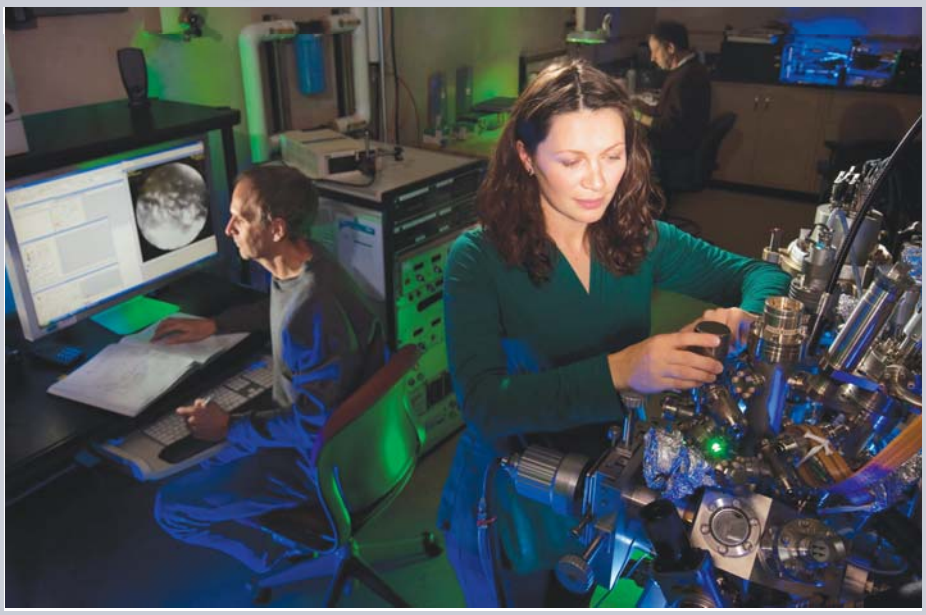
HAPPY BIRTHDAY, MTI — Bart Chavez (5712), left, Brian Post (5764), and Jim Russell (Ball Aerospace) monitor the real-time command and telemetry links of the MTI spacecraft during ground contact as it makes its 55,000th orbit. During a standard ground contact, the operators initiate software procedures that handle commands, configure the antenna control units for the helix and dish antennas, and control the digital data recorder. To read about the remarkable success of the MTI project as it observes its 10th year in orbit, see the story on **pages 6-7.** (Photo by Randy Montoya)

How graphene grows



SANDIA RESEARCHERS Elena Starodub, Kevin McCarty (far left) and Norm Bartelt (far right) around the Low Energy Electron Microscope used to study graphene growth. (Photo by Randy Wong)

By Patti Koning

Big things often come in small — or in this case, thin — packages. Graphene, a single-atom-thick planar sheet of carbon atoms, is considered by many to be the next, big thing in nanoelectronics, the material that might keep Moore's law in existence.

Graphene came into vogue about five years ago when two Manchester University scientists, Andre Geim and Kostya Novoselov, extracted it from bulk graphite. Graphene is chemically simple but physically strong and highly conductive. Electrons move through it at 1/300th the speed of light, significantly faster than through silicon. Scientists are excited by its potential for improved solar cells, LCD displays,

(Continued on page 3)

Inside . . .

Sandia LabNews

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Sandia National Laboratories

Changes coming to Sandia's M&O contract to improve efficiency, reduce complexity

By Julie Hall

Since August, Sandia and the Sandia Site Office have been taking a close look at their relationship. Ultimately, every DOE and NNSA directive serving as the contractual requirements of the NNSA-contractor relationship will be scrutinized, potentially modified — or even eliminated.

The effort is part of a larger initiative that has been under way for the past few years to streamline the way the Department of Energy oversees contractors. The goal of the "Governance & Oversight Reform" effort is to free up federal and contractor resources to focus more on mission outcomes and results, and to foster a relationship based more on partnership and trust than compliance between contractors and their respective NNSA offices.

After a successful pilot five years ago at the Kansas City Plant, Secretary of Energy Steven Chu has directed DOE to focus on improving the efficiency and effectiveness

(Continued on page 9)

That's that

Got a note from Irene Dubicka (5925) not long ago, a heads up for us reporter/photojournalist types at the *Lab News* to watch our Ps and Qs in Michigan. The thing that prompted her note was an item in the *Detroit News* about the Michigan Intelligence Operations Center for Homeland Security. The article explains that "the little-known center fights terrorism by investigating suspicious behavior, such as people taking photos and writing notes in public." That pretty much describes to a "T" what we do at the *Lab News*. Irene jokingly ended her note with a little friendly advice: "Tell Randy [Montoya] not to take any pictures in Michigan!" That's not likely to happen anytime soon, but the fact is, more than one of us from the *Lab News* – Randy included – have been stopped in the course of doing our work and questioned by Air Force security. Randy was even "taken in" one time. It's frustrating, of course, but look at it from their perspective: They don't know us from Adam and – especially since 9/11 – what we do *does* look suspicious.

* * *

Speaking of base security, have you heard about those new credentialing requirements Kirtland Air Force Base is about to deploy? The new requirement, to be introduced sometime after April, is called the Defense Biometric Identification System, or DBIDS. The system has already been implemented at military installations around the world and is now coming to KAFB. In a nutshell, DBIDS is a DoD identity authentication and force protection tool. Over the years, we at Sandia/New Mexico have enjoyed a fairly painless base entry process. A heads-up brochure being handed out at KAFB gates says the DBIDS process won't change that; the process, it says, "is quick and efficient and should not slow down base entry." Well, I'm skeptical about that; we'll see. But again, consider the issue from the military's point of view. If you were a base commander, wouldn't you feel the way flight director Gene Kranz felt during the Apollo 13 mission: "Not on my watch." I get it. I may not like it, but I get it.

* * *

Do you do much handwriting anymore? I mean, writing things down in longhand? Except when I'm taking notes during an interview, I hardly use longhand at all. And I must admit, my cursive writing has deteriorated so much over the years that when I come back to my office, I have to transcribe my notes right away while I can still remember what my scrawlings actually say. If I go back to my notes a week or two later, they're as indecipherable as the still-mysterious ancient Indus script. What brings this up? Well, the other day I had to download and complete a form that required a lot of hand-written input. I'd hardly gotten through half a page of the three-page form before my hand and wrist really started to ache. When I think of all the papers, stories, and reports I used to draft in longhand, my hand just throbs at the memory.

On this subject, CBS did a report a couple of years ago about the vanishing art of handwriting. It's probably been written about (keyboarded about?) in a lot of other media, too. The bottom line is, kids are learning keyboarding skills at an earlier and earlier age and are less and less willing or able to write the old-fashioned way. Some schools are effectively giving up on handwriting; others are fighting a rearguard action.

I'm of mixed feelings about the issue, just as I am about the use of calculators in math classes. On the one hand, the traditionalist in me says, doggone it, people should know how to write and do basic calculations without electronic crutches. On the other hand, the early adopter in me says "why?" What do you think? Handwriting? Or keyboarding?

See you next time.

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

Sandian Shawn Dirk honored as Outstanding Young Investigator by American Chemical Society

Sandia chemist Shawn Dirk (1821) was selected for the Outstanding Young Investigator award at the 2009 annual meeting of the American Chemical Society. In that capacity, he was invited to present at the society's 2009 Young Investigator Symposium held in Washington, D.C.

SHAWN DIRK

The award from the ACS was given in recognition of Shawn's important and diverse contributions to organic materials research in the areas of chemical sensors, novel polymeric dielectrics for hybrid cars, functionalized biomaterials, nanocomposites, and organic lithographic techniques.

Shawn, who earned a PhD at Rice University in 2002, came to Sandia as a post-doctoral associate in 2002 and was hired as a member of the technical staff in 2004. Among other responsibilities, his Sandia work has entailed directing research in the area of novel polymeric dielectrics for next-generation hybrid cars under the DOE FreedomCAR program.

Shawn holds two patents and is the lead author or coauthor of 35 publications.

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LOCKHEED MARTIN

Sandia, NNSA dedicate National Security Computing Center

NNSA and Sandia officials cut the red ribbon at the official dedication of the new National Security Computing Center at Sandia. The center is based around the Sandia-built Red Storm supercomputer platform. Its unique capabilities will be applied to help solve pressing national security problems such as cyber defense, vulnerability assessments, informatics (network discovery), space systems threats, and situational awareness. Pictured at the ribbon cutting are, from left, Jim Chavez, director of Systems Research Center 5900; Jerry McDowell, VP of Div. 5000 Defense Systems and Assessments; Dimitri Kusnezov, director of NNSA's Office of Research and Development for National Security Science & Technology; Joan Woodard, Sandia Deputy Labs Director for National Security Technologies and Systems; Bob Scott of the NNSA Sandia Site Office; Victor Atkins, senior analyst, Office of Intelligence; and James Peery, director of Information Systems Analysis Center 5600. (Photo by Randy Montoya)

Workshop explores the next generation for Sandia's biodefense R&D

By Holly Larsen

Unfair Advantage. Other Scary Things. Who Cares. These are not typical topics for breakout sessions at Sandia scientific workshops. But then, the Next-Generation Technologies for Biodetection and Diagnostics Workshop was not a typical Sandia event.

Motivated by the need to effectively pursue opportunities for biosecurity solutions, organizer Anup Singh (8621), manager of Biosystems R&D, took the unusual step of launching the workshop with a full day of speakers from organizations outside Sandia.

"As we explore the next stage of how we might provide solutions to the nation's biodefense problems, it's essential to look beyond Sandia — to get a good view of the larger landscape, see who the other players are and where we fit in," says Anup.

Adds Glenn Kubiak (8600), director of Biological and Materials Sciences, "Our external advisors have stressed the need to bring in people from the outside to get a wider vision of the problem space. Too often, we only talk to ourselves. This workshop was a good opportunity to hear about issues from people at the front of the pack."

ELENI KOUSVELARI (8600) leads a focus discussion group at the Next-Generation Technologies for Biodetection and Diagnostics Workshop. (Photo by Dino Vournas)

The view from the outside

Distinguished scholars and researchers from a range of institutions, including UCLA's David Geffen School of Medicine, the Columbia College of Physicians and Surgeons, and the Center for Point-of-Care Diagnostics for Global Health, widened Sandia's perspective on discrete topics within two broad areas: understanding the biology of infectious diseases and pathogens, and medical diagnostics and environmental detection platforms.

"These sessions gave us a rapid overview of some of the cutting-edge external research relevant to Sandia's biodefense program, as well as hear firsthand about the problems faced in the real world," says Wahid Hermina (1710).

For example, notes Anup, workshop attendees learned that rising population in many parts of the world is forcing humans and cattle to live closer together, making it easier for viruses to jump from animals to humans. Moreover, limited access to health care and nonexistent testing facilities in these areas create a perfect scenario for rapid, undetected spread of zoonotic diseases. Hence, to detect and contain the next outbreak faster, Sandia researchers need to develop assays and devices that are not only useful at home but are sufficiently cheap and portable to be useful in poorer parts of the world.

The customer side of the equation

After examining the lay of the land in current R&D, Anup invited Sandia participants to open up the customer or sponsor side of the equation, discussing the unmet needs of such customers such as Department of Homeland Security and considering the capabilities Sandia brings to the table to meet those needs. The session began with an opening lecture by Lynn Phillips, one of the cocreators of the value proposition concept. According to Phillips, success in delivering value requires investigating customers and the problems they face in depth, and then proposing solutions that customers wouldn't necessarily think of on their own.

Other key components to success, she says, include communicating about the measurable value of a solution, especially as compared to other alternatives, and ensuring the infrastructure necessary for effective delivery of the proposed solution. Phillips provided some guidelines for Sandians to improve the process of preparing and delivering value proposition to biodefense customers.

Breaking out to move forward

Two focus sessions — one centered on Sandia's value proposition in biodefense R&D and the second on unknown and emerging threats — gave participants a chance to break into smaller groups to discuss rationales and strategies for moving forward.

Homeland Security and Defense Systems Center 8100 Director Jill Hruby kick-started the first focus session with a candid appraisal of the past and present of Sandia's biodefense programs and offered suggestions for what the future should look like. Participants engaged in discussions on multiple opportunities and issues, including the need to spend limited discretionary funds wisely, take a systems analysis approach to selecting potential customers and projects, and partner strategically to overcome some limitations inherent to a national lab.

The second session focused on strategies to counter emerging and unknown threats, specifically man-made agents that could be enabled by recent advances in synthetic biology and nanotechnology. Summaries of the second session underscored the importance of building a larger biology program to analyze the possible threats, identify which are possible, and target solutions appropriately.

All of the focus sessions returned to common themes: how to find the time and resources to successfully implement Sandia's new biology strategy and work more effectively across disciplines. Many pointed to the workshop as a step toward greater integration, and leaders promised to consider creating similar opportunities in the future.

"As Sandia's biology capability grows, so does the potential to make important contributions to national security. To make this happen, we need to get people together to agree on a direction. We'll continue to emphasize communication to help build a program that reaches across the key capabilities at Sandia," says Glenn.

"The workshop did a great job of bringing people together, and in light of the release of new national strategy for biodefense that may take the nation down a different path than in the past, the timing was perfect," adds Jill. "As you might expect from an event like this, participants found more questions than answers — and I really look forward to working through these questions in the months ahead."

Sandia CaliforniaNews

Graphene

(Continued from page 1)

touch screens, and other technologies.

Norm Bartelt, Elena Starodub, and Kevin McCarty (all 8656) have been studying the formation of graphene for the past three years. This is no small task; graphene grows at extremely high temperatures, so its formation cannot be imaged using standard microscopy methods.

"There was a realization that you can do more with this material," explains Norm. "We want to understand how it forms. With that knowledge, you can control growth to make better-performing materials."

Recently, the team had a double breakthrough. They developed a method to image graphene in the earliest stages of formation and then they saw something very unexpected. It takes clusters of five carbon atoms to add area to a growing graphene sheet, an observation that greatly surprised Norm, a theoretical physicist.

"The rate at which carbon atoms attach should be proportional to the number of carbon atoms present," he explains. "I've spent 20 years developing theories to explain how thin films grow, and none has behaved like this. We discovered that carbon atoms go through a complicated contortion before attaching to a graphene sheet." To convince Norm, Elena repeated her measurements more than once, looking for an error that could explain the unexpected result.

Kevin developed the use of electron reflectivity to measure the number of carbon atoms on the surface. "I tried out the method on simpler systems, metal films growing on metal, and thought that it might work with graphene growth," he says. "We found that the reflectivity is sensitive to minuscule amounts of carbon on the substrate surface."

With practice, Kevin was able to image the growth of graphene while measuring the concentration of the carbon atoms floating around the surface — in a sort of pre-graphene configuration.

"Once Kevin had learned how to measure very small concentrations of atoms attached to the surface, we then found this bizarre behavior of graphene growth, which was like nothing any of us had seen before," says Norm. "We used information from the images that is usually ignored."

Elena has been perfecting the technique of growing individual graphene crystals to continue studying how they develop. By closely monitoring the concentration of carbon, she can make what Norm describes as "tremendously large, perfect crystals." This has led to more discoveries about the different phases of graphene on specific surfaces; for example, on the metal iridium the graphene crystals grow in four different orientations.

Peter Feibelman (1130) is doing first-principles calculations of the atomic structure of carbon and graphene on metal surfaces to help the team get a better sense of what is behind its behavior as it nucleates and grows. "Our method does not have atomic resolution, so we are guessing about where individual carbon atoms are," says Norm. "With his first-principles calculations, Peter can develop hypotheses to test against our measurements. "

Peter's contribution both validates and enhances the experimental work. "It gives us a much more complete description," says Kevin. "We can then make statements about the behavior of individual carbon atoms."

The project has generated six papers over the past 18 months, published in the *New Journal of Physics, Physical Review B*, and *Carbon*. The two articles in the *New Journal of Physics* were featured on the publisher's "Select" website while the second paper in *Physical Review B*, "Graphene Growth by Metal Etching on Ru(0001)," was an editor's selection.

The technique development began under a Laboratory Directed Research and Development (LDRD) project. The research is currently supported by the Office of Basic Energy Sciences and by an LDRD project to enable graphene nanoelectronics. "Using the knowledge developed through this research, graphene with extremely low defect densities is being grown and tested," explains Kevin. "This is important because the material's superb electronic and mechanical properties are only realized in samples of high crystalline quality."

Space Talk

LIFT OFF — Sandia's MISSE-7 experiment is launched on space shuttle Atlantis in November 2009. After a two-day chase, Atlantis caught up with the International Space Station, where the MISSE-7 passive experiment containers — or PECs — were deployed on a mount point on the exterior of the orbital research facility.

Breaking the logjam: Improving data download from space

Story by Neal Singer
Photos courtesy of NASA

Sandia-developed satellite systems have increased their sensing capabilities dramatically in recent years, but the bandwidth available for these payloads to transmit data to Earth has essentially remained constant, creating a kind of data logjam.

The Sandia solution has been to prereduce the large data stream by developing processing architectures that increase satellite onboard computing capabilities. Then, only the most useful information would be transmitted to Earth.

But questions as to how well the latest in computing electronics would fare in the harsh environment of outer space, where high-energy particles might collide with a transistor and change the value of an individual calculation, remained unresolved.

Now, preliminary results of a Sandia experiment in progress on the International Space Station are providing insights into the effects of high-energy radiation on these computing electronics, enabling appropriate mitigation of these potentially crippling effects in future Sandia designs.

"We're getting true on-orbit data from a space environment," says Dave Bullington (2664), Sandia's lead engineer on the experiment taking place in low Earth orbit.

NASA's "Materials on the International Space Station Experiment" (MISSE) program, under the direction of the Naval Research Laboratory (NRL), provides opportunities for low-risk, quick and inexpensive flight tests of materials and equipment in space aboard the International Space Station (ISS), says NRL lead Robert Walters.

MISSE provides suitcase-like containers called passive experiment containers (PECs) to hold multiple experiments. These are mounted by astronauts on the exterior of the ISS, thus exposing the experiments to the rigors of space.

The seventh in an ongoing series of MISSE flight opportunities, MISSE-7 for the first time offered researchers power and data connections provided by the ISS from which to run actively powered experiments.

On Nov. 16, 2009, the space shuttle launched carrying the MISSE-7 equipment and on Nov. 23, astronauts manually deployed these containers on the exterior of the ISS. Sandia has been receiving data from this research payload ever since.

At the heart of these new computing architectures are powerful yet flexible computing chips, configurable to support different missions. These chips are called reconfigurable field-programmable gate arrays (FPGAs).

Since these FPGAs are reconfigurable rather than limited to a predefined architecture, their circuits can be overwritten, somewhat the way a read-write compact disk has more possible uses than a read-only disk. This makes prototyping easier and also permits changing missions on satellites previously designed for other purposes.

Because new generations of FPGAs available from commercial suppliers may not have been fully tested for reliable performance in space, Sandia engineers help validate device performance in a relevant environment before the devices are integrated into high-consequence operational systems.

Sandia, in a partnership with Xilinx, designed the SEU Xilinx-Sandia Experiment (SEUXSE) for this opportunity to fly on MISSE-7.

(SEUs — single event upsets — refer to electronic changes caused by collisions with a single subatomic particle.)

SEUXSE contains a fourth-generation space qualified FPGA (Virtex 4) and a fifth-generation commercial or non-space qualified FPGA (Virtex 5) from Xilinx. Converting the ISS power to levels compatible with the Virtex devices are Sandia-designed power converters

(Continued on next page)

THE SPACE SHUTTLE ATLANTIS carries the innovative "Materials on the International Space Station Experiments" — MISSE — to the International Space Station. Sandia has been involved in several MISSE experiments.

(Continued from preceding page)

known as point-of-load (POL) converters.

Sandia engineer Brandon Witcher (5762) provided the POL design for SEUXSE — the first time these efficient, high-quality power converters have been used in space.

Special algorithms were developed and programmed into both of these Virtex FPGAs to detect and report upset events while the FPGAs were running typical satellite data-processing tasks.

Dave notes that each Virtex contains two traditional processors in addition to several other circuits designed to capture upset performance data relating to each circuit type. "We're validating models with four computers inside these chips and sending back data messages every few minutes."

With the data collected from this platform, researchers in future Sandia programs will know exactly how these FPGAs and POL converters perform in the space environment and how to design mitigation approaches into these processing routines to account for upsets encountered in space.

NASA PERSONNEL in a pre-launch clean room prepare MISSE-7 experiment package for launch.

A second experiment called SEUXSE II, featuring even more recent computing components, has already been prepared to lift off on a future shuttle flight as part of MISSE-8.

For SEUXSE II, Sandia researchers replaced the commercial version of the Virtex 5 from Xilinx with an early release version of the space-qualified Virtex 5.

"Fortunately," says SEUXSE researcher Jeff Kalb (2664), "the new Virtex 5 from Xilinx had a compatible footprint to the previous Virtex 5 and we could leverage the hardware that was designed for MISSE-7."

Sandia researchers were also able to expand on the algorithms designed for MISSE-7 to provide even more insight to the space environment on MISSE-8.

SEUXSE II was delivered to NRL on Feb. 1, 2010, and MISSE-8 is expected to launch on the Space Shuttle in July 2010. When it is deployed on the ISS, it will replace the MISSE-7 PEC, which will be returned to Earth on the shuttle, allowing Sandia researchers to analyze SEUXSE hardware after it has been on orbit.

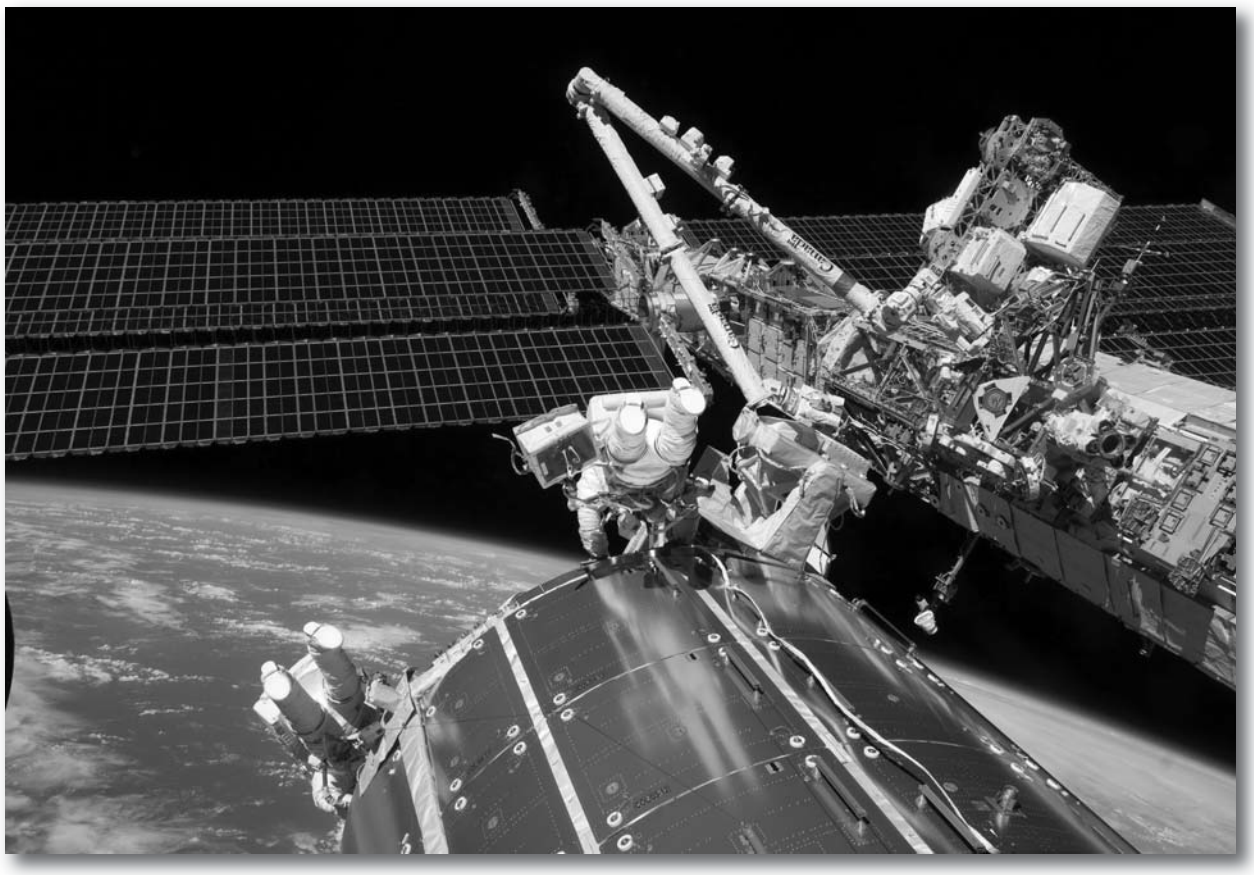
Sandia is the first to put these versions of the Virtex technology into orbit, Jeff says. These FPGAs and POL converters likely will become the heart of future processing architectures for Sandia's DOE/NNSA customers. "The point is for us to get early on-orbit information on how these devices function in space."

The mechanical design of SEUXSE and SEUXSE II was achieved by Dennis Clingan (2617), experienced in designing packages for NASA programs where astronaut safety is paramount.

Testing materials in the harsh space environment

MISSE-7 is also flying the Sandia Passive ISS Research Experiments (SPIRE). These tests passively expose a variety of materials and devices to the harsh space environment. Upon return to ground, they will be tested to determine if degradation has occurred due to synergistic factors such as ionizing radiation, UV exposure, thermal cycling, micrometeorite impacts and vacuum effects. Radiation-shielding structural composites (Dave Calkins, 1833 and Gayle Thayer, 5711), doped laser fibers (former Sandian Dahv Kliner), pure tin finished parts (Ed Binasiewicz, 5761), MEMs latching impact sensors (Mike Baker, 1749), and GaAs photodiodes (Alan Hsu, 5719) are some of the 15 Sandia passive experiments that together are SPIRE.

Sandia, through the support of the NA-22 Space Nuclear Detonation Detection (SNDD) Program office, developed SEUXSE and SPIRE in an 18-month period for a cost that was one-fifth of other comparable experiments. SEUXSE II was then delivered in one-third the time and cost of the original SEUXSE.



ASTRONAUTS deploy passive experiment containers (PECs), including MISSE-7, during an EVA outside the International Space Station.

A space-based polymer mirror that can be reshaped on the fly

In March 2008, Sandia researchers sent space-grade polymers to the International Space Station to see whether the inexpensive lightweight material, with its easily changeable shape, could replace expensive orbiting telescopic mirrors made of polished glass or beryllium.

"A conventional telescope mirror takes 18 months to two and a half years to manufacture," program manager Jeff Martin (2617) says. "You have to order it exactly and you can't change it. It's the long tent pole in a satellite system.

"But a polymer mirror with a controllable shape opens up space missions that couldn't otherwise exist. Apply a voltage to its piezoelectric-coated surface and it changes curvature to create the surface you want."

The work envisioned controlled changes in curvature similar to the more expensive technique called adaptive optics, which changes the alignment of submirrors to alter the overall shape of a telescope's mirror by hundreds of nanometers.

"But a polymer mirror's shape can be altered by hundreds of micrometers," points out Sandia principal investigator Mat Celina (1821), "and in a continuous fashion." A polymeric mirror would also be far less expensive.

To monitor degradation of materials sensitive to the strong UV and atomic oxygen found in the harsh environment of low Earth orbit, Mat's team secured Sandia's place in the MISSE-6 program, the first time the Labs was so involved.

NASA's Materials on the International Space Station Experiment (MISSE) program, under the direction of the Naval Research Laboratory, provides opportunities to researchers for low-risk, quick, and inexpensive flight tests of materials and equipment in space aboard the International Space Station (ISS).

Sandia researchers equipped their experiment with solid-state data loggers to record declining function over time.

These experiments, designed by Mat, Tim Dargaville, and Gary Jones (all 1821) were the first of their kind to activate piezoelectric materials and record their responsiveness during cumulative space exposure. They were also the first active MISSE experiment. "We also exposed passive samples for comparison," says Mat.

The process applied voltage to a bimetallic strip to make its tip go up and down. The extent of motion was recorded.

"Over time, that amplitude should get smaller and smaller," says Jeff. "Of course, if these materials were phenomenal, there would be no degradation."

How phenomenal is still an open question. The experiment, expected to be in space for six months, was there for a year and a half because the Columbia shuttle disaster delayed subsequent launches. The materials returned to Earth in September 2009, and were returned to Sandia researchers for analysis in November. Piecing together the results could take as long as a year.

The plastic material is a polyvinylidene fluoride (PVDF) copolymer, a material that can be produced in large plastic sheets. Big rolls are available at Lowe's, Jeff says. "An extra processing step makes it shrink or grow when you apply a voltage. We invented a new flavor to get the best advantages in a space environment."

The work is funded by Sandia's Laboratory Directed Research and Development office.

— Neal Singer

Additional help was given by Gayle Thayer (5711), who is the principle investigator and primary interface with NRL; Tracie Durbin (1513), who provided thermal analysis; Ethan Blansett (5735) who provided space radiation environment modeling and upset rate predictions; Mythi To (5337), who provided SEUXSE hardware design support; Dave Heine (2664) Jonathan Donaldson (2664), Chris Wojahn (5337), Dave Lee (2664), and Jim Daniels (5337), who developed the algorithms and provided test support for SEUXSE; and Org. 5761, which provided fabrication support.

MULTISPECTRAL THERMAL IMAGER

Ten years after entering orbit, satellite continues to serve

Story by Darrick Hurst

For engineers and scientists at Sandia, the evening of Friday, March 12, marked a proud moment in exceptional service to the nation. Hundreds of miles above the Earth, the Multispectral Thermal Imager satellite reached its 10th anniversary of service as it completed its 55,000th orbit — far exceeding both its intended maximum life and its potential applications in the process.

"The MTI satellite project is a terrific example of how NNSA and the Department of Energy leverage the best science and engineering in the world to advance nonproliferation efforts and promote national security," NNSA Administrator Thomas D'Agostino says. "The multilaboratory team has consistently demonstrated the critical role our national laboratories play in tackling the most challenging problems facing our nation and the world."

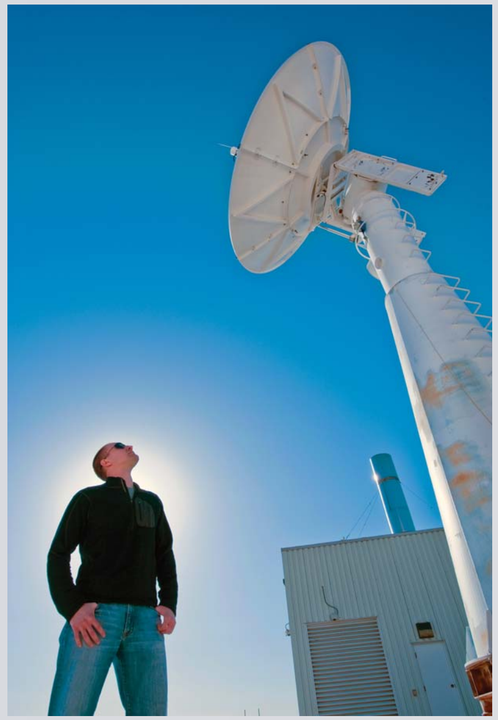
NNSA sponsored the MTI satellite project as a trilab effort to develop and evaluate advanced space-based technology for nonproliferation treaty monitoring and other national security and civilian applications. The project was carried out by DOE's Savannah River National Laboratory and NNSA's Los Alamos and Sandia laboratories. Sandia served as the lead lab, responsible for systems engineering, integration, testing, launch support, and on-orbit operations.

"This has been an exhilarating program to be a part of," says Randy Bell, director of the Office of Nuclear Detonation Detection and former MTI program manager. "[The MTI program] achieved many firsts in satellite engineering and remote sensing science. The program relied on a small, experienced, dedicated core team that ensured there was great technical and programmatic communication across all subsystems and science elements."

HAPPY BIRTHDAY — Brian Brock (5735, center) and Rob Tachau (5737, right) talk during a casual cake and ice cream celebration at the Thunderbird Café for Sandians who contributed to the MTI project. The10th anniversary of the launch of the MTI satellite — which has greatly exceeded its maximum design life and continues to operate nominally — was observed March 12.
(Photo by Randy Montoya)

Originally only intended for a one- to three-year mission, the MTI satellite was designed to provide highly accurate radiometry with good spatial resolution in 15 spectral bands and to measure ground temperatures from space with accuracies in the realm of one Kelvin. Analysts armed with advanced computer simulation codes and expertise could then employ these precision radiometric and thermal imaging capabilities to research and explore phenomenology associated with nuclear proliferation. The temperature data collected by the MTI satellite is important because heat is a characteristic that is difficult to hide and serves as a strong indicator of a facility's function and throughput — producing power or nuclear weapons material.

"After reaching the DOE program's three-year goal, the asset was still functional and providing us with important data but was without a primary sponsor," says Brian Post (5764), current project lead for the MTI satellite. "By leveraging many small funding sources between existing and new projects, we were able to continue supporting minimized operations for the MTI for a period of time until we could secure new overall sponsorship for the project."



GROUND TRUTH — Brian Post (5764) stands under an antenna at the ground station at Sandia National Labs during the MTI satellite's 55,000th orbit.
(Photo by Randy Montoya)

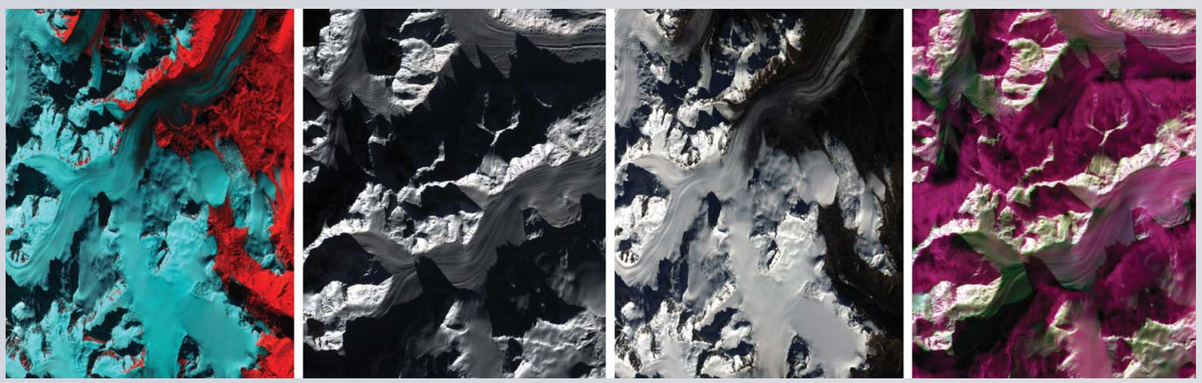
Overcoming obstacles

After completing the initial nonproliferation mission, the scientists, engineers, and technicians supporting the MTI began to use the satellite in new mission roles, and were obliged to deal with a multitude of unexpected or unplanned issues to keep the system mission capable.

"Having gone well beyond its one-year mission, several anomalies arose over the following years that threatened to end the mission," Brian says. "The inertial reference unit failed, the onboard calibration capability was lost, the focal plane array was damaged when the sun unexpectedly entered the telescope's field of view, the MTI's long-term orbit plane drifted beyond its design limit, and the satellite experienced battery failures and other power and control problems. Each time, the outstanding project team was able to mitigate these issues and keep the satellite operating and functional."

Through their innovations, the operations team and the system's original designers at Sandia and Ball Aerospace not only succeeded in nursing the MTI back to life, but they also made design improvements to the MTI that enhanced the system capabilities and imaging capacity.

"The data and research results that have come from the MTI project in the more than 10 years it has operated more than justify the satellite as a worthwhile investment," Brian says. "I truly believe we are lucky as a nation to have the MTI and to have kept it going as a resource. The value of this asset and technology is shown not just in the original mission we completed, but also in the multitude of other projects and programs that the MTI either initiated or contributed to directly."

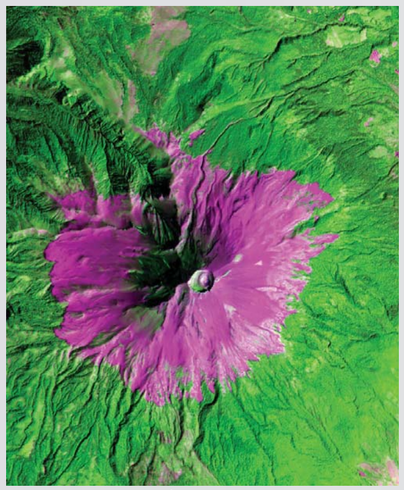


THE HEALTH OF GLACIER ICE or the character of the permanent or seasonal ice pack in the Arctic or Antarctic can give climate scientists the data that they need to refine global climate models. MTI multispectral and thermal imagery of the Trimble Glacier in Alaska provides researchers data needed to assess its "health."

CRYSTAL BLUE PERSUASION — This image of Lake Tahoe was taken by the MTI satellite during a calibration pass near the crest of the Sierra Nevada mountains on the California-Nevada border. Because it is a deep, thermally stable body of water, satellite operators use the lake to calibrate the asset's sensors that measure bulk water temperatures.

Serving science beyond nonproliferation

NNSA made the MTI system available to other users for government-sponsored research in the national interest after the satellite had completed its initial goals. As it turned out, the 15 spectral bands that the MTI science team had selected to address the program's nonproliferation mission also provide valuable data to scientists who study a vast array of geophysical and other environmental phenomena, with applications never envisioned by the MTI developers. In addition to numerous defense-related applications, the more than 100 members of the MTI users group have employed the satellite's imagery for research in such diverse areas as volcanology, glaciology, entomology, climatology, and the study of the moon.



MTI IMAGERY OF POPOCATÉPETL volcano in Mexico reveals subsurface hot spots and maps magma channels, while other thermal bands provide information on the effects of escaping gases. The goal is to improve computer simulations needed to model volcanic activity and environmental impacts. The study of volcanoes is important because they represent one of the most active features of landscape generation and can pose a threat to humans and the environment.

OTHER PARTICIPANTS in the MTI satellite project include the Air Force Research Laboratory, National Institute of Standards and Technology, Ball Aerospace, Santa Barbara Research Center, Hughes Danbury Optical Systems, TRW, more than 40 other commercial and academic institutions in 16 states, and a users group with experimenters representing more than 50 government organizations.

"An important goal for us was to make our data available to the community," Brian says. "And not just provide that data, but provide it in a format that researchers can understand, use, and manipulate in their work."

The MTI's data and imaging capabilities have proven useful to researchers studying the health of glacier ice, as well as the character of the permanent or seasonal ice pack in the Arctic or Antarctic, which can give climate scientists information they need to refine global climate models. The MTI has also provided useful data to researchers who study clouds in an effort to understand their effect on global warming. In addition to the direct scientific contributions of the MTI data, images have also been used as a resource for algorithm and signal processing technique developments.

Continuing to serve into the future

With sponsorship secured for the foreseeable future of the MTI satellite, the project team eagerly looks forward to years of continued work supporting research and development interests.

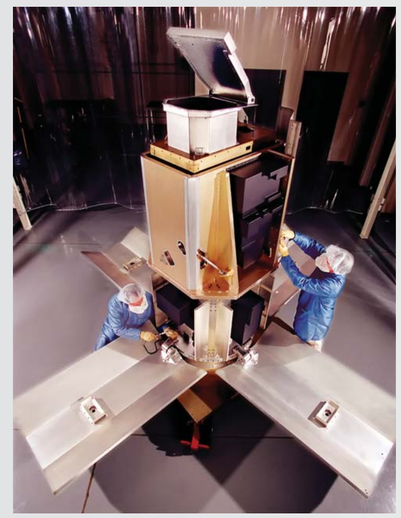
"Based on our latest predictions, the satellite still has many years of life left on orbit prior to re-entry," Brian says. "We look forward to continuing our work contributing to and enabling our nation's research and technology development. Particularly with the full lifespan of the satellite in mind, this has been a fantastic government investment and an incredibly successful project."

The MTI project was the collaborative work of more than 500 Sandians from across 36 centers and more than 100 departments at Sandia, and more than a thousand others across all the program's participants.

"The outstanding results of the MTI program are the product of a lot of hard work and attention to detail from a lot of people," says Brian Brock (5735), original project manager for the MTI. "The satellite was designed with such a radiometric accuracy and precision that LANL and the National Institute of Standards and Technology had to develop new standards to calibrate it. When the MTI launched, there simply was nothing like it and it is still a unique asset. It was truly a world-class product from a world-class team."

"This program clearly demonstrated that it's the quality of the people that matter most in the quality of the outcome," Bell says. "Throughout all phases of the program from initial planning, design, development, launch, and operations, there was a careful balance between rigorous engineering to ensure reliability and exploratory science to push the limits of performance."

"I owe a debt of gratitude to both our incredibly capable project team and also to the original subject matter experts who, although not actively working on the project, never cease to come to our aid when needed," says Brian Post.



PREPPING FOR FLIGHT — Sandia engineers prepare the Multispectral Thermal Imager for flight. The MTI satellite was launched on March 12, 2000, by the US Air Force from Vandenberg Air Force Base through the DoD Space Test Program.
(Photo by Randy Montoya)

Sandians present to the world's largest general scientific society

By Stephanie Holinka and Stephanie Hobby

The annual meeting of the American Association for the Advancement of Science draws thousands together to discuss new developments in science, as well as urgent policy issues. This year, three Sandians were invited to speak at the gathering, which brought together roughly 10,000 scientists, engineers, policy makers, educators, and journalists from 50 nations.

The theme of this year's conference, "Bridging Science and Society," stressed the importance of effectively communicating scientific findings to the general public. This year, the conference was largely focused on the science around preserving natural resources and finding cleaner, more efficient energy sources.

Algae as a source of fuel

Sandian Ron Pate (6733) is one of the nation's leading researchers in the quest to develop algae-based biofuels. During the AAAS conference, Ron presented the current state of research and development in his talk, "Resources, Methods, and Approaches for Algae Production."

RON PATE

Using algae as a basic feedstock source for transportation fuel is widely thought to hold great promise. Researchers believe microalgae could yield as much as 7,000 gallons of oil per acre per year, but achieving that level of productivity remains to be demonstrated reliably or affordably at a large scale.

Ron is a principal member of technical staff at Sandia, and has been in Washington, D.C., since November 2009, serving as a technical consultant to the emerging algae biofuels program in the Office of Biomass Program at DOE's Office of Energy Efficiency and Renewable Energy (DOE/EERE-OBP).

The OBP algae biofuels program evolved out of an initiative started in 2008 to develop a National Algae Biofuels Technology Roadmap. Under the program, researchers from DOE/EERE-OBP, Sandia, the National Renewable Energy Laboratory (NREL), other national laboratories, universities, and industry are teaming up to overcome some of the field's biggest challenges.

During his presentation, Ron pointed to the potential benefits of algae as a fuel source, including rural economic development, high rates of productivity, and the capture of carbon dioxide, which spurs algae growth. Unlike other biofuels, such as corn ethanol, algae production does not compete with traditional agriculture for land or fresh water. Instead, it can thrive in non-freshwater and requires significantly less land while producing higher energy yields than other crops.

Ron cautioned the audience that making the leap from the current preliminary analytical stage to full-scale production is challenged by a number of technical hurdles and unknowns, including locating prime regions of the country for algae growth, resource requirements, and the sheer technical issues of harvesting, dewatering, and post-processing of algae into renewable fuels and other coproducts.

Nearly $800 million in stimulus funds has been directed to biofuels research and development projects nationwide, with about $150 million invested in algae-related biofuels research, development, and demonstration projects. An additional $35 million in DOE/EERE program funds is expected to be allocated for algae in FY2010.

Solid-state lighting

Julia Phillips (1200), director of the Physical, Chemical, and Nano Sciences Center at Sandia, presented "Realizing the Promise of Solid-State Lighting: The Role of Nanotechnology" at the 2010 AAAS annual meeting. Her talk covered solid-state lighting and its potential as a near-term generator of energy efficiencies.

JULIA PHILLIPS

Julia described ways that solid-state lighting can better utilize existing energy sources and identified areas of needed nanotechnology research in the ongoing work to hasten its mainstream adoption. She discussed how further energy efficiency in technologies such as solid-state lighting could assist the nation in securing its energy future.

"Efficiency is an important interim piece of the energy puzzle as we wait for energy research to bring us new technologies," Julia says. "It's not the only piece, but it is an important one. It's relatively low-hanging fruit compared to discovering whole new energy sources."

Sandia leads the $46 million Energy Frontier Research Center (EFRC) for solid-state lighting science, one of 46 funded by DOE's Office of Science. These centers enlist the talents and skills of the very best American scientists and engineers to address current fundamental scientific roadblocks to US energy security.

Julia noted that lighting represents one of the greatest opportunities for efficiency. Currently, between 75 percent and 95 percent of the energy used in conventional lighting is wasted. Phillips said most forms of light production produce great amounts of heat that is wasted energy and sometimes must be dissipated through cooling.

Lighting currently consumes about 22 percent of US electricity at a cost to consumers of about $50 billion per year. Though solid-state lighting is an emerging technology it has the potential to reduce energy consumption for lighting by a factor of three to six times, Julia said.

Promoting Climate Literacy conference

Sandia researcher Ellen Stechel (6339), manager of the Energy, Climate, and Atmospheric Management team, presented the latest in climate change research during the Conference on Promoting Climate Literacy. The conference took place at Scripps Institute of Oceanography on Feb. 17.

Ellen was part of a panel to update the audience about the state of climate science research. Although much of her work today is about mitigating environmental impacts, including managing Sandia's Sunshine to Petrol program, she has a strong background in education and policy making. Between 1998 and 2005, she had responsibility for Ford Motor Company's climate science program and advised the company's senior management. Now, she oversees Sandia's climate research, which is based on the North Slope of Alaska.

ELLEN STECHEL

"I am not a climate expert, but my role has always been trying to communicate for the science community to people who have to make decisions about what they should and should not do," Ellen says. "I see my role as more of an educator."

More than 150 scientists and educators attended the day-long invitational workshop, which was timed to coincide with the AAAS conference Feb. 18-22.

Employee death

Fred Salas' friendship was one of life's precious gifts

By Iris Aboytes

Fred Salas (6772) died March 12. He was 58 years old and had been at Sandia almost a quarter of a century, the last eight years as a Sandia employee.

Fred joined the Labs in 1986 as a contractor and became a Sandia employee in 2001. He was a principal technologist with expertise in mechanical and pressure systems.

FRED SALAS

"One of Fred's strengths was his ability to work independently," says his manager, Kevin McMahon (6772). "Once given a task, Fred gathered the resources and completed the work ahead of schedule — entirely on his own."

Fred was recently matrixed to Dept. 1513. "His work included precision cleaning and certifying flight hardware for use in satellite systems," says manager Dan Rader. "He was conscientious, hard-working, and thorough. Work tended to come to Fred because he was efficient and always provided a high-quality product. He had an incredible work ethic and seemed to devour work."

"Fred came to work around 5 a.m.," says Kathleen Holt-Larese (6772). "He would have all the experiments for the day set up and ready to go. By 7 a.m., he had the lab pristine for experiments. Fred was an expert on everything in the lab and mentored us on all the instruments and protocols. He could build or fix anything and was never overwhelmed or frustrated, most likely because he put in four more hours of work per day than anyone else. He loved to speak Spanish and had fun teaching visiting Egyptian scientists some."

For Tracie Durbin (1513), Fred was a dedicated man who cared a lot about the people around him. "He was probably one of the hardest-working people I have ever met," says Tracie. "He could not sit still; he would help others."

"Fred and I shared an office for five months," says Jessica Kruichak (6772). "When I first started, he was concerned about making my half of the office home. He drew me a picture and gave me a figurine to spruce it up. He called me "*mi hijita*" [my little daughter] which was very endearing to me, since that is what my grandma used to call me."

"Fred was a person like none I have met before," says Fotini Walton (6772). "His friendship was one of life's precious gifts. He called us all daughters and sons. If you got here early enough to catch him around the office you would hear him whistling in the halls and smile just knowing he was there. When I did not see him on a daily basis, I would find a candy bar or sodas on my desk. We all have testaments of Fred's love and friendship in our offices, a business card holder, a turtle brightly painted."

The thing that would always put a smile on Melissa Yaklin's (1513) face was hearing him answer the phone. "'This Fred,' he would answer, in a voice twice as loud as when he talked to you in person. My favorite story about Fred involves scones. I brought some into work and made sure to save him one. Well, I guess Fred hadn't seen a scone before. He wouldn't eat it. He was told that it was sort of like a cookie and a muffin, but he still wouldn't try it. We all joked that the next time I would have to wrap it in a tortilla so he would try it."

Leslie Simmons (5578) remembers the twinkle in Fred's eyes. "He genuinely reveled in hearing about my daughter as if she and I were both family," she says. "Fred had a manner that put me at ease: no pretense, no gloom, just friendliness and, above all else, kindness. He was gentle and sincere."

"Fred had a workshop and was very good at making picture frames from extremely weathered wood that he gave away," says David Barringer (1513). "No one, and I mean absolutely no one, ever questioned the quality of his work. His personality was such that it was impossible to let someone down. It wasn't in his vocabulary."

When his office administrative assistant Amber Pacheco (6772) performed some tasks for Fred, he would always, "every single time, return a favor with a candy or memento, no matter how small the task was," says Amber.

"I was passing by his work area one day and noticed he was struggling," says Gary Calhoun (5574). "I offered to help him and he said 'no' of course. He likened the situation with having to dress his niece and nephew for bedtime. He valued his relationship with his family and friends."

"Fred was a storyteller and jokester," adds Kathleen Holt-Larese. "He had a dry, witty sense of humor. His execution of a punch line was impeccable. One of my favorite jokes was about a family driving through northern New Mexico. They stopped at a burger joint and were commenting about the unusual names of towns they had driven by like Pojoaque and Tesuque. The dad turns to the teenager behind the counter and asks, 'How do you pronounce the name of this place?' The teenager responds tentatively 'LOT-A-BUR-GER.' I crack a smile every time remembering Fred's deadpan pronunciation of Lotaburger."

Employee Perspectives Survey 2010

Analysis of responses enables tracking of trends over time

By Bill Murphy

More than half the Sandia population participated in the 2009 Lockheed Martin Employee Perspectives survey, with results suggesting that, all in all, employees strongly value the Labs as a good place to work.

The biennial survey was conducted in October and November 2009 across Lockheed Martin Corp. Sandia's response rate of 51 percent (of the approximately 8,200 employees invited to participate) marked a significant increase over the 2007 participation rate of 41 percent.

Charline Wells, senior manager in Corporate Learning and Professional Development Org. 3520, notes that the survey questions touched on three fundamental areas of work life: human resources (HR), ethics, and diversity. "The questions in the survey encouraged people to think about things that aren't necessarily part the of day-to-day conversation," Char says.

Encouraging communications

"The whole idea of the survey," she adds, "is to get an employee perspective on our work environment and to encourage communications between employees and management."

The confidential survey provided participants an opportunity to comment on many aspects of Sandia's culture, including overall job satisfaction, career development, ethics issues, diversity and inclusion, and more.

The results of the survey were distributed to managers across the Labs on March 15, with each manager receiving just the data from his or her own organization plus instructions on how to interpret the data and share it with their direct reports. (Directors and above were afforded access not just to direct reports but to all reports within their organizations.)

The power of the Employee Perspectives Survey, says Char, is that it gives managers at all levels across the Labs specific data that can be used to develop action items to improve the Sandia work environment.

Proud to work at Sandia

"It's important for the credibility and long-term usefulness of the survey process," Char adds, "that Sandians see that their managers have paid attention to the data, have followed up, and are initiating some actions."

While the survey data can be parsed down to the departmental level, the Labs-wide results offer a snapshot of current employee attitudes about Sandia as a whole. On the positive side of the HR component of the survey, for example, respondents reported that: They are proud to work at Sandia (4.17 on a scale of 1-5); they believe in the ability of their workgroups to develop innovative solutions to tough challenges (4.14); they are not looking for work outside Sandia (4.11); they feel they have their manager's support in following Sandia's values of ethical workplace conduct (4.19); and they are constantly looking for ways to do their jobs better (4.29).

> *"The whole idea of the survey is to get an employee perspective on our work environment and to encourage communications between employees and management."*
>
> **— Charline Wells (3520)**

On the side that might be categorized as "needs improvement," respondents reported concerns over management's effectiveness in communicating about current issues and long-term direction. That's been a recurring issue, Char says, and one that will continue to receive priority attention.

Labs-wide survey results also reflected a notable improvement in perceptions about diversity, an ongoing commitment to ethical conduct, and an ongoing positive relationship between employees and their direct managers.

Statistical analysis

This year, Char notes, a Sandia statistician worked with HR to analyze the survey data, correlating the 2009 responses with responses from previous Employee Perspectives surveys and Sandia-conducted Pulse surveys. The statistician's insights, Char notes, "have been invaluable in helping us track trends and to identify points in time" when specific issues become widespread concerns.

Using trend analysis, Char says, "helps us discern where we are or aren't making an impact" with specific action items designed to improve a challenge area.

"This kind of analysis keeps us from going down blind alleys thinking we're addressing an issue when, in fact, we might not be getting to the heart of it. It tells us where we're scratching at the top, but not getting at the sides," she says.

While the survey highlights Labs-wide issues, it is perhaps at the individual organizational level that the results may be most meaningful. Many managers across the Labs have already been scheduling and conducting meetings with their staffs to discuss the survey results and develop action items.

The collective result of those discussions, Char says, will be "to help us be proactive with our number-one priority: Making sure we keep Sandia a great place to work."

Contract

(Continued from page 1)

of the relationship between the government and the management and operations (M&O) contractors. At the behest of NNSA Administrator Tom D'Agostino, a team led by Div. 10000 VP Matt O'Brien and Div. 9000 VP Joe Polito, and championed by Deputy Director Al Romig and SSO Manager Patty Wagner, has been reviewing directives — Sandia's marching orders from DOE — looking for opportunities to eliminate requirements that are redundant with existing state or federal requirements, or to replace them with industry or site-specific standards that achieve the same goals.

> *"The Kansas City Plant simplified their operations, was able to devote more attention and resources to their mission, and ultimately saved money."*
>
> **— Gary Zura (10010)**

"The whole purpose is to refocus our joint efforts and resources to better accomplish our mission," says Joe. Improved efficiencies and cost savings are other desired outcomes.

"This is good for the government. It's good for Sandia," he says. "It gives us the freedom and responsibility to design our own systems to meet NNSA's requirements."

First phase to culminate in new PEP

In the just-completed first phase of the effort, 34 of 40 directives reviewed were recommended for removal from the current contract. The remaining 68 directives will be reviewed later this fiscal year, Joe says.

Sandia and SSO also plan to adopt a new Performance Evaluation Plan (PEP) — objectives and milestones upon which Sandia's performance is evaluated — at the end of March, which will represent the official adoption of the new business model. The PEP, which will incorporate concepts as appropriate from the KCP approach, will be in place for the remainder of FY10. The new PEP will focus more on outcomes, mission, and using Sandia's Integrated Laboratory Management System (ILMS) to provide assurance, Joe says.

Changes likely to ILMS

Many of these contractual changes will not be immediately obvious to most Sandians, say Matt and Joe. However, Sandia's corporate processes and procedures will be reexamined and adjusted to find new and more efficient ways to align with the changes to directives. Accordingly, ILMS likely will experience some changes, too.

ILMS is Sandia's management system and is the way the Labs meets the requirements for implementing a Contractor Assurance System, or CAS. When Sandia's current M&O contract went into effect in FY04, it was the first in the DOE complex to incorporate the CAS concept. The idea behind ILMS was to allow SSO to adopt more "systems-level oversight" using assurance evidence in lieu of detailed transaction monitoring, Joe says.

Today, all of the sites in the DOE complex have similar CAS provisions in their contracts.

But CAS did not fully address the issue of redundant DOE requirements, which come to Sandia in the form of DOE orders and manuals, and are accompanied by a Contractor Requirements Documents, or CRDs. The ultimate intent of contractor assurance is that DOE specifies requirements — the "whats" — and Sandia and other contractors determine how to meet them. Over time, however, "hows" have crept into the directives and CRDs, which are then reflected in internal processes and procedures.

KCP piloted new governance model

In 2005 former NNSA Administrator Linton Brooks directed KCP and the Kansas City Site Office to pilot a governance structure in which the "hows" would be removed from the M&O contract. KCP established internal procedures for best meeting the requirements, allowing the site office to perform systems-level oversight based on evidence provided through the CAS.

> *"We all need to recognize that this is a journey. It won't be perfect right away but will evolve over time."*
>
> **— Joe Polito (9000)**

"The Kansas City Plant simplified their operations, was able to devote more attention and resources to their mission, and ultimately saved money," says senior manager Gary Zura (10010). Gary and Chuck Meyers (9001) share project management of Sandia's contract reform effort.

When Steven Chu became Secretary of Energy, he directed the entire DOE to move in the direction of KCP's example. Then in December 2009 D'Agostino directed that all NNSA sites adopt the new model, instructing Sandia and the Nevada Test Site to work together to be the first sites to adopt the new business model.

"Just as SSO and Sandia were leaders in adopting CAS, we have been asked again to the pave the way to this new business relationship," says Matt.

A great opportunity

Joe emphasizes that Sandia will still have to meet the requirements of NNSA, DOE, and the law. "SSO and Sandia will be free, however, to unwind and simplify the many layers of process requirements that have built up over the years," he says. "This gives us the freedom and responsibility to design our own systems to meet these requirements. We will operate more like a commercial organization.

"We all need to recognize that this is a journey," says Joe. "It won't be perfect right away but will evolve over time. It's a big shift in thinking on the part of government and the Labs and a great opportunity for both."

Mileposts

New Mexico photos by Michelle Fleming


Nick Durand
30 4846


Gary Fischer
30 2992


James Godfrey
30 2138


Michael Knoll
30 5300


Rolando Serna
30 4848


Kurt Wessendorf
30 1732


Hank Westrich
30 1911


Gloria Zamora
30 12124


Daniel Carroll
25 5734


David Hendrick
25 4870


David Kuntz
25 1515


Vincent Luk
25 5431


Tanya McMullen
25 5097


Donald Small
25 5348


Tad Ashlock
20 5336


Ellen Cook
20 6400


Steven Grieco
20 421


David Leong
20 8944


Ro Malcomb
20 4219


Todd Sterk
20 2952


Howard Walther
20 2991


Whitney Wolf
20 212


Barbara Fuge
15 10541


Kyle Hayden
15 9342

Darren Hoke
15 411

Tran Nhu Lai
15 2717

Nancy Linarez-Royce
15 212

Gwen Lansford
15 2957

David Robinson
15 1415

Andy Salinger
15 1414

Neal Singer
15 3651

Frank Van Swol
15 1814

Recent Retirees

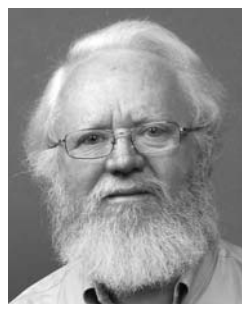

Bruce Whittet
36 6483


Kay Stout
24 3334

David Stout
33 4024


Allen Camp
32 310


Mark Weber
32 9542


Pete Roth
31 2546


C. Wayne Burton
25 4135


Steve Martin
26 5935


Arnold Augustoni
24 1128


Mary Loukota
18 11500


Jan Walters
15 12002

Larry Lane House groundbreaking scheduled

The groundbreaking for the Habitat for Humanity House built in memory of retired Sandian and long-time Habitat SWAT Team member Larry Lane will be at 8:30 a.m. Saturday, March 27. The house site is 6104 Townsend Place SW. Also, the groundbreaking for the 10th Sandia Habitat for Humanity House is tentatively scheduled for Saturday, May 15. For more information, contact Sam Bono (3652) at 284-3226 or sbono@sandia.gov or Patty Zamora (3652) at 844-2146 or pgzamor@sandia.gov.

Help for Haiti

Sandians donate more than 60 pairs of crutches to help in relief effort for earthquake-ravaged nation

In the wake of the devastating earthquake that ravaged Haiti earlier this year, people around the world responded with an unprecedented outpouring of support.

Sandians, characteristically, did their part, offering material and moral support in many ways, motivated by the desire to help the Haitian people reclaim their lives and rebuild their homes.

Among other things, Sandians responded to a call from the Christians in the Workplace Networking Group (CWNG) to donate crutches for the Haitian relief effort.

In answer to an item published in the *Sandia Daily News*, Sandians over the course of 10 days in February brought in more than 60 pairs of crutches. Carol Eiffert, (3600) a member of the CWNG steering committee, watched in growing delight and gratitude as the crutches piled up in the office of her boss, Public Relations and Communications Center 3600 Director George Rhynedance.

Through previous charitable activities, Carol had been in contact with Albuquerque-based St. Anthony's Alliance, which runs several mostly medical-related projects in developing countries, including Haiti. It turns out that the group was seeking crutches to deliver to an orphange it is associated with in Haiti.

"They asked me if I could help," Carol recalls. "I told them, 'We might get a lot of crutches.' And they told me 'We can use all you can get.'"

Albuquerque orthopedic surgeon Teresa Balcomb, one of the founders of St. Anthony's Alliance, delivered the crutches to Haiti in late February, where they were immediately distributed to people in need. The earthquake had left many thousands of Haitians with severe and life-threatening injuries, including leg injuries requiring treatments up to and including amputations.

Carol says she was gratified by the outpouring of support from Sandians, who, she says, proved once again that they are "incredibly generous people."

And Elyce Tryon, executive director of St. Anthony's Alliance, offered high praise for Sandians. "In less than a week," she wrote to the *Lab News*, "we received 60 pairs of crutches and $100 from the generous people at Sandia. It is impossible to express with words the effect that just one pair of crutches can have on a person who just lost his leg. We are infinitely grateful to the people at Sandia for this wonderful outpouring of support."

Now, CWNG is asking Sandians to step to the plate again. With the Haitian rainy season coming, tens of thousands of people are without homes or shelter. The networking group is seeking donations to acquire tents to send to the still-suffering Haitian people. For information, contact Carol at 844-6002 or caeiffe@sandia.gov.

CRUTCHES DONATED BY SANDIANS in February were delivered to Haitians in need, including many who suffered injuries requiring amputations.

CAROL EIFFERT, standing here with the 60-plus pair of crutches donated by Sandians, spearheaded the collection drive. (Photo by Randy Montoya)

ORTHOPEDIC SURGEON Teresa Balcomb, MD, left, a founder of Albuquerque-based St. Anthony's Alliance, prepares to operate in a temporary operating theater set up by volunteers from Operation Smile. With Balcomb are Sean Quinlan, RN, center, and Anisa Svensson, cRNA. This was the last case during Balcomb's latest trip to Haiti; here, she is taking care of a child who suffered a crush injury to the hand during the earthquake. It was Balcomb who delivered the crutches donated by Sandians in February.

CRUTCHES delivered to Haitians injured in the earthquake made an immediate difference in people's lives.