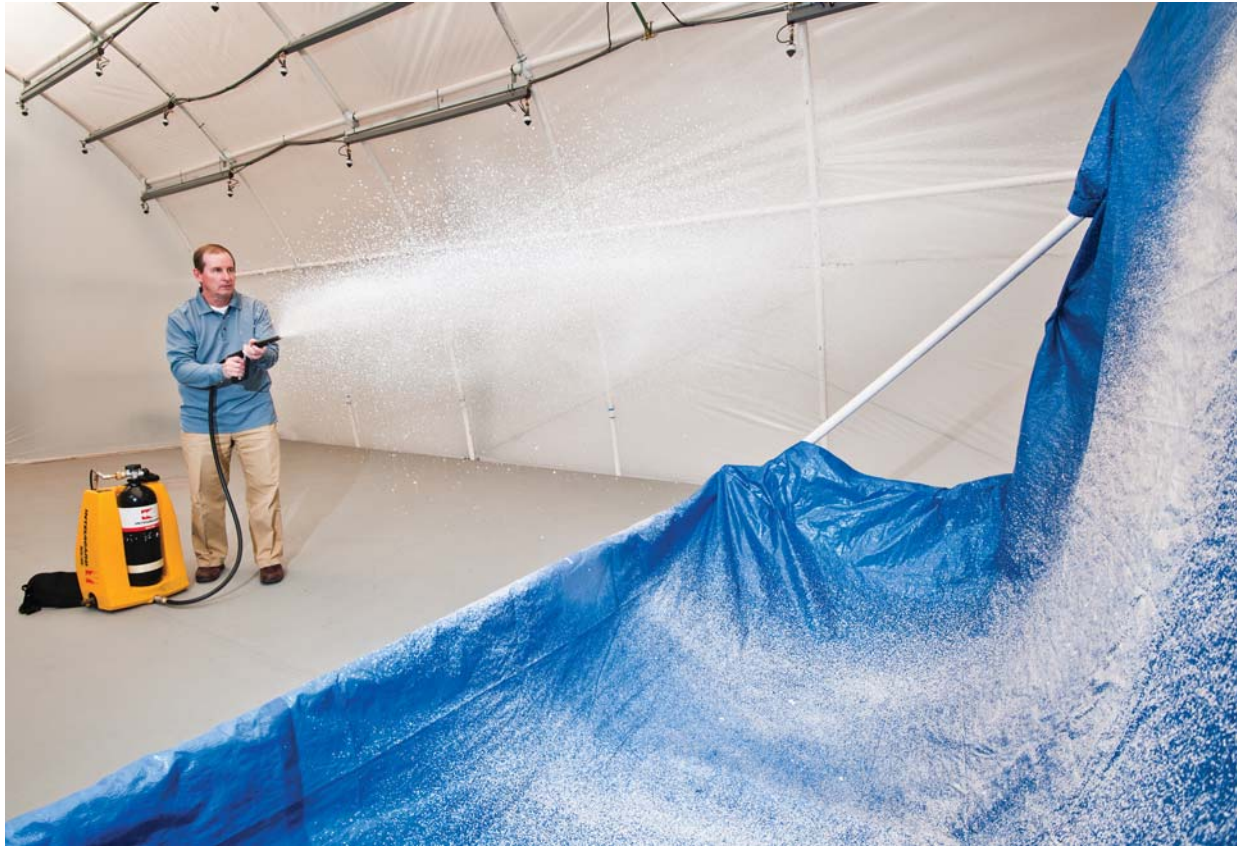


Anthrax-killing foam proves effective in meth lab cleanup

Sandia's chem/bio decontamination foam is now also being deployed as a meth eraser



By Stephanie Holinka

Sandia's decontamination foam, developed more than a decade ago for remediation of chemical and biological agents and used to decontaminate federal office buildings and mailrooms during the anthrax attacks in 2001, is now being used to decontaminate illegal methamphetamine labs.

Mark Tucker (6632), a chemical engineer in Sandia's Chemical & Biological Systems Dept. and co-creator of the original decontamination formulas, DF100 and DF200, says the decontamination formulation renders all types of typical chemical and biological agents harmless.

"For structures contaminated with meth, owners have two choices: demolish it or reclaim it," says Kevin Irvine, vice president and general manager at EFT Holdings, which licenses the Sandia formulation and sells it under two names, EasyDecon® DF200, certified against chemical and biological agents, and Crystal Clean, intended for meth cleanup.

The meth cleanup problem is a big one. The US Drug Enforcement Administration's (DEA) Clandestine

(Continued on page 5)

RESEARCHER Mark Tucker (6632) demonstrates application of Sandia-developed decontamination foam. The foam, used 10 years ago in the cleanup effort following the deadly 2001 anthrax attacks, is now being used to decontaminate environmentally devastating meth labs. (Photo by Randy Montoya)

Sandians recall timeless legacy of Rev. Martin Luther King Jr.



Sandians Patrice Gregory, Sean Harris, Lydia Coleman, and Melvin Bennett were not even born when Dr. Martin Luther King Jr. was assassinated in 1968. The civil rights leader's legacy, though, continues to touch them in their daily lives. Says Patrice: "I know every day that he is why I'm here right now." Read their stories on page 8.

Bruce Walker joins executive leadership ranks as Div. 2000 VP

ReplacesCarolyn Hart, who retired in December; CFO Matt O'Brien also retires

Sandia has a new chief weapons engineer. Bruce Walker, a 34-year veteran of the Labs, has been named VP of Weapons Engineering and Product Realization Div. 2000 and chief engineer for nuclear weapons. Bruce succeeds Carolyn Hart, who retired at the end of last year.

During the course of a distinguished Sandia career, Bruce has held numerous increasingly responsible positions, most recently serving (since December 2010) as director of Nuclear Weapons Planning Operations and Integration Center 200. In this position, he also served as the chief operating officer for the nuclear weapons program at Sandia.

From 2008 to 2010, Bruce was director of Monitoring Systems and Technology Center 5700, where he was responsible for the Remote Sensing and Verification (RSV) Program, which encompasses Sandia's work in Nonproliferation R&D, the US Nuclear Detonation Detection System (USNDS), and

(Continued on page 2)



A Sandia-developed power-over-fiber communications cable offers total electrical isolation. See page 3.



Sandia, Vermont officials have announced plans to launch a Center for Energy Transformation & Innovation. See page 8.

Sandia LabNews

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Sandia cyber project looks to help IT professionals with complex Domain Name System vulnerabilities

By Mike Janes

In 2008, Karen Evans, administrator of the Office of Government and Information Technology at the White House's Office of Management and Budget (OMB), wrote a memo to all government chief information officers that read, in part:

"The Government's reliance on the Internet to disseminate and provide access to information has increased significantly over the years, as have the risks associated with potential unauthorized use, compromise, and loss of the .gov domain space."

Consequently, the OMB soon issued a mandate to all federal information systems, including those at Sandia and others with a .gov domain name, to deploy a new security feature, Domain Name System Security (DNSSEC). That new policy required that "the top level .gov domain will be DNSSEC-signed, and processes to enable secure delegated sub-domains will be developed."

The mandate made perfect sense, says Sandia computer scientist Casey Deccio (8966), but there

soon emerged a problem when .gov organizations actually began deploying DNSSEC.

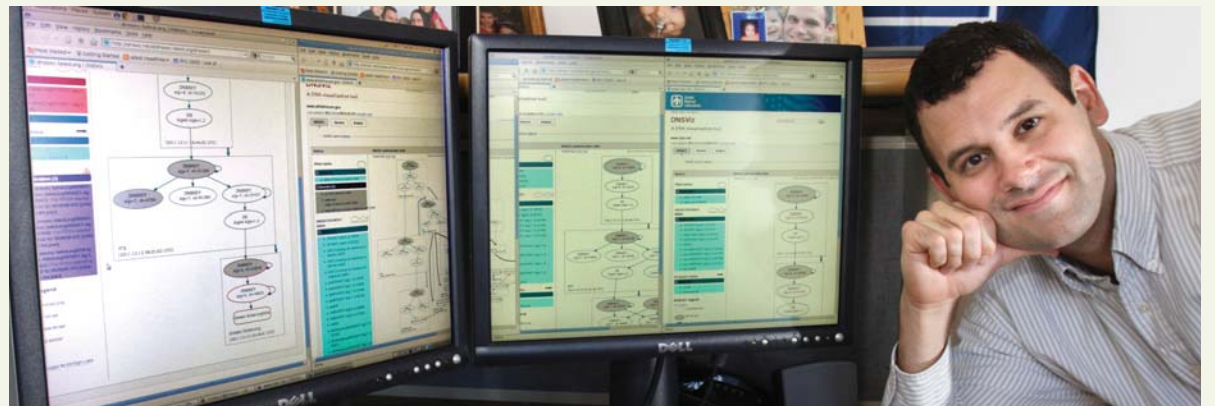
"It (DNSSEC) is hard to configure correctly and has to undergo regular maintenance," says Casey. "It adds a great deal of complexity to IT systems, and if configured improperly or deployed onto servers that aren't fully compatible with it, it keeps users from accessing .gov sites. They just get error responses."

Taking matters into his own hands

When Sandia started to experience such problems due to other sites' DNSSEC misconfigurations, Casey decided to take matters into his own hands. Using internal funding, he began to develop a visualization tool, now known as DNSViz, to help network administrators in the federal government and global community better understand DNSSEC and to help them troubleshoot problems.

The still-new DNSSEC security feature, in an ideal world, will allow user applications like web browsers to ensure that the IP addresses they have

(Continued on page 3)



RESEARCHER Casey Deccio (8966) has developed a visualization tool, now known as DNSViz, to help network administrators better understand Domain Name System Security (DNSSEC) and to help them troubleshoot problems. (Photo by Dino Vournas)

• Sandia/California hosts industry day to boost innovative cooling technology •

See story, photos on page 4

That's that

Do you feel energized at the beginning of a new year, waking up on Jan. 1 rarin' to go? I'd like to say I do, but I must admit to a bit of ambivalence this year. What with the end-of-the year retirement of my longtime colleague Iris Aboytes, putting out the *Lab News* is going to be a distinctly more challenging prospect for our team in 2012 than it has been in years past. And a lot less fun, too.

In the six years I've been editing this newspaper, I have relied on — almost to the point of taking for granted — Iris's contributions. Was there a story that needed to be told? A hole in the newspaper filled? A vital piece of information tracked down yesterday? Call Iris. This isn't to suggest that I ever had to ask her to do anything; she was always totally self-motivated, bursting with ideas and totally preoccupied with thinking about new ways to tell familiar stories.

But after a difficult — I would almost say agonizing — process for her, Iris decided a few months ago that 2011 would be her last year at the Labs. When she told me she was leaving, I took the news well. In fact, to paraphrase one-time presidential candidate Bob Dole, the night after Iris told me she was retiring, I slept like a baby: I woke up every two hours and cried.

Seriously, though, Iris will be missed, and missed in ways that we haven't even considered yet. In all of this, there is a piece of good news: In characteristic Iris fashion, she couldn't just hang it up and walk out the door. An old colleague of hers, Doug Drumheller, himself a retired Sandia engineer, called Iris a few days before the Christmas break and asked her if she was interested in a feature story idea. Iris could have said, sorry, Doug but I'm out of here. Instead, she said sure. And so it was that on her last day at Sandia, Iris was finishing up a story about Doug hand-crafting a replica of the world's first sea clock, developed in the late 18th century as an accurate device for determining longitude. Iris knew the story wouldn't be published until after she was gone, but she didn't want to say no to Doug and, too, I think maybe she wasn't quite ready to let go. In any case she left me — us — one last gift, a story we plan to publish in an upcoming issue. Thanks again, Iris.

And oh, I'll bet good money that on Jan. 1, Iris *did* wake up rarin' to go. That, too, is an Iris characteristic.

* * *

Iris wasn't the only Sandian to leave late last year, of course. All of us said goodbye to colleagues and friends. Lots of familiar faces are gone, VPs, directors, and managers among them. I was particularly sorry to see that long-time ombud Don Noack decided to retire in December. I thought of Don, only half-jokingly, as Sandia's "pastor." Spend five minutes with him and you were struck by his innate decency, a quality that served him — and the Labs — very well during his many years as a corporate ombud. With Don, you "got it" very quickly: Here was a guy who wanted to do the right thing and wanted to see that the right thing was done in the Labs' person-to-person relationships.

I had the chance to interview Don a few times over the years, and our talks always turned into conversations that led to — I think — a mutual respect and — I hope — a level of friendship. Sandia's Ombuds Office was established in 1993 to (as the charter put it) "confidentially voice and/or resolve concerns, issues, and barriers that could impede progress toward achieving our desired corporate culture. To complement and supplement existing resources and generally improve the hospitality of Sandia for employees." I can't imagine anyone more suited to ensuring the Ombuds fulfilled the terms of its charter than Don Noack. Although he has left the scene, the Ombuds Office remains and the team is, I'm sure, every bit as committed as was Don to providing a safe, caring, confidential place to work out the sometimes thorny issues that can arise in any workplace.

See you next time.

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

Bruce Walker is new Div. 2000 VP

(Continued from page 1)

overall satellite technology R&D.

In an email message to all employees announcing Bruce's new position, Labs Director Paul Hommert noted that earlier in his career, Bruce managed the Synthetic Aperture Radar (SAR) Department and was instrumental in establishing SAR work at Sandia — from its genesis through the development of several differentiating capabilities. Over the years, Paul noted, Bruce was responsible for numerous nuclear weapons and DoD radar programs.



BRUCE WALKER

"Please join me," Paul wrote, "in congratulating Bruce for his promotion to executive leadership, a role that I am confident Bruce will fulfill with the same passion and hard work that he has put into his dedicated service at Sandia for more than three decades."

In his message, Paul also thanked Carolyn for her service, noting that she had "an illustrious career at the Laboratories, serving with distinction for more than 33 years in positions of increasing responsibility. . . I know that the leadership Carolyn brought over the past several years to the weapons program will leave a lasting legacy for which we are all grateful. . . Carolyn has been an integral part in the fabric of the Laboratories, and we will miss her leadership and contributions."

Bruce is a Fellow Member of the Microwave Sensing Symposia. He holds one patent in synthetic aperture radar. He received a bachelor of science degree in electrical engineering from Oklahoma State University in 1976 and a master of science degree in electrical engineering from the University of Texas at Austin in 1977.

In another change at the executive leadership level, Sandia Chief Finance Officer and Business Operations Div. 10000 VP Matt O'Brien also retired at the end of 2011. In announcing the news to Sandia staff, Deputy Labs Director and Executive VP for Mission Support Kim Sawyer thanked Matt for his service, noting that "throughout his career, Matt has made many contributions. Among his many contributions, Matt led change with the consolidation of the business operations team, championed the Business Leadership Program and led improvements across the organization. Matt is leaving a lasting legacy for which we are all grateful."

Kim announced that Finance and Accounting Director Jeff Kallio will serve as acting chief financial officer.

Employee Recognition Award nominations sought



- Technical excellence
- Leadership
- Exceptional service
- Ethics and integrity

The Employee Recognition Awards program honors individuals and teams whose work or contributions in support of Sandia's mission and values have been exceptional. Nominations for the award will be accepted from Jan. 10-31.

The ERA program recognizes excellence in five categories, four for individual nominees and one for teams.

The individual categories are: technical excellence; exceptional service; leadership (which is also the category to acknowledge an individual for demonstrating exceptional people skills, etc.); and, new this year, Ethics and Integrity, which recognizes employees who have demonstrated the highest standards of integrity and ethical business conduct.

The team category recognizes teams whose exceptional achievements are critically enabled by teamwork and model the value of people working together toward a common goal, proactively looking for and acting upon opportunities to improve, while being fully accountable for their performance.

Nomination forms with detailed instructions are available from Sandia's internal web homepage or at <http://info.sandia.gov/era>. Each division has an ERA coordinator, also listed via the link above.

Any current, regular Sandia employee may nominate individuals or teams.

A separate nomination form must be submitted for each individual and team nomination. A combined total of 122 individuals and teams will receive corporate Employee Recognition Awards.



Sandia National Laboratories

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Addressing DNS security concerns

(Continued from page 1)

received from the DNS have not been “spoofed” by anyone with ill intent. As such, Internet-connected systems within the government can verify that the responses are authoritative and have not been altered. Still, the hiccups with implementing DNSSEC have been enough for Casey to develop DNSViz.

The trouble with DNS

When you type in a Uniform Resource Locator (URL) into a web browser on your workstation, magic seems to happen.

Essentially, you might notice a few commands that appear at the bottom of your screen, then just sit back momentarily while the Internet gremlins do their thing and miraculously find and display the web page you’re seeking.

But in reality, for every URL your browser accesses — including web pages, embedded images, and other content — your computer has to first translate the hostname of the URL into an Internet Protocol (IP) address. The entity doing much of that work is known as a Domain Name System (DNS) server. A DNS “lookup” — whereby the server is asked for the IP address that corresponds to the hostname of the URL you’ve typed — is a prerequisite for doing almost anything on the Internet, including web browsing, emailing, or videoconferencing.

The DNS functions in many ways like a telephone book, translating hostnames (like www.sandia.gov) into numerical addresses that your computer can subsequently identify and “dial up” to access the remote servers.

There is a natural hierarchy within the DNS, each domain name identifying its own ancestry. For example, sandia.gov is a “child” of .gov, which is a child of the DNS root. Each parent refers clients to other servers that can give answers for their “children.” This ancestral line is the backbone for building a chain of trust that must exist for authenticating a DNS lookup with DNSSEC. Each link in the chain vouches for the link below it.

In this way the DNS might be described as a sort of referral-based system analogous to meeting someone through a mutual friend. A user trusts a DNS answer because he or she trusts the source it came from, trust gained first through another referral source. This process continues for each “link” in the chain up to the DNS root.

DNSViz — helping the IT professional ‘see’ the problems

Without DNSSEC, the “trust” of referrals and answers is superficial, and tampering by third-party attackers could go undetected, thus redirecting online communications to unwanted destinations. This represents a particularly troublesome vulnerability for .gov addresses owned by government organizations guarding national security information and other vital data. But DNSSEC is of little use if network administrators don’t know how to configure or use it.

Casey describes DNSViz as a “tool for visualizing the status of a DNS zone.” It provides a visual analysis of the DNSSEC authentication chain for a domain name and its resolution path in the DNS namespace, made available via a web browser to any Internet user (<http://dnsviz.net/>). It visually highlights and describes configuration errors detected by the tool to assist administrators in identifying and fixing DNSSEC-related configuration problems.

The primary contribution provided by DNSViz is the ability to bring together all the components that work together for DNSSEC to function properly into a single graphical representation. The resulting visualization is a collection of configuration data and relationships that are otherwise difficult to assemble, assess, and understand.

Tool functions in two primary ways

To help network administrators in their DNSSEC deployment, Casey’s DNSViz tool functions in two primary ways: it actively analyzes a domain name by performing pertinent DNS lookups, and it makes the analysis available via the web interface. The active analysis occurs periodically to build a history of DNSSEC deployment over time and provide a historical reference for DNS administrators.

The means for making the data available to users is currently the web interface, though Casey intends to expand DNSViz functionality to allow access via other means. For example, alert mechanisms might be used to inform affected parties, and application programming interfaces (API) can be designed to allow administrators to programmatically access the information instead of manually browsing to the DNSViz web site.

Currently, Casey has the tool running in the background on Sandia/California’s servers, monitoring a list of some 100,000 DNS names. It performs an analysis a couple of times each day and offers a situational awareness of what the DNS configuration for each name looks like from top to bottom. He has demonstrated the challenges of DNSSEC deployment, as measured by his tool, in international DNS forums and workshops. He hopes to use these results to identify practices contributing to DNSSEC mishaps and suggest changes to improve DNSSEC deployment in practice.

Though the functionality provided by DNSViz could potentially be included in a marketable software product that’s sold by a for-profit company, Casey says he envisions it as an open-source tool available to anyone who needs it. With further funding, he hopes to expand the tool so that it can analyze DNS health and security on a continuous basis, essentially creating a full-blown monitoring system that is scalable, versatile, and more informational.

Sandia
CaliforniaNews

Developing power-over-fiber communications cable: When total isolation is a good thing

By Sue Major Holmes

Sometimes total electrical isolation is a good thing — and that’s the idea behind a power-over-fiber (PoF) communications cable being developed by Sandia engineers.

“It’s common to isolate communications between systems or devices by using fiber optic cables, but if power is required, then sending power down a copper wire can at times be a safety-critical issue, and substituting it with battery power may not be suitable or practical,” says Steve Sanderson (6623).

He, Titus Appel (6623), and Walter Wrye, a former intern, are co-inventors of a patent-pending hybrid cable design that uses fiber to send and regulate optical power to the communications electronics integral to the cable.

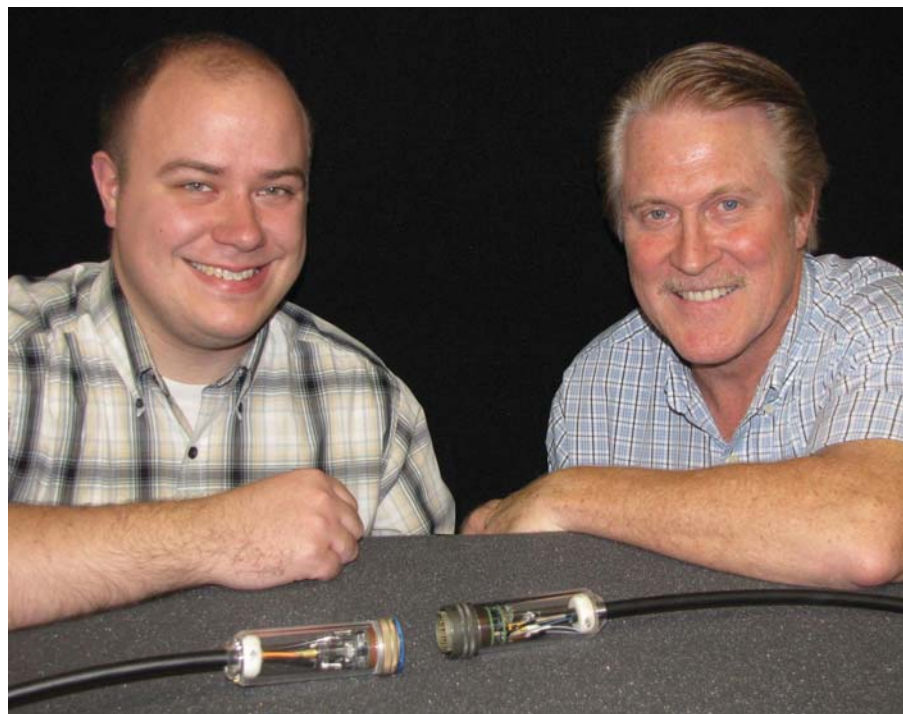
The cable ends resemble a typical copper electrical cable with pin and socket connectors. However, optical interface circuits integrated into the connector housing, or backshell, provide fiber optic transmission of both data communications and optical power. To conserve energy, optical power is delivered only on demand, Steve says.

“The key issue here is to maintain total electrical isolation from any stray electrical energy and high-voltage electrical surges caused by such things as lightning strikes,” he says.

The developers envision the PoF cable replacing existing copper cables in areas related to safety, such as security, explosives, explosion-proof environments, aviation, and medical devices.

“The first-generation PoF cable just delivers optical power to the cable’s internal electronics for data communication between devices. We are now adding the capability to deliver electrical power externally to a connected low-power device,” Steve says.

In the PoF cable’s current version, the backshell



CABLE GUYS — Titus Appel and Steve Sanderson (both 6623) with a first-generation power-over-fiber cable that converts a signal from electrical-to-optical-to-electrical, thus emulating an electrical cable with total isolation.

encapsulates circular stacked circuit boards with LEDs coupled to plastic optical fibers for communications, and a laser diode and miniaturized photovoltaic-type cell coupled to the ends of a single glass fiber for optical power delivery. The backshell is then filled with thermally conductive material to keep the laser diode cool during peak demands for power.

Working on Gen-2 version

In the next version, the team plans to use only glass fibers. “Although plastic fiber requires less preparation time than glass, it takes up more room,” Steve says. The team also is working with next-generation microcontrollers, new packaging layouts, and new optical devices to reduce the size.

The team recently tested a PoF low-energy detonator firing cable with fireset electronics built into the backshell. The optically powered fireset embeds a microcontroller that reports such things as detonator resistance, temperature, and charging voltages, and receives command messages to fire the detonator. When it’s idle or powered down, the circuitry is designed to short the detonator input leads to prevent unwanted electrical energy from reaching it.

Steve came up with the concept about three years ago after being given the challenge by a project needing total electrical isolation between communication devices to meet safety requirements.

The effort currently is being funded to develop a rugged PoF cable 3 to 4 meters long and production ready.

“Our customer requested this length and a data rate greater than 20 kbit per second, but you could go much greater distances at lower data rates without increasing power levels,” Steve says. “Or, by increasing the power levels, data rates could be the same or higher.”

The team built a prototype, fine-tuned the packaging, and began figuring out the process for mass production.

Now, they’re working to reduce the backshell’s length from 4 inches to 2.5 inches, as well as decrease the weight and lower costs.

“One of our ongoing objectives is to reduce the physical size so that it’s more widely used,” says Steve, who has seen technology packaging shrink dramatically in the 35 years he’s been with Sandia.

“The PoF cable has power limitations,” Steve says. “It’s not to be construed as a means to power your house, for example, or handle the high speeds of a computer network.”

“But because there are growing needs of low-power sensor/control applications related to safety, having convenient optically generated power available is a tremendous benefit.”

Sandia/California hosts Industry Day to accelerate commercialization of 'Sandia Cooler' technology



THE INDUSTRY DAY EVENT FOR THE SANDIA COOLER brought together cooling system manufacturers, entrepreneurs, potential end-users, and local business representatives to learn about the new technology and brainstorm potential applications and the commercialization process. Calvin Tsang of AVC America (far left), a cooling system manufacturer, offers an idea during a discussion of the commercialization process. Looking on are, left to right, Russell Hall of Cooliance, Jason Huang of TaiSol electronics, and William Sanchez and Steven Stoddard of CoolChip. (Photo by Dino Vournas)

Sandia California News

By Patti Koning

The "Sandia Cooler," invented by Jeff Koplow (8366), could dramatically alter the air-cooling landscape in computing and microelectronics, LEDs/solid-state lighting, HVAC, and other applications, resulting in huge economic and energy savings (see July 15, 2011, *Sandia Lab News*). To accelerate this potentially game-changing technology's path to commercialization, Sandia/California recently held an Industry Day that brought together manufacturers, end-users, entrepreneurs, and local government and business representatives.

"Our primary interest is in getting this technology into the marketplace and making an impact on energy efficiency," says Art Pontau (8360). "We do this because we are a national security lab, which includes energy and economic security. We want to ensure that this technology is successful and making a difference as quickly as possible."

The Sandia Cooler, also known as the "Air Bearing Heat Exchanger," solves the key heat transfer bottleneck — the boundary layer of dead air that clings to cooling fins in conventional cooling schemes. The value proposition for the Sandia Cooler, says Neal Fornaciari (8366), is a dramatic increase in cooling per-

formance without resorting to methods such as liquid cooling. It generates a several-fold improvement in cooling performance in a device that is 10 times smaller than the current state-of-the-art alternatives, is exceptionally quiet, immune to dust fouling, and relatively simple to manufacture.

Attending Industry Day were Russell Hall of Cooliance; Jason Huang of TaiSol Electronics and Calvin Tsang of AVC America, representing established cooling system manufacturers; Gerry Baranano of RevLanch; and William Sanchez and Steven Stoddard of CoolChip, representing entrepreneurs; Jeff Kmetec of Philips, representing potential end users; Rob White, economic development director with the City of Livermore; and Paula Groves of the Alameda County Small Business Center.

The event began with introductions to Sandia, the Combustion Research Facility, and the Livermore Valley Open Campus, where Industry Day was held. Jeff then gave a presentation of the Cooler technology, followed by a visit to his lab for prototype system demonstrations and technical questions and answers. The entire group then came back together for a discussion on potential applications for the technology, as well as ideas on enabling a successful commercialization process. The day ended with informal networking

at a local venue where industry attendees and Sandians continued to explore opportunities surrounding this breakthrough innovation.

Industry Day was very successful, says Ed Noma (8529), who leads business development for the Sandia Cooler. "Bringing this diverse group together, with their different perspectives and relationships to the technology, was very important," he says. "We need a critical mass of potential industry partners to get excited about this technology, who will in turn catalyze a broader ecosystem of stakeholders to accelerate the commercialization process."

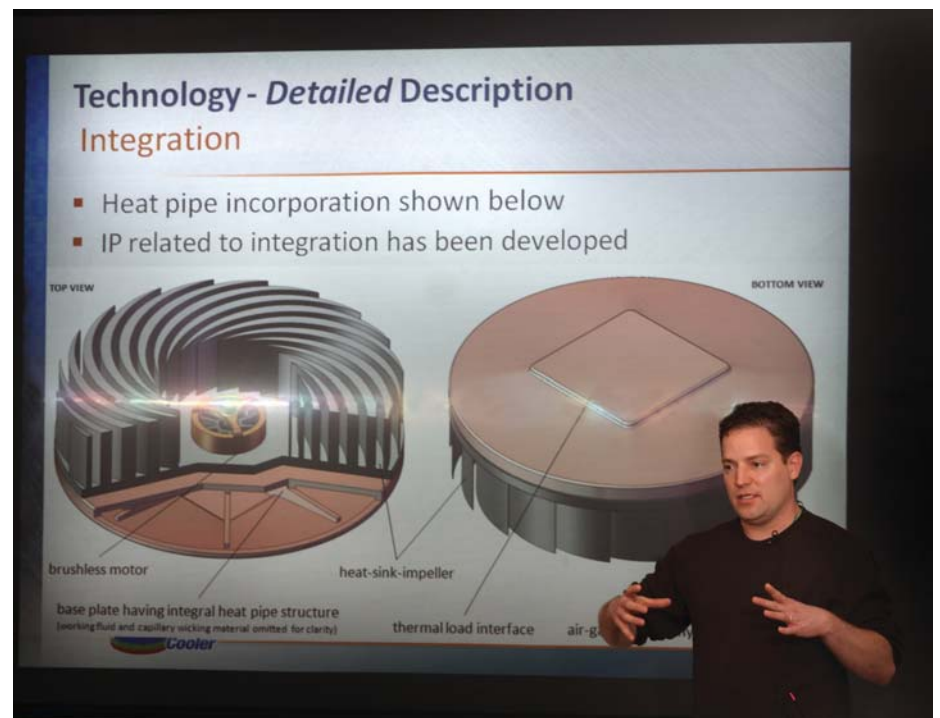
Industry Day had several, overlapping purposes. One was to share the Cooler technology and its potential with industry; another was to glean insight from industry about commercialization of this and future technologies; and a third was to create connections and explore synergies among a diverse group of stakeholders who collectively could take ownership of commercializing the technology.

And it's no accident that Industry Day took place at the Livermore Valley Open Campus.

"Industry Day embodies what LVOC can do for the labs, bringing us together in new ways with the external partners who are critical to ensuring that Sandia's work has maximum real-world impact," Ed says.



INDUSTRY DAY PARTICIPANTS toured Jeff Koplow's lab and saw demonstrations of different versions of the Cooler and experienced the technology's special features, like the force of the air flow generated by the rotating heat-sink-impeller. High-speed rotation of the heat exchanger fins greatly improves heat transfer and minimizes the problem of fouling. A further advantage of this device architecture is the freedom to tailor fin shape for very low noise operation. (Photo by Dino Vournas)



JEFF KOPLAW (8366), inventor of the Sandia Cooler, explains the science behind the device. (Photo by Dino Vournas)

Foam

(Continued from page 1)

Meth Lab registry lists thousands of locations in the US where law enforcement agencies have reportedly found chemicals or paraphernalia indicating the presence of either clandestine drug laboratories or dumpsites.

In 2007, EFT released Crystal Clean, a chemically identical formula to EasyDecon® DF200, but packaged and marketed specifically for meth cleanup. Sites contaminated with meth are considered crime scenes, but the contamination is chemical rather than biological, so the approximately 700 remediation companies that clean up meth lab contamination also do other types of crime scene cleanup because they are accustomed to the sampling and documentation process.

Holding the bag

"Property owners are often liable for expensive cleanup costs since most insurance companies won't pay for cleanup related to methamphetamine, viewing damage resulting from meth labs as arising from a criminal act," Irvine says. That means that property owners and landlords are often left holding the bag for the cost of remediating a residence or business contaminated as a result of meth cooking."

According to the Department of Justice, the chemicals used to cook meth, and the toxic compounds and byproducts resulting from its manufacture, produce toxic fumes, vapors, and residues. The report says anyone, but especially children, spending time in or near a meth lab could be exposed to toxic substances, which could produce short- and long-term problems. Chronic exposure to substances typically used in meth manufacture may cause cancer; damage the brain, liver, kidney, spleen, and immunologic system; and result in birth defects.

Mark says many cleaning methods don't remove methamphetamine and the chemicals used to produce it. Incompletely or improperly cleaned surfaces, such as floors, countertops, and drywall, can remain contaminated, even after being cleaned many times. Methamphetamine can remain in a structure for months to years.

Mild, nontoxic, noncorrosive

The decontamination formulation includes a collection of mild, nontoxic, and noncorrosive chemicals found in common household products, such as hair conditioner and toothpaste. It contains both surfactants, which lift agents off a surface, and mild oxidizers,

Meth in New Mexico

In 2010, substance abuse treatment admissions for amphetamine-related addictions surpassed other drugs, such as cocaine and heroin.

According to the New Mexico Department of Public Health, the state remains among the top US states for drug-induced death, largely due to the high rates of unintentional drug poisoning or overdose.

Additionally, New Mexico serves as a major trans-shipment area for drugs, including methamphetamine, from Mexico. Though the US Drug Enforcement Administration says trafficking of meth is a larger problem than abuse, there are 179 New Mexico locations on the DEA's current list of locations involved in meth-related activities.

New Mexico regulates meth cleanup, and requires that sites be cleaned to 1.0 g/1sq. ft. (1 microgram/sq. ft.). It also requires the industrial hygienist that takes site samples be from a separate entity from the remediator doing the cleanup.



A REMEDIATOR sprays Crystal Clean on surfaces of a house contaminated with methamphetamine. In an hour, the foam is rinsed clean with water, and the remaining liquids are harmless enough to be put down a kitchen drain. (Photo courtesy of EFT Holdings)



dence, so a formal chain of custody is established for the samples, and they are taken to an independent lab. The lab runs the samples through a mass spectrometer to determine the level of contamination.

Foam deployed as a preventive measure

In most instances, Crystal Clean reduces the levels from a pre-test state, to .02 µg/100 square cm (microgram/sq. cm) or less, which is considered nondetectable.

Irvine says the Crystal Clean formula is more expensive than other cleaners, but that the product saves greatly on labor costs and lab costs because other cleaning solutions usually require more than one cleaning, with a larger crew doing the cleaning, and with costly sampling taking place in between cleanings.

Another advantage of this cleanup method, Irvine says, is that some other methods are destructive or use more

corrosive substances, and the resulting chemical residues are themselves toxic. Crystal Clean is rendered nonhazardous and nontoxic, requiring only a surface wipe when finished.

Sandia's decontamination formula was developed through funding provided by the DOE and NNSA Chemical and Biological National Security Program (CBNP).

Sandia has also licensed the DF200 formula to other firms, which have developed it for use in a wide-ranging variety of applications, such as commercial and residential mold remediation, disinfection of hospitals and schools, pesticide removal for farm equipment, and military applications, including counterterrorism preparedness. The foam has also been deployed as a preventive measure at presidential debates and a political convention.

Chronic exposure to substances typically used in meth manufacture may cause cancer; damage the brain, liver, kidney, spleen, and immunologic system; and result in birth defects.

which break down the agent's molecules into nontoxic pieces that can be washed down a household drain like detergent or dish soap.

Formulation left meth nondetectable

In experiments from a few years ago, John Martyny, associate professor and industrial hygienist at the National Jewish Medical and Research Center's Division of Environmental and Occupational Health Sciences and a national expert on the effects of meth exposure on children, compared the effectiveness of common cleaners, such as detergent and bleach, on methamphetamine cleanup. Martyny included Sandia's decontamination formula in the testing. His experiments showed that, after cleaning with EasyDecon, the methamphetamine present on tested surfaces was likely oxidized to another compound and was nondetectable.

Irvine says even if a meth site is known, it doesn't always mean it gets cleaned up, due to the expense. Some states don't have cleanup guidelines and don't require homeowners to disclose if a structure is contaminated with meth. There have been instances where families have discovered they were living in a house contaminated with meth only after family members were hospitalized for respiratory problems characteristic of chronic meth exposure.

In the 22 states that have guidelines, structures contaminated with meth are seized by police, and the structure is quarantined by a local or state agency (depending on the state) until it can be demonstrated that the structure is cleared of methamphetamine to a certain level.

During structure remediation with Crystal Clean, a remediation crew removes everything from the structure, including carpets and drapes, until the house is stripped bare except for the fixtures.

The crew mixes the Crystal Clean solution on site and sprays the foam on walls, ceilings, and floors. The foam expands to about 15 times its liquid volume through a special nozzle that draws air into the spray, allowing it to reach contamination in crevices and in the air. In an hour, it collapses back to a liquid. Using only fresh water, rags, and sponges, the crew then removes the benign residue from all surfaces.

After the site is cleaned, an independent industrial hygienist tapes off a sample area in the cleaned structure and takes a number of swipe samples appropriate for the location size. The samples are treated as evi-



MARK TUCKER (6632) prepares to demonstrate Sandia-developed decontamination foam. (Photo by Randy Montoya)

Recent Retirees

New Mexico photos
by Michelle Fleming
California photos
by Randy Wong



Paul C. McKey
38 5773



Debra Cazzola
36 9512



Basil Steele
36 6500



Richard Cernosek
35 5719



Guy Northcutt
35 2995



Ron Stolz
35 8110



Christopher Cameron
34 6112



Don Noack
34 30



Louis Hernandez Jr.
33 9514



Ron Olsberg
33 5629



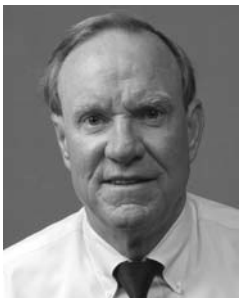
Ernest S. Salas
33 10265



Joseph Fernandez
32 231



Christine Yang
32 8958



Mike Knoll
31 5300



Kwok Kee Ma
31 1752



Mike Mundt
31 413



Elizabeth Richards
31 6926



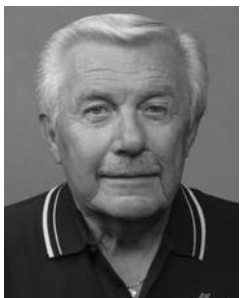
Ed Baynes
30 10265



Barbara Roberts
30 3333



Rachel Lucero
30 1800



Robert Mattison
30 2541



Sheila Akins
29 8944



Cathy Reder
29 5765



Bruce Criel
28 10520



Joseph Damico
27 6832



Lydia Perez-Romo
26 4234



Mark Biggs
22 10520



Marsha Strauch
22 10011



Jim Cates
21 411



Patti Sanchez
20 233



Barry Goldstein
18 6224



Lillian Snyder
17 6920



Laura Lang
16 857



William Stubblefield
16 1461

Mileposts

New Mexico photos by Michelle Fleming
California photos by Randy Wong



Larry Andrews
35 1733



Jeff Jortner
30 8953



Ed Hathaway
25 8511



Cynthia Huber
25 9538



Bill Peters
25 10221



Sandra Begay-Campbell
20 6124



Curtis Fox
20 4842



David Seabrook
20 4237



Daniel Stump
20 4241



Herman Armijo
15 8517

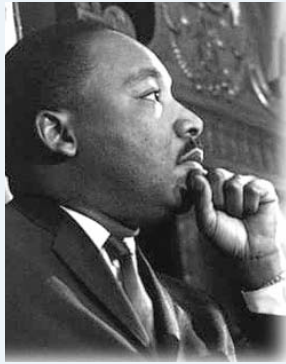
Young Sandians say Martin Luther King paved their way

By Nancy Salem

Patrice Gregory was born in 1980, 12 years after the assassination of Dr. Martin Luther King Jr. Last year, she earned a doctorate in mechanical engineering from the University Maryland and was hired at Sandia.

The Pine Bluff, Ark., native says that throughout her career journey, she felt King at her side. "His impact on my life is too enormous to verbalize," Patrice (422) says. "I know every day that he is why I'm here right now."

King is an iconic figure in the African-American civil rights movement. He was a clergyman, activist, and leader who used nonviolent methods to bring about social change. He led the 1955 Montgomery Bus Boycott and helped found the Southern Christian Leadership Conference. He led the 1963 March on Washington, where he delivered his legendary *I Have a Dream* speech envisioning a color-blind society. He received the Nobel Peace Prize for his efforts to end racial segregation and racial discrimination. He fought poverty and promoted education. King was shot and killed by James Earl Ray on April 4, 1968, in Memphis, Tenn. He was 39.



DR. MARTIN LUTHER KING JR.

The federal Martin Luther King Jr. Day holiday was signed into law in 1983. It is celebrated yearly on the third Monday of January to mark King's Jan. 15 birthday. While some states at first resisted acknowledging the holiday, it was officially observed in all 50 states for the first time in 2000.

Patrice's family went to the newly opened Martin Luther King Jr. Memorial in Washington, D.C., at Thanksgiving. "It was kind of surreal," she says. "My grandmother who just turned 90 was there, and so was my youngest cousin who's 17. Everyone understood what Dr. King meant. Age isn't a factor in the impact he had on your life. I can't imagine what my life would have been like had he not sacrificed."

Patrice's sentiments are shared by other young Sandians born after King's passing.

Sean Harris (9533), a graduate of La Cueva High School and the University of New Mexico, has worked as a Sandia software engineer for seven-and-a-half years. Harris, 29, received two Martin Luther King Jr. scholar-

ships at UNM and went on to earn a master's degree in management information systems from the University of Illinois. He was a member of the same fraternity as King, Alpha Phi Alpha Fraternity Inc., and went to Washington, D.C., in August for the opening of the King memorial.

"I've done a lot of research on Dr. King," Sean says. "He was so involved in education and making sure African-Americans had opportunities to get an education. Even though he's not still around, his dream is being moved forward by giving people those opportunities."

Sean says he connected to King's message and participated in MLK marches and commemorative events. "When I think about him, I think about the sacrifices he made so that we could have the opportunities we have today," he says. "If not for him, I wouldn't be a Sandia employee, I wouldn't have graduated from La Cueva and UNM. He paved the way for the younger generation."

Lydia Coleman (10694), a financial analyst with a degree in business administration from Prairie View A&M in Texas, says the King message she holds closest is that all people are created equal. "I think about the *I Have a Dream* speech. We won't be judged by the color of our skin," she says. "The color of my skin doesn't define who I am. I define it."

Lydia, 23, a Kansas native, says she doesn't think of King as a figure from the past. "To me, he's not history," she says. "He's a part of how I see the world daily. I see his dream still coming to pass."

Melvin Bennett (10626), a finance graduate of Prairie View A&M, says he feels most impacted by King's efforts to end segregation. "I was able to go to school with students of different backgrounds and befriend them because of the work he did," says Melvin, 22, a



LIVING LEGACY— Sandians, left to right, Melvin Bennett (10626), Patrice Gregory (0422), and Lydia Coleman (10694) recall the impact Dr. Martin Luther King Jr. had on their lives and the lives of their families. (Photo by Randy Montoya)

project administrator. "I was able to come to a place like Sandia and not have to worry about not getting a job because of my race."

Melvin says the holiday in his hometown of Livingston, Texas, that honors King is a multicultural festival celebrating Hispanics, African-Americans, Native Americans, and Anglos. "People come together and share cultures," he says. "I like that because it enables me to associate with people of different backgrounds, and share and learn from each other. I am able to do that now because of Dr. King's work."

Patrice, Sean, Lydia, and Melvin say they learned about King as children — in church, at school, at home — and will continue to keep King's memory alive by spreading the message of nonviolent activism against racial discrimination.

Patrice has watched the *I Have a Dream* speech many times. "It makes you wonder when his dream will really come true, when all men are equal," she says. "It's a lot better now. But there is still work to be done."

'From the mountain of despair, a stone of hope'



National Park Service photo

To enter the Martin Luther King Jr. Memorial in Washington, D.C., you first pass through the Mountain of Despair, a huge rock sculpture signifying the seemingly insurmountable obstacles in the struggle for racial justice. Upon emerging from the Mountain of Despair, you come upon the Stone of Hope, a massive

block of granite from which the heroic figure of Dr. Martin Luther King Jr. emerges five times life size. Inscription walls flanking each side of the centerpiece sculpture highlight some of King's most memorable quotations. The theme for the memorial is taken from King's *I Have a Dream* speech, in which he said, "I have a dream that one day every valley shall be exalted, every hill and mountain shall be made low, the rough places will be made plains, and the crooked places will be made straight, and the glory of the Lord shall be revealed, and all the flesh shall see it together. This is our hope. This is the faith that I go back to the South with. With this faith we will be able to hew out of the mountain of despair a stone of hope."

The memorial was dedicated in Washington last summer after more than 20 years of planning, fundraising, and development. It stands in a privileged spot at the northwest corner of the Tidal Basin near the Franklin Delano Roosevelt Memorial, on a sightline linking the Lincoln Memorial to the northwest and the Jefferson Memorial to the southeast. The official address of the monument, 1964 Independence Avenue, SW, commemorates the year that the Civil Rights Act of 1964 became law.

Vermont-Sandia Partnership Center for Energy Transformation and Innovation

By Stephanie Holinka

Vermont Sen. Bernie Sanders, Gov. Peter Shumlin, and Div. 8000 VP Rick Stulen have announced a \$15 million, three-year partnership to establish a joint Center for Energy Transformation and Innovation to be housed at the University of Vermont (UVM).

Researchers at the Center will collaborate on research in areas such as energy efficiency, complex systems, consumer response and acceptance, and energy policy and governance.

The Center's members include Sandia, the state of Vermont, University of Vermont, Efficiency Vermont, and a number of Vermont educational institutions, businesses, and nonprofits. The partnership also includes eEnergy Vermont, a consortium of Vermont's 20 utility companies.

"This partnership will serve as a trusted national resource to support the development and dissemination of smart grid best practices that will accelerate the nation toward a 21st century energy infrastructure," says Rick, VP of Sandia's California Laboratory as well as its Energy, Climate, and Infrastructure Security programs.

The idea for the collaboration was sparked in 2008, when Sanders attended a field hearing on concentrating solar power at Sandia in Albuquerque. The hearing led to a unique agreement to tackle major, complex challenges that face the country's energy future.

The Vermont-Sandia partnership began to take shape in 2011, with a grant from the DOE's Power Systems Fellowship Program that supported the creation of



an interdisciplinary community to foster education, workforce development, and technological innovation in Vermont's electric power sector. The partnership sponsored faculty/student fellowships on modernizing electric power, short courses and seminars at UVM on such topics as smart grid technology and cybersecurity, and other events, leading up to the creation of the Center.

"I am very proud to announce that we are bringing a very significant national lab presence to New England by establishing the Center for Energy Transformation and Innovation right here in Vermont," Sanders said.

In addition to UVM, participating schools include Vermont Tech, Vermont State Colleges, Norwich University, and Vermont Law School.

Funding for the center comes from the DOE's Advanced Research Projects Agency-Energy (ARPA-E), Sandia, and the state of Vermont.