Sandia's weapons program: Exciting work ahead, but the fiscal environment will be challenging

Joan Woodard talks about program's accomplishments, prospects, budgets, and staffing

The Lab News *had the opportunity recently to sit down with Deputy Labs Director for Nuclear Weapons Joan Woodard to talk about the state of the program. The interview was conducted by John German and Stephanie Holinka. Here's a transcript of their conversation.*

* * *

Lab News: *Let's start with a big question . . . What are the strongest arguments today for maintenance of the existing stockpile as a credible deterrent? There's a national debate on this subject and the outcome of that debate will determine much of the Labs' future.*

Joan Woodard: Let me first note that I don't think there's a person at Sandia — and it would probably be hard to find anyone in the nation — who wouldn't welcome a nuclear weapons-free, peaceful world if we could really get there with confidence and reasonable assurance.

But let's get to the reality of the international landscape. The international landscape has a number of declared nuclear nations and number of suspected nuclear nations, and nuclear-capable nations. And a number of these nations are publicly discussing their development of advanced systems and their intent to change and transform their nuclear weapons capabilities.

In the face of that environment what should be the US response? Consider first the two extremes: Should we have no stockpile? Or should we engage in an arms race? Most Americans would reject those two extremes; that leaves us with the question of how to define the right balance, the right deterrent, the right stockpile for today's environment.

Photo by Randy Montoya

JOAN WOODARD

In answering that question, I think there are three things that are important. First of all, we need to have a stockpile that's sized appropriately, and the president has made his decision about where to go with that stockpile and we're on that course to get there by 2012.

The second part of this issue is that the stockpile needs to be capable of addressing the international threat environment; it needs to have the right capabilities. The military and DoD will need to make that determination. As a nation, we talk about capabilities-based strategy for national security and defense; this strategy needs to be applied in the nuclear deterrent arena.

The third part is maintaining the technical strength and competency to understand nuclear weapons physics, weapons design engineering, advanced technology, survivability, surety technology and systems, etc. In short, we must maintain the science and technology base that underpins our nuclear weapons capability and helps our nation avoid technological surprise.

Support in the military

LN: *Is there support within the military for maintaining a nuclear deterrent or is the feeling that some conventional weapons are catching up in their abilities to meet the strategic objectives?*

JW: Regarding our strategic deterrent capability, up until the introduction of the 2001 Nuclear

(Continued on page 5)

License expands access for researchers to microfluidic fittings

'Miniature plumbing made simple'

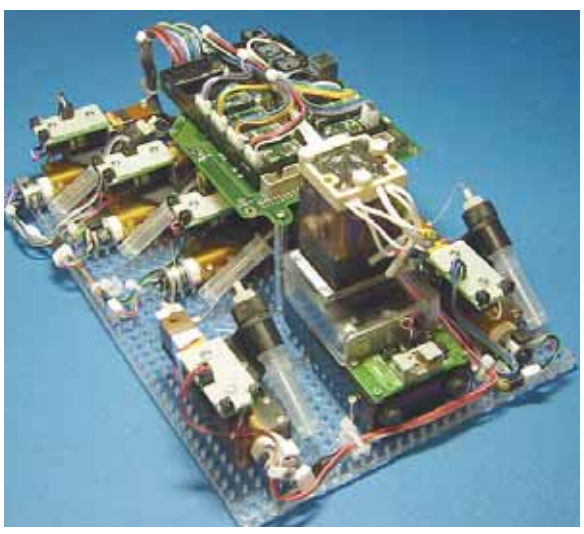
By Nancy Garcia

Necessity was the mother of invention for a recently licensed suite of microfluidic fittings, manifolds, and interconnects that allows researchers and engineers to configure their own analytical devices, as well as to potentially form integrated systems for myriad applications.

"It's the only time at Sandia I've seen anything propagate like this," said inventor Ron Renzi (8125). "It's amazing how well-received these technologies were." Among the team members responsible for the development were Distinguished Technologist Tom Raber (8125) and business development specialist Jim Wilhelm (8529), who handled the licensing agreement.

The suite was originally developed during the initial stages of the Grand Challenge µChemLab Laboratory Directed Research and Development (LDRD) program, Ron says, when he could not find commercially available components that enabled easily formed fluidic seals in small spaces. µChemLab was designed to enhance traditional wet-bench chemical analysis of such things as trace explosives and biotoxins by rapidly and portably separating samples on-chip under an applied voltage.

(Continued on page 3)



MICROFLUIDIC pumps, valves, and fittings are among the components that make up the BioBriefcase analysis train.

Sandia LabNews

Vol. 58, No. 12 June 9, 2006

Managed by Lockheed Martin for the National Nuclear Security Administration

Sandia National Laboratories

Summit tackles engineering innovation

Leaders from government, industry, academia explore potential roles in creating engineering workforce of the future

By Julie Hall

Making math and science exciting for young people, rethinking how engineering is done, and exploring what drives creativity and innovation were among topics discussed by some 50 leaders from industry, universities, government, and national laboratories at Albuquerque's Hyatt Regency May 31. The gathering, hosted by Sandia, kicked off a daylong summit focused on accelerating innovation in engineering and creating a highly qualified workforce of the future as a linchpin to American industrial competitiveness and national security.

See related story, "Collaborate to innovate, innovate to succeed," on **page 4.**

"The security of our nation may depend more on a commitment to research and education than on any other factor, including the strength of our military," said Sandia Labs President and Director Tom Hunter in his opening remarks, summarizing conclusions of a National Academies of Science report released last fall. Compiled by a blue-ribbon panel of business leaders, scientists, and educators led by retired Lockheed Martin Chairman Norm Augustine, *Rising Above the Gathering Storm* made strong recommendations for federal action to enhance US

(Continued on page 4)

LABS DIRECTOR Tom Hunter (left) and Intel Chairman of the Board Craig Barrett compare notes before launching the Sandia-hosted Accelerating Engineering Innovation summit.

(Photo by Bill Doty)

Sandia and Kansas State U. team up to make a modern flight computer, the brains of a rocket or RV. Story on ***page 5.***

What's what

If you looked at the spread about Employee Recognition Awards in the last issue of *Lab News*, you may have felt like Yogi Berra – you know, déjà vu all over again. A technical glitch in the transfer of electronic files to our commercial printer caused the listing to start over at the beginning of each new page, leaving off the awards at the end. The spread was carefully read by at least three *Lab News* staffers and was perfect in page proofs. The glitch happened in transfer of electrons, unseen by human eyes.

It was a shocker for new *Lab News* Editor Bill Murphy, who went slack-faced when he saw the printed copies. But he fixed it on the *Lab News* web page right away and promised in a *Sandia Daily News* note to run the correct listings in this issue.

Retiree Craig Jones didn't notice the glitch, or, if he did, had the good manners not to mention it. His reaction, instead, was "Holy Batman. . . Did my former organization, Airworthiness Assurrance, really win 5 or 6 group awards?"

You can make book on it, Craig, and they – and all the team awards – are listed, beginning on page 8.

* * *

If you listen to "A Prairie Home Companion," as I do, you know that one of the fictitious sponsors is the Duct Tape Council. And if you're on the mailing list for the affiliated Pretty Good Goods catalog, as I am, you know that you can shill for that fictitious sponsor by buying Duct Tape Council caps and shirts – and wearing them.

Thinking about that recently, I remembered being at a new fast food place a few years ago and being a little surprised and very amused that a lot of kids were clamoring for autographs from an Elvis impersonator hired to entertain the crowd. Unless I misunderstood, these kids were jumping up and down for the scrawled name of someone pretending to be someone else – someone who actually left the building years ago.

There are, of course, lots of people who are famous for being famous – like Paris Hilton. And there are famous incidents that never happened, like the plaintive plea from the kid to Shoeless Joe Jackson outside the courthouse during proceedings surrounding the scandal over the 1919 World Series. "Say it ain't so, Joe," the kid pleaded. But there was no kid and the plea never happened; it was made up by Charley Owens of the *Chicago Daily News* to spice up his story.

These vignettes about reality vs. fantasy are germane to a "summit" in Albuquerque last week on the general subject of improving education as the route to a better workforce and greater national security. Hosted by Sandia, it included Labs Director Tom Hunter, Intel Chairman Craig Barrett, and representatives from industry and academia around the country. To paraphrase the title to the Duke Ellington song "Things Ain't What They Used To Be," one of the messages from the summit was that education in America ain't like it ought to be if we're going to remain competitive in the global economy.

Don't miss Julie Hall's account of that meeting, on page 1.

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

Sandia LabNews

Sandia National Laboratories

http://www.sandia.gov/LabNews

Albuquerque, New Mexico 87185-0165
Livermore, California 94550-0969
Tonopah, Nevada • Nevada Test Site • Amarillo, Texas • Carlsbad, New Mexico • Washington, D.C.

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

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

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

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Employee death

Joann Herrera of Scientific Computing Systems Dept. 4328 died May 24, 2006. She was 48 years old.

Joann had been at Sandia for 25 years. She is survived by her brothers Tony Herrera and Manuel Herrera, and her sisters Virginia Chavez, Ramona Lopez, Maryellen Herrera, Ruth Pacheco, and Betty Trujillo.

JOANN HERRERA

THE CORPORATE PLANNING CALENDAR

Labs launches Corporate Planning Calendar

The new Web-based Corporate Planning Calendar (CPC) is set to launch.

It's a tool designed to integrate several executive calendars, enabling users to have immediate access to scheduled events. Because it unifies event scheduling into a single system, says CPC coordinator Ruth Bitsui, the calendar readily informs employees and contractors, improves schedule management, and increases attendance at important meetings by reducing conflicting events.

The calendar project was born out of a long-felt need to communicate corporate events and activities to the entire Labs population, Ruth says.

Executive VP and Deputy Labs Director John Stichman has supported the effort, Ruth notes, adding that John and Executive Staff Director Sam Varnado encourage Sandians to use it as a means to add effectiveness and efficiency in coordinating schedules. The online calendar, Ruth says, is the result of teamwork among the following departments: Infrastructure Computing Service, Executive Resources, and Creative Arts.

• **Who can view the calendar?** Anyone with a Sandia Kerberos password is invited to use the calendar.

• **Who can add events?** The CPC support team adds corporate activities and events to the various calendars.

• **Scheduled demos of the CPC**

To learn how to use this online tool, join the CPC support team for any of the four scheduled demos at the Steve Schiff Auditorium on June 27, 8-9:15 a.m. and 9:45-11 a.m. or July 18, 8-9:15 a.m. and 9:45-11 a.m.

Recent Patents

David Raymond (6211): Controllable Magneto-Rheological Fluid-Based Dampers for Drilling.

David Reichmuth (8324) and Timothy Shepodd (8778): Method for Producing High Dielectric Strength Microvalves.

Ed Bochenski (8231), Jack Skinner (8226), Paul Dentinger (8759), and Scott Lindblom (5924): Low Power Photomultiplier Tube Circuit and Method Therefor.

Anup Singh (8321): Dielectrophoretic Systems Without Embedded Electrodes.

Steve Rice (8224) and Mark Allendorf (8324): Apparatus for Measuring the Concentration of a Species at a Distance.

Jim McElhanon (8778), Blake Simmons (8759), Tom Zifer (8778), Greg Jamison (1816), Kamyar Rahimian (1722), David R. Wheeler (1721), and Chad Staiger (6215): Thermally Cleavable Surfactants.

Steven Goldsmith (5632): System and Method for Secure Group Transactions.

Joe Schoeniger (8321), Robert Hughes (1721), Karl Wally (8125), and Stanley Kravitz (1723): Single Particle Electrochemical Sensors and Methods of Utilization.

Sympathy

To Heather Tate (5934) on the loss of her sister, Lorena, May 22, 2006.

Tiny plumbing

(Continued from page 1)

Through the help of Jim and Senior Manager Art Pontau of Materials and Energy Sciences Section 8750, the fittings were licensed late last year to LabSmith, a Livermore-based hardware company formed by former Sandians Eric Cummings and Kirsten Pace.

Working on the initial µChemLab project eight years ago with designer Mark Claudnic (8948), the team developed the first component, called CapTite — a one-piece ferruled fitting with thread connections for sealing to thin, flexible capillaries. This solved the problem of getting fluids to microchannels on chips in a way that prevents troublesome leaks or bubbles.

The next year, manifolds and interfaces that provide consistent fluid connections with simple and accurate alignment were developed. Ron said the suite of tools has become much used in the last three or four years, adding, "It really is miniature plumbing made simple."

The initial grant has spawned work in many Sandia programs, including those sponsored by the Department of Homeland Security (DHS), DoD, National Institutes of Health (NIH), and numerous LDRD programs.

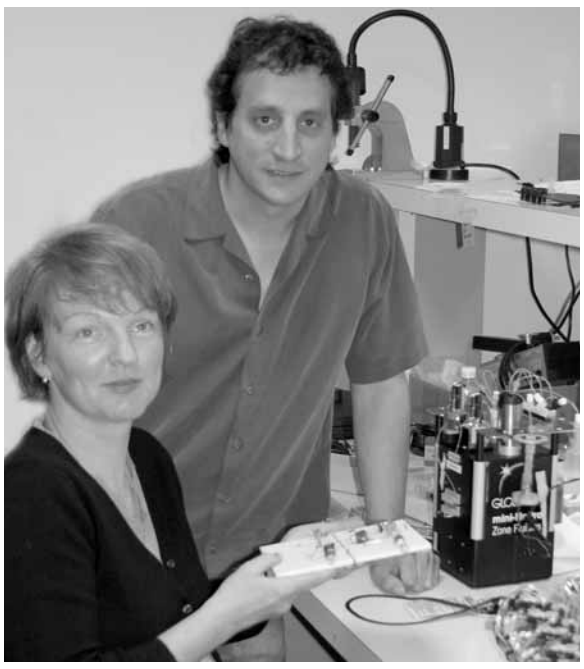
Microthruster development

A specific application example includes LDRD-funded microthruster development, in which designs are being explored for using propellants in nanosatellites for uses such as communications, surveillance, or networking. The fittings allow different configurations to be tested so that mixing an oxidizer to increase thrust can be investigated. The liquid propellants are moved using electrokinetic pumping, in which an electric field causes bulk electroosmotic flow of a liquid in a packed bed within the capillary. The flow reaches the closed end of a capillary and drives a reverse, pressure-driven flow that can be tailored to the application by altering the size of particles in the packed bed.

Several patents have been issued or applied for with the assistance of Scott Ferko (8125), a co-inventor of the patented one-piece ferrule. Patents awarded so far include those associated with compression manifolds, microvalves, and high-pressure fittings. The high-pressure fitting is capable of withstanding up to 40,000 psi and can be used in smaller versions of the standard benchtop analytical tool, high-pressure liquid chromatography systems requiring about 10,000 psi. If scaled down, the technique can potentially be made quicker and more selective, sensitive, and convenient.

The microvalves include a multiport selector valve that has been continuously improved over the last two years, and is now frequently and reliably employed in microflow and nanoflow systems.

"The valves have been tested for more than 250,000 cycles, demonstrating a robustness that enables creation of reliable autonomous systems in the field," says Microfluidics Dept. 8324 Manager Yolanda Fintschenko.



STREAMLINED — Gabriela Chirica (8324), left, and Ron Renzi display a module designed to automate sample preparation in a streamlined, continuous fashion to concentrate, fractionate, and analyze cells, using new approaches to replace some benchtop techniques such as centrifugation. (Photo by Bud Pelletier)

The fittings are also being used to enable selective concentrators that exploit differences in conductivity between particles and the suspending liquid in the presence of a nonuniform electric field.

Sandia researchers improved upon using this well-known force phenomenon (termed dielectrophoresis) for these devices by placing insulating obstacles within microchannels, and the associated electrodes outside in reservoirs. The insulating posts, arrayed in the middle of the microchannel, constrict the electric field and create a field gradient that gives rise to the dielectrophoretic particle separation. This approach is much easier to fabricate (using injection-molded polymers) than the previous glass-based approach. They say their technology, known as iDEP (for insulator-based dielectrophoresis), could revolutionize biological sample preparation. The iDEP technology is currently the focus of a cooperative research and development agreement with Lockheed Martin.

In New Mexico, these tools are enabling a discovery platform for mechanical testing, optical interrogation, electronic manipulation, and measurement at the Center for Integrated Nanotechnologies. Generally, there are applications in proteomics, genomics, chromatography, a variety of microassemblies, and in medical, defense, and similar fields.

One medical diagnostic application is a small portable device that within minutes should be able to screen saliva for markers of periodontal disease, and blood for early indicators of heart disease. Funded by the NIH, the R&D effort includes collaborators at the University of Michigan School of Dentistry and its School of Engineering, as well as the Cornell University School of Applied and Engineering Physics.

Terry Michalske, director of Biological & Energy Sciences Center 8300, has called the research team's results "truly world-class," saying, "They have succeeded in combining cutting-edge science and engineering to achieve something that has the potential to revolutionize medical diagnostics."

"The initial investment blossomed into a real success story, and a fundamental strong element of that was the engineering," Ron says. "It's gone a long way. . . . We have great science here, and we also have great engineering to enable the science."

More than 20 second-generation µChemLab boxes relying on the aforementioned technologies are currently used in Sandia programs. The components are modular and employ a common breadboard and control architecture.

"Researchers can grab the components, draw a flow schematic, integrate and assemble the parts in hours instead of days, weeks, or months," Ron says. "We want to take the chemist away from the problem and not be doing wet chemistry out in the field."

Ron is also lead engineer on a team incorporating the fittings and other enabling technologies into the BioBriefcase project, an environmental monitoring collaboration with Lawrence Livermore National Laboratory (LLNL). The DHS-sponsored project calls for a compact broad-spectrum bioagent detector that autonomously collects, prepares, and analyzes samples using three techniques (DNA amplification using polymerase chain reaction to identify pathogens, immunoassays to detect pathogens and toxins, and fluorescence tagging to identify protein toxins) in a portable unit complete with a system to archive samples for further analysis.

Another DHS-funded project using this suite of microfluidic tools is the Enhanced Bioaerosol Detection project. Besides Sandia, it includes LLNL, Oak Ridge, Pacific Northwest, and Los Alamos national laboratories, as well as Yale University and the Army Research Laboratory. The prototype, slated for testing in August, is a selective aerosol collector and fluorescence spectrometer under investigation for potential use as a low-false-alarm-rate early warning bioaerosol sensor.

"The technologies have propagated through different programs," Ron says, "not all of which they were invented for." This is likely to continue as the field of microfluidics and its applications evolve.

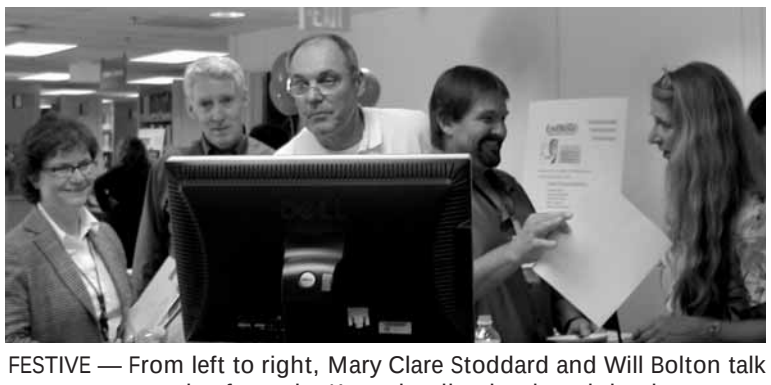
Sandia CaliforniaNews

California technical library gets a new home

By Nancy Garcia

The California Technical Library got an extreme makeover when it moved to bigger quarters in early April, relinquishing drab gray and green furnishings for comfortable new surroundings in a bright, airy setting that accommodates employees needing a quiet space to do research.

Located in Mobile 51 at the center of the site in the property protection area, the library boasts ample shelves, six study carrels, and six public computers for customers. The building also offers wireless access.



FESTIVE — From left to right, Mary Clare Stoddard and Will Bolton talk to a representative from the Knovel online book and database company; Tony Lajeunesse, second from right, speaks with librarian and team lead Saundra Lormand. (Photo by Nancy Garcia)

More than 300 members of the workforce turned out for an opening celebration May 23, attended by eight vendors who came to acquaint users with some of the resources available there:

- CAS SciFinder for chemistry and materials science
- EBSCO Business/News/Newspapers database
- CRCnetBase and KNOVEL electronic handbooks for the sci-tech disciplines
- Safari Bookshelf e-books for computing, information technology, and general management
- Multidisciplinary subject databases, IEEE Xplore/Inspec (electrical, electronic, computing, physics, and chemical physics) and ISI Web of Knowledge/SciSearch
- EndNote, a software application for managing references and creating bibliographies.

Publishers that sent literature and donated door prizes included Jane's (which covers defense and military intelligence), SPIE (optical engineering and photonics), and IHS (standards and specifications).

Collaborative Applications Development and Integration Dept. 8529 team lead Saundra Lormand and her team organized activities to acquaint visitors with the layout and two days of training sessions about electronic resources offered by the library. She said visitors from the New Mexico site are welcome to visit and use the library and computers between meetings. She also anticipates it will be a resource to point out to potential employees.

Collaborate to innovate, innovate to succeed

Summit participants from industry, academia, national labs explore ideas for new partnering mechanisms

By Bill Murphy

What a perfect match-up of venue and event.

The just-opened Bldg. 858 East, one of the newest components in the growing MESA complex, welcomed its first-ever outside group, invited to Sandia to participate in the Accelerating Engineering Innovation summit.

MESA itself, of course, is Sandia's half-billion dollar campus whose underlying vision is to provide the tools, the resources, and the infrastructure needed to advance engineering R&D for the 21st century. As Labs Director Tom Hunter has noted, it is intended to be part of Sandia's initiative to be leaders in transforming how engineering is done.

The summit participants, a blue-chip group of senior science and engineering officials from industry, academia, and the national laboratories, convened at the Labs last Thursday to lay the groundwork for closer collaboration among the three US R&D research communities to address engineering innovation.

The summit was hosted by Sandia as a response to the American Competitiveness Initiative set forth by President Bush; it calls for a multi-billion investment in R&D, education, entrepreneurship, and pro-research tax incentives. New Mexico's senators Pete Domenici and Jeff Bingaman have been strong champions of the initiative in Congress.

The summit began with a kick-off event on May 31, with Tom and Intel Chairman Craig Barrett discussing the current landscape for engineering in the US, problems with science and math education in K-12, and how to make engineering more attractive to young students (see "Summit tackles engineering innovation" on page 1).

The Thursday session, hosted by Div. 1000 VP and Chief Technology Officer Rick Stulen, featured a series of panel discussions by representatives from the three communities. During the presentations, panelists laid out their views on the obstacles that stand in the way of advancing US engineering to the next level.

SUMMIT PARTICIPANTS Paul Peercy (left), dean of the University of Wisconsin College of Engineering; Jim Roberto, deputy director for science and technology at Oak Ridge National Laboratory; and Sandia Div. 1000 VP and Chief Technology Officer Rick Stulen, during a break in the summit proceedings. (Photo by Bill Doty)

Perhaps the single dominant theme of the three panels was that the communities need to get better — much better — at collaboration. Senior executives at the meeting said US industry is increasingly turning to foreign universities and institutes for partnerships to develop advanced technology, in part because it takes too long to develop an agreement here in the US.

The industry panel discussed what is missing from today's engineering graduates. They need employees who can communicate well, understand the competitive market, are strongly grounded in math and science, and are not simply trained but rather have the capacity to think and learn.

There was consensus that effective teaming is vital to innovation. As one panelist put it, "The 'Eureka moment' is not the lone nerd in the corner saying 'Aha!'" but two people — or more — coming to the realization that they can discover and innovate more effectively by working together than by working alone.

Another panelist, responding to a skeptical question about whether innovation is really a group phenomenon, offered the perspective that innovation belongs to the group, while discovery and invention may very well still reside to some extent in the individual.

Rick Stulen, serving as a panelist on the government labs panel, noted that there are pretty decent models for effective partnering between various combinations among any two of the three communities: government and academia, academia and industry, industry and government. The missing model, he said, is a good, sustainable and agile approach to successful partnering among all three communities. Such models exist in Europe and Asia, but because of different funding streams for the universities and different sociopolitical environments, these approaches haven't been as widely successful in the US. Time is the currency of the future, noted several participants, and in Europe and Asia, partnership agreements can be completed in a matter of days.

Said another participant: "Institutions that learn how to partner effectively are going to win — and nations that learn how to partner are going to win."

The summit initiated planning for a partnership among industries, universities, and national laboratories to establish a series of national innovation institutes to address issues identified during the summit discussions. The participants strongly endorsed Sandia's role to help lead the engineering innovation agenda, beginning with the emerging needs in nanoengineering.

Next steps include a report to DOE on the summit outcome, a follow-up conference to hone the specifics of what an effective government/ industry/academia institute might look like, and related follow-up activities required to make the vision of the summit a reality.

Summit

(Continued from page 1)

science and technology and maintain competitiveness in the 21st century.

Growing out of the NAS report was President Bush's American Competitiveness Initiative. In February, Tom participated in a panel discussion led by the president at Intel's Rio Rancho plant, along with then Intel CEO Craig Barrett.

The National Academies has identified accelerating engineering innovation as a critical element in achieving the goals of the American Competitiveness Initiative. The initiative calls for $5.9 billion in FY2007 to increase investments in R&D, strengthen education, and encourage entrepreneurship and also includes additional funding over a 10-year period for research and R&D tax incentives.

Sandia hosted the summit to bring together potential partners to explore ways to improve engineering education and accelerate engineering innovation, and to discuss how government, industry, universities, and the national labs might work together toward this goal, particularly in the area of nanoengineering, building on Sandia's capabilities in high-performance computing, MESA, and CINT.

Tom said one of the challenges the group and the nation faces is doing a better job of promoting engineering as an exciting career with good income potential. Recruiting students to engineering fields can be challenging in a society that doesn't place a strong emphasis in science and engineering, as it did during the time of Sputnik and the US-USSR space race of the late 1950s.

He said a friend who is a professor at a major university jokingly bemoaned the fact that there's never been a television show called "L.A. Engineering" to help glamorize the profession.

Intel Chairman Craig Barrett said the country needs another initiative like the post-Sputnik education push to excite kids about math and science, suggesting that dealing with the energy crisis could be the focus.

"You really need to set a national strategy or priority and show that it can be solved and in fact is important to the government; science and technology is important to us all," he said. "Then you'd get it out of the backwater that it's in and get it on the front page."

Role of education

Of particular importance to Sandia is cultivating a highly qualified workforce to undertake next-generation engineering for its national security missions. This may require rethinking how engineering is done and taught to enable us "to leapfrog ahead" and get to the creative results faster, Tom said. For example, computing needs to be regarded less as a means for calculating and more as a means of learning and idea sharing, he said.

Barrett described concerns about America's K-16 education system discouraging kids who might be interested in math and science. "We're not doing a particularly good job of creating smart people with US passports," he said. One problem is a lack of qualified teachers for science and math.

Another problem is that the US educational system is not setting high enough expectation levels, something you learn right away in running operations for an international company. He talked about the potential of charter schools and competition within the K-12 educational system as potentially a positive force for improving quality.

On the positive side, Barrett said that with both political parties vying for leadership on this topic and an election coming up, the opportunity is ripe.

"We have the best timing in the world to focus on this," he said.

The schedule for the following day included panel discussions to identify and address key aspects of the engineering innovation dilemma through multi-institutional partnerships, presentations and discussion on Discovery Science and Engineering Institutes, and small group breakout sessions.

Tom Hunter and Div. 1000 VP and Chief Technology Officer Rick Stulen hosted the summit. Sandians led or facilitated various working sessions, presentations, and discussions during the summit.

In addition to the Sandia contingent, attendees included industry executives from Intel, Monsanto, Goodyear, Microsoft, Exxon-Mobil, Lockheed Martin, IBM, HP, and Procter & Gamble. Representing academia were engineering deans or their representatives from Harvard, University of Florida, Rensselaer Polytechnic Institute, University of Wisconsin, University of Illinois, University of Michigan, Rose-Hulman Institute of Technology, University of Texas, Harvey Mudd College, Yale, MIT, University of New Mexico, UC Davis, and UC Santa Barbara. Attendees also included science and engineering leaders from DOE, NNSA, Los Alamos National Laboratory, Oak Ridge National Laboratory, and the National Academy of Engineering.

Sandia collaborates with Kansas State University in successful flight computer demonstration

IMPACCT computer system developed to replace SANDAC system

By Michael Padilla

Sandia and Kansas State University researchers have teamed up to create a new flight computer for use in rockets and reentry vehicles.

A flight computer is the brains of a rocket or RV. It tells the vehicle where it is, where it's going, and how to get there.

The new IMPACCT (Integrated Multi-Module PowerPC-based Aerospace COTS Computer Technology) flight computer replaces SANDAC (Sandia Airborne Computer), which has been used for the past 20 years and on more than 100 missions.

The new flight computer recently flew on the Missile Defense Agency's Critical Measurements and Countermeasures Program flight test. The test was part of MDA's test program that provides participants with the ability to reduce technical risk by testing against challenging and complex target scenes in a controlled environment.

"The IMPACCT-1 flight computer successfully flew on the MDA test which was executed to gather experimental data," says Earl Creel, manager of Navigation, Guidance, and Control Dept. 5416. "The idea of the IMPACCT was to create a smaller and more robust flight computer around commercial processor card assemblies."

THE IMPACCT flight computer was installed in this Sandia test rocket at the Kauai Test Facility, where it completed a successful test flight.

An agreement between Sandia and the Electrical and Computer Engineering Department at Kansas State University (EECE/KSU) was formed three years ago to provide two master's-level graduate students to work on technology developments supporting the IMPACCT computer family.

Kyle McDowell and Jerad Simon were hired by Sandia as summer interns and worked on creating the new flight computer. Both based their theses on the technology, earned their master's degrees, and are now technical members of Dept. 5416.

Sandia's Flight Computers Dept. 5339 was instrumental in taking the thesis prototype IMPACCT-2 to production status.

FLIGHT LINES — Jarrod Wood (left), Kyle McDowell, Jerad Simon, and Austin Wareing check out a prototype of the IMPACCT flight computer. Kyle and Jerad began at Sandia as summer interns and were hired as members of the technical staff. KSU students Austin and Jarrod are new Sandia interns.

Durable, reliable, economical

Don Tolsch, manager of Dept. 5339, says the successful development and qualification efforts associated with the IMPACCT-2 flight computer have been the result of strong cooperation between Centers 5300 and 5400.

"The IMPACCT-2 computer is but one in a family of machines that will allow Sandia to address the future needs of our customers in both a time and cost-effective manner," he says.

"As the brains of the vehicle, the flight computer must be durable, reliable, and economical," says Kyle.

"We are fortunate that the thesis prototype worked and now we are able to expand on what we achieved."

The primary design concept for IMPACCT was to take advantage of the continuous advances being made in commercial off-the-shelf (COTS) systems, says Jerad.

"We are not reinventing the wheel," he says. "But we are making advances to systems by combining technology and updating the software and hardware."

One challenge, Jerad says, is working on unforeseen problems that might arise in off-the-shelf systems.

A portion of the collaboration is to work toward the integration of PowerPC-based hardened processors, capable of running Green-Hills Integrity software (a real-time embedded OS), into upper-level electrical and computer engineering classes.

Faculty and graduate students are able to use the equipment in a classroom setting in synergy with ongoing efforts at Sandia.

The students will be able to gain extensive knowledge of the equipment in two graduate-level courses and will be able provide feedback on how to best employ the equipment and provide recommendations for improvements.

EECE/KSU assistant professor Dwight Day is principal investigator; professor John Devore is co-investigator.

Earl says the KSU collaboration has proven to be successful.

"We have gained two very good employees, created two new flight computer programs, and have established a positive working relationship with Kansas State University."

Joan Woodard

(Continued from page 1)

Posture Review there was a strict definition of the strategic deterrent as the *nuclear* capability.

The Nuclear Posture Review introduced the concept of a conventional component in the nation's strategic deterrent. Technology for a conventional strategic deterrent is being pursued; it is called global strike, or conventional global strike.

But now let me address the other question: First, there are a lot of people in the military who support the necessity of a nuclear deterrent, but it's important to realize that the nuclear deterrent only touches a small part of the overall military community today. One question is whether the overall military intellectually supports the idea of the nation having a nuclear deterrent. I believe the answer is yes. But there's a second part of this question: Does the military think the nuclear deterrent is a big part of their war-fighting toolkit? I would hope that the answer to this is no; I hope they would see it in the former. That is an important distinction and one that we always want to preserve — the nuclear deterrent is a unique and special piece of defense for our nation. And this distinction must always be kept clear in people's minds.

LN: *What does a nuclear-armed Iran mean for us specifically?*

JW: First of all, this is another piece of the picture of the international environment — there are nations — and we can only speculate on their reasoning — which look at their environment, look at the threat situation, look at us, see our incredible conventional military superiority, and are driven to develop nuclear weapons capability. Some see nuclear capability as a way of gaining prestige and demonstrating the strength of their nation. These are extremely important dynamics that are probably not unique to the Iranian leadership. Are there other nations that have similar thoughts?

I can't pretend to understand what motivates Iran's leaders, but it is a piece of the international landscape that further reinforces the importance of having a nuclear deterrent.

Complex 2030

LN: *Changing the subject, what is this "Complex 2030" idea we've been hearing about?*

JW: The nuclear weapons complex we have today is more or less the same complex that existed 10 years ago. A little over 10 years ago the nuclear weapons complex downsized — four sites were eliminated. But the remaining sites today are more or less the same as they were 10 years ago. During that intervening 10-year period we have maintained the stockpile, establishing the confidence in the stockpile without underground testing through the science-based stockpile stewardship program.

During this time we have completed small alts and mods — that is, alterations and modifications — and we currently have a life-extension program [LEP] underway for the W76. The stockpile stewardship program really characterized the last decade, and that program will continue because we will always have the responsibility of maintaining the confidence in our reliability estimates of the stockpile.

Now we are entering an era where we may be required to remanufacture the military capability that's in the stockpile. This may involve concepts like the Reliable Replacement Warhead [RRW] and perhaps maybe even more extensive LEPs. This will require the complex to operate and produce full systems unlike we have in the recent past.

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Joan Woodard

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Complex 2030 is the strategy for the future complex that will go hand in glove with the future stockpile. The future stockpile is defined by a number of national-level documents — the national security strategy, the Nuclear Posture Review, and the Moscow Treaty, for example. We need a complex that's really hand in glove with the future stockpile definition.

Some parts of the complex are really quite old and have not been maintained as they should have been. Some of the production facilities in particular are in a poor state of repair. And in some cases, too, the operations and business practices around the complex are not designed to support smaller-lot production at an affordable cost. Complex 2030 is designed to address those issues; it defines the direction for transformation of the complex.

Transforming the stockpile

LN: *Can you predict what it may mean for Sandia?*

JW: The Complex 2030 plan will likely have impacts on Sandia on a number of levels.

One example is the transformation of the complex; the plan calls for removal of special nuclear material (so-called Category I and II) from all the labs. This affects our Sandia Pulsed Reactor. We're now undertaking the fairly challenging scientific program called QASPR [Qualification Alternatives to Sandia Pulsed Reactor] which will establish an approach based on modeling and simulation and the use of other experimental facilities to create the same kind of capability that we have in SPR today. That allows us to save the cost of operating and securing SPR, which is a large expense today.

"Let me clarify something here: There's a confusion I've seen in the public press where people have incorrectly picked up the impression that RRW is all about creating a more reliable weapon. That's not the case. RRW is a design to achieve the same level of reliability but with higher confidence in our ability to assert that reliability every year."

Another significant piece of Complex 2030 is the transformation of the stockpile from the LEP [life-extension program] era — where we extend the current stockpile life through alts/mods and other life extension programs — to an RRW-based stockpile, remanufacturing a stockpile to the current military requirements. That RRW-based stockpile enables elimination of some hazardous materials, incorporates greater design margins, and enables significant improvements in safety and security and use control. As those principles are realized in the RRW, the complex will change to support that kind of stockpile. What does that mean for Sandia? With an RRW-based stockpile, Sandia will have the major role in the systems engineering and overall systems integration support.

LN: *I'd like to talk more about RRW, but first, is Complex 2030 the same as the need for "transforming the complex" that we've been hearing about?*

JW: Essentially, yes. You may recall that there was a study about the future needs of the complex. That study was ordered by the Congress, by the House of Representatives. It's sometimes referred to as the Overskei Study because the chairman of the study group was Dr. David Overskei. They made a number of recommendations — some are being implemented directly, some are being implemented in a limited way. So, yes, Complex 2030 is the response by NNSA to the advice it received from the Overskei panel report. It is the NNSA strategy on moving forward.

LN: *At the Labs over the past few months we've talked about leading the transformation of the complex. What is Sandia's proper role in transforming the complex and what are we doing to attain that leadership position within the overall complex?*

JW: Leadership comes not by the fact that you're anointed, or you're put up on a pedestal. Leadership comes by actions that pull others along. Leaders inspire, are committed to a vision, and take action on that vision. I think our greatest opportunity to contribute in the transformation of the stockpile and the complex is by performing and focusing on our mission work. But we shouldn't do that work in such a way that we're just locally optimizing our success. Rather, we approach all our work as part of a team across the entire complex, with the federal authorities and federal program managers in the key decision-making role. That's leadership.

DEPUTY LABS DIRECTOR JOAN WOODARD (left) talks with *Lab News* interviewers John German and Stephanie Holinka about the state of the weapons program at Sandia. (Photos by Randy Montoya)

Sandia's role in RRW

LN: *So back to RRW. What is Sandia's role exactly? I understand right now we're in a feasibility study where Sandia's New Mexico site is supporting LANL and our California site is supporting Livermore.*

JW: Our historic policy as a nation — and NNSA embraces this — has been to maintain two teams that compete in an intellectual competition for the best ideas. That was exercised with the RRW design study — the study results were submitted in March.

These results will be evaluated through a process determined by the federal authorities and a decision will be made about what to do next. Our role has been to support both teams, just as we have for many, many decades. And we participated on both teams, establishing walls between the teams to preserve the competition-sensitive information.

LN: *What will determine whether RRW moves forward in a policy sense? Is* **not** *moving forward with RRW even an option?*

JW: That's a really good and important question. Consider the current stockpile — these weapons were designed for particular military capabilities that drove aspects of the design to be very highly tuned. And those considerations in some cases led to some very tight design margins. The future stockpile requirements don't require that kind of fine-tuning. However, the current threat environment calls for better surety — and that too is part of the requirements.

Part of the policy debate right now is, "Okay, fine, but as long as these [existing] weapons are still viable, can't we just keep going with them?" And that gets down to arguments about aging, about confidence. As years go by we get farther and farther away from the test basis. So, it comes down to a confidence issue, confidence in the reliability. And let me clarify something here: There's a confusion I've seen in the public press where people have incorrectly picked up the impression that RRW is all about creating a more reliable weapon. That's not the case. RRW is a design to achieve the same level of reliability but with higher confidence in our ability to assert that reliability every year.

RRW represents a departure in terms of design requirements for nuclear weapons and the stockpile. If you relax the requirement to have the highest yield for the lowest weight — that is, to be able to launch the most yield the longest distance in a multiple reentry vehicle configuration — then we can design weapons in such a way that, without underground testing, we will continue to be able to have the confidence in our assessment of the reliability of the weapon. Similarly, if we can design surety features into the weapons systems, we can achieve higher levels of safety, security, and control at an affordable cost.

LN: *RRW, then, is not a new weapon?*

JW: The key is that RRW is not a new military capability. We're maintaining military capability, but we can't remanufacture the weapons that are in the stockpile today because we can't even buy some of the hardware in the systems. So to remanufacture for the same military capability, we must do it with today's available hardware and materials, increasing the surety of the systems, and we must do it in a way that will give us greater confidence in asserting reliability year after year after year without having to run underground tests.

LN: *Assuming RRW moves forward beyond the design phase, what will be Sandia's role? We've heard a wide range of estimates from almost nothing to a lot.*

JW: If you look back decades ago when we were doing the W76, the W87, the W78, Sandia's role has always been substantial, from engineering design through to the first production unit. We not only have the design responsibility for a number of the key weapon components but we also have the overall systems engineering role. The systems engineering role includes both modeling and simulation as well as experimental testing work to certify the design against the systems requirements. Because the surety capability is one of the fundamental RRW design goals, and because we are the primary provider of surety componentry, we will have significant technology development and maturation responsibility.

W76, Z machine, and QASPR

LN: *It sounds like there are big challenges and lots of opportunities ahead for Sandia. But how about citing a couple of our recent nuclear weapons accomplishments that will have a national impact, a large national impact?*

JW: Thinking about our key accomplishments, there are many, but let me talk about three that I'm particularly proud of.

The first I would like to highlight is the W76 [life-extension program]. The design teams have worked to demanding schedule and cost requirements through very complex and challenging design requirements. We're continuing the drive to the first production unit through some challenging and difficult issues. Folks are in the trenches working very hard; they're working closely with the Kansas City Plant, working the issues. And what we've been able to accomplish and how far we've come with the 76 life-extension program is really a phenomenal accomplishment for this lab.

The second is the work at Z, which has been really quite exceptional. We have a tremendous group of people working at Z and they're contributing across the board in material dynamics, in a number of aspects of weapons physics, as well as continued work in support of weapons effects. The work has been really quite astonishing, gathering experimental data on phenomena

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Joan Woodard

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that have eluded us for some time. And we continue to develop strong, collaborative relationships with Lawrence Livermore and Los Alamos [national laboratories].

And then there is the Qualification Alternatives to Sandia Pulsed Reactor, the QASPR program. We know that in the international environment there are nations with nuclear weapons. For us to have some understanding of the effects of those weapons on some of our own defense hardware and technologies, and how you might harden for a radiation environment, is really important.

We designed very unique experimental facilities to simulate these radiation environments. One of those unique facilities was SPR [Sandia Pulsed Reactor]. It's one of a kind — it's the gold standard. But now for reasons associated with the cost of operation and security, we now plan to close the facility. So we've drawn a very hard line that says we're going to operate SPR this year and at the end of this year it is done. That has really been a challenge for us.

Normally when you develop some new capability, such as a new computer model or new laboratory experiment, and you've got the gold standard over here, what you do is develop that new capability and then afterwards you test it compared to the gold standard. Then you see whether they line up. With QASPR we're doing that in reverse. We're taking the data from SPR this year and we're putting it on the shelf. And then we're going to come back over the next couple of years and compare our work to the data we're developing on SPR right now. Another challenging program with risks that we are managing to the best of our ability.

"Folks are in the trenches working very hard [in the W76 program]; they're working closely with the Kansas City Plant, working the issues. And what we've been able to accomplish and how far we've come with the W76 life extension program is really a phenomenal accomplishment for this lab."

Initiatives in the NWSMU

LN: *About a year ago now, not long after Tom [Hunter] became Labs director, we went through a pretty major restructuring. How is that working for the nuclear weapons program?*

JW: The laboratory changes have not changed the nuclear weapons program. However, we — the nuclear weapons program team — are making some changes that I'm actually very excited about.

I'm trying to formalize a much stronger engagement with the line organizations in the nuclear weapons program, with formal roles for some key line directors as advisors to the program. We now have a program director in California, which we didn't have for the last four or five years. We've also tried to do some workload balancing across the programs.

We're also starting to establish a more formal planned structure for the projects. Next year we will have project plans for each project. Project managers will be senior managers; that'll free up the department managers to execute the mission work. And it will get the senior managers very directly involved in the nuclear weapons program. And because senior managers interact with their directors much more frequently than do department managers and staff, we have more directors with knowledge of the programs. I believe this is going to do a lot in terms of the integration of the line organizations in the program.

Also this next year, we're changing the way we do budgeting and FTE targets. We're going to use these project plans [mentioned just above] as the basis for the implementation of the spend plans.

Budgets and hiring

LN: *You mentioned the budget. What is the near-term budget outlook for the nuclear weapons program?*

JW: The House has issued its report draft on the FY07 budget and actually it came out very close to the president's nuclear weapons budget request. If you look at the longer-term trends, the expectation is that the nuclear weapons budget over the next years will be flat at best. Even with flat, though, with inflation of a few percentage points a year, we'll have a net loss of buying power.

What I've been telling people is that, even though we're entering an exciting and dynamic time with RRW and the LEP work that's continuing, we'll be doing our overall stockpile work in a particularly challenging time. We are being challenged to be much more cost-effective as a laboratory.

In terms of immediate impact, this current year we reduced approximately 160 FTEs in the weapons program. I predict that we're going to be down on the order of 150 to 200 FTEs a year over the next years. It will really challenge us but we should not take this as a message that the program is not important and we don't have incredibly important work to do. We're actually entering an era where the demand of actual product is going to be quite large.

LN: *So that brings up the natural next questions: If you're losing 150 to 200 FTEs a year, mostly through attrition, and at the same time you're trying to replace retiring weaponeers with fresh talent, how will you do that? What's the plan?*

JW: Fortunately over the past four years we've added a number of people to the nuclear weapons program. For example, I look at several of the [Division] 2000 centers — they've hired some really great folks, a lot of folks directly out of school, so they're very current in their academic training. And what's great is that while we're doing the LEP and even the RRW design study, these [new] folks are having the opportunity to work side-by-side with some of the folks who have many years of experience in the weapons program. We're obviously going to be more constrained in our hiring over the next years, but we will continue to have a need and will execute some judicious hiring to accomplish our work.

ISO certification a learning experience

LN: *I wanted to ask you about ISO certification for nuclear weapons program. What will that entail and what are the benefits of that?*

JW: This fall we will be submitting an application for ISO certification. We're applying for certification for the overall management system for the program, the SMU. Though we're not applying yet for ISO certification for everything that we do in nuclear weapons, I think this a good starting point for us to test what we have in place against the standard of the ISO certification process for quality management systems. Based on the feedback we get from this first application, I'm sure we'll learn a lot. That will position us for the next step.

ISO certification gives us a good basis, a formalized basis, to demonstrate that we have an industry-standard approach for quality assurance and quality management. And that, in turn, will provide a good assurance to NNSA that we have a quality management system. NNSA currently audits us periodically and reviews our system. In the future, with this certification, they will be able to rely more heavily on that certification rather than doing their own independent audit. And for us, we're learning a lot about how and why we do things just by the process of going through the ISO application process. It's been a tremendous learning experience.

Confidence and reliability

LN: *We know the certification of the stockpile is the most important job that Sandia has. Is there a day in the future when certification will not happen? And what happens the day after?*

JW: First of all, let me clear up a common misperception: We don't certify the stockpile. What we do is we assess the certification. For example, just as we are putting the LEP in the stockpile, we are qualifying, we are certifying, that design. We're saying, in effect, here are the requirements and here's the body of documentation that says, yes, our design meets the requirements; it passed the certification basis.

Every year we look at that thoroughly through a process involving our independent assessment group, to see if there's any concern about our confidence in what we say about reliability.

Over time virtually every weapon system in the stockpile has had some hardware that we have had to fix, due to aging and other design issues. Any high-tech piece of hardware has these issues come up. As you continue with this process over time, you're moving away from the original certification basis. And so, over time, you may have more uncertainty.

And that brings us back to the merits of RRW, to increase our confidence in reliability.

LN: *I guess the lay person doesn't really understand. Is there a certain threshold at which the president goes 'oh boy,' or is it a spectrum?*

JW: There have been situations in decades past where we've removed weapons from the stockpile for various reasons. These have been rare situations, but would it be out of the question to think that that might come up again? No. But to address your point in general terms, assessment is a very challenging problem that relies on data, information, models, and technical expertise in knowledgeable people. And that's why having really, really intelligent, best-and-brightest people who have the experience to make those technical judgments is vitally important.

LN: *Aside from removing weapons from the stockpile over a technical issue, you noted that we are in the process of downsizing the stockpile per presidential order. How do we go about doing that?*

JW: Yes, the president has said the stockpile will be 1,700 to 2,200 warheads by 2012. We are in fact dismantling weapons and changing the size and the makeup of the stockpile by doing that.

Our ongoing surveillance program also results in a net reduction in the stockpile. Every year we do a surveillance program involving removing a sample of the stockpile. Some of the weapons we destructively test, some of them we test and then reassemble and send back to the stockpile. What that means is that each year the stockpile is reduced by a handful of units.

We are now transforming the way we do surveillance. Previously, surveillance was a test-based statistical sample approach. In that method, you draw out samples and test them to see if how well they work.

Today we're moving toward something called integrated stockpile evaluation. That approach has a new design for the sample size based on what we know about the systems, what we know about the aging science, and the modeling capability that we've developed. Under this new approach, we're able to reduce the sample size and use much more of our knowledge basis from historic testing and modeling to evaluate the stockpile.

Teaming for success

LN: *Anything else that you'd like to talk about?*

JW: We're moving into a new era that involves the enduring stockpile stewardship program plus RRW as well as transformation around the future stockpile and the future complex, Complex 2030. It's really challenging us [the NNSA labs] to work together like never before. NNSA is encouraging interdependence and teamwork. They're putting in place multi-site incentives where we're all together, succeeding together or failing together. I think that's really causing some good behavior changes.

The three weapons labs are coming together; the weapons programs leads at the labs have been working over the last months to come together as a team. We've been known to have our disagreements in the past and I'm sure we'll have our disagreements in the future, but we're working hard to develop a strong relationship so we can be a highly effective team to support NNSA and the nation.

It's all about getting focused on the job and getting it done.

66 Team awards recognize achievement

The 2006 Employee Recognition Awards program this year recognized 57 individuals and 66 teams. The individual recipients' photos were published in the May 26 issue of the *Lab News*, along with some of the team winners. Other team listings were inadvertently omitted in that issue. Here is a complete listing of the teams — all the teams — that earned recognition this year for contributions to mission success.

2005 ECP Campaign Team

The 2005 ECP Team led the incredibly successful 2005 Campaign.

Ellen Wilsey, Benita Montano, Sonia Herrera, Antoinette Anaya, Ginny Edmund, Lorraine Cordova, Pam Catanach, Geri Herrera, Nichole Herschler, Janette Kohler, Jacque Ramirez, Tracy Knowlton, Carmen Good, Melissa Garner, Art Verardo, James Jaramillo, Gwen Sorensen, Ed Lizewski, Jon Cashwell, Iris Aboytes, M. Griselda Armijo, Suzette Beck, Tara Renee Camacho-Lopez, Kathryn Crowder, Joanne Dodge, Sarah Downey, Jason Follingstad, Cristina Fritz, Laura Justus, Yvonne Mak, Debra Menke, Joanne Paulos, Therese Porter, Sandhya Rajan, Shelley Reams, Steven Rivera, Crystal Rose, David Salas, Colin Scroggins, Diane Sessa, Clare Stanopiewicz, Dana Tidwell, Mary Beth Tidwell, Mary Woodruff.

5th Annual Forklift Rodeo Team

This team is dedicated to the safe operation of forklifts here at the Laboratory through the Forklift Safety Rodeo.

Rebecca Naranjo, Ernest Sanchez, Elizabeth Carson, Willie Johns, Brad Lackey, Gabriel King, Mark Warner, Darrell Fong, Anthony Leyba, Lewis Marlman

Advanced Fuel Cycle Initiative (AFCI) Technical Integration Team

The AFCI Technical Integration Team rises to meet the Energy Policy Act of 2005 (EPACT) reporting requirements for DOE-NE and the Secretary of Energy.

Doretha Smith, Helen Srader, Victoria Kristine Nuanes, Kasumi Silva, Heather Maclean, Peggy Collins, James Smith, George Bailey, John Kelly, Dave Sala, Cindy Burnett, Benjamin Cipiti, Shawn Burns, Tracy Dunham, Nancy Hetrick, Karen Jo Klar, Doug Prout

Airworthiness Assurance Team

This team produced maintenance, inspection, and repair solutions to address critical airworthiness problems for the FAA, NASA, military, and world aviation community.

Ciji Nelson, Joseph Dimambro, Dennis Roach, Julia Archibeque-Guerra, Waylon Anthony Delong, Josephine Graham, Lenore Boulton, Paul Veers, Paul Werner, Kirk Rackow, David Moore, Eric Bloomquist, Tonimarie Dudley, Mike Ashbaugh, Michel Bode, Iyiin Chang, James Arlin Cooper, David Galella, Gerald Langwell, Rob Pappas, Richard Perry, Floyd Spencer, Paul Swindell, Phil Walkington, Thomas Witkowski

ATMOSPHERIC RADIATION MEASUREMENT — UNMANNED AEROSPACE VEHICLE (ARM-UAV) TEAM

Atmospheric Radiation Measurement-Unmanned Aerospace Vehicle (ARM-UAV) Team

For the team's exceptional dedication and hard work in developing a complex atmospheric research payload and deploying it in the Tropical Western Pacific.

Terry Spraggins, Jason Reinhardt, Ken Black, Joel Groskopf, Dan Yee, Larry Lebel, John Smith, Bob McCoy, Tim Tooman, John Beitia, Roger Busbee, Colleen Harris, Cynthia Richards

B61 Development Test Assembly Team

For ongoing exceptional service in the assembly/disassembly of numerous successful flight and Area III test units and a critical B61 hydrodynamic test conducted at LANL.

David Clements, Bryan Guernsey, Mark Anderson, DebbieLee Campos, William Reutzel, Frank Whiston, David Faucett, Michael Hall, Thomas Martinez, Felipe Reyes, Samuel Sevier

BioNet Systems Modeling and Analysis Team

For delivering the Biological Decision Analysis Center (BioDAC), a new tool that produces important results to improve the nation's defense against bioterrorism.

California Team Members: Dawn Manley, Heidi Ammerlahn, Lynn Yang, Marion Martin, Julie Fruetel, Christine Yang, Marilyn Hawley, Ben Wu, Michael Johnson, Zach Heath, Stephen Mueller, Mike Goldsby, Jaideep Ray, Mark Allen **New Mexico Team Members:** Han Wei Lin, John Jungels, Luis Hernandez, Jr., Michael Chen, Donna Djordjevich, Jason Honda, Angela Hsu, Andrew Rothfuss, Timothy Sa, Keith Vanderveen, William Wilcox

CDM Financial Team

CDM Financial Team revised processes to meet Tail Number Accounting Requirements.

Joan Lane, Cathie Sanchez, Donna Bauer, Patricia Salgado, Maryanne Heise, Mary Quintana, Maria Beltz, Emily Sers, Shawn Littleford, Joel Boyer, Lina Castillo, Sharon Dobias, Joanna Frumkin, Roger Kite, Brian Leen, Eva Wilcox, Lark Willson

Center 4500 Software Engineering Process Group

Center management and staff sustained their path of software process improvement and were externally certified (and NNSA recognized) as a SW-CMM(R) Level 3 organization.

Terri Galpin, Leslie Gardner, D. Roberta Jaramillo, Larry Kincaid, Susan Harty, Marie Gendreau, Lisa Trainor, Albert Alvarado, David Cuyler, Gerald Esch, Gregory Durfee, R. Scott Joyce, Joseph Schofield, Thomas Cuyler, Kim Denton-Hill, Thomas Ferguson, Manuel Ontiveros, Gary Rivord, Edward Saucier, Boris Starr, Jr., W. David Williams

China Nonproliferation Technology Demonstration Team (CNTDT)

In an historic first, CNTDT was successful in jointly designing and implementing security upgrades at two nuclear facilities at the China Institute of Atomic Energy.

Lori Carroll, Tasha Perea, Heidi Smartt, Dominic Martinez, Steven Iveson, Jason Coombs, Donnie Glidewell, Charles Nickerson, Robert Follis, Tommy Goolsby, Janice Leach, Richard Lucero, Brent Peterson, James Purvis

CID (Classified Electronic Media Inventory Database) Development Team

For creation and production deployment of new automated inventory tools for managing the thousands of pieces of active classified electronic media on the SCN.

Ben Anello, Elisa Berg, Heather Robideau, Matt Bohnsack, Russell Goebel, Rich Cleary, Charlie Snider, Jeffrey Anastasio, Mark Stilwell

Closure of External Safeguards & Security (S&S) Findings

The Resolution of Findings program successfully closed 65 external findings from Security programs and all Sandia sites in FY05 using a thorough verification assessment process.

Gloria Solis, Joanne Trujillo, Theresa Apodaca, Samantha Flores, Anita Romero, Melanie Florez, Timothy Lucero, Enid Brown, Melanie Mead, Heather Egtervanwissekerke, Steve Feador, Barbara Frames, Daniel Frampton, Dionne Hildago, Ryan Housley, Benjamin Huff, Brenday Jensen, Lisa Kaneshiro, Ronald Knowles, Michael Merlino, Charles J.E. Montoya, Michael Pooler, Robert Schwartzman, Bud Siple, Nicolas Walker

Code Management System (CMS) for the Air Force Materiel Command Application Team.

Code Management System capabilities were significantly increased to support use control for B61-7,11; W80-0,1; B83-0,1 and W84-0 weapons in addition to the previously supported B61-3,4,10.

Adria Liszka Reutzel, Katherine Sutton, Anne Chavez, Mary Atkins, H. Daniel Caton, Amy Matteucci, Carla Weatherred, Johnny Baca, Barbara Pass, Elaine Lopez, R. Reed Jackson, Jr., Elaine Paulsen Evans, Rosemary Gergen, Melissa Wilson, Jim Emery, Mike Dinallo, David Peercy, David Calkins, Juan Espinoza, Marianna Mauritz, Ryland Hubka, Deborah Kernan, Gigi Gonzales, Julie Bouchard, Kevin Schmidt, Steven Rezac, Tom Brewer, Matt Donnelly, James Turner, David Gelet, Dave Neidigk, Harvey Ogden, Brian Geery, David Cocain, Kenneth Reaves, Paula Sanchez, Bryan Spicer

Compact Pulsed Power Team

For consistently providing cutting-edge compact pulsed power design and development in a strongly customer (WFO and DP) focused environment.

Jeff Alexander, John Joseph Borchardt, Phillip Coleman, Gary Denison, David Ferguson, Larry Lucero, Christopher Moya, Paul Primm, Steven Shope, Talbot Smith, Joshua Usher, Jose Villalva

Core Design Configuration Management Process Development Team

For creation of the new process for the configuration management of Pro/E model files during the weapon product life cycle.

California Team Member: Aaron Machado
New Mexico Team Members: Timothy Wiseley, Abraham Sego, Irene Kolb, Anthony Trujillo, Sean Brooks, Timothy Meeks

Critical Flight Hardware Fabrication Team

Critical Flight Hardware Fabrication for the Sandia LDRI Orbiter Inspection System (LOIS) in support of the NASA Return to Flight Program.

Paul Thompson, Clarence Esquibel, Michael Meade, Ronald Ward, Monico Lucero, Ronnie Albers, Mario Elevario, Gordon Box, Nicole Yazzie, Mark Kumpunen, Jack Heister, Kraig McKee, James Paustian, Carlos Mascarenas, Thomas Gutierrez, Johnny Montano, E. Keith Mote, John Cresap, William Vanselous, Andy Charley, Linda Kelton, Henry Lorenzo

Cyber Counterintelligence Analysis Team

Roger Suppona, Michael Hannah, and Gerald Hendrickson, teaming on their own initiative, for exceptional contributions to the national counterintelligence community and the war on terrorism.

Gerald Hendrickson, Roger Suppona, Michael Hannah

DART (Design through Analysis Realization Team)

The Design through Analysis Realization Team (DART) is an integrated suite of software tools that enables analysis to more profoundly impact weapon design.

SANDSTORM TEAM

Sean Brooks, Constantine Pavlakos, Alan Scott, Christopher Lamb, Darryl Melander, Tom Laub, Robert Whiteside, Howard Walther, Patricia Kaufmann, Lisa Ice, Rena Haynes, Catherine Alarid, Lydia Koch, Karen Haskell, Daniel Sands, Teddy Blacker, Steven Owen, Edward Hoffman, Charles Adams, Robert Clay, John Greenfield, Merlin Current, Jr., Michael Hardwick, Victor Holmes, Wilbur Johnson, Joseph Jung, Colby Lavin, Jill Schwegel, Amy Shrouf, Gregory Sjaardema, David White, Brian Wylie

Division 10000 Behavior-Based Safety Operations Steering Committee

The Behavior-Based Safety (BBS) Operations Steering Committee designed and implemented a process to prevent injuries in Division 10000 for Logistics and Facilities Maintenance workgroups.

Pete Nieto, Twyla Sprouse, Christine Saavedra, Yvonne Molina, Ricardo De La Rosa, David Baca, Mary Bawcom, Donald Rhodes, Dominic Kittredge, Edward Archibeque, Michael Lucero, Ernest Salas

Enterprise Database Administration Team

Recognition of teamwork, technical skills, and commitment demonstrated by the DBA team in achieving the goal to become a true enterprise resource for database services.

Art Machtinger, David Schoch, Lawrence Arellano, Kyle Hayden, Jonathan Kreisle, Ronald Weagley, Rachel Cardona Brown, Elaine Martinez, Priscilla Altsisi, Rachel Drucilla Sitges, Linda Garcia, Cynthia Huber, Peggy Schroeder, Michael Mink, Walter Walkow, Carl Prestwich, Bernadette Edge, Michael Hagengruber, Michele Lesher, Dave Kelly, Chris Castle, Andrew Ambabo, Susan Gonzales, Angie Morales

Explosives Technologies Group On-the-Job Explosives Training Team

This team developed and presented hands-on explosives safety training for the Explosives Technology Group. This comprehensive, documented training will ensure safe, consistent work practices.

Brian Melof, Kevin Fleming, Susan Bender, Adam Jimenez, David Wackerbarth, Frank Horine

Facilities Lighting Enhancement Design and Construction Team

The Lighting Team converted most of Sandia's lights to improve illumination quality, reduce maintenance, standardize equipment, and reduce energy consumption by over two million watts.

Samuel McCord, Donald Kerekes, Kelley A.C. Garcia, Herman Gomez, John Gonzales, Greg Anderson, Nicasio Nolasco, Jr., Gary Hoe, Ralph Wrons, Steve Koffman, Wesley Rita Mozley, Roger Rizkalla, Lucille Roybal, Thomas Vigil

Facilities Maintenance MESA Customer Service Team 2

For employing a team approach to reducing costs, improving performance, and reducing customer disruption in maintenance and modification of building mechanical and electrical systems.

Eugene Wade, Albert Yepa, Adrienne Gaylor, Kelley Garcia, Russel Matheson, Randy Gates, Dan Williams, Mary Trump, Thomas Mulville, Bill Kolb, James Dotson, James Robinson, Joseph Hancock, Thomas Boothe, Steve Goodrich, James King, Gerald Walters, Kirt Wilson, Rick Elliott, Greg Anderson, Pete Argo, Phillip Pelzman, Richard Simmons

Foreign Travel Team Integration

For integration of Division 4000 Foreign Travel Office with Center 6900 travel expertise, developing one team to provide comprehensive foreign travel support to the Labs.

Lori Carroll, Cynthia Maxwell, Janine Donnelly, Keri Parmeter, Ramona Tenorio, Christine Schwatken, Susan Kline, Patricia Dickens, Marceline Jordan, Laura Connolly, Stephanie Kelly, Leslie McReaken, Jackie Stover

FY2006 Ten Year Comprehensive Site Plan Team

For exceptional contributions to an outstanding FY2006 TYCSP.

Norman Wasson, Carol Meincke, Nydia Schmidt, Monica Salas, Debra Yzquierdo-Trujillo, Edward Pioquinto, Bryan Davis, Donald Campbell, Kenneth Kuzio, Michael Gomez, Edward Tooley, Harry Gullett, Karen Lynne Henry, Olaf Juveland, Thomas Bosiljevac, Darrell Rogers, Allen Herring, Darrick Jones, Linda Chavez, Beth Dick, Gary Hoe, Michael McClafferty, Katherine Rivera, Nathan Sommer, Peggy Stevens, Racquel Strader, Craig Taylor

(Continued on next page)

Team honorees

(Continued from preceding page)

Glass-to-Metal Sealing Team

For exceptional teamwork, dedication, and technical achievement in addressing hermetic seal failures on Lightning Arrestor Connectors in support of the W76-1 and W80-3 programs.

Garry Bryant, Bonnie McKenzie, Alice Kilgo, Neil Sorensen, Mark Rodriguez, Ronald Loehman, Michael Rye, William Wallace, V. Carter Hodges, Chad Watson, Charles Walker, James Van Den Avyle, Mark Reece, Jason Brown, Richard Grant, Jeffrey Christensen, Ronnie Stone, Larry Andrews, R. Wayne Buttry, Michael Cuban, James Emmons, Joseph Michael, Saundra Monroe, Donald Susan, Wayne Tuohig

Hurricane Katrina Economic Analysis Team

Providing Economic Impact Analysis of Hurricane Katrina accurately and ahead of schedule.

Nancy Brodsky, Lory Cooperstock, Paula Downes, Mark Ehlen, Verne Loose, Andrew Scholand, Vanessa Vargas

Integrated Correlation and Display System Team

For successfully delivering and verifying the Integrated Correlation And Display System (ICADS).

Stefani Chan, Jamie Smith, Jeanne Oselio, Kathryn Smith, Joselyne Gallegos, Mary Padilla-Myers, Carmen Allen, Janis Schuster, Melicia Proctor, Christine Korbin, Susan Louise Wilson, Denise Carlson, Betty Roush, Birute Watson, Theresa Bourne, Amelia Maxted, Russell Osborne, Susan A.H. Jean-Pierre, Alicia Perry, Michael Kruthaupt, Monica Carriaga, Michael Duran, Jill Rivera, Marisa Ruffolo, Kevin Heck, Audrey Martinez, Martin Chen, Jeannine Washington, Gery Navalesi, Richard Chapman, Lawrence Ray, Linda Dubbert, Jeremy Goold, Jake Proctor, Marc Gunkel, Glyn Evans, Loren Jayne, Michael Hess, Cathryn Peterson, Linda Shepard, Sally Harrer, Billy Don Richard, Karen Erickson, Gary Cable, Meara Allena Walsh, Paul Attermeier, Walt Huebner, Thomas Anthony Artale, Dorothy Simpson, Deborah Pechewlys, Cindi Reyes, Renee Howell, Michael Eckley, J. Randy Weatherby, Charles Keller, Patricia Sprauer, Teresa Bottomly, In Mccann, Sue Bodily, Andrew Jonathan Horn, Edith Henderson, Mathew Morlock, James Opalka, Anthony Montoya, Gary Day, J. David Kestly, John Williams, Philip Dreike, Steven Weissman, William Breiland, William Filter, Don Rountree, Ellan Anderson, Darrell Thomas, Allen Sault, John Romesberg, Martin Arrambide, John Robert Iverson, Nazim Elmazi, Surapong Somkaew, Randall Comer, Ivan Lee, Nathan Michael, John McGlinchey, Robert Carter, David Saetrum, William Slosarik, George Davidson, Bonnie Woodard, Greg Haseman, Robert Paul Clark, Jr., Steve Spahr, Rondall Jones, Christopher Reed Love, Nelson Enns, John Burns, Doug Trump, David Scott Henderson, Paul Getz, David Copithorne, Ryan Prescott, Philip Sackinger, William Hilbun, William Richardson, David Stuart, Brian Errett, Brad Andrzejewski, Lorraine Baca, John Ball, Julian Bartlett, Suzanna Bemis, Joseph Chavez, Meifan Chen, Chui Fan Cheng, Bernard Clifford, David Clifford, Ian Cooke, Jacob Delgado, Eric Fox, Margaret Furman, Mary Caroline Gabel, Daniel Garcia, Phyllis Garcia, Jennifer Gjullin, Maria Grabianowski, Julie Gregory, J. Michael Griesmeyer, Victoria Hamilton, Monica Hansen, Christopher Hogg, Jeffrey Joseph, Jeffrey Kluck, Richard Kominek, Sylvia Lake, Jayme S.C. Lara, William Lawry, Nancy Martinez, Susan Martinez, Anthony Medina, David Michael, Darwin Newcom, Todd Ritterbush, Robert Brian Romero, Deborah Saiz, Lori Sanchez-Guerra, David Sears, Sean Stroud, Marilynn Jane Szydlowski, Jimmy Tempel, Tan Thai, E. Don Thalhammer, Eric Tomlin, Vincent Urias, Timothy Vargo, Anthony Wagner, Lonnie Widler, Darin Worf, Stephen Zenker

ISL MODELING TEAM

ISL Modeling Team

In recognition of groundbreaking modeling and simulation based understanding of ISL Shock-Unlock Behavior.

Clay W.G. Fulcher, John Holland, Charles Stone, Nicole Breivik, Timothy Edwards, Timothy Jones, Henry Duong, Kenneth Eras, William Greenwood, Kenneth Gwinn, Lubomyra Kmetyk, Jakob Ostien, Howard Walther

Israeli-Jordanian Explosive Portal Monitor Cooperation Team

Sandia National Laboratories and Soreq Nuclear Research Center (Israel) collaborated to develop an explosive detection portal that is now in use on the Israeli-Jordanian border.

Charles Rhykerd, Jr., Christopher Runyan-Beebe, Amir Mohagheghi

KM-SAL Team

This award is for the synergistic efforts of the business and technical teams to provide Sandia with the Knowledge Management - Streaming Assets Library (KM-SAL) application.

Susan Moore, John Tissler, Rachel Drucilla Sitges, LaVonne Cortez, Ellen Lemen, Jaye Bullington, Laurence Cox, Mark Ralph, Marcellea Davis-Sneddon, Bertha Barreras, David Pollock, John Montoya, Tamara Orth, Jessica Dixon, Bernadette Edge

MicroChemBioLab Proteomic-Based Biological Detector Deployment Team

For building a proteomic-based biodetector and testing it over a three-week period at the Edgewood Chemical and Biological Center (ECBC) in September 2005.

Bruce Mosier, George Sartor, Brent Haroldsen, Jeanne Stachowiak, Judy Rognlien, Ron Renzti, Scott Ferko, Dan Yee, Gabriela Chirica, Victoria VanderNoot, Jim Van De Vreugde, Rafael Davalos, Tom Raber, Isaac Shokair, Michael Bartsch, Pamela Caton, Evelyn Cruz, Jaime Lachmann, Erin Shugard, Karl Wally, David Weaver

Microelectronics Vulnerability Analysis Team

This team developed and demonstrated a very significant microelectronic vulnerability analysis capability that is unique in the nation today.

Joshua Etzkin, Ronald Espinoza, Alan Phan, Tabitha Peyton, Jared Dove, Phillip Forbes

Neutron Generator Subassembly and Quality Acceptance Team

Neutron Generator Subassembly personnel and Product Acceptance personnel combined efforts to review significant data, reduce product acceptance backlog, and thereby put more product to stock.

Glenn Roubik, William Shiffrar, Juanita Marker, Liliana Andrade, Susan Shelton, Ruth Bargman-Romero, Mark Rule, Robert Stiers, Cory Hensley, Jacqueline Scoggin, Mary Bonner, Moses Jones, J. Anthony Wingate, Bobby Baca

Neutron Tube Target Loading Team

The Target Loading Team was able to execute the NNSA Mission reassignment and establish Target Loading within the Neutron Generator Production Center sooner than planned.

Sean Benedict, Douglas Evans, Peter Henderson, David Fragua, Michael Lopez, Steven Woodall, David Hawn, Robin Ohlhausen, Lisa Walla, Carol Mehrhoff, Terry Mason, Daniel Severinghaus, Kenneth Burris, Donald Zerwekh, Kent Robbins, Michelangelo Smith, Michael Vining, Nathan Acree, Patrick Apodaca, Jamie Coffey, James Lucero, Henry Peebles, Christopher Roberts, Domenick Tufariello

Nuclear Power Plant Vulnerability Assessment Team

For successfully demonstrating the applicability of DOE security assessment tools to commercial nuclear power plants, which led to immediate, tangible improvements in their security posture.

Brady Pompei, Elizabeth Jaramillo, Jane Hillman, Janice Leach, Michael Itamura, James Rivera, G. Bruce Varnado, Richard Grochowski, Donnie Whitehead, Andrew Walter, Christopher Hammond, Patrick Knight, Vernon Koonce, Laura Whittet

Photonic Crystal Light-Emitting Diode Team

This team has developed the single greatest efficiency increase for gallium nitride-based light-emitting diodes in recent years, resulting in a 50% jump in efficiency.

Karen Cross, Kristine Fullmer, Katherine H.A. Bogart, Stanley Kravitz, Randy Shul, Ronald Hadley, Robert Biefeld, Daniel Koleske, Carrie Schmidt, Arthur Fischer, Joel Wendt

Prompt Global Response R&D Team

For outstanding service in the understanding and advancement of Sandia's technical capabilities related to "prompt global response" through focused research and development.

John Wronosky, Ryan Bond, Justin Smith, David Kuntz, Jared Madsen, John Emerson, Ronald Tucker, Mary Anna McWherter-Payne, Alicia Ayala, Walter Rutledge, Ronald Loehman, David Vigil, Harold Cooper, John Macha, Jeffrey Galloway, Jonathan Salton, Bennie Blackwell, Rafael Caicedo, Jonathan Christensen, Earl Creel, Sherrika Daniel, John Phelan, David Stokebrand, Alfred Watts, John White

Radar Transponder Development Team

For the outstanding rapid development and successful field trials of two systems important to the war on global terrorism.

Bobby Rush, Michael Murphy, Bertice Tise, Robert Ghormley, Ronald Diegle, Joel Darnold, David Werling, Marjorie Kirkel, Stephanie Otts, Ryan Halle, Adam Umpleby, Jason Payne, Jeffrey Thomson, Bradley Otts, Shawn Leslie, Sheree Boblick, Gerald Boyd, Jacqueline Griffin, Richard Hurley, Joseph Lucero, Brian McMurtrey, Christopher Rodenbeck, Theodore Salas, Bernd Strassner II, M. Ray Thomas, Curtis Webb, David Wiegandt

Radiation Protection & Industrial Hygiene Training Project Team

The RP&IH Training Project Team is recognized for providing exemplary safety training for personnel across Sandia and the DOE Complex, as well as nationally and internationally.

Brian Thomson, Marvin Hadley, Charlie Guinn, Randy Goodwin, John Inman, John Cochran, Vincent McRoberts

Radio Isotope Micro Power Sources (RIMS) Team

For outstanding work in Phase I of the DARPA-sponsored RIMS project, being the only performer in the program to meet all go/no go milestones.

Michael Shaw, Robert Koudelka, Ihab El-Kady, Christopher Murray, James Fleming, James Mikkalson, Carrie Schmidt, Jeanne Sergeant

Red Storm Design, Development & Deployment Team

The Red Storm Design, Development, and Deployment Team designed and partnered with Cray Inc. to develop and deploy a highly successful new massively parallel supercomputer.

Robert Ballance, Linda Bonnefoy-Lev, Ronald Brightwell, William Camp, Douglas Doerfler, James Handrock, Paul Iwanchuk, Karen Jefferson, Suzanne Kelly, James Laros, III, Robert Leland, Michael Levenhagen, John Naegle, John Noe, Kevin Pedretti, Mahesh Rajan, Leonard Stands, Judith Sturtevant, James Tomkins, Keith Underwood, John Vandyke, Courtenay Vaughan, H. Lee Ward, David White, John Zepper

ROWS Development Team

Exceptional efforts to design, develop and install Remotely Operated Weapons System (ROWS) at Whiteman AFB (WAFB) and Y12 in 2005.

Kristopher Klingler, Douglas Smathers, Regina Valenzuela, Daniel Rondeau, Ronald Simon, Michael Martinez, James Tauscher, Paul Johnson, Deborah Eaglin, William Evans, Stella Vigil, Larry Shipers, Steven Scott, Mark McAllaster, Terry Barber, Michael Kuehl, Frank Gerdin, Kevin Jones, Scott Rose, Michael Williams, James Woods

Saliva Diagnostics Team

For pioneering lab-on-a-chip technologies to measure disease biomarkers in human saliva rapidly and with high sensitivity towards developing next-generation point-of-care clinical diagnostics devices.

James Brennan, Anson Hatch, Amy Elizabeth Herr, Ronald Renzi, Anup Singh, Daniel Throckmorton, Huu Tran, Victoria Vandernoot

SANDIA RADIOLOGICAL ASSISTANCE PROGRAM (RAP) TEAM

Sandia/Goodyear Assurance Tire R&D 100 Award Team

Through innovative use of computational simulation, Sandia and Goodyear collaborated in the development of the Assurance line of tires featuring TripleTred technology.

Charles Stone, Martin Heinstein, Gerald Wellman, John Mitchell, Deepesh Kholwadwala, Samuel Key, Robert Kerr, Kenneth Alvin, Michael Glass, Harold Morgan, Gregory Sjaardema, Paul Wolfenbarger, Arlo Ames, Mark Blanford

Sandia's Intrusion Detection Team

The IDS team has created a computing environment that this year has withstood some of the most substantial and concentrated attacks against our Internet-facing servers.

Douglas Kayatt, Jr., Nellie Ward, Roger Suppona, James Hutchins, Eric Thomas, Timothy Toole

Sandstorm Team

This team conceived, designed and implemented a unique capability that was initially believed to be impossible, providing an unprecedented solution to a significant national problem.

Kevin Harrison, Christine Mitchell, Emily Mitchell, Catherine Nowlen, John Ziegler, David Goodnow, Tan Thai, Bradley Gabel, Douglas Ghormley, Marv Daniel, Michael Pendley, Robert Martinez, J. Joseph Clement, Edward Cole Jr., Kevin Nichols, Jud Blickley, Mark Jacobus, Michelle Leger, James Liang, John Vonderheide

SPR Restart Team

The SPR Restart Team successfully executed a very ambitious schedule to bring the Sandia Pulsed Reactor back to operational status to support critical programmatic testing.

Sidney Domingues, James Duncan, Autumn Higgins, Ralph Clovis, Michael Torneby, Ronald Knief, Darren Talley, Anthony Aragon, Raymond Beets, Robert Brandhuber, Allen Stanley, Norman Schwers, Donald Berry, Matthew Burger, John Ford, Anthony Baca, Gregory Baum, John Garcia, Gary Harms, Paul Helmick, Nancy Hetrick, Michael Knazovich, Robin Perini, Joseph Sandoval, Bonnie Shapiro, Caren Wenner

Security SPR Restart Team

The Security SPR Restart Team faced tremendous, ongoing challenges yet succeeded in delivering critical systems essential for restarting the Sandia Pulse Reactor for Stockpile Assurance.

Tom Rodgers, Walter Smith, Anthony Aragon, George Greer, Gregory Baum, Ronald Baker, Jerry Brenden, Daniel Frampton, Donald Funk, William Gallegos, Todd Harrison, Paul Keller, Ronald Knowles, David Lee, Jr., Magdelene Lucero, Michael Lucero, Michael Merlino, Larry Millington, Michael Pooler, Anthony Ramirez, C. Brian Robinson, Bud Siple, Allan Swanson, Nicolas Walker, Lisa Webster

Sandia Radiological Assistance Program (RAP) Team

The Sandia RAP Team and robotics personnel from the Mobile Robotics Department successfully resolved an incident at WSMR involving a stuck 15 kilocurie cobalt-60 radiation source.

Daniel Puetz, Daniel CdeBaca, Deborah Wright, Clinton Hobart, James Buttz, Michael Saavedra, Phil Bennett, Robb Lee, Robert Anderson, Richard Stump, Alex Horvath, Jr., Gregory Sahd

Stockpile Evaluation Sampling Rationale Study Team

A multi-disciplinary, multi-organization team to develop and support implementation of an alternative sampling rationale for Sandia's nuclear weapons Integrated Stockpile Evaluation (ISE) program.

Sheryl Hingorani, Kathleen Diegert, Janet Sjulin, Ronald Hahn, Kenneth Pierce, John Arfman, Jr., Rene Bierbaum, Tedd Rohwer, Floyd Spencer

Team Moonbeam

Team Moonbeam successfully completed four analytic projects that informed US national security policy decisions and provided key information about emerging strategic threats and proliferation risks.

Imelda Quam, John Montoya, Ann Smith, Rod Forsythe, Charles Lee, Louis Feltz, William Kerschen, Thomas Heine, Brian Schwaner

(Continued on next page)

Mileposts

New Mexico photos by Michelle Fleming


Charles Borgman
40 5416


George Laguna
35 5353

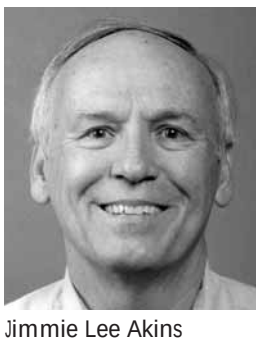

Thomas Baca
30 1523


Nina Chapman
30 10200


Phyllis Padilla Owens
30 3656


Robert Parson
30 2555


Tommy Lynn Teague
30 5934


Jimmie Lee Akins
25 4334


Thomas Essenmacher
25 5416


Martin Fuentes
25 12347


James Grossman
25 6211


Patricia Miller
25 10826


Theodore Wolff
25 3652


Thomas Dickman
20 2717


Deborah Jensen Kill
20 2622


Mark Ekman
15 6956

Team honorees

(Continued from preceding page)

Thermal Spray A.T. Program Team

Team greatly exceeded customer expectations, reversed a bad situation, solved a critical national security problem, and enhanced Sandia's reputation, while also reducing customer cost/risk.

David Anthony Urrea, Jr., Rachel Giunta, Mark Smith, Aaron Hall, John Cates, Dominic Vasquez, James McCloskey, Harold Anderson, Jr., Howard Anderson, David Beatty, Beth Brown, Diedre Hirschfield, Andrew Mayer, Timothy Roemer


W88 STE DESIGN AND IMPLEMENTATION TEAM

Thunderbird Computational Cluster Team

For exceptional teamwork, unparalleled effort, and outstanding achievement deploying Thunderbird, the world's fifth-largest supercomputer and new core of Sandia's Institutional and NW capacity computing.

Jonathan Atencio, Matt Bohnsack, Donna Brown, Sophia Corwell, Joshua England, Eric Engquist, Marcus Epperson, Archie Gibson, Russell Goebel, Joann Herrera, Joey Jablonski, Linda Jaramillo, Kevin Kelsey, Anh Lai, Matthew Leininger, Jesse Livesay, Chris Maestas, David Martinez, Geoffrey McGirt, Patricia Miller, John Naegle, Jeff Ogden, Jerry Smith, Ben Taylor, Sean Taylor

Tritium Producing Burnable Absorber Rod Design Evaluation Team

For performing critical modeling and analysis leading to a redesign of the rods to be used for tritium production in commercial light-water reactors.

Bernice Mills, Don Cowgill, Rion Causey, Aili Ting, Michael Malinowski, Robert Nilson

TTC Commissioning Team

For outstanding efforts leading to the commissioning of a state-of-the-art Thermal Test Complex.

Randy Foster, Martin Sanchez, David Whittington, Ciro Ramirez, James Nakos, Thomas Blanchat, Marvin Roybal, Dann Jernigan, Patrick Brady, Sheldon Tieszen, Charles Hanks, Kevin Ward, Allen Smith, Bruce Amos, Bennie Belone, John Bentz, Deven Codding, Michael Dexter, Don Estrada, Michael Gross, Edward Hunda, Kirk Jensen, John McFarland, Scott Rowland, Paul Schlavin, Richard Streit

Video Network Programming Production Team

The Video Network Programming Production Team has demonstrated exceptional teamwork, creativity, and support for corporate initiatives with this important employee communication tool.

Pam Welch, Al Lujan, Don DeLuca, Brent Peterson, Mark Olona, Dolores Lujan, Irene Allen, Myra Edaburn, Judy Hubbard, Cindy Barchus, Judith Preston, Gary Chemistruck, Richard Sanderville, Jacob Adcock, Dale Green, Rogulja Wolf, Warren Benjamin, Chad Hooker, Howard Kercheval, Dale Kruzic, Daniel Schell

Virtual Perimeter Security Grand Challenge Team

The team developed a demonstrable Virtual Perimeter Security (VPS) System with the purpose of extending the current ability to detect, assess, and respond to adversaries.

Bruce Whittet, Diane Armijo, Denise Bleakly, Regan Stinnett, Stephen Ortiz, Daniel Pritchard, Robert Riley, William King, C. Wayne Burton, Douglas Adams, Brian Nelson, Rodema Ashby, Nina Berry, Michael Bukaty, Lonni Diehl, Jeremy Giron, Janice Johnston, Hung Nguyen, Bradley Norman, Willaim O'Rourke, Fred Oppel, III, Kelly Snow, David Toledo, Paul Wayne, Frank Wunderlin

W76-1/Mk4A System Abnormal Impact/Stronglink Shock-Unlock Evaluation Team

Outstanding evaluation and resolution of the Abnormal Impact/Stronglink Shock Unlock phenomena on the W76-1/Mk4A Life Extension Program.

Joseph Jung, Timothy Edwards, Stephanie Pollice, Nicole Breivik, John Nagel, Jr., Kenneth Gwinn, Clay W.G. Fulcher, David Clauss, Scott Klenke, Christian O'Gorman, Brad Bosell, Jimmy Brown, Jeffrey Dabling, Alton Donnell, Kenneth Eras, William Greenwood, John Ludwigsen, Jeffrey Mahn, Scott Nicolaysen, Michael Orrell, Todd Simmermacher, Scott Slezak, Charles Vanecek

W78 Thermal Spray Team

Rapid response to develop thermal spray process to satisfy new system hardness requirement within a compressed First Production Unit delivery schedule.

Brian Franke, John Stephens, Alice Kilgo, Edward Astle, David Van Ornum, James White, Bruce Bowles, Daniel Sherman, Scott Jones, Kent Robbins, David Lopez, John Hart, Richard DiPrima, Christopher Kureczko, Andrew Mayer, David Moore, Ciji Nelson, Timothy Roemer, Floyd Spencer, Robert Stiers, Loren Updegraff

W80 LEP Stronglinks Prototype Design Review Team

The Prototype Design Review Team expertly reviewed and summarized the five-year development effort undertaken for the W80 LEP stronglinks.

Christopher Sorensen, Gustavo Toledo, Michelle Griffith, Kelvin Diaz, Laurance Lukens, Jamey Bond, Daniel Wilcox, Aaron Ison, Richard Liedtke, Jeffrey Dabling, Marc Polosky

W87 JTA4 FTU-19 Assembly and Flight Support Team

For demonstrating the highest standards of dedication, excellence, and teamwork. This team met significant high-value W87 milestones despite technical challenges and a demanding schedule.

Don Osbourn, Judy Lau, Roman Romond, Tom Clark, Veronica Harwood, Kit Schmitz, Kiet Tieu, Levi Forman, George Schubert, Ben Markel, Derek Baptist, Gary Kirchner, Seung Choi, Greg Valdez, Kurt Berger, Mark Claudnic, Bruce Hamilton, Keeven Hurtt, Ragon Kinney, Paul Lowe, Mark Martin, Quenton McKinnis, Lee Rieger, Anthony Tafoya, Peter Zick

W87 JTA4 FTU-19 High Accuracy Separation Package (HASP) Team

For successful delivery of Flight Test Unit - 19 (FTU-19) sensor package, which successfully measured RV trajectory environments for launch, boost, separation and reentry phases.

California Team Member: Daniel Levy **New Mexico Team Members:** Anthony Tafoya, Augie Chapa, Michelle Vinson, Kyla Martinez, Yvonne Batchelor, Frank Pena, Charles Healer, Peter Zick, John Sarsfield, Stewart Kohler, Ragon Kinney, Keeven Hurtt, Lorraine Ashford, Richard Corderman, Leanna Fresquez, Patrick Gabaldon, Stewart Iverson, Leroy Miller y Romero, Kenneth Reaves


WAR RESERVE COTS INSERTION PROCESS (WRCIP) TEAM

W88 STE Design and Implementation Team

Team successfully defined new QC1-10/ISO 9000 processes and architecture for the design and implementation of Surveillance Test Equipment (STE) and delivered a new W88 STE.

David Turner, Biu So, Nathanael J.K. Brown, Jose Castillo, Gerald Miller, Jr., Peter Smolenski, Maria Armendariz, Marilyn Cornell, Patricia Bonham, Anna Otero, Carol Skinner, Suzette Beck, Rodney Depoy, Ronald Richardson, Edward James, Aaron Thompson, Bryant Sterling, Dean Martin, Stephen Graham, Brandon Hill, Larry Kuykendall, Rene Ramirez, David Schultz, Keith Snyder, Steven Spinhirne

War Reserve COTS Insertion Process (WRCIP) Team

The WRCIP Team successfully implemented processes and procured the latest technology COTS parts for nuclear weapons, saving over $100M on just two lifetime extension programs.

Floyd Gentry, Charlie Sandoval, Julio Marchiondo Jr., John McBrayer, Matthew Montano, Richard Wavrik, John Witham, Lorraine Curtis, Jim Sweet, Paul Plunkett, Paul Vianco, Joe Borrego, Clarence Collins, Roger Billau, Raymond Heath, Art Minser, Joe Aragon, Christina Benavidez, Steve Biehl, Jimmy Bou, Emily Crespin, John Gaona, Jr., John Lopez, Jimmie Martinez, Frank Paulic

Z-pinch Radiation Pulse Shaping Team

Experiments on Z demonstrated the ability to generate a soft X-ray radiation temporal profile suitable for imploding and compressing a fusion capsule with low entropy.

Raymond Lemke, Michael Cuneo, Diana Schroen, Daniel Sinars, Roger Vesey, David Bliss, Gordon Chandler, Michael Mazarakis, William Stygar