

DOE standards group to fast-track energy security improvements in US critical infrastructure systems

Sandia to lead four-lab group to help international community set the bar

By John German

A coordinated interruption in the steady supply of electric power, oil, gas, or water could have crippling effects on US national security, experts say.

And US energy supply systems are thought to be vulnerable to terrorist acts, including cyber attacks.

But what is secure?

With so many government agencies, standards bodies, utility companies, and equipment suppliers in the US and overseas involved in making, selecting, and using the equipment that controls domestic energy supply systems, arriving at a consensus, much less developing requirements and defining what constitutes adequate security of those systems, has been difficult, says Rolf Carlson of Advanced Information and Control Systems Dept. 5517.

To address this problem, DOE's Office of Energy Assurance recently established a standards group, the Critical Infrastructure Security Standards Working Group (CISSWG), to serve as a clearinghouse for critical energy infrastructure security standards development.

Four-lab leadership

The group initially is being led by infrastructure security experts at four DOE national laboratories — Sandia, Pacific Northwest Laboratory, Argonne National Laboratory, and Idaho National Engineering and Environmental Laboratory (INEEL) — and is sponsored by DOE's National SCADA Testbed (NSTB), which is co-led by Sandia and INEEL.

But CISSWG is relying on the contributions of industry, academia, government, national labs, and existing standards bodies to accomplish its objectives, says Rolf, who is serving as CISSWG's chairperson.

The group's goals include coordinating and
(Continued on page 4)



DEFINING SECURITY — Rolf Carlson is chairing a DOE team developing international standards for security of critical infrastructures. (Photo by Randy Montoya)

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Labs-led team tests hydroponic greenhouse method for crops to reduce possibility of future water wars

How to save millions of gallons of water a year; research involves Sandia, Mexico, NM State, and U of A



RON PATE inspects first fruits of his group's labors — hydroponically grown grains in greenhouses just 100 yards from the Mexico/New Mexico border. (Photos by Neal Singer)

By Neal Singer

It doesn't take a mathematician — particularly in water-starved times — to see the advantage of a method that uses roughly one percent the fresh water formerly needed to grow the same amount of crops: Much more water would be available for human consumption and other ben-

eficial uses than from the small, though real, economies generated by low-flush toilets and low-flow showers.

That's the magnitude of water savings claimed by Mexican researchers in a specialized hydroponic greenhouse project in arid Chihuahua. These results are now being replicated and tested by a bevy of wireless sensors being installed in a forage-growing greenhouse built barely a stone's throw from the Mexico border under the supervision of Sandia.

Sandia work is led by Ron Pate and Phil Pohl (both 6143). Mexican researchers, led by Purdue PhD engineering graduate Hector Gallegos

and forage greenhouse system fabricator Francisco Aguirre, as well as other researchers at New Mexico State and the University of Arizona, are also involved in the project.

"The potential savings in water is particularly important in the American Southwest, Mexico, and other water-parched regions like the Middle East and certain lands between India and Pakistan," says Ron, "where the majority of water use

is for irrigated agriculture rather than direct human consumption or residential and industrial use." Thus a reduction in agricultural usage greatly increases the amount potentially available for other productive uses.

From 800,000 to 11,000 acre-feet

Preliminary indications are that hydroponic greenhouses in New Mexico, for example, could reduce the current 800,000 acre-feet of water to 11,000 acre-feet to produce an equivalent amount [dry weight] of livestock forage, and do this on less than 1,000 acres instead of 260,000 acres — the current amount used for New Mexico production of alfalfa. Eighty percent of New Mexico's water use is agricultural, over half of which goes toward growing forage mostly con-

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What's what

Well, an issue later than Larry Perrine committed me to while I was away on vacation, I can report that the C in Labs Director C. Paul Robinson's name is for Charles. And I know that beyond his expertise in physics, diplomacy, and administration, he's a talented singer and guitarist.

I decided not to ask, but I think he may be a Johnny Cash fan, too. You know, all those black suits he wears. . .

I'm sure Larry could have come up with this information himself, but he has a pretty tight schedule these days. As he noted in the column he wrote while I was away, he was going on vacation right away. And then he took a few days off to rest up from that, and here we are. He just didn't have time to dig out all that information.

* * *

At the end of each week's "Car Talk" on NPR, one of the host "Click and Clack, the Tappet Brothers" brothers regales his brother — and national audience — with the show's credits. There's the Russian driver, Pickup Andropoff; law firm, Dewey, Cheetum, and Howe; accounts payable administrator, Imelda Czechs; etc.

With that in mind, a Sandia researcher e-mailed, "A few years ago I came across a paper that had an author's name that when pronounced sounded like another word, but in this particular case a chemical: C.O. Too — sounds like CO₂. I was curious if others have come across other unique names, particularly for the field in which they work."

Know of any?

* * *

Things are not always what they seem or appear to be, and some initially wide-eyed Sandians were reminded of that recently after receiving an e-mail message from the Travel Department. The subject line read: Notification to Strip Account Travelers.

They were relieved to learn that in this case, the word "strip" was a modifier — not a verb.

* * *

There were a few takers on the challenge to come up with creative ads. Duke Gray (9623) just finished remodeling the master bathroom at his house and offers a 20-year-old commode that "still works great" for \$10 and a ceramic bathtub "with a small chip on bottom, but still holds water," for \$10.

Mark Shuchat-Marx (9622) is probably pushing the edge with his offer of a ham sandwich, "only 1 bite missing, \$1 or best offer." Others?

* * *

And about memory. . . Why can people remember their eight-or-more-digits military ID numbers from half a century ago but can't recall Aunt Hattie's two-digit speed-dial code?

* * *

A publicity-shy and hobby-challenged Sandian points out that if Tom Hanks didn't have a middle name and worked at Sandia, his e-mail address would be thanks@sandia.gov.

* * *

Webinar. Web-seminar. Know of any other new Internet-inspired words?

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

Sandia teams win Lockheed Martin NOVA Awards

Two Sandia research teams are among the winners of the annual Lockheed Martin NOVA Awards.

The teams, both honored with Sandia Employee Recognition Awards earlier this year, are the Z-Dynamic Hohlraum Inertial Confinement Fusion Team and the Space Shuttle *Columbia* Accident Investigation team.

They will

be among teams and individuals from across Lockheed Martin's business sectors who will be honored in a special ceremony at the National Air and Space Museum in October.



Z-DYNAMIC HOHLRAUM Inertial Confinement Fusion Team (not all team members shown).

The NOVA award program was established in 1995, upon Lockheed Martin's formation, to honor individuals and teams across the corporation who have made outstanding contributions to Lockheed Martin's mission and business objectives. Awards are made annually in four categories — Exceptional Service, Leadership, Teamwork, and Technical Excellence. The two winning Sandia teams were recognized for technical excellence.



SPACE SHUTTLE *Columbia* Accident Investigation Team (not all team members shown).

The NOVA award derives its name from the Latin word for "new," and its astronomical definition as "a stellar outburst of creative power," with the star motif building on the Lockheed Martin symbol. The NOVA awards program recognizes those "stars" who contribute their own creativity to the overall success of Lockheed Martin.

Members of the Dynamic Hohlraum Team include James Bailey, Gordon Chandler, Thomas Mehlhorn, Patrick Lake, Ramon Leeper, Thomas Nash, James Potter, Carlos Ruiz, Johann Seamen, and Stephen Slutz.

Members of the Space Shuttle *Columbia* Accident Investigation Team include Kyle Thompson, Moo Lee, Donald Potter, David Kuntz, Ronald Loehman, Rodney May, David Crawford, Carl Peterson, Kurt Metzinger, Arthur Ratzel, Edward Piekos, Kenneth Gwinn, William Oberkamp, Basil Hassan, Jeffrey Payne, Wilson Brooks, Bonnie Antoun, Sam Glenn Beard, Jr., Thomas Bickel, Bennie Francis Blackwell, Thomas Buchheit, Brian Dodson, Michail Gallis, John Gieske, Jill Glass, Robert Hardy, Michael Hassard, Eugene Hertel, Jr., Roy Hogan, Jr., Teresa Jordan-Culler, Robert Kerr, John Korellis, Wei-Yang, Lu, Richard Perry, Kirk Rackow, Dennis Roach, Christopher Roy, Simon Scheffel, Phillip Walkington, Kenneth Wilson, Steven Younghouse, Roger Max Zimmerman, and Jose Hernandez.

Sandia LabNews

Sandia National Laboratories

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Ken Frazier, Editor 505/844-6210
Bill Murphy, Writer 505/845-0845
Chris Burroughs, Writer 505/844-0948
Randy Montoya, Photographer 505/844-5605
Nancy Garcia, California site contact 925/294-2932
Contributors: Janet Carpenter (844-7841), John German (844-5199), Neal Singer (845-7078), Larry Perrine (845-8511), Howard Kercheval (columnist, 844-7842), Will Keener (844-1690), Iris Aboytes (844-2282), Michael Padilla (284-5325), Rod Geer (844-6601), Michael Lanigan (844-2297), and Michelle Fleming (Ads, Milepost photos, 844-4902). Dept. 12640 Manager: Chris Miller (844-0587).

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Recent Patents

Stewart Griffiths (8350) and Robert Nilson (8752): Method for Producing a Thin Sample Band in a Microchannel Device.

Timothy Shepodd (8762): Cast-to-Shape Electrokinetic Trapping Medium.

George Sartor (8358) and Kenneth Hencken: Electrokinetic Pump.

Albert Marshall (9745), Donald King (6872), Kevin Zavadil (1832), Stanley Kravitz (1763), Chris Tigges (1742), and Gregory Vawter (1742): Self-Powered Microthermionic Converter.

Karen Waldrip (2521), Stephen Lee (1123), and Jun Han: Distributed Bragg Reflector Using AlGaIn/GaN.

Commuter options for Sandians to be aired Sept. 9

Traffic jams. Base-access delays. Road Construction. Parking space shortages. Learn how to make these irksome antagonisms of driving to work a thing of the past at the Sandia Traffic Safety Committee's Commuting Options Extravaganza.

City Transit's Rose Murray and Sandia Traffic Safety Committee's Linda Stefoin will team up with Debbie Moore (both 3333) in the Steve Schiff Auditorium on Thursday, Sept. 9, at 11:30 a.m., to make Sandians more aware of their commuting options.

Murray will introduce the City's new Rapid

Ride program and talk about the changes the City is making to the public transportation system that will make it easier and more useful to Albuquerque residents.

Debbie will provide information on bike routes, carpools, and vanpools as they relate to the specific needs of Sandians.

Says Linda: "As Sandians we have always been particularly sensitive to the causes of environmental protection, pollution prevention, and energy conservation, so I am expecting a high level of interest, as well as participation." —Matthew Stackpole

Sandia researchers, Livermore police demonstrate 'sensor management architecture' for rapid deployment of detection system

In unique experiment, complex system was deployed in Robertson Park over Fourth of July

By Mike Janes

While some 15,000 Livermore residents and visitors enjoyed barbecues, music, picnics, and other Fourth of July festivities, Sandia researchers and their counterparts at the City of Livermore Police Department (LPD) were using the occasion to test a complex system of sensors and other advanced technology designed to keep revelers safe from possible future terrorist attacks.

No such threats were expected (or experienced) at Livermore's Robertson Park, which acted as the backdrop for the unique experiment. Still, Sandia researchers say the test deployment confirmed their hopes that the Sensor Management Architecture (SMA) system could serve an important and valuable role for regional law enforcement and emergency response agencies such as the LPD.

"How can we rapidly deploy sensors, surveillance cameras, and detection equipment across a small geographic location, monitor the data they collect, and communicate amongst ourselves via multiple command stations? That's the question we're attempting to answer," said Michael Johnson (8114).

For the Fourth of July event, Sandia placed multiple environmental detectors and two high-resolution, Internet protocol (IP) video cameras at Robertson Park, as well as a mobile sensor that monitors conditions such as temperature and wind velocity. The wireless data processing

Sandia CaliforniaNews

equipment was then linked to a dual-location, high-speed communications network that allowed Sandia and LPD personnel to receive information in near real-time. The cameras provided event security coordinators with a public view of the stage and a remote parking area.

WiFi infrastructure

The wireless fidelity ("WiFi") technology infrastructure, developed by the Sunnyvale firm Tropos Networks, provided a secure, encrypted wireless network that extended over a mile and a half. The communications network also included a low-range telemetry system, mounted on an antenna in the Livermore hills, which enabled data to be transmitted to separate command posts at the park and at LPD headquarters. The detectors themselves were interconnected via an "Intelligent Sensing Module" (ISM) designed and developed by Sandia with support from Livermore's Sierra Custom Electronics.

All in all, system set-up was completed in about two hours.

The idea, according to Heidi Ammerlahn (8112), is to discourage terror attacks by having a networked, rapidly deployable system in place



SOME of the SMA equipment was carried in the trunk of a Livermore police car.



LIVERMORE POLICE DEPARTMENT'S Community Outreach Vehicle served as the command post for the city's Fourth of July celebrations and was the primary monitoring location for LPD and Sandia staff involved in the SMA testing.

that will arm first responders with the information and technical infrastructure necessary to take action quickly and effectively. Any number of special events, both large and small, could benefit from such a system, she says.

"The benefit to local public safety is that very specialized sensing and video monitoring equipment can be quickly and securely integrated into an IP network, using either fixed wiring or encrypted wireless, to provide command staff, dispatch centers, and field personnel with vital information that has never been available before," says Greg Park, Livermore Police Department's Information Technology Coordinator.

Larger-scale events and venues that are attractive to terrorists, however, are of particular concern to the Department of Homeland Security — the agency funding the program — and the SMA system developed at Sandia might be a viable method for combating those fears. Depending on the detection equipment being used, the system could be configured to detect any number of weapons of mass destruction and could also serve as a monitoring tool for law enforcement officials.

Systems approach is key

"Suppose, at a major political event, a terrorist group decided to release a chemical agent that would expose hundreds of people to a deadly plume," says Heidi. With an SMA system in place, she says, a chem-detector could activate an alarm and identify and characterize the agent. The communications component of the system would immediately notify emergency personnel located at either an on-site or off-site command center and send back key information. Finally, at the same time, surveillance cameras, trained on the event location, would immediately zero in on the area of interest and provide potentially life-saving intelligence to officials.

Conceivably, officials could swiftly determine the level of threat, the type of agent released, the environmental conditions impacting the release, and the whereabouts of any sus-

pects. The information could be made available in the blink of an eye, shaving precious minutes off the response time.

'A new and exciting mission'

"Working directly with the local first responders, including both police and fire services, is a new and exciting mission for our laboratory," says Rick Stulen, Director of Exploratory Systems and Development Center 8100 and a key member of the Labs' homeland security management team. "We are actively looking to broaden our impact within the region and open our doors to state and local entities utilizing technology being developed at the laboratory."

Sandia recently hosted a first-responder forum at the Labs that included about a dozen firefighters from around the country. The resulting discussions provided Labs researchers with valuable insights from the end users who are often the first to respond to the scene of an emergency disaster, terrorist event, or other dangerous situation.

First responders and personnel responsible for developing operations plans, logistics, and emergency response efforts urgently need systems that are reliable and easily deployable, says Michael. The exercise in Livermore demonstrated how well the SMA system can work, he says, and Sandia has approached other Bay Area law enforcement authorities about integrating the system into their existing operations plans.

Sandia has demonstrated similar detection and sensor architecture for San Francisco International Airport, and a major East Coast city's transportation authority is now considering how it might integrate Sandia's sensor management architecture into its emergency plan.

The long-term goal, says Heidi, is to provide a system that can respond rapidly to those high-profile special events that have such overriding importance that federal agencies such as the Secret Service and Federal Bureau of Investigation assume responsibility for their security. Political conventions and inaugurations, she says, might fit into that category.

Energy supply

(Continued from page 1)

influencing international and industrial standards activities, providing technical leadership, and facilitating oversight in order to improve US energy security through the adoption of beneficial technologies and security practices.

Growing need for security

While the scope of CISSWG is broad, its first priority is to help secure the command and control systems — called SCADA for Supervisory Control and Data Acquisition — that facilitate operation of energy infrastructures, says Rolf.

As the SCADA systems have been modernized and as business requirements have driven the need for more real-time system information, connections to corporate enterprise networks and business applications via Internet technologies have become the norm, he says.

This has introduced vulnerabilities that are common to all modern networked systems. At the same time, adversaries have become more sophisticated and have easy access to system information and attack tools via the Internet to exploit these vulnerabilities, he says.

“There is a growing need to develop and apply technology and processes to improve the protection of these systems,” says Rolf. “But in part because of competition among utilities and equipment suppliers and the small profit margins in the industry, the international energy community has not yet been able to adopt new security measures adequate for today’s security environment.”

CISSWG can serve as an objective non-indus-

“It is important that the international standards community hears the US speaking in a clear and coherent voice.”

try and non-government third party to bring together the needs of the various energy-related stakeholders and recommend standards that would lead to improved security, he says.

An international effort

The four labs were selected for their expertise in physical security, cyber security, and infrastructure security, and their involvement in various standards activities.

CISSWG’s effort is by necessity international in scope, says Rolf. Many of the 20 or more standards groups that help establish specifications for energy control equipment are international. A significant portion of the world’s top manufacturers of infrastructure control equipment is made up of multinational companies based in Europe.

The traditional process for adopting new standards through these bodies often takes decades to complete. CISSWG will, it is hoped, accelerate this process, he says.

“It is important that the international standards community hears the US speaking in a clear and coherent voice,” he says. “By working with national and international standards bodies and working groups to develop improved security standards, we can enhance the global market for

secure technologies and systems that will in turn improve the US national security posture.”

Coordinate, prioritize

The group’s first, ongoing task is to gather information about current standards efforts and share it with members of the US national lab, academic, and industrial communities to encourage participation in international standards development, Rolf says.

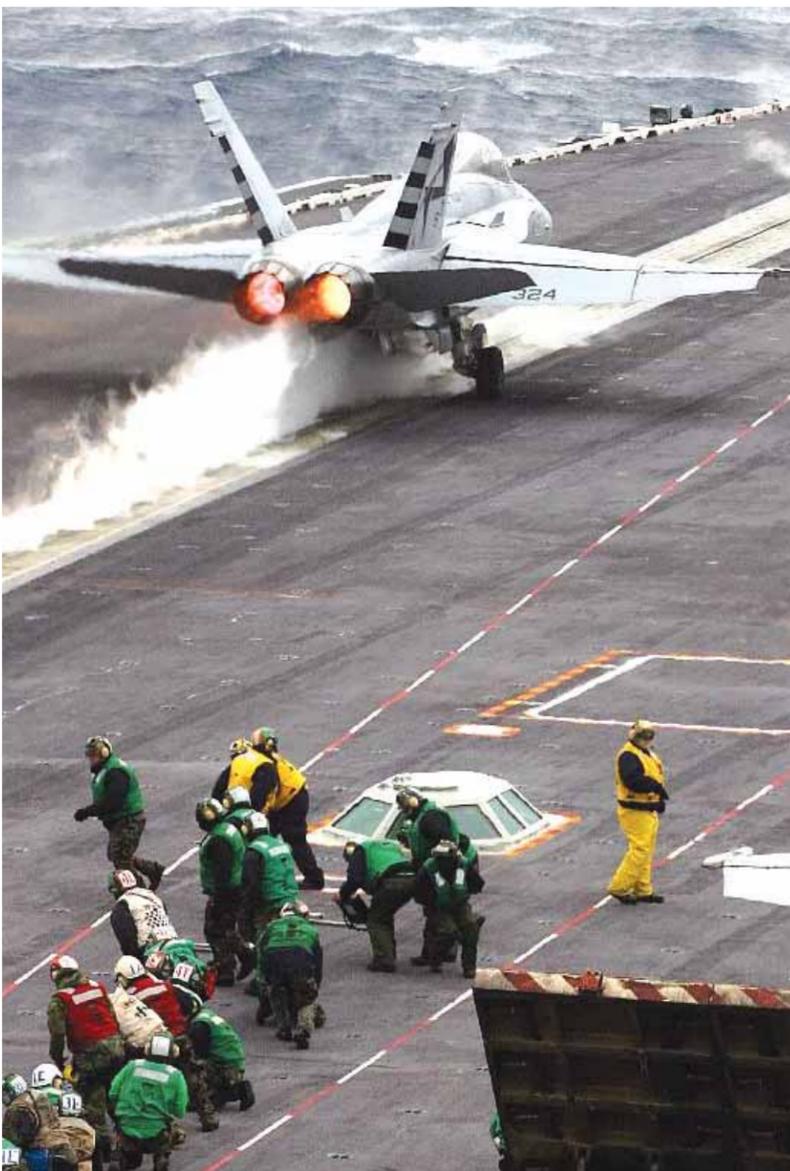
CISSWG also will make recommendations to various standards bodies currently developing standards and develop a business plan for how DOE can best influence the process for improving the US energy infrastructure security.

Working with other US government agencies such as the Department of Homeland Security and the Environmental Protection Agency, the group will coordinate US efforts, prioritize work, create forums for information exchange, support strategically important standards efforts, and ensure that ongoing efforts meet US requirements for security — including confidentiality, authentication, penetration resistance, physical security, and other factors.

The four DOE labs will form the first-year core group for CISSWG. Additional members will be added in later years as funding permits. In addition, the CISSWG is open to supporting other programs and needs around the laboratory complex that require standards for secure command and control, such as sensor networks, physical security systems, and other forms of monitoring systems.

For additional information regarding CISSWG, contact Rolf Carlson at 844-9476 (recarls@sandia.gov), Juan Torres at 844-0809 (jtorre@sandia.gov), or Reynold Tamashiro at 845-9804 (rstamas@sandia.gov).

Carrier Ops . . . Sandia style



AN F-18 TAKES OFF from the aircraft carrier USS *Harry S. Truman*. Dwight Miller of Systems Reliability Dept. 15242 took this and the three photos from the *Truman* flight deck that helped illustrate the front-page article in the Aug. 20 issue of the *Lab News* about Sandia assisting the Navy in shaping the future of aircraft carrier operations and should have been so credited.

New Mexico/Taiwan groups sign MOU



AS THE CAPSTONE of a workshop on “Technology Commercialization and Research Parks: Best Practices Between Taiwan and New Mexico,” representatives from New Mexico and Taiwan signed a Memorandum of Understanding marking a commitment to continue working together on areas of mutual interest. Shown here are, from left, Jackie Kerby Moore, Executive Director, Sandia Science and Technology Park; Tzong-Ming Yen, Deputy Director General, Science Park Administration; Wei-Chung Wang, Director General, Department of International Cooperation, Taiwan National Science Council; Sherman McCorkle, Chairman of the Board, Science and Technology Park; Garrey Carruthers, Vice Provost for Economic Development, New Mexico State University; Terry Yates, Vice Provost, University of New Mexico; and Kevin Boberg, Associate Dean/Director of Arrowhead Research Park, New Mexico State University. The workshop, hosted by the office of Sen. Jeff Bingaman, D-N.M., provided New Mexico universities, laboratories, and research parks an opportunity to share ideas with like institutions from Taiwan. (Photo by Randy Montoya)

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Water

(Continued from page 1)

sisting of alfalfa.

Similar conditions of water use exist in many places in the world.

Conventional farming methods in arid regions lose huge amounts of water through evaporation and over-absorption by soil. Over time, this can also result in soil salination and loss of agricultural productivity. Neither are factors in hydroponic greenhouses, which do not require high-quality arable land to function in the first place.

A cause for war

While agricultural tradition, cultural factors, and economic realities make immediate implementation of hydroponic greenhouse methods for livestock forage doubtful, at least in New Mexico, Sandia is interested because, Ron says, "Discussions at Sandia's Advanced Concepts Group and elsewhere have targeted disputes over water as possible, if not likely, causes for international conflict or war in the 21st century." Echoes Sandia director Peter Davies (6100), "A large proportion of freshwater usage around the world is agricultural, so the ability to reduce the amount of water needed for it and thus lessen the possibility of conflict is extremely important to the security of the United States and the world."

Says Gerry Yonas (16000), Sandia Principal Scientist and director of the Labs' Advanced Concept Group (ACG), "Because the ACG looks to



RACKS OF GRAIN thriving hydroponically under cover in the blazingly hot sun of southern New Mexico are demonstrating the incredible water efficiencies that can be attained with sophisticated conservation techniques.

future global security issues, we advanced the idea of a bi-national lab between Mexico and the US to deal with border issues that have a potential for conflict. This project is the first fruit of that idea."

Says Jessica Turnley, a Sandia consultant and director of the Sandia-spun-off Bi-National Sustainability Laboratory, "We look forward to using the greenhouse facility to work with Sandia and with scientists and community folk from both sides of the border to develop technologies to help improve the quality of life."

Herds kept alive in drought

Mexican ranchers in times of drought have already used relatively inexpensive hydroponic greenhouses to grow feed to preserve their herds, says Gallegos.

He and his researchers take a keen interest in the US project, taking place just north of the US/Mexico border in Santa Teresa, N.M., a few miles west of El Paso. They come up weekly from Ciudad Chihuahua — a drive of about 3.5 hours — to help in design, construction, and implementation of the project.

"The difference [between our projects and this one] is the sensors Sandia is installing to check things there," Gallegos said in a telephone interview from Chihuahua. "Normally we only use a humidity sensor to know when to run our irrigation." The Sandia-placed sensors and computer simulations will tell him how to grow crops still more efficiently, he says. "We need to review the amount of water used in the greenhouse; the only way to do this is to determine accurately the amount needed at every step." Also, he says, the



AS PRESSURES on the world's freshwater supplies increase along with populations, water itself becomes a national security issue.

Mexican tests used only readily available wheat and corn; the Sandia tests include triticale, sorghum, barley, and oats.

"We want to be aware of microclimate variances," says Ron. "We want to know how feed grows from changes in temperature and location and time of watering. That will help us modify the design and operation of the greenhouses."

The way it works

The dense array of sensors in the 8m x 18m (26 ft by 59 ft) greenhouse will monitor light, temperature, relative humidity, and air pressure. The data, collected every few minutes, will be sent by phone line to a remote computer for analysis. "We expect that the [greenhouse] system will not be as slow-moving or spatially homogeneous as one might think in terms of environmental change," Ron says. "Every time the water system pops on, the local temperature around the plants drops relatively quickly." Water sprays from quarter-inch nozzles for 20 seconds into plants growing in a series of plastic trays stacked on metal racks, whenever a humidity sensor or a back-up timer trips a control circuit. To lessen labor and also protect against mold, the researchers are exploring the development and use of trays that themselves would be edible by livestock, thus making washing and sanitizing trays unnecessary. Such tray material could also add nutrition content to the overall forage product, making it a



KRQE TV-13 newsmen Bob Martin, accompanied by Ron Pate, gets a video shot of the solar array system that powers the water and air circulation systems in the hydroponic greenhouses.

more balanced ration for the livestock. Consumption of water, seed, and labor are also being monitored.

The nutritional quality of the hydroponically grown plants will be determined by Clint Loest, a professor of animal nutrition at New Mexico State University, whose lab will compare results of feed testing with the animals' actual requirements.

"This is definitely unique in the animal for-

age area," he said. "If we can get the animals to perform just as well on greenhouse forage, that would be an incredible advance. It would be such a breakthrough that we might even give up a little performance if it's going to save so much water."

The hydroponic greenhouse, also known as "protected agriculture" or "controlled environment agriculture," also controls and modifies light reaching the plants. Experiments will reduce light intensity and restrict certain frequencies, using a variety of shading mechanisms to avoid overheating and improve plant growth.

The "speaking plant" approach

Says Gene Giacomelli, director of the highly regarded Controlled Environment Agricultural Program in the Agricultural and Biosystems Engineering Department, University of Arizona, "Sandia has advanced technologies that can be added to lower the cost of traditional environmental sensing." In addition to the wireless technologies currently being installed, Giacomelli mentioned a possible "speaking plant approach," where very small, lightweight, inexpensive sensors are put directly on each plant to monitor the plant's water status, temperature, and growth rate. "We envision these [futuristic] sensors linked together [via wireless communications], possibly on every plant, so the plant tells the control system directly what it needs, instead of merely monitoring air around the plant. The plant may have other needs these [more distant sensors] don't tell us. This will be the highest tech going."

He complimented Sandia researchers for seeking out expertise to complement traditional Sandia



FORTY-TWO SENSOR DEVICES such as this will provide a stream of data to researchers on temperature, humidity, light intensity, and barometric pressure at multiple sites throughout the greenhouse.

strengths. "They recognized that when you apply technology to a biological system, you can't just plunk it in there without having biological expertise to apply the high tech in a practical way."

The solar way

Experiments are also being planned to use the blocked light to create another asset: solar-generated electrical power. (Greenhouse pumps, timers, and sensors are already powered by free-standing solar modules that change light into electricity, which is then stored in batteries for nighttime use and during cloudy weather conditions.)

"Greenhouses could be a solar source," says Sandia researcher Vipin Gupta (6233), "because sunlight has to be filtered in arid areas to prevent crop damage because it is too intense. The challenge is to create reliable, effective materials to use that part of the spectrum the plant is not interested in using to produce power that can be put on a grid as well as operate the greenhouse." Vipin is currently based at the University of Texas at El Paso's Materials Research Technology Institute and serves as a local focal point for the project. Sandia technologist Ed Baynes (4148) is based in Las Cruces and provides technical support for the greenhouse. Nina Berry and Jesse Davis (both 8961), with two summer student interns, are helping implement the wireless networked sensor array and cell phone data link, expected to be installed in mid-September.

Mileposts

New Mexico photos by Michelle Fleming



Steven Hatch
25 9743



Gerald Lipka
25 10826



John C De Baca
30 9127



Richard Pepping
25 5733



Lyle Golightly
20 10848



Aaron Hillhouse
20 2112



Michael Martinez
20 1832



Anthony Montoya
20 14151



Cathy Vortolomei
20 2994



Linda Jaramillo-Alfaro
15 3521



Laura Lenberg
15 9741



Christopher Mullaney
15 6337



James Potter
15 1636



Daniel Rondeau
15 15301



Dianne Sanchez
15 10872



Randall Schunk
15 9114



Marsha Lou Strauch
15 10730



Malcolm Stringer
15 2913



Scot Swanson
15 1762

Feedback

Will Transportation Safety Administration recognize DOE Q clearances?

Q: The Transportation Safety Administration is piloting a Registered Traveler program to allow approved passengers to get through airport security lines faster. According to the article in Time, 6/21/04, "To gain that privilege, passengers must submit to an extensive background check, including searches of commercial and government databases. "This sounds an awful lot like a Q-clearance background check; has anyone asked TSA if they'd be willing to enroll Q-cleared or TS-cleared government employees and contractors in the program automatically? It would save the government a lot of money if it didn't do background checks twice on such cleared individuals, and considering how much travel Sandians do, it would save us a lot of time too!"

A: The Sandia Travel Department checked with the Transportation Safety Administration (TSA) regarding your suggestion about automatically enrolling Q-cleared or TS-cleared government employees and contractors in their Traveler Pilot Program, saving the government both time and money. They stated that at this time TSA would conduct its own investigations and that this was not an option. TSA, in partnership with selected airlines and airports across the country, has launched this program. This program will be rolled out in phases across the country. Once the program is operational at the traveler's home airport the airlines participating in the program will send out invitation letters to their frequent travelers. The Albuquerque International Sunport is not one of these selected airports. It is a great idea, and the Treasury and Travel Services Department appreciates your time and effort to bring this to our attention.

— Barbara Cochran (10507)

Q: I work at a non-Albuquerque Sandia site and periodically visit Albuquerque to work with my colleagues here. This morning as I drove on base in my rental car, the guard at the Gibson gate directed me to the Visitor Center for a base pass. I was told in the Visitor Center that all vehicles must have either a base sticker or a base pass. I was waved through the same gate in the same sticker-less and pass-less rental car the previous two mornings solely on the basis of my Sandia badge. Given FPCON Alpha conditions, should I assume that I'll always need a base pass when I'm in a rental car (so I can take the extra time at the Visitor Center into account if I have a morning meeting) or should I just drive up to the guard and see if I get waved through?

A: Kirtland AFB does require that all vehicles have a base decal or a temporary base pass for base access. It is not base policy to allow access for a vehicle based on the driver having a Sandia Badge, but enforcement may not always be consistent. For Sandia employees or contractors, the badge office receptionists in the lobby of Bldg. 800 can issue base decals for personal vehicles. Those driving a rental car can stop at the Wyoming Gate to be issued a temporary base pass.

— Boris Starr (4223)

Q: What determines the position level for new hires? For example, a new hire with BSEE from UNM may be hired as an MTS. A new hire with BSEET from NMT is hired as an STNG. Obviously there is a big difference in being a MTS or STNG. Is the difference in the degrees the determining factor? The degrees are very similar in content and they both go to school the same amount of time. Why the disparity?

A: The ladder and level classification for new hires as well as existing employees is based on many factors and considerations. The work being performed is the primary consideration for ladder identification. The complexity of the work assigned as well as the individual's knowledge, skills, and abilities (KSAs) determine the level within the ladder; e.g., MTS vs. SMTS. An individual's KSAs may come from many different areas and methods; e.g., college education, military training, etc. A college education is the most widely used path to obtain these KSAs. The differentiation between a BSEET and BSEE is based upon management's assessment of the knowledge provided through the degree and its applicability to completing the identified work. While these degrees may be generally similar, the course curriculum between these two degrees is not identical. The difference in knowledge created by these differences will translate into a different ladder and/or level assignment due to the different work assigned.

— BJ Jones (3500)

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Steven N. Burchett Auditorium dedicated in JCEL building



MEMBERS OF THE Burchett family gather with Sandia leaders to dedicate the new auditorium in the JCEL building named in Steve Burchett's honor.

IN AUG. 12 CEREMONIES, a conference room in the new Joint Computational Engineering Laboratory (JCEL), Bldg. 899, was dedicated and named the Steven N. Burchett Auditorium in honor of a fallen Sandian. The family of Steve Burchett, who died March 5 at the age of 59 after 36 years of service to Sandia, was present at the dedication. Here Sandians and family members pose with a poster that is a mock-up of what the final plaque will look like when delivered and installed in 4 to 6 weeks. From left: Hal Morgan (9140), Tom Hunter (9000), Spencer Burchett

(son), Sue Burchett (wife), Jacob Weinmaster (grandson), Hanna Weinmaster (granddaughter), Sheri Weinmaster (daughter), Eric Weinmaster (son-in-law), Tom Bickel (9100), and Al Romig (5000). The citation reads: "For his dedication and leadership in the advancement of Engineering Sciences and nuclear weapons analysis throughout his career at Sandia National Laboratories." The plaque was made possible by donations from Steve's friends and colleagues and Sandians throughout the Labs. "Thank you for thinking so highly of Steve that you chose to dedicate the

auditorium to him," Sue Burchett said in a thank you note afterward to Sandians. "He would have felt so undeserving of this great honor. . . . It is mind-boggling to our family to think of all that you did to make the dedication ceremony so special and your willingness to give generously out of your own pockets to make it all possible. On behalf of Steve, I know that he would be so humbled and so grateful and would want to thank each and every one of you personally if he could. . . . You have given us a very precious gift. On behalf of our family, please accept our deepest gratitude."

Sandia News Briefs

US Capitol Police praise Chris Cherry and colleagues for Operation America bomb-disablement training

Chris Cherry (5916) and his Sandia colleagues have been praised by the US Capitol Police for their national training program and innovative research

in bomb-disablement methods. "The Operation America program under the direction of Mr. Christopher R. Cherry is the most innovative and progressive bomb technician course offered anywhere," begins a letter to Sandia President C. Paul Robinson from John E. King, special agent/bomb technician, Hazardous Devices Section, US Capitol Police in Washington. "Mr. Cherry and the members of the Sandia staff are some of the most hard-working and dedicated individuals that I have had the pleasure of working with. The class is a living course in that new technology is always disseminated that not only improves the bomb technician's skill but enhances the bomb technician's understanding of the science behind the use and applications. Mr. Cherry is always developing new tools and technologies along with techniques that improve the bomb technician's capabilities to operate safer in the dangerous environment in which we work. . . . The effort of Operation America supersedes any bomb technician training offered today, and I hope Sandia will continue with the support of this vital and progressive training."

Former Sandian Dan Arvizu is candidate for Idaho lab top job

Former Sandia engineer and director Dan Arvizu is the Idaho Laboratory Affiliates' (ILA) candidate for the position of laboratory director of the Idaho National Laboratory, according to an Aug. 19 report in the *University of Chicago Chronicle*. Idaho Laboratory Affiliates, which the University of Chicago leads, submitted a bid to DOE for the management and operation contract for the proposed Idaho National Laboratory. The ILA consists of the university; Kellogg, Brown & Root Services Inc.; Teledyne Brown

Engineering Inc; and Nuclear Fuel Services Inc. The Idaho National Laboratory will combine the research and development components of the Idaho National Engineering and Environmental Laboratory and the Argonne National Laboratory-West. The *Chronicle* said Arvizu is the ILA's candidate for lab director. Arvizu spent 21 years at Sandia. He directed Sandia centers for advanced technology, materials and process sciences, and technology commercialization.

New policy on vehicle handicap access to tech areas

To better safeguard and control personal vehicle access into the tech areas, individuals requiring handicap access are now required to process through the Medical department for authorization.

This new process, which includes a physician's authorization, will be required on a yearly basis. Be sure to provide a copy of the original medical paperwork used to secure the state-issued handicap placard. The physician at Medical will then notify Traffic Safety and the Badge Office so accommodation can be made.

The Sandia handicap placard will be made at the Badge Office and will expire one year from the date of issue. The placard can either be sent to the requestor via internal mail or be picked up in person. Allow 48 hours from date of medical authorization for placard to be issued.

Current holders of Sandia-issued handicap placards: contact Chris Bell (4223-1) at 844-2060, ckbell@sandia.gov (or Lorraine Solanos, (4223-1) at 284-3958, lsolano@sandia.gov) to ensure compliance.



Wes Martin on Iraq



SANDIAN (and Col.) Wes Martin describes conditions in Iraq. Wes, recently returned from a military assignment in the Middle East, spoke Aug. 24 to more than 100 Sandians at the Steve Schiff Auditorium. In his talk, accompanied by photos he took during his tour of duty, he offered his personal perspective on the effects of the war on Iraqi society. (Also see *Lab News*, Aug. 20.) (Photo by Randy Montoya)