Labs Director Tom Hunter talks about his first year, creativity, compliance, benefits, weapons, and more

In his first Lab News *State of the Labs interview, he touts Sandia's strong R&D, discusses changes ahead*

April 29 marks the first anniversary of Tom Hunter's taking office as Sandia's 12th president and laboratory director. The Lab News *sat down with Tom in his office recently to discuss his first year in that role and get his thoughts on a wide variety of issues, internal and external, facing the Labs. This tradition of an annual* Lab News *State of the Labs Interview with Sandia's top official goes back several decades now. This interview was conducted by retiring* Lab News *Editor Ken Frazier, incoming* Lab News *editor Bill Murphy, and Lab News staff member Chris Burroughs:*

Lab News: *It's been almost a year now since you became the president, and we are curious, how are you enjoying your job as president? Have you been able to enjoy it at all? Or has it just been a lot of hard work and worry?*

Tom Hunter: I think enjoyment describes it very well. It is both a privilege and opportunity. It has allowed me to do a number of things that I find to be quite interesting and quite empowering actually. Certainly meeting with the president a couple of times allowed me opportunities that wouldn't have happened otherwise. And there are forums in which I am able to represent this laboratory that I find truly enjoyable. Of course there is a lot of work to do, but it has been quite enjoyable.

LN: *What's been the most unexpected aspect of the first year as president? Anything surprise you?*

Tom: We knew we were in need of fairly significant transformation on many fronts. I think the extent to which we will have to transform the laboratories is something that probably we hadn't fully anticipated, but it is very reasonable to do. And the complexity and difficulty in doing that is also something that we find ourselves constantly faced with. It's a bit more than we probably anticipated, but it's not unreasonable.

LABS DIRECTOR TOM HUNTER makes a point during annual State of the Labs interview. (Photo by Randy Montoya)

LN: *We'll have a chance to talk about that some more if you want. What's been the most pleasant surprise? Or have there been any?*

Tom: The pleasant things have to do almost entirely with the opportunity to represent the people of the laboratory wherever that occurs, whatever forum that is. That can be at the town meetings, engaging the leadership of the DOE or the DoD, working across the state, working with universities across the country. All those things are extremely pleasant. It's not a big surprise that they were part of this job. I think it's an important part of what the job should be. The other thing I find extremely pleasant is spending time whenever possible with Sandians at any particular level — staff, managers, directors, vice presidents. It's a bit of a surprise to me how enjoyable that is, if you can find the time.

Creativity and compliance

LN: *Speaking of spending time with Sandians at all levels across the board, there was a report going*

(Continued on page 5)

Raising the bar — significantly

Sandia's recent Spring Leadership Forum brings managers together to discuss the Labs' future and hear senior management outline strategies for success and relevance in a changing world. Story on **page 8.**

Sandia LabNews

Vol. 58, No. 9 April 28, 2006

Managed by Lockheed Martin for the National Nuclear Security Administration

Sandia National Laboratories

Distinguished guests help open MESA

OPENING CUTS — Sen. Pete Domenici, R-N.M. (second from right), and Sandia Labs Director and President Tom Hunter wield the scissors, cutting the ribbon last Friday, April 21, to mark the formal opening of the Microlab and Microfab facilities, key components of Sandia's Microsystems and Engineering Sciences Applications (MESA) complex. Joining Tom and Domenici are Rep. Heather Wilson, R-N.M., and Sen. Jeff Bingaman, D-N.M. Scheduled to come online next year is the MESA Weapons Integration Facility, or WIF. Upon completion, MESA will provide the essential facilities and equipment to enable the design, integration, and qualification of microsystem technologies for the nuclear weapons complex of the future. For another photo of the ribbon-cutting ceremonies, see **page 3**. (Photo by Randy Montoya)

New guidance aids responders in dirty bomb scenarios

Sandia, Brookhaven researchers publish results in Health Physics *journal*

By Michael Padilla

Individuals responding to "dirty bomb" explosions during the first 48 hours can now rely on new protective guidance thanks, to researchers at Sandia and Brookhaven National Laboratory.

The research goal was to provide science-based response recommendations to the Department of Homeland Security for use in community preparedness activities. The research helps lessen health impacts to those who might be exposed to material from a dirty bomb, formally known as a radiological dispersal device (RDD).

Featured in a cover article in the April issue of the journal *Health Physics*, the guidance is offered by Sandia senior scientist Fred Harper (6417) and Brookhaven National Laboratory health physicist Stephen Musolino.

The guidance shows that management of

(Continued on page 4)

Inside . . .

What's what

You'll find the annual State of the Labs interview with Labs Director Tom Hunter in this issue. Reading the extended story will give you a sense of Tom's assessment of the state of our work world and the direction he wants us to take as we navigate through changing priorities, tightening budgets, and other issues that impact our national security.

If you want to know — or at least get a notion of — where we're headed, don't miss it. . . beginning on page 1.

* * *

About that backpage piece on "Appropriate workplace attire" in the last edition of *Lab News*. That chart (from *USA Today*) was not part of Sandia's dress guidelines, but even so, there are a few things about it that I didn't get. "Leather mules" showed up in the "Probably OK" column, but "No socks" was in the "Not OK" column. I don't wear leather mules, so I'm not an expert, but I don't think I've ever seen both worn at the exact very same time. I think that would be a little unusual.

And that thing about three-day stubble — a no-no, the chart said — seemed a little wide of day-to-day evidence. Stubble's not the thing for some of us of greater vintage, but it's around. Just thumb through a grocery store check-out lane magazine and look at the rockers, would-be rockers, and movie hotties. Most of 'em look like they ran out of shaving foam or somebody shut off their bathroom electricity. Stubble shows up even occasionally on a Sandia manager-type. Besides, without a stubble period, how do you get from smooth-shaven to the beard stage?

Underwear as outerwear? That it's even an issue is a little puzzling. Opus is the only person (he's really a penguin, of course, not a person) I know of who wears underwear as outerwear with any regularity, but I don't get out a lot, so maybe there's something I'm missing.

That no-no on "blue hair or other colors not found in nature" is probably irrelevant for Sandia. But you'd better not chuckle about blue hair around your granny's favorite bingo parlor — and certainly not the beauty parlor (oops, . . . make that salon) where the fluffy blue hairdos are created.

By the way, what's up with listing denim jackets in the "Not OK" column? What's the problem with denim jackets? Of course, the chart doesn't apply to Sandia, but we live in denim in these parts. Dissing denim — around here, anyway — is like disdaining island shirts in Hawaii or wingtip tassle loafers in Hollywood or pinstripe suits along Wall Street.

Nose rings? They seem a little problematic to me, but again, that's a matter of vintage. And in a community of academics and researchers focused on national security, we probably should be careful about nose rings — the literal or figurative kinds.

* * *

Ever get summoned and say, "Hold on; I'll be there in a jiffy"? Well, maybe not. Google "define jiffy" and take your pick. It'll take longer than a "jiffy."

— 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.

Ken Frazier, Editor (Retiring). 505/844-6210
Bill Murphy, Editor (Incoming). 505/845-0845
Chris Burroughs, Writer. 505/844-0948
Randy Montoya, Photographer 505/844-5605
Nancy Garcia, California site contact. 925/294-2932

Contributors: Janet Carpenter (844-7841), John German (844-5199), Neal Singer (845-7078), Larry Perrine (845-8511), Howard Kercheval (columnist, 844-7842), Will Keener (844-1690), Iris Aboytes (844-2282), Michael Padilla (284-5325), Julie Hall (284-7761), Rod Geer (844-6601), Michael Lanigan (844-2297), and Michelle Fleming (Ads, Milepost photos, 844-4902). Erin Gardner (intern, 284-8432), Darrick Hurst (intern, 844-8009). Dept. 3651 Manager: Chris Miller (844-0587).

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

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

LOCKHEED MARTIN

Lab News Reader Service

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

Others: To receive the *Lab News* or to change the address (except retirees), contact Michelle Fleming, Media Relations and Communications Dept. 3651, 505-844-4902, e-mail meflemi@sandia.gov, or Mail Stop 0165, Sandia National Laboratories, Albuquerque, NM 87185-0165.

Employees: To change the number of copies of the *Lab News* your Mail Stop is receiving please call Honario Anaya, Mail Services Team 10268-4, at 844-3796. At Sandia/California contact the Mail Room at 294-2427.

Recent Patents

Stephen Gentry (5703), Mark W. Smith (5712), Jody Smith (5712), Christine Wehlburg, and Joseph Wehlburg: Staring 2-D Hadmard Transform Spectral Imager.

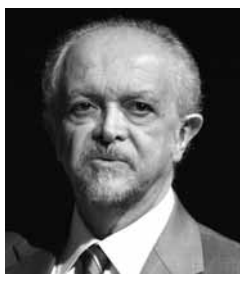
Doug Chinn (1723), Arnold Burger (Fisk University), and Ralph James (Brookhaven National Laboratory): Surface Treatment and Protection Method for Cadmium Zinc Telluride Crystals.

Alfredo Morales (8762) and Marcela Gonzales: Gray Scale X-Ray Mask.

Nobel laureate chemist Mario Molina opens Earth Day celebration

By Ken Frazier and Iris Aboytes

Nobel laureate Mario Molina opened Sandia's Earth Day Celebration April 20 with a lecture in the Steve Schiff Auditorium on the impact of human activities on the atmosphere. Molina, now at the University of California, San Diego, shared the 1995 Nobel Prize in chemistry with F. Sherwood Rowland and Paul Crutzen for their work in the 1970s identifying chlorofluorocarbons (CFCs) as a serious chemical threat to Earth's protective ozone layer.



MARIO MOLINA

"Activities of society can affect the environment," Molina told the Sandia audience. "We are looking at environmental problems on a global scale." He likened Earth's thin atmosphere to the peel of an apple.

Since enactment of the international protocols banning CFCs, he said, the ozone layer is beginning to recover, but it will take time because of the chemicals' long residence times in the atmosphere. "It is recovering very slowly," he said.

He said the case shows that "it *is* possible for society to solve a global environmental problem." But he added that this is unfortunately the only such instance so far where that has been accomplished.

Global warming is another serious threat, he emphasized, and he displayed some of the evidence, such as comparison photos showing glaciers receding dramatically over the past century. He discussed some of the positive feedback effects that worsen the problem. One is that as atmospheric temperatures rise, the atmosphere holds more water. Water vapor is itself a greenhouse gas (allowing in sunlight, holding in reradiated heat), making the temperature rise even worse.

Air pollution particles, paradoxically, may counteract greenhouse gases to some degree, but the particles are short-lived in the atmosphere while greenhouse gases are not. "Greenhouse gases will win this competition," Molina said. The particulates' effects may actually have been keeping us from seeing the full effect of greenhouse warming. "So we may have been underestimating the warming effects," he said. "There is a worry that the climate change effects may be a bit larger than had been estimated."

Molina serves on international panels that evaluate the scientific evidence of climate change in an attempt to identify a scientific consensus. He said "the bulk of scientists" agree that there is a connection between the observed global temperature increases and human activities. Should society do something about it? he asked. He emphasized that it is not up to the scientific community to decide that question, but as individuals "we can express our opinions." He added, "The culture needs to change in harmony with the environment."

Presentation about historic Camino Real *to Thunderbirds is May 8*

Enrique Lamadrid, director of Chicano Hispano Mexicano Studies at the University of New Mexico and an expert in the folklore, literature, and cultural history of the region, will talk to Sandia Thunderbirds (and all interested persons) on the topic *"El Camino Real de Tierra Adentro:* New Mexico's Link to the World."

The free talk is Monday, May 8, at 2 p.m. at the Mountain View Club (formerly the Officers Club East), on Kirtland Air Force Base, building 22000, at the east end of Club Road (turn east just inside the Wyoming Gate).

Preceding the talk, there will be a luncheon open to all. Just show up between noon and 12:30 p.m.

Call Rod Boenig at 836-6977 for information on how to attend.

Distinguished lecturer David Goodstein discusses concerns about the end of fossil fuels

By Nancy Garcia

Caltech professor David Goodstein spent most of his career thinking about condensed matter physics, but when he saw a June 2001 graphic in the *Los Angeles Times* predicting that oil production would peak by 2007, he became alarmed. "I wanted to know what I could do," he said at the sixth California Truman Distinguished Lecture this month. "I'm just a physicist, so I wrote a book."

The title of his 2004 book, *Out of Gas: The End of the Age of Oil* was the subject of his talk.

Goodstein discussed some historical background, current issues, and possible solutions.

He began by reminding listeners that fossil fuels were produced over thousands of years from organic matter that captured energy from the sun. "Oil companies merely extract it and sell it, that's why it's so cheap," he said. He also distinguished between energy and fuel, saying, "We do need to conserve something, and that's called fuel . . . fuel is more valuable than energy, because you can use it in mobile sources."

NO MYTHS ABOUT IT — Distinguished lecturer David Goodstein portrayed a list of common myths about energy, such as the concept that the greenhouse effect is all bad while in fact, atmospheric trapping of heat has made the earth habitable. (Photo by Bud Pelletier)

In a quick retrospective on energy, he pointed out that in the 18th century, Sir Ben Thompson (an expatriot of New Hampshire) proposed that heat was a form of motion. Conservation of energy, Goodstein said, was discovered nine times, and was credited to its last discoverer in the 19th century, James Prescott Joule.

Touching upon electromagnetism, he commented that our eyes evolved to be most sensitive to colors of sunlight reflected around us, quipping, "You don't glow in the dark because you're just too cool."

When sunlight reaches earth, about 30 percent is reflected and the rest absorbed. He said climate trapping of heat — the greenhouse effect — helped make earth a "balmy Garden of Eden," and that if the atmosphere were stripped of greenhouse gases, the surface would be a chilly zero degrees Fahrenheit. Venus, on the other hand, has what he called a runaway greenhouse effect and is a fiery inferno.

Goodstein quipped that due to the beneficial nature of the pre-industrial greenhouse effect, "We evolved, came down from the trees, and started building steam engines." Now, with our industrial activities, "We don't know how far we can push the earth until it reverts to one of these other states — but we know it can. . . . We are doing an uncontrolled experiment with the climate of the only planet we have — it's a very foolish thing to be doing."

In the 18th century James Watt built a better steam engine that kicked off the industrial revolution and led to railroads and the rise of cities. Major fuels in the 19th century were coal and whale oil. When E. L. Drake drilled the first oil well in western Pennsylvania in 1859, the fluid was first used for illumination and lubrication. In 1861, however, Nikolaus Otto designed the first internal combustion engine, and the thirst for oil was born.

In 1957 geophysicist M. King Hubbert, who worked for Shell Oil, predicted US oil production would peak in 1970, based on the record of oil discovery, production, extraction, and use in the lower 48 states. Indeed, the Texas Railroad Commission, which looked at excess capacity in that state to govern the price of oil, announced no excess capacity in 1971, after which the Organization of Petroleum Exporting Countries came to the fore in influencing oil prices (some 65 percent of reserves are in its countries – 10 times greater than any of the next five largest oil-producing regions).

A major point of Goodstein's talk is that the world's oil production will also peak, just like the US, production did. A 1998 paper in *Scientific American* by Colin Campbell and Jean Laherrere predicted the peak would occur around now, Goodstein added. "For the past 20 years, we have been extracting oil faster than discovering it. The reserves numbers are very, very uncertain." The peak, he said, may not occur for a number or years — or may have already, as subsequent events will make clear.

The oil embargo and Iran crisis of the 1970s led to temporary gas lines and despair, Goodstein said, but he believes that after the peak occurs, the shortage will be "for real and permanent . . . civilization as we know it will come to an end sometime by the end of the century . . . we are facing some very difficult times."

The issue for our standard of living is that the US uses one-fourth the world's energy although we have only 5 percent of the population. China, India, and other parts of the world want a higher standard of living, and that means using more energy.

He believes we can envision a way to substitute a different world for the world we have today, but that "getting there is very difficult."

Besides oil, fossil fuels include other organic matter that was "cooked" under ocean beds: natural gas, which was "overcooked," and shale oil, which was "not cooked enough." Another potential source of fuel might be methane hydrate, a flammable solid that resembles ice and exists in ocean sediments. Finally, coal deposits may be sufficient for hundreds or thousands of years, and could be liquefied as the Germans did in World War II.

Regardless of the challenges using these other sources, Goodstein said all fossil fuel will run out, with unknown consequences for the climate. Sequestering carbon dioxide is a formidable problem. Returning to pre-industrial levels would require removing one-fourth the atmospheric carbon. The concept of sequestering it at the bottom of the ocean is an issue in part because that could alter the acidity of the water, affecting ocean life. Another thought is to pump it into oil or gas wells.

Solar sources include hydropower, though dams have already been built wherever possible. Wind is too unsteady, Goodstein said, and biomass is inefficient.

Conservation is also part of the mix. "There's no reason we can't all drive hybrids," Goodstein opined, which he said would reduce gas consumption by a factor of two. He added that among solutions proposed or tried, Brazil's flex cars can operate on alcohol produced from sugar cane, while Amory Lovins of the Rocky Mountain Institute proposes levying "fee-bates" against sport utility vehicles. Advanced batteries and hydrogen are among transportation-powering alternatives. One sticking point, he believes, is that "politicians refuse to acknowledge the problem, much less lead us out of the wilderness."

Fission-based nuclear energy cannot supply all the world's energy needs, which would require building a plant a day for 30 years, longer than the known uranium reserve would last at that rate of expanded use. Breeder reactors would be a dangerous alternative because they produce plutonium. Fusion is not yet feasible. "It's the energy source of the future, and always will be," Goodstein said. With it, a gallon of seawater could provide the equivalent of 300 gallons of gasoline. "We would have ample energy forever," he said.

Goodstein concluded that he hopes some of his listeners will go out and solve the problem. Mentioning Sandia's Z-pinch fusion research and policy centers at Caltech and Stanford, he observed, "there are lots of efforts going on, but it's an uncoordinated effort." He believes an analogy for finding solutions could be the commitment of the Kennedy administration to place a man on the moon — which happened in less than 10 years. "We know how to solve technical problems," Goodstein said.

Sandia CaliforniaNews

In New Mexico. . .

VIPs help launch new MESA facilities

MESA DEDICATION — Attending the MESA ribbon-cutting ceremony Friday, April 21, were, from left, Patty Wagner, NNSA Sandia Site Office manager; Tom D'Agostino, NNSA Deputy Administrator for Defense Programs; Rick Stulen, VP of Science, Technology, and Research Foundations and chief technology officer; Tom Hunter, President and Laboratories Director; Rep. Heather Wilson, R-N.M.; Sen. Jeff Bingaman, D-N.M.; and Sen. Pete Domenici, R-N.M. (Photo by Randy Montoya)

Dirty bomb

(Continued from page 1)

public health for the effects of an RDD is different from the approach taken for chemical or biological terrorism, and gives first-responders and planners science-based options for new response strategies.

While the particulate cloud from an RDD can be hazardous, it is not as immediately dangerous to life and health as anthrax or chemical agents. Until now, many planners were treating biological, chemical, and radiological agents identically, resulting in overly conservative and inefficient procedures for the first-responders.

More than 500 explosive experiments were conducted during some 20 years at Sandia to determine how the radioactive material in an RDD would disperse in the environment through aerosolization, the formation of a cloud of particles. The experiments were conducted in large sealed chambers for "dirty bomb" scenarios and performed on various materials including ceramics, metals, powders, and liquids. The materials used in the experiments helped determine the dispersal characteristics of most realistic radioactive sources that could be predicted accurately.

The quantities of material used to simulate the radioactive material, the shock physics, and the aerosol physics representative of what might occur in the detonation of an actual device were all tested. The results were then applied to predict the dispersal of actual radioactive sources using many different device designs.

"We focused on sophisticated aerosolization techniques to provide the responders with guidance based on what is realistically possible," Fred says. "We've also performed experiments investigating some of the more probable aerosolization techniques that terrorists might employ."

TEST CHAMBER — Paul Johnson and Fred Harper (both 6417) demonstrate where the experiments took place in Sandia's 1,000-cubic-meter aerosolization chamber. The chamber was used to capture and characterize the particles dispersed following explosive aerosolization events. (Photo by Randy Montoya)

High zone established

Based on the experiments, the researchers recommended establishing a "high zone" with boundaries of 500 meters in all directions from the point of detonation. Because of the large number of experiments conducted for the study, Fred says, first-responders can follow it without radiation measurements if they know there is radiation associated with the explosion.

Responders are advised to evacuate this "high zone" and control access to prevent uncontaminated people from entering the affected area.

The guidance instructs first-responders in how to interpret radiation levels and assists them with decisions such as where to locate a command post, how to triage contaminated personnel who may need medical evaluations due to inhalation of radioactive material, and how to handle individuals who may not need an urgent medical exam for radiation injury.

The guidance also provides answers to complex questions such as whether to shelter-in-place or evacuate the public, because the timing of protective actions can affect the amount of radiation exposure.

"With this guidance first-responders can now have a tool to help them make the tough decisions they will be faced with in those first critical hours," Fred says.

Musolino says the new strategies will help speed up lifesaving efforts to aid the injured victims and minimize the overall radiation dose to the public.

"I hope a terrorist act with an RDD never happens. But if it does, we want the first-responders to have the best science behind the tough decisions they will make in those first critical hours," he says.

The research was funded primarily by DOE and the DOD's Defense Threat Reduction Agency. Recently, the DHS and Nuclear Regulatory Commission contributed to the work, DHS coordinating the outreach effort with the first-responder community.

Labs recognized for support of Guard and Reserve

The New Mexico Committee for Employer Support of the Guard and Reserve (NMCESGR) has recognized several Sandians for their outstanding support to employees who are members of Guard and Reserve.

Heinz Schmitt, a former Sandia VP and now a key volunteer member of the ESGR committee in Albuquerque, organized the recognition event (held last month) and served as master of ceremonies for the presentations.

Div. 3000 VP Kim Adams introduced a number of Sandians in attendance, including the honorees and their nominators.

Marcey Abate (2951) and Rodney May (1522) received the "My Boss is a Patriot" award. Marcey was nominated by Izabel Nazario (2950) and Rodney was nominated by Tim Jones (1524).

Steve Stevens, State Chair for the NMCESGR, presented the special "5-Star Statement of Support" to Kim Adams, who accepted the award on behalf of Sandia.

The 5-Star Statement is the highest recognition given to employers who meet a demanding list of criteria to ensure that all supervisors are knowledgeable regarding the laws governing time off for training/duty for members of the Guard and Reserve. In fact, Stevens noted, Sandia's policies exceed the minimum required by current law.

Ann Murphy (3332), a benefits administrator in HR, has been designated a primary focal point for all employer/employee issues resulting from an employee's Guard and Reserve membership.

Stevens congratulated Sandia for setting the standard for large employers in New Mexico. He thanked Kim for her leadership in ensuring Sandia remains proactively involved in implementing the policies regarding employees who are members of the Guard and Reserve.

Pictured above are, front row, from left, Izabel Nazario, Marcey Abate, Kim Adams, Rod May, and Tim Jones. In the back row are Heinz Schmitt, Leroy Pickens, Steve Stevens, Magdalena Foley, and Col. Steve Ver Heist.

State of the Labs

(Continued from page 1)

around — I think it originated in a report for the LLT that you're probably familiar with — regarding creativity at the Labs. And there was this assertion that creativity isn't today what is was, say, 30 years ago. There was some discussion back and forth even in our own little group whether that's right on, not quite fair, or a simplification. What do you think about the state of creativity at the Labs?

Tom: Those are two different things but let me address. This is a very important issue, and I've tried in my communications with employees to note that if the nation expects any one thing of us, it is to be creative and objective in the way we approach our work. Is there a difference from several decades ago? No one can speak to that with great clarity, but my sense is that the people are just as creative if not more creative than ever, because there has been quite a lot of emphasis in American education and more enablement of creativity than probably there was 30 years ago. The inherent capability today of people is at least where it was 30 years ago. The difference is that the world is much more complex now. And there are things that we must address today that we didn't used to have to address with the intensity that we do today. And so that is viewed by some people as taking time away from their being as creative as they would like. I think the question is not only are we as creative but how are we managing our time? Are we getting our time balanced right so there's creative time? Our goal should be to provide as much creative time, as much creative environment, as we possibly can. We have to deal with the realities and complexities of the day. Do we really work toward simple approaches that allow people to address the topics without consuming so much of their time, so that there is a true creative element there, a creative aspect of their time? It's a very important balance question at the laboratory and the laboratory of the future.

LN: *Related to that is the amount of time that people at all levels have to spend on what you might call compliance-driven requirements. There is a concern that compliance with rules has become much more of a burden than it ever used to be and that, in a sense, we may be losing our identity as a very creative national lab because of this compliance culture that seems to be pushed on us from multiple agencies and sources. What do you think about that and how do you deal with that problem?*

Tom: Yes, in fact this question comes up a lot in the forums we have with the staff. The question really is in what environment are we living and what do we make of that environment? We have found ourselves in the position of needing to increase our attention to a lot of matters. What you described as compliance-related things do need our attention. We then need to sort out how they can be done in the most practical, simple way. If there's one message I would give to all of the staff, it is that it's our role to figure out how to do these things to the extent that we should and fulfill that role. We can define how simple, straightforward, and practical it is to do these things and how much time it will take.

LN: *"Our" and "we" meaning —?*

Tom: The Sandians — for us as an institution, for Sandia as a laboratory. As opposed to the compliance framework, which you described and which was imposed by others that we have to accept. The real opportunity for us that we need to capitalize on far more than we have is to define our own fate in these matters. And we have to ask whether we create within Sandia the incentive to make things much more complicated. Have we in the last decade or so evolved in such a way that we have made things extremely complicated? And so what start as initial requirements, what you call compliance requirements, actually get turned into very complex things that dominate a lot of the time of the people who have to do that. We've got to take our own destiny in our hands and define how things should be done. We have to find ways to do that as simply and practically as possible. I know it's an issue on everyone's mind.

LN: *Would you see NNSA and the NNSA Sandia Site Office as a partner with us in realizing that? For lack of a better way to express it, are they on our side in trying to get to where you're talking about?*

Tom: I'm convinced that is the role they want us to provide, that NNSA wants us to define our own way of achieving these goals. Our own way of defining how our work is done. Our own way of assessing our work. Our own way of deciding what our safety bases are. They want us to do that. And they want to stand back and say we think your systems to do this are fine, so we then don't have to be in the middle of engaging at a compliance day-to-day level. I'm confident that is true because I've had those conversations with them. Now to play that out in practice is the real challenge for us and for them.

LABS PRESIDENT AND DIRECTOR TOM HUNTER emphasizes a point during the annual *Lab News* State of the Labs Q&A with *Lab News* interviewers Bill Murphy, Ken Frazier, and Chris Burroughs. (Photos by Randy Montoya)

"My sense is that the people are just as creative if not more creative than ever. The difference [from 30 years ago] is that the world is much more complex now . . . . We have to deal with the realities and complexities of the day."

Safety and ES&H

LN: *In regard to compliance, how is Sandia doing in terms of safety, which has been so emphasized over the past year? And what are Sandia's major ES&H concerns and what should we be doing better?*

Tom: Well, safety is one of those fundamental parts of operational excellence. We define the laboratory in terms of three major vectors: nuclear weapon transformation, supporting broader national security, and a laboratory that manages in an excellent way — operational excellence. Safety is certainly a major part of that third piece and one that we've had to focus on quite a lot. We needed to put foundations and systems in place that would allow us to deploy a safety program across the laboratory, one that was doable and met the expectations of our customers, particularly our SSO customers. That framework was not in place. We've had to work very hard to get that framework in place. Now we have a kind of enterprise framework for how our ES&H program will fold out. We have a best-in-class plan to describe how we will get to a higher level of safety engagement. And we have strengthened a few key areas according to that final rating. First, we have gotten an extremely significant amount of what I call leadership engagement. We made safety and the safety environment an important part of all the leadership culture, the vice presidents, directors, and senior managers in particular. We've tried to make it clear that safety is part of the leadership role at the laboratory. Then given that foundation, we've tried to deploy some specific things like self-assessments that rolled out across the laboratory. We've been rolling out a uniform notification program and we are going to be rolling out things in other areas like work controls. The secret is to do that, as we discussed earlier, so it is simple and clear and consistent — so it enables us to keep this creative environment that we have to maintain. How are we doing that overall? The foundation is coming together nicely. It needed to be given real emphasis. We are making really good progress in our significant incidents. Our days-away case rate is going down. We still have a large number of recordable incidents. We have to create a culture where people are aware of their own work and their own environment, including the people around them. And so in deployment and in results we have some improvements before we can achieve best in class. But the foundation's doing nicely and the deployment is beginning. The people are to be commended for all the work they've done.

LN: *When John Shaw [then DOE's assistant secretary for ES&H] was here we had an opportunity to spend some time with him. I asked him how Sandia is doing in terms of safety as compared to other laboratories. He said we're right in the middle; we're not bad and we're not perfect, we're right in the middle.*

Tom: That's correct. It depends on which metrics you use. If you use recordables as a measure, which I don't think is always the right measure, we are pretty much right with everyone else. If we look at progress made on certain things like the more serious incidents, we are actually making real progress compared to the other laboratories. So I think that's a good characterization. But I would like to make sure the people of the laboratory know how important it is that we do this and in a way that enables creativity. And that we're trying very hard to have both the safest of environments and the most respect for our workforce and enable them to be as productive as possible.

Benefits changes

LN: *I want to change the subject somewhat, to an area you addressed during the employee dialog session in late February. You noted that DOE has mandated that Sandia and other labs normalize benefits within industry standards. That can be a little scary sounding because people hear it as reducing benefits, including health coverage, and increasing costs, or both. Given that Sandia can't offer its employees all the perks that a private sector company can — profit sharing, stock options, signing bonuses come to mind — why can't the Labs use such things as additional health care coverage, better pension packages, and more vacation time, for example, as a way to balance benefits against the many financial benefits that a private sector company can offer? After all, if we normalize health care benefits by reducing them while ignoring huge potential rewards of stock options or profit sharing, are we really normalizing at all?*

Tom: It's very clear that under our contract DOE expects us to have a benefit structure that has understandable and reasonable relationships with

(Continued on next page)

State of the Labs

(Continued from preceding page)

those in our peer community — in both universities and industry. That means we have to look at each and every one of our benefits and ask the questions: How does it compare to these norms? Where would we like to go and where would DOE support us going? DOE would argue that overall we have a package that when added up is above industry norm. And we're going to have to propose modifications to the plan that can get us close to that norm. That's the environment we find ourselves in. At the same time, though, I think we do exactly what you say when we talk about the opportunities we can provide for people at Sandia. We argue that we have to have compensation that is market-based for our research and development type market structure and that allows us to be at the better end of the compensation analysis across the country. We also argue that we have other opportunities — support for employees internally, learning, the education opportunities, and others — so that with all things considered together as a package we offer the kind of environment where the best people can come and do as well from all standpoints as they would had they gone to a university or industry. That's the core of our argument. It doesn't change the fact that when I look at a specific set of benefits, we have to go back in and do some normalization. And we are doing that. We're working with DOE to propose things that will allow us to be closer to the norms.

LN: *What it really comes down to is, is the package going to remain compelling enough over time to retain, to recruit, the very best people, which is what Sandia has always done? Do you feel confident that within the parameters DOE is asking us to work within that down the road we can continue to say that the very best people still will choose to come here?*

Tom: Of course that is our primary goal — to be a place of choice for the nation's best, particularly those in science and engineering — and DOE shares that goal. They do share the reality of what's happening in the marketplace. The reason I can answer yes to that question that we could retain the best people is because the broad trends in the marketplace are such that both industry and universities are reducing their historical support for the workforce into different forms. That means we will continue to be attractive and competitive in that regard. But it doesn't mean that we will be able to retain ours in exactly the form they've always been.

LN: *One specific that you mentioned at the State of the Labs talks — you said perhaps by 2010 we may have to resume contributions into the pension plan. I assume you meant employee contributions, or did you mean company contributions, or did you mean both?*

Tom: I didn't say. Because we haven't determined that. But I think it's important to note that historically neither the company nor the employees have made contributions. Employees have not made contributions since 1974, and the company has not made contributions since 1986. What we know is as we look at the funding basis for our defined benefit plan today and project the cost in about 2011, we project that we'll have to have some contribution of some reasonable size. Whether that's done by the employees or by the company we'll have to decide. We haven't sorted that out yet. We just know contributions will have to be made. But it is four years away in the current projections.

Outsourcing?

LN: *Another thing you brought up was outsourcing. You talked about industry finding opportunities to outsource even what are traditional high-level professional services. You mentioned that the Labs has to look at all of the things that are out there, the whole suite of options that industry is turning to. Could you go into a little bit more into where outsourcing might fit into the Labs?*

Tom: Outsourcing per se is not the issue for Sandia. The issue for Sandia is how to provide the most benefit to the government with the most efficiency and the most reasonable cost. So the way we look at all those questions is to ask what is the right role for us and how to deliver it in the most efficient way. In the national security business, for our core work, it is almost antithetical to think of outsourcing in a major way because we are at our core a national security laboratory. Our role is unique to our nation's government. We have some very important and unique relationships with the government. So it's very unlikely when you get to our core work, unlike almost every commercial business, that we would have to address outsourcing for that work. Then it simply boils down to how to do everything else that we do in the most efficient and cost-effective manner. We have looked at our cost projections over the next several years and asked how do we provide the right kind of place, the right kind of employees, and the right kind of support for our customers. And we haven't rejected any means of achieving that nor have we decided on any particular means of achieving that. But we've given the challenge to our cost team to try to deal with those costs.

LN: *Is it ultimately purely a cost-driven call?*

Tom: It's probably better to say that it's cost in the broadest sense. That certainly includes financial cost, and we will be dealing with cost-balancing questions in the future. But it's also in terms of cost to our time. We have to ask, what things are we really good at? You want to have those key capabilities and you want to make sure you do those well. If you're ever out of balance in those capabilities, there's a broader cost in involvement of the leadership, involvement of time. But it's largely cost, with a big piece of that being financial cost.

"My perception is not that California is a separate laboratory. It is a separate location, which has its own unique needs and roles that you would expect when you have almost a thousand people at a separate location. But it is an integral part of this laboratory as well."

Laboratory transformation

LN: *I'd like to return to something you said at the beginning and that's the transformation of the laboratory. You said that was one of the things that has proved more difficult than you had expected. What are you referring to specifically?*

Tom: The transformation of the laboratory is more complex than we thought because it has to be more foundational. We have to go back and look at how the laboratory is really structured and functioning as an enterprise. And then how should it be functioning if we look ahead a couple decades and think of ourselves as leaders in enterprise management? And so the deep foundational part is something we have to address more fundamentally than we thought. That means things like our Integrated Laboratory Management System, which was a choice we made to respond to pulling the laboratory all together and a condition under our contract. It has to be done with great care. There have to be very well-planned approaches to defining and structuring an enterprise. That then will tell you how all the pieces fit together, how they should fit together. But at the same time there are other dimensions. There's the people dimension because we have a relatively new leadership team. We have different people in new and different roles. We created some new roles. These changes don't happen overnight. There's a culture dimension that has to be addressed. The biggest culture dimension I have seen is that we really are one laboratory, as opposed to many who identify with a piece of the laboratory rather than the laboratory as a whole. Having an integrated enterprise requires this cultural identification with the laboratory as a whole — as opposed to an organization, as opposed to a business sector, for example. So, that's what we're trying to encourage at the higher level and that's what makes it complicated because that is a change in people's thinking, into broader enterprise thinking.

LN: *Is the reorganization that you instituted back in early summer last year moving us in that direction?*

Tom: It was designed to move us in that direction, exactly.

LN: *Is your sense that we are actually making progress in this area?*

Tom: I see good progress. The area of progress most observable to me is the role we've asked of our vice presidents. In the way we restructured we tasked our vice presidents, who have large organizations to look after, to simultaneously look at and deal with cross-laboratory issues. They have to think as laboratory citizens and deal with integrated issues for the laboratory. And that's been very positive. People have really risen to that challenge. They have taken on roles that make a difference for the laboratory as a whole, not just their organizations.

California site

LN: *In dealing with California there is sometimes the perception that they think of themselves as a whole separate laboratory. Is there anything that can be done to change that perception?*

Tom: My perception is not that California is a separate laboratory. It is a separate location, which has its own unique needs and roles that you would expect when you have almost a thousand people at a separate location. But it is an integral part of this laboratory as well. I think what you see is a natural evolution when you have geographical distance in between. And having lived there and worked at the site for some time I see that it is important to have this sense of identity when you're in California that allows you to think you are accountable for the whole site. When you think about people and operations and in some cases programs, it's important to have some coherence at that location because it has its own identity at the site. At the same time as we look at our big programs, we've got to see California as a piece of that, and I think we're starting to do that. Mim has responsibility for the SMU dealing with homeland security, which is really about homeland security and force protection and is supported by organizations across the entire laboratory. We have a mixing of roles to allow more of that. So I don't think the perspective of a different laboratory is the right one. I think there's a bit of a different identity for people who work in different places. And I think we need to do more to take advantage of the strengths of all of our sites and particularly the one in California.

LN: *The California site just observed its 50th anniversary. You were out there, and a lot of glowing words were said about it, and we devoted eight pages to it in the* Lab News. *Is its future secure, its role secure?*

Tom: The California site has a very robust role in our support for the weapons program. There is a significant weapons program role in California because Lawrence Livermore still has a major commitment to the systems in the stockpile and the evolution of the stockpile as we go forward. In that key ingredient I don't expect to see changes in the near term. I think that will remain the case. There'll be so-called California weapons systems, and our support for those will maintain. It will be necessary to look at our other programs and ask how can we take advantage of the strengths and give California more, and we're doing that. Al Romig is working in large part with Mim to make sure it happens. And of course we have a big role in helping keep the nation quite secure, and California plays a very important part of that role.

(Continued on next page)

State of the Labs

(Continued from preceding page)

Nuclear Weapons

LN: *We haven't talked about our core mission, nuclear weapons. I'd like to get into that and give you an opportunity to express where we are right now. What about current programs? How does it all fit in with the national weapons complex?*

Tom: I'll comment on it from my role as Lab Director. For the actual specific sense of strategy for nuclear weapons [Deputy Director] Joan [Woodard] is the person who represents us. [*Editor's note: An interview with Joan on the weapons program is scheduled next month.*] I can tell you what my perspective is as the Lab Director and that is that these are very exciting times of transformation for the nuclear weapons program. Probably what we're doing in these few years will set the framework for what the nuclear complex is for several decades. So it couldn't be more important for us or for the nation. What that means is that the stockpile will be evaluated in its role in deterrence, in its role in national security. Out of it will come some transformations in the stockpile itself. An example will be the current thinking around RRW [reliable replacement warhead], which is a transformational agent in and of itself. And those will redefine or redevelop the nature or the number of systems and the size of the stockpile. The one thing that seems reasonably clear about that is that we'll have to have a different kind of stockpile as we look ahead several decades. At least it will be different in part from what we have today. And we'll see how much different it is as these evaluations move forward. Probably the second thing is the complex itself and how the roles around the complex are being addressed. People are looking at how you define roles and how you look for ways to integrate activities and particularly things that deal with our security costs so they can be done more efficiently. I think that in the short term over the next few years you'll be seeing some suggested ideas on ways to look at roles and functions across the complex to streamline them a bit. And that leaves the third area, which is how is the complex managed and how does it work as an enterprise. I think you're going to see a lot of evidence of that where NNSA takes a very deliberate role in asking how the enterprise should function, how we use our contracts to incentivize, the role of science, the role of production, and the role of taking care of the stockpile. I think you'll see all three of those things — the stockpile, the complex, and the way the complex is managed — addressed fairly significantly by DOE/NNSA, with strong support from the labs and particularly strong support from Sandia.

LN: *Speaking of reorganizing and restructuring and rethinking the complex, do you see in the foreseeable future a continued need for three weapons labs? You can tie that in to the RRW and the competition that Ambassador Brooks talked about with Lawrence Livemore and our California site competing with LANL and Sandia/New Mexico in doing some design stuff. Once the design is established and you've got an RRW program in place, will it take two different [physics] labs to continue to manage that?*

Tom: I think that will be an open question for a while. In the absence of nuclear testing we have to sort out how you can achieve confidence around what we originally dealt with by testing. And how you create the capabilities to be sure you can ensure that confidence. There are many people who feel strongly that that confidence can be derived largely from competition between two nuclear explosive package laboratories. That's certainly a way to achieve that, and it has worked well for the country. We'll probably not see an immediate impact on that; it's going to be an open question for a while. The bigger question is going to be what capabilities do we really need? How do they fit with the affordability of the complex? And how do we assure and maintain that confidence when we can't have testing of nuclear weapons?

"Probably what we're doing in these few years will set the framework for what the nuclear complex is for several decades. So it couldn't be more important for us or for the nation. What that means is that the stockpile will be evaluated in its role in deterrence, in its role in national security."

LN: *A few weeks ago Richard Garwin spoke here in Albuquerque and expressed the concern that a move to RRW is going to be a move toward all-out nuclear testing. He seems to think that going down the path of RRW will inevitably lead to a demand for all-out nuclear testing.*

Tom: I've heard those arguments. They are not ones that I subscribe to. The intent of RRW is to provide for more confidence in the absence of testing. I don't see anybody wavering about that. It would violate the whole premise of RRW if it did lead in the direction of testing. But I have confidence in the people who make those judgments about what changes they could make in the weapons to allow them to be more robust — and still make sure that it doesn't lead us down the road to requiring a test. I'm glad you've raised the issue because it's sure something that has to be looked at very carefully and cautiously.

LN: *One thing regarding evaluation of the stockpile. We just did a story on the Integrated Stockpile Evaluation Program. Can you comment on that? It's about changes in the way they've done things.*

Tom: I can comment on it. It's certainly more appropriate to have Joan comment about those things. What we know is that the stockpile is getting smaller in size and it's also getting older. Because of that you have to be sure you have a robust surveillance program that allows you to rethink how you make those judgments every year. I believe the new integrated surveillance program that has been proposed certainly has the right kind of thinking behind how you deal with those conditions of essentially fewer and older weapons. The careful deployment of the right kind of annual gathering of information is in fact the basis in which I put forth my annual letter on the reassessment of the stockpile. I have confidence that it's going to move along. I particularly like the idea that we're thinking about it deeply and asking what could we be doing in the time of a different evolution of the stockpile. It is a very important job.

Budgets, stability, and hiring

LN: *We haven't talked about budgets at all yet or our budget situation. You've indicated that you're confident that we could maintain size and stability and budget even at a time of perhaps declining weapons program budgets by an increase in Work For Others. Is that the case? Are you still confident about that and what do you see as the budget situation both in the short term and long term?*

Tom: First to clarify terms — when we talk about nuclear weapons and then we talk about the other part of the laboratory, only a small part of that is Work For Others. The work outside nuclear weapons includes a lot of work for the DOE. So DOE is still about two-thirds of all the work in the laboratory. Today we know the president's budget for Fiscal '07, and we of course know what the deployment has been for '06. And we know generally what the forecast is for the nuclear weapons program as we go further in time. The nuclear weapons program is not a growing program. It has grown significantly in the last five years, but it is not growing over the next five years. What that means is what I call a relatively flat budget for nuclear weapons at this laboratory. There could be dips of a few percent, dips that increase as we go forward in time — but generally fairly flat. It will mean that we will have to look at some redeployment of resources in people into other customers. That's been our plan all along. At the same time we're going to have to reduce costs as we look across the benefits pictures, we look across all the pictures of the cost future of the laboratory. We're going to have to have a compound approach to reducing costs and achieving an agility of people so we can match up the people with the customers as we transition into a changing nuclear weapons program and a growth in programs other than nuclear weapons. We do anticipate a growth in places other than nuclear weapons. And that is our baseline plan. All indications today are that we will remain a relatively stable laboratory, and that is our planning base.

"A key part of a stable laboratory is to have a robust hiring program. Hiring this year is intended to be roughly the same size as the attrition for the laboratory."

A key part of a stable laboratory is to have a robust hiring program. Hiring this year is intended to be roughly the same size as the attrition for the laboratory. That is our goal as we move forward — to have a robust hiring program every year. From all of the projections that we see we're going to be able to achieve that. It will require a lot of work in all three areas — in Joan's area to be sure that the nuclear weapons role that we have is the right one and researched properly. It will require Al Romig to be sure we are aggressive and working hard to establish the relationship with new customers that will allow us to fulfill that growth. It's going to require John Stichman working very hard to deal with the question of the overall cost of the laboratory and the efficiency of the laboratory. The balance in those three things I think is the strategy that will allow us to keep the laboratory stable. That's certainly what our planning is.

LN: *So if you talk about robust hiring programs, are you talking about 500 people a year or do you have any kind of figures in mind?*

Tom: We use attrition as the benchmark. I'm not sure what the future years' attrition rates are projected to be, but today it's a little less than 400 people. So as we think about robust, it's in the range of the attrition to the laboratory, which is around 400 people. Now, over the last several years we've hired more than that. In our future projection we're going to hire at about that level.

LN: *Are there certain areas of recruiting that are a lot more important than others? What would be the emphasis? And has that changed?*

Tom: The emphasis will continue to be based on the capabilities that we're trying to maintain or project in the future. And for us that's going to be an increasing emphasis on our key forward-going capabilities. If you look at our work and investments in microsystems, we need to make sure we have the right kind of staff to fully take advantage of those investments. If you look at our work broadly in information systems — I would include in that high-performance computing and modeling and simulation — that is clearly a key forward-going capability in which we will maintain aggressive hiring, because we gear ourselves as national and world leaders in that regard. We'll have to maintain the right workforce and the workforce additions to allow us to achieve that.

LN: *Is DOE going to continue to be very supportive, funding-wise, of keeping us at of the cutting edge in information technology? Right now we have wonderful infrastructure to offer to recruits who want to get their hands on Sandia's hardware. Is that going to continue*

(Continued on next page)

State of the Labs

(Continued from preceding page)

to be the case?

Tom: That's a very good question. Let's talk about the computing side of the information. If you look at the fundamental role that modeling and simulation has in how engineering is done, the way in which creativity is achieved, the way in which innovation is achieved, the trend in this century is clearly going to be for a significantly expanded role of modeling and simulation.

In a much more fundamental way modeling and simulation has always been thought of as an enabler of the normal processes and understandings. In the future I think it will be a method of discovery and a method of innovation even in and of itself.

DOE has made significant investments at all the laboratories in this. I think that's going to be progressively harder to do in the future, because there are significant budget pressures on all the capabilities and I think it's going to be more difficult to provide the kind of support for the nuclear weapons program that we have now.

However, our other customers benefit enormously from this high-performance computing and modeling and simulation capability. Our other customers, I believe, care deeply about our and the other laboratories' preeminent role in modeling and simulation. I think our other customers will see that there's opportunity to make investments. We can make investments as an institution, like we did with the Thunderbird, to put us ever nearer the forefront.

Thunderbird, other innovative R&D

LN: *Is Thunderbird a model for where we might be going in supercomputing? That was a really innovative program across the board.*

Tom: The Thunderbird is, of course, a capacity computing engine, and one that is innovative on several fronts. First, it's innovative in the way it partners with suppliers to get a system that is very flexible and works very well. Second, it's innovative in the way the laboratory was able to put together resources to get it. And then it's innovative in its cost-effectiveness to provide significant capacity at a very reasonable cost. It shows the creativity of our people. But you asked a question about future support. I think it's going to be more challenging in the nuclear weapons area, but I think our other customers will see the advantage in Sandia's continued leadership role in this area, and I see that the laboratory can make institutional investments that will allow that leadership to continue.

LN: *What about other areas of R&D at the labs? What about nanotechnology and biotechnology? How do you see their role?*

Tom: Of course, the nanotechnology frontier is very significant, and our progress has been amazing. The foundation of the work we do in microsystems and in evolving material science is now being addressed by this approach to nanotechnology, basically the atom scale, of trying to understand and evolve materials and functions of material. The quality of our nanotechnology work has led to a vote of confidence in us by DOE, enabling us to build the CINT [Center for Integrated Nanotechnology] facility and have national attention be drawn to us as a user facility and as a place of excellence around nanotechnology. That's a very significant achievement for the laboratory. We've built the facility on-time and on-budget, and it's now available as a user facility. That is an enormous statement about what our laboratory can accomplish. I see this as an important foundation for all the work that we do. We will also have revolutionary impact in many areas of science and technology across the country. Because of this CINT experience and because of the way we work with Los Alamos, New Mexico is now thought of in a leadership position. I think it's very important [to this community] and very important to the future of the laboratory.

Biology and biotechnology was your second question. It turns out as you deal with national security you almost have to address today the question of what is the nation's security situation with respect to biological threats.

That means we have to maintain a role of understanding, of deep insight, into what it means to give confidence to our nation that threats from biological sources are understood and can be dealt with. We're going to have to deal with it in a whole spectrum of activity. NISAC [National Infrastructure Simulation and Analysis Center], again with Los Alamos, is going to have to capture the broad implications of what might happen in the face of biological threats. At the same time, we're going to have to go all the way down to the molecular level to gain new insights into fundamental things like immunity and how the body really works, and how cells work and pass information and materials back and forth. That is a natural application of work in modeling and simulation and computing, for example. So we're going to have to span that whole spectrum, but we're going to have to do it in a way in which we have a strong engagement with people in the core of the biological community. And that's what we've done. It's been a strategy of partnerships, a strategy of applying our capabilities, particularly modeling and simulation, where they make sense. That, to me, constitutes a nice spectrum of engagement, and I expect to see that continue.

Pulsed power accomplishments outstanding

LN: *Are there any other areas of R&D that you'd like to say anything about?*

Tom: There is one other that we ought to mention and that is one in which the future is evolving. That is our role in pulsed power and to some extent fusion.

Our accomplishments in pulsed power have been just outstanding. They include the work we're doing not only in the fusion-related area, but the significant work we've done in looking at the character of materials. That has really captured a large amount of attention in the nation's scientific community.

We need for that to continue because it's important to the nation's science core that someone's able to do that. It's important to have some alternatives in areas like energy where we look at different ways of achieving fusion energy. It is very important to the weapons program to have that capability available to people throughout the weapons program. We're making a significant investment right now in upgrading [our Z machine] in the near term into a much greater capacity. It's the longer term that we need to spend more time addressing: How we maintain the role and the prominence and the creativity shown by the people at Sandia who demonstrated all these new techniques. In fact, to refer back to one of your very first questions, if you look at examples of creativity and how we've applied modern techniques to resolving age-old problems, our work in pulsed power is one of the examples of explicit and enormous creativity.

Looking at the future

LN: *Looking ahead to the future, how do you see the Labs 10 to 20 years down the line?*

Tom: You always have to look at your vision for what you'd like to see and have happen and what events will shape that. One thing we see quite clearly is the complexity and challenge of the national security situation. It will span everything from energy supplies to nuclear weapons deterrent. The nation over the next decade is clearly going to have significant needs in providing some assurance to our people that the nation is in fact secure.

We now see much of that spectrum that we hadn't seen before, and that means that the need for technology and for scientific understanding

(Continued on next page)

Sandia managers' daylong Spring Leadership Forum explores evolving Labs missions

More than 500 Sandia managers, directors, and VPs recently spent a day together discussing the Labs' future.

The April 5 Spring Leadership Forum included presentations by the Labs' Strategic Management Group (SMG) executives about the challenges Sandia faces as it adapts to evolving environments, missions, and customers.

"The complex and stockpile will not be the same in a decade. That's clear," said Labs President Tom Hunter. "The nation needs us to help define a viable path. And if you look at the broader set of national security needs, they are becoming more complex. Our customers are expecting us to deliver innovative technologies and solutions, now and into the future."

"Finally, the bar — that is, the level of acceptable performance — on our operations, including cost effectiveness, safety, security, and efficiency, all have been raised significantly. Those expectations are at historical highs."

He outlined the three elements of Sandia's management strategy: 1) Leading the transformation of the nuclear weapons stockpile and complex into a modern, agile enterprise that maintains strategic deterrence far into the 21st century; 2) Maximizing our contributions in national security through development and application of leading-edge technology and innovative systems; and 3) Achieving world-class excellence in operations that support and enable our mission.

Joan Woodard, Labs Deputy Director for Nuclear Weapons, discussed the national debate about nuclear weapons, including the future role and size of the nuclear deterrent, the likelihood that nuclear weapons budgets will level off in coming years, and Sandia's role in the transformation of the nuclear weapons stockpile and complex.

"Engaging in new approaches that challenge our technical abilities using modeling and simulation, coupled with validated models and improved understanding of fundamental scientific phenomena, what we call science-based engineering, is the core of our ability to assess and maintain the current and future stockpile," Joan said.

Representing Labs Deputy Director for Integrated Technology & Systems Al Romig, VP for Defense Systems & Assessments Jerry McDowell said the Labs' future stability depends to some degree on development and successful application of technologies and systems that support the nation's abilities to adapt to the changing face of strategic warfare, as well as strategic and enduring relationships with national security customers.

"What defines us as a national laboratory is that we don't pick the low-hanging fruit for the problems that face our national security customers," he said. "We step up and we deal with the most difficult problems, the ones that manifest themselves in the toughest environments you can possibly imagine, and that have absolutely the most astounding consequences if we fail to act."

Labs Deputy Director John Stichman spoke on the Labs' transformation effort, and said in order to succeed in its national security missions, Sandia must achieve greater excellence in science, safety, and operations.

This drive for excellence includes improving Labs management systems and infrastructures, hiring and developing talent, providing national leadership in innovative science and engineering approaches, and working safely, securely, and mindfully.

"It's not merely about the integrated laboratory management system, or all about safety systems, and so on," he said. "It's about the much larger improvements we bring to bear to ensure mission success."

Watch future issues of the *Lab News* for discussion and elaboration from each of the SMG leaders about their strategic planning efforts. —*John German*

Managers encouraged to draw from leadership model

Managers attending the 2006 Spring Leadership Forum were encouraged to take part in Full Spectrum Leadership, a proprietary Lockheed Martin competency model designed to help leaders at all levels of management develop improved knowledge, skills, and abilities needed to exhibit strong leadership behaviors.

Full Spectrum Leadership tools are tailored to the distinct needs of first-level, mid-level, and executive-level leaders. Managers will soon receive more information about Full Spectrum Leadership via email.

Mileposts

New Mexico photos by Michelle Fleming
California photos by Bud Pellitier


Jeff Moore
30 8523


Christine Morgan
30 4333


Bill Ballard
25 8200


Jeanne Lewis
25 2111


Anthony Montoya
25 2661


Craig Searls
25 5991


Jennifer Simmons
25 2995


Judy Case
20 3817


Marie-Elena Kidd
20 2622


Rosalie Lopez-Spinello
20 2722

Recent Retirees


Danny Mitchell
38 8241


Judy Hansen
21 4216


Kathryn Lindell
20 2430


Leann Adams Miller
20 5625


M. Sheila Wilson
20 1051

State of the Labs

(Continued from preceding page)

will be more intense over this next decade than it has probably been historically, because it is more complex. So, in my mind, the need for the laboratories is going to be ever more clear in the eyes of the country. The need for the results that can come from the laboratories will be ever more clear.

At the same time there are pressures the nation is facing with respect to economics. The growing pressure on the federal budget, the current federal deficit, the growing pressures of the aging workforce, and the growing cost of medical care — all those things are going to put us into a different financial situation than we probably have seen for the last several decades.

The need is going to be clearly there, the pressures — particularly financial — are going to be there. And then the world situation . . . My hope for the world situation is that we have a period of stability that is maintained by a relative economic balance across the countries, but also by the fact that deterrence is working and there's no major disruption in the geopolitical framework. So, the need will be clear, the pressure will be great.

I think what matters about the future of the laboratories is this: Are we — and are we perceived to be — places of unique excellence for science and technology? And then, do we achieve that excellence in such a way that there's unquestioned value about the role of the laboratories? Those are the issues that convince me we have to move this laboratory to focus on providing that unquestioned value in a way that the cost is viewed as more than worth it.

I think that will mean a laboratory with clear capabilities that are perceived to be world-class. It means a workforce that is viewed to be the envy of any research establishment anywhere. It means an operating environment where we pull together this exquisite balance between creativity and making sure everything performs and operates in an excellent way. The reason I feel strongly about that is, as you heard from almost every sector, and as you saw in the last opportunity I had to meet with the president [during a national Town Hall meeting on US competitiveness at Intel in Rio Rancho], we did talk about the future of science and engineering. The nation, the president, expects that of us, expects us to be that place of unique excellence.

And so we'd better chart the way for this renaissance in science and engineering and the education system that goes with it. We've got to be — and perceived to be — leaders in that renaissance. We must be seen as the people who are leading the effort to ensure that the nation remains in every way foremost in the application of science and engineering to support our economy and our relation to world economy.

So I see the role of the laboratories really as pivotal at this time because we've got to make that transition. We have to be the example of that transition. We've got to be out there leading this transition.

LN: *We've covered all the ground we intended but I wanted to give you the opportunity to add anything else.*

Tom: First, I think it's important for everyone in the laboratories to know that this is a time when our role in the country is one of utmost importance — and that's a perspective shared by people from all over. Second, we know the transformation to providing maximum benefit to the country is going to be difficult. It's going to provide us a lot of challenges. We don't know or understand all the dimensions of that transformation; we're trying to learn as much as we can about it. As we move forward with this transformation, communications like we have via the *Lab News* and communications we have with the staff are going to be more important than ever.

The goal of the transformation is to assure that people are maximally creative and supported and recognized in all that they do.

So we need to continue to work toward better communication, better understanding on everybody's part, of how we can approach this in the best possible way. I personally take advantage of every opportunity I can to learn more about how this transformation is affecting the laboratory and the people of the laboratory and to try get it framed in such a way that's enduring and enriching for everybody who's here.

Thunderbird computer team wins IES award

The Thunderbird Computer Team won the IES Award for Excellence for its stellar achievement in the deployment of the Thunderbird Linux Cluster, the world's fifth fastest supercomputer and new core of Sandia's institutional and nuclear weapons capacity computing.

The IES Award for Excellence is the formal way the IES SMU (Integrated & Enabling Services Strategic Management Unit) recognizes outstanding performance in making real its dual visions of integrating services as one team and absolutely enabling Sandia's success.

John Stichman, Executive VP, and Frank Figueroa, IES SMU VP, presented Thunderbird team leaders John Zepper and Carl Leishman with a wall clock and plaque at the IES SMU All Minds meeting Wednesday, April 26, at the Steve Schiff Auditorium. Each of the 74 T-bird team members — and they came from centers 1400, 4200, 4300, 8900, 10200, 10300, 10800, and 12400 — received an IES desk clock and certificate.

The timepiece award theme, Frank explained, is symbolic of IES's commitment to save time and enable the mission work of the labs.

Frank called the Thunderbird "an awesome feat in negotiation, installation, teamwork, and sheer vision for the Lab's future." John said it was "a great accomplishment with far-reaching implications in achieving essential efficiencies for Sandia."

He added that the Thunderbird team embodied an important strength on which Sandia builds: outstanding people with can-do attitudes.

Thunderbird cluster team members

John Zepper, Carl Leishman, Bob Amdahl, Ryan Andres, Jim Ang, Jimmy Armijo, Jonathan Atencio, Adolfo Bachicha, Carl Bennett, Brad Beske, Matt Bohnsack, Linda Bonnefoy-Lev, Todd Broste, Donna Brown, Carl Chavez, Kathy Chavez, Milt Clauser, Irwin Cordova, Joseph Cordova, Sophia Corwell, John Dexter, Doug Doerfler, Josh England, Eric Engquist, Marcus Epperson, Allan Friedt, Jerry Friesen, Steven Garcia, Archie Gibson, Russ Goebel, Stephen Gonzales, Don Hand, Joann Herrera, Joey Jablonski, Curtis Janssen, Linda Jaramillo, Kevin Kelsey, Anh Lai, Matt Leininger, Jesse Livesay, Carolyn Lucero, Jeff Lunsford, Chris Maestas, David Martinez, Glenda Maynes, Geoff McGirt, Mark Meyer, Jeff Miller, Pat Miller, Steve Monk, John Moya, John Naegle, Scott Neely, John Noe, Jeff Ogden, Dino Pavlakos, Mike Rahmer, Anthony Sanchez, Daniel Sanchez, Rudy Sanchez, Leigh Saunders, Randy Scott, Andy Silva, Steve Simonds, Jerry Smith, Mike Smith, Mitch Sukalski, Ben Taylor, Robert Taylor, Sean Taylor, Bernie Trujillo, Frank Villareal, Bob Walkney, Harlan Zuercher.

Protect your information; Roy can't do it all

By Darrick Hurst

When Sandia Labs lead custodian Roy Flanders (10848) came across a tech area dumpster while performing his daily tasks last October, alarms

AN ALERT LEAD CUSTODIAN, Roy Flanders (10848), prevented sensitive information from being disposed of incorrectly. Roy won an OPSEC recognition award for his awareness. (Photo by Randy Montoya)

went off. Something didn't look right.

Roy knew this dumpster, knew what to expect when he looked in it: clear trash bags filled with the usual medley of innocuous paper trash, coffee grounds, orange peels, and balled-up sticky notes. But that's not what he saw; this day, the dumpster was filled with documents, just documents — lots of them — and they looked like they might even be sensitive.

What began as a typical workday for the vigilant custodian had quickly become an important study in operations security (OPSEC).

Fortunately in this case, the custodian who discovered the compromised documents had a high level of awareness concerning sensitive information protection, says OPSEC Program Manager Reggie Tibbetts (4234). Roy quickly notified his supervisor and the OPSEC Program Office, which confirmed that these bags did, in fact, contain a variety of sensitive information that shouldn't have been there. Further investigation by OPSEC personnel tracked the documents to a Sandian who had been cleaning out his office in preparation for relocation to another building, and hastily tossed the papers in the garbage.

"This is a great example of the value of maintaining a high level of information security awareness at all times," Reggie says. "Moving out of an office, whether it's because of retirement, transfer, or promotion, is an especially critical time that calls for special attention. It's a situation where we often find bags of trash with sensitive information."

Had the holder of these documents followed basic OPSEC principles, Reggie says, this incident could have easily been prevented.

OPSEC as a mindset

OPSEC — that is, Operations Security — is a methodology that applies from the highest reaches of national government to each person's daily life. Essentially, OPSEC is an active approach to preventing the unintentional release of critical information. In government, these practices protect sensitive information about US activities, capabilities, and intentions. At home, following these practices can protect your personal assets when you leave for an extended period of time.

An adversary interested in collecting information will often piece together and interpret bits of information as a means of developing critical intelligence about a target. Those bits of information can come from any source — positive or negative, classified or unclassified; from casual chitchat with a cashier at the department store, conversations at restaurants and clubs, or news clippings sent to friends and family via mail or e-mail.

As more and more Americans use the Internet to communicate through blogging and instant messaging, diligence in safeguarding information becomes increasingly important.

Such open-source media is an easy exploitation for malicious groups gathering information.

"This is a great example of the value of maintaining a high level of information security awareness at all times."

Reggie Tibbetts

Many times, employees do not fully understand the sensitivity of the materials they encounter while cleaning offices or preparing for moves. This is why, according to Reggie, it is essential to be aware of the information in your possession. It is not uncommon for people to become careless during transitions such as relocations, retirement, or termination and inadvertently discard or mishandle the information in their custody. Properly marking and storing sensitive documents will protect any such sensitive information.

"Do not dispose of OUO or unclassified sensitive information in the trash or recycling containers," Reggie reminds Sandians. "That sensitive information should be discarded by using the white destruction bags or shredders. This will ensure that the materials are properly destroyed."

In this instance, the custodian who spotted the sensitive documents prevented what could have been a potentially disastrous release of sensitive information.

For his attentiveness, Roy Flanders received an award of recognition from the Safeguards and Security Center and the Sandia/New Mexico OPSEC Program.

2005 Lockheed Martin ethics survey results indicate Sandians are generally ethical and want to do the right thing

By Chris Burroughs

A whopping 89 percent of Sandians surveyed believe that Lockheed Martin's ethical principle of citizenship is applied in the Labs' daily operations.

That's a finding in a recently released report of the Lockheed Martin ethics survey taken by Sandia employees in November.

Report confirms Sandians' values

"Sandians are generally ethical and want to do the right thing," says Doug Nordquist, senior manager of Sandia's Ethics and Business Conduct Office 12410. "This report just confirms that."

He adds that the 2005 survey results were consistent with the survey administered to employees in 2003, indicating that Sandians view ethics in the workplace as necessary to doing good business.

All Sandia employees were asked to take the survey between Nov. 1 and Nov. 30 with a response rate of 24 percent.

Some 36,249 Lockheed Martin employees around the world also took the same survey. Similar surveys were also offered in 1995, 1997, 1999, 2001, and 2003.

Lockheed Martin developed the questions, and an independent company sent the survey to all Lockheed Martin employees. The independent company also processed the data for Sandia at the corporate, division, and center levels. Survey results were released last month.

Doug says that while most survey responses were positive, a few surprises and areas of concern emerged. They included:

• Thirty-eight percent of the Sandia survey responders indicated they have never used the Lockheed Martin Code of Conduct in guiding their decisions and conduct at work.

• Forty-nine percent indicated that they were unlikely to contact the Ethics Helpline if they had a question about how to apply Lockheed Martin standards of ethical business conduct in a particular situation.

• Forty-four percent indicated they were unlikely to contact an ethics officer if they had a question about how to apply Lockheed Martin's standards of ethical business conduct in a particular situation.

347 inquiries at Ethics Office

Even with those figures, last year Sandia's Ethics Office had 347 inquiries/guidances and 35 investigations of cases of possible ethics misconduct. Following investigations, about 29 percent of the cases were substantiated — shown to be valid with corrective action taken.

The allegations of misconduct were reported by employees, retirees, contractors, and vendors.

Survey results were shared with all vice presidents and division and center heads.

Ethics and Business Conduct Office Services

• Consulting services — provide advice/guidance regarding questions or concerns of ethics issues. *(Note: If an illegal action is identified during the consulting discussion, the Ethics Office must investigate or refer the issue as a managerial responsibility.)*

• Investigative Services — perform neutral and objective investigations to ascertain facts and determine whether a violation of law, policy, process, or value is present.

• Training — Administer and conduct required Lockheed Martin Ethics training.

Sandia Ethics helpline — (505) 844-1744

How to reach the Ethics and Business Conduct Office

Sandia Ethics Helpline — (505) 844-1744

(Anonymous — Non-ISDN Phone)

Lockheed Martin Ethics Helpline — (800) 563-8442

DOE NNSA Employee Concerns Program Hotline — (800) 688-5713