Water Initiative.

"The EPA has regulations for water utilities to monitor for trihalomethanes on a regular schedule," Curt says. "Currently they have to collect samples and send them to labs for analysis. They get numbers back a few days later. This is a scary thing for us as consumers. The way it's done now, chemists might have measured high levels and there is chance someone has already consumed the water before the results return. Using the μ ChemLab will provide a way to bring the labs to the site and get results in a more timely manner."

The μ ChemLab system is expected to help water utilities control the formation of trihalomethanes by functioning as a component of a process control loop.

New Mexico's portable unit analyzes a sample of water by bubbling air through it and collecting trihalomethanes from that air. The collector is heated, sending the trihalomethanes through a separation channel and then over a surface acoustic wave (SAW) detector.

"The collector and the separation phase can be purchased off the shelf, but the SAW detector is at the heart of the microChemLab," Curt says. "The goal by the end of summer is to replace the commercial separation column with a Sandia microfabricated column made using MEMS fabrication technology to reduce the power needed and increase performance."

Commercial collectors are about four to five inches in diameter. Microfabricated collectors will

DSO turns your classified into scrap

Department 6146 offers a service that destroys excess classified material, up to and including Secret Restricted Data (SRD). Dwight Stockham (manager, 6146, and a Derivative Classifier) says Disassembly & Sanitization Operations (DSO) has been functional since February. The service was begun as a result of the need to destroy classified material removed from the Classified Waste Landfill — part of the Environmental Restoration Project.

DSO is a one-of-a-kind operation currently offered only to Sandia organizations, but the service may be expanded to include other DOE facilities outside of Sandia that need to destroy classified items. Dwight foresees this service will someday be upgraded to handle all levels of classified material.

If the item is accepted for DSO, it will be documented and locked in one of two Vault Type Rooms until the DSO process can begin. It will be tracked until the process is completed. Disassembly and sanitization is achieved by a variety of operations, which can include the use of a shredder, a ring mill, a band saw, and hand tools, until the item is no longer classified. Material that is generated is disposed of according to Sandia policy.

To schedule the service, contact Dwight (844-5493 or djstock@sandia.gov). He will need information detailing what the item is, its classification, quantity, size, and location. If the item is accepted by DSO, arrangements can be made to pick it up, or it can be dropped off at Tech Area 2, the site of DSO. A Project/Task is required to cover the cost associated with the service. — Jan Kohler (6147)

be half a square inch. They are in development and need further tuning for trihalomethanes.

The Sandia/New Mexico microChemLab uses similar concepts to the California one — collect, separate, and detect. The main difference is at the "front end" of the device, where different capabilities are needed to be able to extract gases such as trihalomethanes from the water.

"Both systems will speed the analytical process and give the utility operator better information in a shorter time period," Wayne says. "In addition to routine water quality monitoring, both are expected to be part of early warning systems that can alert utility operators to intentional contamination events that might occur at vulnerable locations downstream from treatment plans."

And finally, he says, "In both of these projects Sandia has successfully leveraged MEMS-based core technologies nurtured by various DOE programs into the water security applications area."

Combustion

(Continued from preceding page)

compression ratio and lack of throttling losses). The concept, homogeneous charge compression ignition (HCCI), has been known for some time but the operating range was very limited, and the technical challenges could not be overcome without modern computerized controls.

John's research is conducted in both a conventional, "all-metal" engine used for performance and emissions measurements, and a second engine with quartz windows to allow laser diagnostics to be used to probe the combustion chamber, illuminating various aspects of the in-cylinder processes.

Although much work is still required to perfect the concept, it is efficient and has low emissions. "Market penetration," John says, "could take several years, but the potential fuel savings are tremendous."

An approach that has the potential for more rapid market penetration is being explored by Paul Miles (8362). Paul is studying modifications

to standard diesel combustion that result in low-temperature combustion in automotive-size diesel engines, greatly reducing NOx and particulate emissions.

Paul is investigating fuel spray and fuel-air mixing to understand in-cylinder geometries that enhance the combustion completeness, and to provide data for the development of computational tools for engine design by colleagues at Los Alamos National Laboratory and the University of Wisconsin. "The fuel injection, mixing, and combustion processes in engines are so complicated, and the physical processes are so convoluted," Paul says, "you're not going to design and optimize advanced combustion systems for these engines other than by computer."

Fuels a focus too

Another part of the research effort is on fuels, especially fuels that enable the full potential of low-temperature combustion. One aspect to be sorted out is what the most appropriate fuel might be. Since gasoline and diesel engines have been around some 100 years, those fuels are now highly optimized for current engine designs, but there is no reason to expect they are ideal for low-

temperature combustion.

Another aspect is how to accommodate the changing nature of the feedstocks for fuels. In the future, bio-derived fuels and fuels from heavier crude oils, oil sands, and potentially shale oil will play an increasing role.

Fuels are a specialty in the engine lab of Chuck Mueller (8362), who is studying fuel effects on low-temperature combustion strategies. Chuck began studying oxygenates in 1997 as a prospective way to reduce soot, and more recently to see if they can enable low-temperature combustion technologies. Experiments in his lab have already shown a drop of two orders of magnitude in pollutant emissions with no loss of fuel economy. "It's really pretty revolutionary," he says. "You'd think all the breakthroughs would have been made by now, but this is a rich field."

"There are still many hurdles to overcome in order to make combustion efficient, clean and practical," he says, "and emissions restrictions typically involve trade-offs between cost and performance. The concepts themselves may be relatively simple," Chuck adds, "but implementing them will be challenging."

Fighting fire

(Continued from page 1)

50-mph winds blowing north toward the Sandia Robotic Vehicle Range and the Four Hills community.

Gary Sanders (10800), Sandia fire marshal and director of Facilities, says he was notified that several Sandians had been deployed to fight the fire.

"I went to ensure they had what they needed and that they could perform this responsibility safely," Gary says. "What I saw was a choreographed ballet of experience with the highest regard for safety that should make every Sandian proud."

The small team from Facilities had either turned around as they were leaving work and saw the smoke and flames or had returned from their homes. They quickly deployed several of Sandia's

This week they left their families three out of four nights to come to Kirtland and deal with emergencies most of us never knew happened.

heavy equipment vehicles, including water trucks to wet the area and road graders and front-end loaders to cut fire-breaks. Communication equipment was provided to guide the response and stay in constant contact.

"While KAFB set up the traffic control and deployed its fire trucks to actually fight key parts of the fire, Sandia provided an integrated set of people, vehicles, communications, and logistics," Gary says. "In fact, both the KAFB incident commander and the Sandia incident commander were heavily reliant on the Sandia team to coordinate major portions of the response. The Sandia team was coordinating the Sandia response, knew the capabilities of all our resources, anticipated the logistical needs and pre-positioned



ON JULY 14, lightning-sparked fires threatened areas of the Labs but drew a quick response from Sandia and KAFB personnel.

(Photo by Jennifer Payne)



WHERE IT BEGAN — On July 15, Sandia personnel doing a postmortem on the fire identified the area where the lightning strike set grass and dry brush aflame.

assets, and handled the issues as if this was part of their everyday job."

Gary gives a partial list of the equipment and expertise Sandia provided.

- The heavy equipment operators, who are trained and certified to fight wild fires, were deployed and kept in constant radio communication as they helped stop the spreading fire.
- Logistical support items ranging from portable toilets from Sandia's storage area, hand equipment from the Labs' landscaping supplies, even drinking water and Gatorade in ice chests from Sandia's warehouse were immediately ready and provided as needed.
- Knowledge of the equipment so that they knew which vehicles were four-wheel-drive (for going off-road), which were air conditioned (to provide air filtering of

soot/ash/smoke for the drivers) and the pumping and hose configurations (so that they could refill the KAFB fire trucks.)

- ES&H safety coordinators to think through the hazards and make sure that people were hydrated and everyone was in communication, aware of rattlesnakes, and aware of hazardous chemicals.
 - Radiological control technicians, because the fire burned across the Air Force's environmental restoration site where thorium is present. Every truck was processed out of the fire zone through a single control point, where it was thoroughly checked for contamination.
 - Medical responders who checked vital signs, stress, and hydration of every one of the workers at the end of their work.
 - Fleet services, which provided refueling (so that vehicles were refueled at the end of the night in case of flare-ups or another incident).
 - Sandians from Tech Area 3, who are also certified to fight wild fires, arrived and positioned to help with mopping up hot spots.
 - Pre-arranging for all vehicles to be washed down in case of contamination and the water then properly contained and environmentally disposed of.
 - Thinking about lessons learned during the operation, including what adjustments to equipment would provide better, safer response capability.
- "We have Sandians who are constantly true heroes, and just treat it as another part of the job," Gary says. "And, they had the highest regard for safety in a very hazardous situation."

More fires, troubles

If the July 14 fire wasn't enough, two more fires broke out Saturday, July 16. Once again the Facilities team drove to Kirtland and helped put them out. Sunday night, July 17, yet another lightning storm with gully washers took out the electrical utilities to Tech Areas 3 and 5.

"Sandians coming from home were again first on the scene and determined the problems," Gary says. "They worked with PNM and KAFB to help with the fixes, which included another explosion from lightning that damaged equipment. After the KAFB electricians left the scene, the Sandians determined that the high voltage lines had a very real probability of falling across Pennsylvania Avenue and causing a very bad car accident. So, Sandians secured the problems."

Gary adds, "These are just three examples spread over four days of what Facilities people do every week from snow removal to handling rain and electrical outages in the middle of the night and in the worst weather so that the rest of us can simply drive to work and turn on our lights and computers. This week they left their families three out of four nights to come to Kirtland and deal with emergencies most of us never knew happened."

In case of emergency, follow EOC's/police instructions

While Sandia Facilities people were helping put out fires and taking care of electrical outages, the Labs' Emergency Operations Center (EOC) was keeping track of what was happening and determining how to advise people who were in Tech Areas 3 and 5.

Initially people were told to evacuate, which they did. Then the smoke became so thick that uniformed officers, both from Sandia's Protective Force and KAFB, were sending Sandia employees back to their buildings to shelter in place until the smoke cleared.

The problem was that some people just drove on, which could have led to dangerous situations. Also, people sheltered in place in buildings were not kept informed about the situation and when they could leave.

Michael Knazovich, manager of Emergency Management Dept. 10337, says that in the future people will be told to evacuate or shelter in place through the Tone Alert Receivers (TAR) located in most buildings.

He says because this is fire season in New

Mexico, events like the July 14 fire might happen again. If they do, he offers the following advice:

- If you are evacuated, follow the instructions provided through the TAR units. Certain roads may be closed and you may be asked to follow alternate routes.
- Adhere to the instructions of uniformed officers, whether they are members of Sandia's Protective Force or military police. They have your best interests in mind and are there to protect you.
- If you are asked to shelter in place, do so, and listen to the TAR units for further information. One of the lessons learned during the July 14 fire was that some people sheltered in place were never contacted with follow-up information about the emergency. In the future, someone from the EOC will be assigned to follow up on the status of persons who have been sheltered or evacuated.
- Stay calm. Sandia emergency personnel will make every effort to make sure that you are safe.

Shuttle *Discovery* returns to space — with help from Sandia



► **Introduction on page one**

Orbiter inspection sensor



BOB NELLUMS co-lead a team of 120 Sandians providing the TPS inspection system.

Sandia provided the primary Thermal Protection System (TPS) inspection system to NASA for the mission of the space shuttle *Discovery*, successfully launched on July 26 after a long hiatus due to the 2003 *Columbia* disaster.

Bob Habbit and Bob Nellums (both 2624) led a collaborative effort of nearly 120 Sandians in creating the sensor. Many of the team members worked nights and weekends to meet NASA's critical need to return to flight ASAP in support of the International Space Station.

Using 3-D imaging, the sensor inspected the orbiter for critical damage to alert astronauts if further investigations are needed to repair the damage. The crew used the orbiter's robotic arm to scan the front edge of both wings for damage as little as a 0.02-inch crack.

The Sandia-patented 3-D technology uses a modulated laser illuminator coupled with a modulated receiver to image and spatially locate each point in the scene. The intensity data is used to detect damage and the geometric data to assess the damage criticality.

The sensor data was relayed back to the Mission Control Center at Johnson Space Center in Houston. A team of more than 20 Sandians working in the Mission Control Center processed and reviewed the data. The processed data were provided to the NASA Mission Management Team. The Mission Management Team used the Sandia data as well as other data to determine if it is safe for the Orbiter to re-enter.

Bob Habbit said he is proud to be part of the mission. "It's exciting to be a contributor to the space program," he says. "This is truly Sandia providing a service to the nation."

Inspection hardware

NASA funded a Sandia team to develop an ultrasonic nondestructive inspection method (hardware, techniques, and standards) that led to a scientifically rigorous pre-flight shuttle certification process. The team investigated and proposed ways to improve nondestructive inspection methods for certifying the flightworthiness of orbiter wing leading edges (*Lab News*, March 19, 2004).

The team, led by Dennis Roach and Phil Walkington (both 6252), initially evaluated and refined their inspection methods and hardware using carbon-composite samples with known defects created by the Sandia team. Later, as part of the selection process, a NASA engineer hand-carried orbiter wing samples to all the labs involved in the project and asked that each lab try to find defects known only to NASA scientists.

The team developed the revised inspection and certification protocols, and the ultrasonic scanning system was integrated into NASA's Shuttle Orbiter Processing Facility at Kennedy Space Center to monitor the health of the shuttle after each orbiter flight.

Sandia produced an in-situ ultrasonic inspection method

Sensor tests

David Crawford (9116) and Kenneth Gwinn (9126) analyzed tests conducted on sensors that were placed on the leading edge of the orbiter's wings (*Lab News*, Feb. 4).

The project focused on validating forcing functions for NASA's Impact Penetration Sensing system (IPSS) Wing Model. The model was developed at Boeing to predict the accelerometer data collected during ascent and micrometeoroid/orbiting debris (MMOD) impacts on shuttle wing and spar leading-edge materials.

The sensors developed by NASA are significant to the return-to-flight effort. The addition of the sensors to the leading edge

was in response to one of the prime objectives identified by the Columbia Accident Investigation Board.

David and Kenneth evaluated test data and were comparing it with structural models of the shuttle and assessing what the signal levels mean. Tasks included defining the forcing functions for foam, pieces of ice (from takeoff), ablator particles, and micrometeorites. Full-scale tests of foam, ice, ablator, metal particle, and MMOD impacts were performed at Southwest Research Institute in San Antonio, Texas. Tests on fiberglass and RCC (reinforced carbon composite) wing panels were conducted at the White Sands Test Facility.

Sandia's orbiter inspection sensor status

Sandia's orbiter inspection sensor attached to Space Shuttle *Discovery*'s robotic arm continues to scan the orbiter for any damage, says David Keese (5040), Deputy to the VP, National Security Programs.

"The data provided by the sensor has been critical in the analysis of the orbiter," says David. "The SMU office is very proud of what the team has accomplished."

"One hundred percent of the data collected to date has been processed," says Vincent

Salazar (2620), senior manager of Sensors and Information Technologies.

The sensor began scanning the orbiter on day two of the flight, after the robotic arm was deployed. The sensor completed initial wing leading-edge and nose-cap scans, plus focused inspection of tile, gap filler, and the port wing.

"These are the kind of projects we like to do at Sandia," Vincent says on behalf of the team. "They're important, they're critical, they're hard, and it is exciting."

By Michael Padilla



while NASA Langley developed the eddy current and thermographic techniques. These groups were the primary players on the NASA In-Situ NDI Team. The NASA In-Situ NDI Team consisted of members from all of the NASA facilities and was assembled to guide NASA as it moves to increased use of advanced nondestructive testing techniques to closely monitor the health of the space shuttle.

In 10 months the Sandia team developed and assembled customized hardware to produce an ultrasonic scanner system that can meet the shuttle wing inspection requirements. Optimum combinations of custom ultrasonic probes and data analysis were merged with the inspection procedures needed to properly survey the heat shield panels. System features were introduced to minimize the potential for human factors errors in identifying and locating the flaws. A validation process, including blind inspections monitored by NASA officials, demonstrated the ability of these inspection systems to meet the accuracy, sensitivity, and reliability requirements.

Team members are Phil, Dennis, Kirk Rackow, and Dick Perry (all 6252). The NASA project manager was Ajay Koshti at Johnson Space Center.

— John German

"All contributions provided by Sandia to NASA are examples of when our country turns to us for exceptional service in the national interest. Sandia continues to be a leader in many areas which benefit our national space program."

Labs President and Director Tom Hunter

THE MISSION EVALUATION ROOM at Johnson Space Center is one of the key nerve centers of NASA's space shuttle flights. Sandians Bob Habbit (extreme left) and

Larry Dalton (next to Bob) were part of the Sandia team deployed to Houston to support the *Discovery* return-to-flight mission.

Peer reviews

Members of Sandia's Aerosciences and Compressible Fluid Mechanics Dept. 9115 contributed two peer reviews on NASA's development of computational tools that are being used to support rapid damage assessments should anything occur during future flights.

Basil Hassan, manager of Dept. 9115, serves as an external member of NASA's Engineering and Safety Center's (NESC) Flight Sciences "Super Problem Resolution Team" (SPRT). NESC was formed shortly after the Columbia accident to oversee any safety issues that might arise in any of NASA's flight programs.

Basil and two staff members, David Kuntz and Jeffrey Payne (both 9115), participated in several peer reviews as NASA prepared for return-to-flight. They were also part of a larger group of Sandia management and staff who were active in the post-accident investigation.

Two recent reviews focused on Debris Transport Review and Boundary Layer Transition Review.

Debris Transport Review focused on NASA's development of tools to model external tank foam or ice buildup that may come off during ascent and potentially hit the orbiter. While several efforts have been under way to minimize foam and ice release from the external tank, NASA wants to predict if the released debris will impact the orbiter in critical areas. NASA has used these tools to redesign parts of the external tank so that catastrophes like the *Columbia* accident will not re-occur.



SANDIANS ON THE JOB during *Discovery*'s flight include, from left, Richard Taplin, Cristina Montoya, Megan Slinkard, and Steve Lebien. They are in the Payload Operations Control Center at Mission Control at the Johnson Space Center in Houston.

Shuttle rollout

To help understand the fatigue caused by vibrations during the rollout, NASA contacted Sandia to assist with a series of tests (*Lab News*, April 1).

Sandia helped NASA design the test and instrumentation to measure the dynamic vibration environment of the rollout. Sandia also provided additional support to NASA by computing the input forces that the crawler applies to the MLP, which are being used by Boeing and NASA to compute the fatigue life for critical shuttle components.

Tom Carne (9124) assisted with a series of tests beginning in November 2003 to develop the data necessary to understand the environment and the response of the space shuttle vehicle during rollout.

Moving the shuttle from the Vehicle Assembly Building at Kennedy Space Center in Florida to the launch normally takes five to six hours at 0.9 mph. As the equipment ages, emphasis is being given to understanding how the rollout may fatigue the orbiter.

The analyses showed that modifying the speed of the crawler would reduce the fatigue stresses of the critical shuttle components. Merely reducing the speed from 0.9 mph to 0.8 mph would significantly reduce the vibrations in the shuttle by shifting the engagement frequency of the crawler treads. The shuttle's vibration response can be much reduced when the driving frequencies are shifted away from its own resonant natural frequencies.

Safety team keeps tractor treads on solid ground

Sandia safety engineer Larry Knudson (10322) saw an excavator straddling a ditch June 27 and took action. For about three hours, he and fellow 10322 members worked with construction operators to resolve a dangerous situation. They were subsequently honored for doing so. Larry described the event for the Lab News this way:

"I was walking over to Z when I noticed this tractor hoe and didn't like the way it was positioned. I called Bryan Drennan (our construction safety expert) to see if he had any experience with such equipment and how it was being used. He suggested that if I was at all concerned I should suspend the activity.

"Anyway, I quickly returned to the operation and told the workers to suspend all activity involving the trench and the tractor. I then called for an inspector while the workers were calling for their superintendent. The superintendent showed up about 10 minutes later and questioned my suspension of his operations. When I told him I was with safety he understood my concerns. I asked Steve Walcott (safety engineer on call) to come out with the department's camera and record the situation. Then I called the Incident Command Post to have them send a representative. I suggested that the work could be resumed if the trench, under and behind the tractor, was filled with dirt. The assembled multitude, along with the contractor superintendent, agreed with that recommendation. It was done. All were happy. I allowed them to resume working.

"A week or so later, Bryan and I, along with



NO-NO — This excavating machine straddling a ditch caught safety engineer Larry Knudson's eye. He was concerned enough about the potential safety issues that he used his authority to suspend all activities until the situation was rectified. Larry and construction safety expert Bryan Drennan were honored by the Laboratory Leadership Team for their heads-up attention to operational excellence and safety. (Photo by Steve Walcott)

Darrell Fong (department manager), were invited to the LLT meeting. The VPs were informed about what we did and shown photographs of the incident. Bryan and I were each given certificates of

appreciation along with a pair of theater tickets. As we were leaving, all attendees, including Lab President Hunter, chatted with us and congratulated us on a job well done." — Elizabeth Malone

What drives Sandia's health care plan decisions?

This is the third article in a series discussing health care plan issues, prepared by Health, Benefits, and Employee Services Center 3300.

In the first article we discussed escalating health care costs, cost shifting, prescription drug increases, and trends towards promoting consumerism (*Lab News*, June 24). Then, we discussed how individuals can affect change in health care spending by adopting healthier lifestyle behaviors to lower the risk of acquiring a costly disease (*Lab News*, July 8). In this installment, we will look at a determining factor behind corporate health care plan purchasing and the drivers behind Sandia's plan decisions.

A key factor in Sandia's historical ability to attract and retain exceptional science, technology, and engineering talent for achieving our vital missions has been our ability to provide a highly competitive benefits package. In 1996, a revised DOE Order 350.1 introduced a comparative value method for assessing benefits programs. This method was incorporated into the Sandia contract in 1997. Sandia has used the Hewitt Value Study in evaluating its benefit programs for more than 23 years. The Hewitt Value Index is a "point-in-time" estimate of the relative value of Sandia's employer-paid benefits compared to those of a selected group of companies. The comparison is one of value and not related to cost.

Sandia is held to DOE Order 350.1, which states that our overall benefits shall be no higher than 5 percent above our comparative group as measured on a benefits valuation index. In 2004,

Sandia's overall total benefit value index according to the Hewitt study was 120.2, or 15.2 percentage points above the DOE benchmark. To meet the requirements of the DOE-ordered value index of 105, Sandia's Benefits administration proposed a comprehensive strategy for calendar year 2006 to reduce the Hewitt Value Index.

To work toward the goal of a Hewitt Index of 105, Sandia's emphasis has been placed on the elements that are most out of line with

industry trends. In looking at the entire benefits package, Sandia proposed to DOE plan changes that can further help align with the ordered value. These included medical plan changes, employee contribution strategies, non-Medicare retiree/survivor medical plan changes, dental

plan changes, and further development of Sandia's disease management and prevention initiatives. The proposed changes would permit Sandia to contain health care costs in both the short and long term. These changes still allow for choice but expand the long-term concept and strategy of consumerism. For instance, by providing preventive care and modifying lifestyle behaviors, we can anticipate a deceleration in trends for later years.

Sandia believes that changes made to our employee health care plans and future opportunities and initiatives for cost savings are a step in the right direction and will eventually lead to compliance with the DOE-ordered value.

Look for the benefits package plan details to be further outlined in future editions of the *Lab News*.



Three Sandians named to 'Top Hispanics in Technology and Business' list

Sandians Frank Figueroa, Sid Gutierrez, and J. Leonard (Lenny) Martinez have been named to the "Top Hispanics in Technology and Business" list for 2005 by *Hispanic Engineer & Information Technology* magazine.

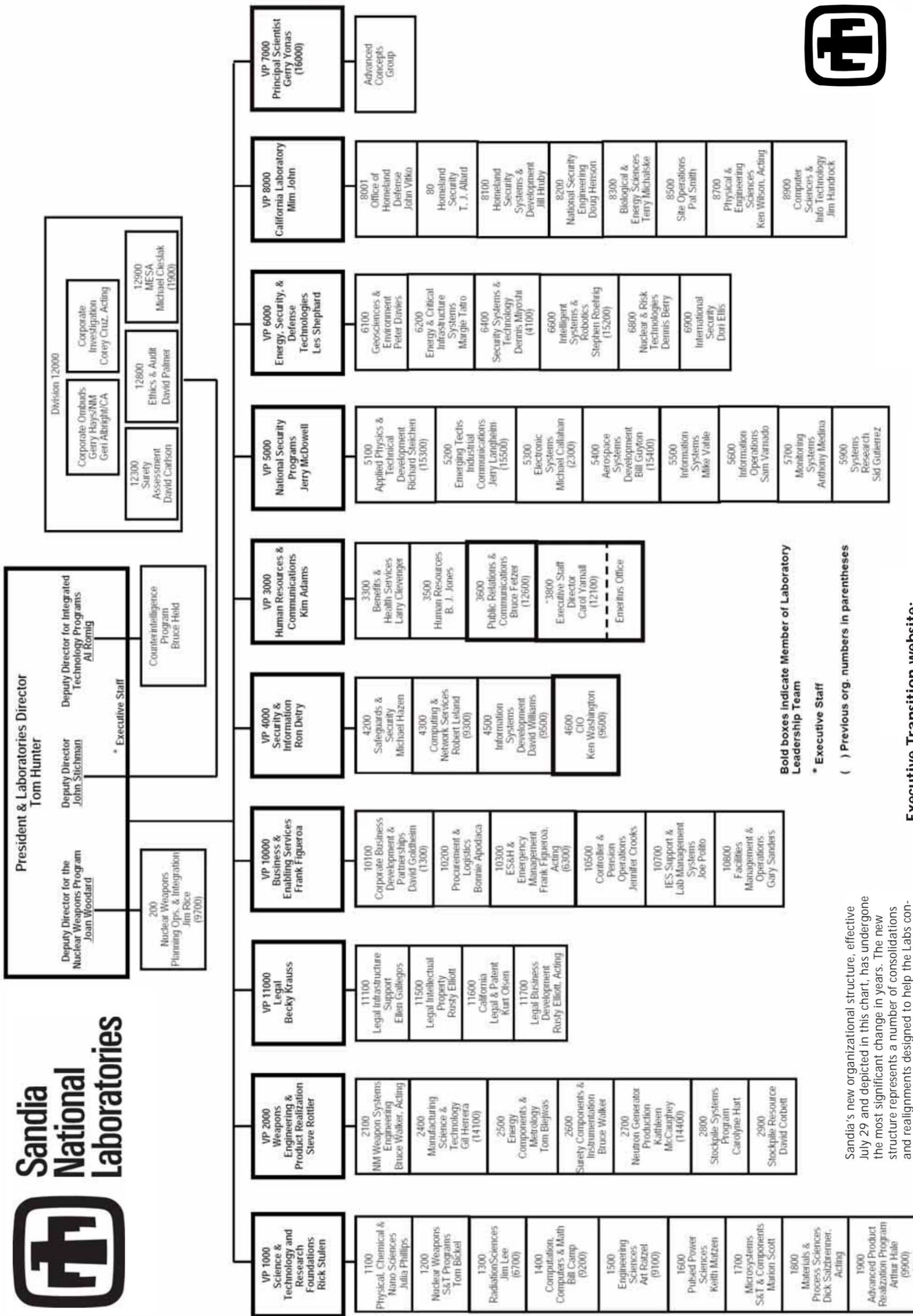
Frank has been VP and chief financial officer for Sandia since 1997. He is responsible for the Integrated Enabling Services Strategic Management Unit as well as finance, business services, facilities and construction, ES&H, procurement, logistics, pension and savings fund management, and prime contract administration. He also has held the position for VP and chief financial officer for Lockheed Martin Energy Systems in Oak Ridge, Tenn.

Sid is director of Systems Research Center 5900. Prior to joining Sandia in 1994 he was an Air Force fighter pilot/test pilot and NASA astronaut/space shuttle commander. He serves on a number of boards and commissions including the Board of Regents of New Mexico Institute of Mining and Technology, the New Mexico Space Commission, the National Advisory Board for the National Hispanic Cultural Center, and the Board of Directors of Goodwill Industries of New Mexico.

Lenny has been VP of Manufacturing Systems, Science & Technology. He joined Sandia in 1995 as director of Production Integration, a center created to integrate lab culture, manufacturing culture, and some private sector initiatives in support of the manufacturing operation to produce neutron generators. He is now on loan to the Lockheed Martin bid team seeking the contract to manage Los Alamos National Laboratory.

Honorees are chosen for this annual list for their outstanding work in technology and their leadership of the institutions where they work. This list includes many of the nation's highest-achieving Hispanic executives, managers, and researchers in industry, government, and academia.

The honorees are featured in the June/July issue of *Hispanic Engineer & Information Technology* magazine. All top 50 will be honored at an awards gala and dinner Sept. 16 in Baltimore, Md.



Bold boxes indicate Member of Laboratory Leadership Team
* Executive Staff
() Previous org. numbers in parentheses

Sandia's new organizational structure, effective July 29 and depicted in this chart, has undergone the most significant change in years. The new structure represents a number of consolidations and realignments designed to help the Labs continue to provide "exceptional service in the national interest."

Executive Transition website:
<http://www-ir.sandia.gov/corpdata/corporate-news/index.html>

Mileposts

New Mexico photos by Michelle Fleming
California photos by Bud Pellitier



James Reitz
40 8236



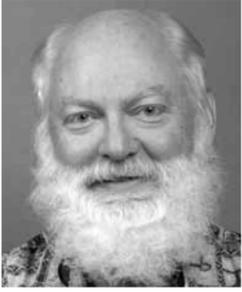
Leroy Holmes
35 2544



James Beasley
30 2954



Jim Hachman
30 8945



Donald Hardy
30 2525



Clarence Filip
25 12820



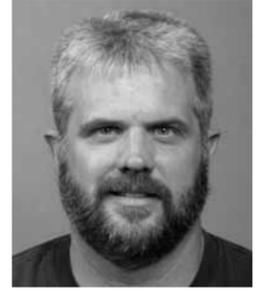
Robert Spulak
25 2564



Thomas Zipperian
25 1740



Robert Brandt
20 8521



Greg Earnest
20 10842



Karl Ricker
20 12336



Robert Ernesto
15 8513



Neal Fornaciari
15 8944



Scott Keith
15 8513



Ajoy Moonka
15 0210



James Ohlhausen
15 1822

Manager Promotions

New Mexico

Vicky Anderson from PMLS, Business Operations Center 9011, to Manager, Business Operations Center IIS 4014.

Vicky joined Sandia in 1981 and did contract auditing. She left in 1987 to work for Motorola Government Electronics in Scottsdale, Ariz., as a supervisor of compliance audit. She returned to Sandia in 1989.

Vicky has done Work for Others (WFO) Accounting, Indirect Rate Applications, and 9100 Business Administration.

Prior to coming to Sandia, she spent eight years in law enforcement in Washington D.C., in the Secret Service and in Berlin, West Germany, conducting military investigations.

Vicky has a BBA from Fort Lewis College, a master's of science in accounting from Colorado State University, and is a CPA.



VICKY ANDERSON

Michelle Barela from PMLS, Nuclear & Risk Technologies Center 6800, to Manager, Center Business Operations Dept. 6034.

Michelle joined Sandia in December 1990 as an OAA within Center 1500. In 1992, she was promoted to a Management Assistant II for Center 5900 and was responsible for a classified work station and manager support. From 1993 to 1998,

Michelle worked for Center 6600 as an ASA doing financial and procurement administration. In 1998, she joined Center 6100 as an MLS where she managed the EM-50 Program and served as the Sandia liaison to the EM-50 DOE/AL office.



MICHELLE BARELA

Before her promotion to manager, Michelle was the Center Business Administrator (PMLS) for Nuclear and Risk Technologies Center 6800. She specializes in project management, financial management, and business operations.

Michelle has a BBA from the College of Santa Fe.

Tom Cilke, new manager for Sensors and Analog Electronics Dept. 5719, joined Sandia on June 20.

Tom has 22 years experience in developing imaging, instrumentation, and telemetry products for aerospace, industrial, and medical industries. Prior to joining Sandia he was a Director of Engineering for Vidar Systems Corporation in Virginia.

He has a BSEE, MSEE, and a PhD, all from UNM.



TOM CILKE

Fran Current from PMTS, SEPR Systems Engineering Dept. 1905, to Manager, SEPR Systems Engineering Dept. 1905.

Fran joined Sandia in 1985 as a Technical Associate performing electromechanical design drafting. He contributed to the product development of the Saturn and Hermes III accelerators as well as several component designs for various weapon programs. In the late 1980s Fran was a key contributor to Sandia's engineering transformation from a paper-based drawing environment to a network-based CAD environment. He joined the newly formed CIO organization as a member of the technical staff in 1994 and used his experience to create the vision of an enterprise-wide information environment. Fran was co-project lead of the EVE team, which brought the web-based intranet to Sandia.

Most recently, Fran has been involved in real-



FRAN CURRENT

izing those same ideals of sharing information, but with a need-to-know twist on the classified network as Product Manager of the Nuclear Weapon information (NWie) Engineering Portal.

Fran earned his associates of science degree in design/drafting and engineering technology from Oklahoma State University.

Nathan Sommer from PMLS, Center 2300 Business Operations Dept. 2023, to Manager, 6300, Center Business Operations, Dept. 10506.

Nathan joined Sandia in 1996 as an intern in the Sandia Audit Intern Program and worked within the audit center.

Nathan had part-time status in the Contract Audit Department as part of the Student Intern Program from 1997 to 1998 while pursuing his MBA at UNM.

He became a member of the Lab staff upon completion of his MBA and worked within the Contract Audit Department until 2002.

In 2002, Nathan matrixed out of controllership as the Lockheed Martin fee accountant and out of controllership of the Legal Division, Contracts Department, and Electronic Systems Center. He performed budgetary analysis and project administration, primarily for the Arming and Fuzing Sub-System on the W76-1/Mk4A LEP program.

Currently Nathan is the ES&H Center Business Manager and still serves in various capacities as a Division 10000 and Corporate Diversity Team member.

Nathan earned a BA in fine arts in 1994 from UC Santa Cruz, and an MBA with a concentration of financial accounting in 1998 from UNM. He has been an active CPA since November 2001.



NATHAN SOMMER

Congratulations

To **Ed Mignardot** (6146) and Robin Napoleone, married in Santa Fe, July 23.

This month in the past

This monthly column highlights Sandia Lab News items from 50, 40, 30, 20, and 10 years ago, but each column does not necessarily include items from each decade.

50 years ago . . .
 Birth of the Thunderbird — “The colorful and symbolic Thunderbird, in brilliant turquoise enamel on a copper background, will be the central figure on Sandia Corporation’s service pin,” announced the Aug. 26, 1955, *Lab News*. Although the basic style of the T-Bird has been updated several times since then, it remains Sandia’s primary corporate symbol today. The original symbol and pin were designed by late Sandia employee Clyde Walker. His design was selected from more than 200 submitted in a competition among employees.



BIRTH OF THE T-BIRD — H.C. “Clyde” Walker holds his Service Recognition pin design. Clyde was the winner of the emblem design contest, chosen from more than 200 proposed designs.

40 years ago . . .
 Computers were already making some tasks easier and helping make electronic devices more reliable and trouble free. An Aug. 27, 1965, story explained how a new computer technique was freeing Sandia draftsmen from the tedious job of drawing printed circuit boards. The process was developed for



PRINTED CIRCUITS — produced by new automated computer technique were displayed by D.D. Isett and C.J. Fisk, who helped develop the new process.

Sandia by a California foundation directed by Iben Browning, a former Sandia employee who conceived the technique. Printed circuits were rapidly replacing the old system of connecting electronic components using dozens of wires soldered to the components. The new technique was called Automated Circuit Card Etching Layout (ACCEL).

30 years ago . . . The Aug. 8, 1975, issue featured a just-announced project to build at the time the world’s largest solar central receiver test facility in Area 3. Designed to produce 10 megawatts of



SHINING ON — The several-times updated facility continues operating today as the National Solar Thermal Test Facility.

electrical energy, the pilot plant was part of the new Energy Research and Development Administration’s high-temperature solar research, development, and demonstration program. The new facility was part of the Labs’ overall solar energy R&D program involving researchers at both Sandia/New Mexico and Sandia/California and four major contractors. The several-times updated facility continues operating today as the National Solar Thermal Test Facility.

20 years ago . . . The latest version of SANDAC (Sandia Airborne Computer) was featured in the Aug. 16, 1985, issue. Weighing 20 pounds, SANDAC IV was designed primarily to put navigation and guidance capabili-

ties into reentry vehicles, but was finding new uses. The Army, for example, was using SANDACs in prototypes of new helicopters to evaluate advanced avionics concepts. In a typical three-processor configuration, SANDAC IV could process 1.5 million instructions per second.



SANDAC IV — In this 1985 photograph, Steve Reynolds pulls a microprocessor board from a SANDAC IV with an 11-stack configuration. SANDAC IV’s stack design was tailored to fit application needs with up to 16 microprocessor boards per unit. Each board could handle 500,000 instructions per second.

(Sandians were already testing a new version, SANDAC V, that used a “next-generation” processor and was designed to process about 40 million instructions per second.)

10 years ago . . . New Sandia President Paul Robinson and new Executive VP John Crawford took office Aug. 15, 1995. The Aug. 18 *Lab News* included a “letter to employees” in which Paul praised Sandia’s outstanding technical work, but called on Sandians to help him streamline the many “complex and unwieldy” internal processes that were hurting the Labs’ efficiency and effectiveness. Sandia faced some unpleasant problems as Paul’s term began. The other page-one story in the same *Lab News* issue was headlined “Several employees and contractors disciplined for accessing sexually explicit web sites.” Six contractors had recently been expelled from Sandia premises and one employee had been placed on administrative leave for accessing such sites.

— Larry Perrine

Sandia Retirement Club (T’Birds)

The following item was submitted by the Sandia Retirement Club, the Thunderbirds.

In a previous issue of the *Lab News* we discussed the Sandia Retirement Club that meets at the Mountain View Club. We invite all Sandians nearing retirement to come out and get acquainted. Call our President Rod Boenig, 836-6977, for more info on our club. He will discuss joining the Thunderbirds with you, or provide any additional information that you desire.

Our August schedule is outlined below. You can get more information by calling the person listed, or you can just show up at any of the listed events. Guests are always welcome.

MONTHLY MEETING Aug. 8, 1:30 p.m.

Paul Pickard (6872) will address the T’birds on hydrogen as a fuel for transportation. This is a topic of interest to many Sandians — retired or otherwise. If interested in attending, just show up at the Mountain View Club at 1:30 p.m. on Aug. 8.

BRIDGE CLUB

Party Bridge— 9:30 a.m.-2:30 p.m., Aug. 4 & 18
 Pairs Bridge — 9:30 a.m.-2:30 p.m., Aug. 11 & 25
 All MVC members welcome. Call Mary Lou Valdez, 268-5375. She will make you feel entirely welcome, and maybe give you a donut and a cup of coffee.

ROADRUNNERS RV CLUB

Aug. 15-19 rally at Little Creek RV Resort in Chama, N.M.
 Reservations should be made under Albu-

querque Road Runner RV Club/Branscombe
 Call 505-756-2382 for reservations and notify Bernard Brown, 291-3368
 Call Jerry Love 832-1338 for info on joining or as a guest.

COMPUTER GROUP

Aug. 16, 12 noon-3 p.m. — Selling and buying stuff on E-Bay or online auctions.
 We also show a PowerPoint production with scanned pictures & commentary for a retiree’s 80th birthday party. Steve Sobolik, who made the production, will discuss how he put it together. This process could also be used to make family albums. Call Richard Jorgensen, 298-6079 for info.

Aug. 12 (Friday), 6:30 p.m., is Thunderbird Night at the club. This is the big night of the month when the T’birds gather for food sociability. Call Lu Kinzer, 890-1768 for reservations. She will arrange for all T’birds to sit together.

Dale and Mary Buchanan invite all T’birds to their 50th wedding anniversary celebration at La Vida Llena, Aug. 12, 1-3 p.m. RSVP 291-3280.

Most of us belonged to the Coronado Club and mourned its passing. The Mountain View Club is, however, a lovely club and supports our events with enthusiasm. We feel fortunate to belong to such a great club. This club, together with the Thunderbirds makes a great combination. All Sandians, retired and nearing retirement, should give serious consideration to the joint membership. If you are considering joining either or both of the two clubs, call Rod Boenig first for a very beneficial financial arrangement.



[Safety First]

Wrestling
with my
workstation
is a pain
in the neck.

- A poorly designed workstation can lead to health problems
- Set up an ergonomics consultation (tell your manager it's free!)

<http://ergo.sandia.gov>

Brought to you by the Sandia Management Team