New Labs President and Director Tom Hunter on privileges, opportunities, and leadership

Tom Hunter takes office as Sandia’s 12th president today (April 29), succeeding Paul Robinson. Here is his letter to employees:

To all Sandians:

Two weeks ago, when I spoke to the Sandia managers at our annual Spring Conference, I talked about how I considered myself to be privileged — privileged to have spent my career at Sandia, and privileged for the opportunities that Sandia has given me.

In those remarks, I was speaking only for myself, but as I began to think about what I wanted to say in this, my first letter to you as Labs Director, it occurred to me that we are all privileged to be Sandians.

At the beginning of our careers, how many different ways might we have gone? How many divergent paths might we have followed? And yet, fortune led each of us to choose Sandia — and for Sandia to choose us, to see in each of us the qualities it sought in forging a team equal to the nation’s toughest national security challenges.

Work of the highest consequence

We are privileged to be called to use our skills, our training, our experience — our position — for work of the highest possible consequence. How many of our neighbors, how many of those with whom we went to school, those who faced the same choices we did and chose another path, how many of those individuals are as privileged

Sandia/ NM Family Day, retiree picnic postponed due to safety concerns

Family Day for Sandia/New Mexico is off. So is the annual retiree picnic.

Family Day 2005 and the retiree picnic, both of which had been scheduled for Saturday, May 14, at the New Mexico facility, have been postponed.

Sandia’s Laboratory Leadership Team Monday reluctantly decided to postpone the event because of site safety concerns due to the large number of major construction projects currently underway at Sandia/New Mexico. A new date will be determined and announced when possible. Sandia/California’s May 21 Friends and Family Day is not affected and will be held as scheduled (see page 3).

“Family Day is an important event for both our employees and their families. While we regret the need to postpone Family Day [in Albuquerque] at this late date,” said Les Shephard, VP 6000, “this will give us time to complete some of our construction and thereby help to further ensure the safety of all employees and visiting family members.

“We know that many Sandians and their family members had already planned their visits, and we apologize for any inconvenience. Safety is our overriding concern, and we can’t compromise that. We hope everyone will understand.”

Watch the Sandia Daily News and the Lab News for further announcements. If you have other questions, call Bruce Petter (12600) at 845-7759.

Some retiree picnic invitations have already been mailed. “Should you receive one, please disregard it,” says Benefits Dept. 3332 Manager Mary Romero Hart.

“We apologize for any confusion and regret that the picnic must be canceled. We are looking at options for recognizing our retirees at a future event.”

Sandia assists with project to maintain vehicles’ tire pressure automatically

Three engineering concepts provided to small business

By Michael Padiila

Dale Petty was tired of maintaining his old farm tires and dealing with blowouts caused by low tire pressure.

Petty, owner of Petty Farm and Ranch in Clovis, N.M., wanted to develop a gadget that would automatically check tires for the recommended pressure and add or release air.

Now the idea is a reality and is being marketed to various companies.

Petty received assistance from Sandia’s Small Business Assistance Program and was partnered with John Browning (59139), principal investigator for the project.

John, a member of the Systems Research Department, came up with various ideas for maintaining the manufacturer’s recommended tire pressure without having to do it manually. He suggested three engineering concepts to Dale: an air compressor system, a high-pressure bottle, and a gas generator.

The air compressor concept is similar to systems that operate tools powered by compressed air. A centrally located air compressor would call for tire inflation pressure to come through an air channel of a rotary union mounted on the wheel. John says this concept would work well in semi tractor trailers, for example, but could not be easily implemented on the majority of passenger vehicles that use constant-velocity joints. A more expensive option is an air compressor system could put an air compressor on each wheel, and would require power to be provided through a slip connection on the axles.

(Continued on page 4)

Vol. 57, No. 9
April 29, 2006

N.M. chile growers are hot topic as hot pepper is a hot topic as a New Mexico specialty crop.

Red-hot chile peppers are hot topic as Sandia, N.M. State University, and N.M. Chile growers team on pepper-sorting R&D project.

Safety at work includes ergonomic evaluation... and follow-through. See story on page 9.

Get the skinny on the world’s thinnest-ever lubricant for weapon parts and other applications. Story on page 5.

Sandia National Laboratories

Managed by Lockheed Martin for the National Nuclear Security Administration

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Sandia Lab News

SANDIA LABS DIRECTOR TOM HUNTER
What’s what

“Safety” is a priority of new DOE Secretary Samuel Bodman. Consequently, it has become the watchword around Sandia these days and we’re all going to be seeing a lot about it in months to come. There already have been recent stories and Sandia Daily News announcements, and there’ll be all-hands meetings, voicemail bulletins, e-mail messages, letters from up and down the organizational chart, ForceField reminders. Video Sandia extrapolations, brochures in your in-mailboxes, eye-catching posters, and probably other stuff nobody’s even thought about yet. Yet.

The messages will be pointed and, more than likely, sometimes entertaining. But beware of two of these media. You can get a nasty paper cut from brochures, and if you’re driving or walking while enthralled with an eye-catching poster warning you to be careful, you could crash or stumble. And although crashing or stumbling would be a graphic lesson, either would produce a negative metric and, besides that, you might skirn your knee or dent your bumper.

An example comes to mind. Not too long ago, one of your Lab News correspondents was walking in an interview in the MESA complex and was so captivated by the tower crane, nifty buildings, and other stuff going on there that he stumbled, fell, and rolled around a little before recovering. Fortunately, he wasn’t injured – falling into the dog muck and suffering only a muddy towel.

The empathetic MESA folks brushed him off and gave him a cookie, and everything was OK. But be careful out there. If you fall and get muddy, there may be no one to brush you off. Or give you a cookie.

The empathetic MESA folks brushed him off and gave him a cookie, and everything was OK. But be careful out there. If you fall and get muddy, there may be no one to brush you off. Or give you a cookie.

Edward廊ercher

Employee Health and Fitness Day

Wednesday, May 18

Hardin Field, Wyoming and F Ave., KAFB

There will be five activity stations running at 15-minute intervals. Come try a back-care obstacle course, group yoga, easy circuit exercise program, and walk. Participate in any three activities to receive an event T-shirt.

For more information, browse the Health, Benefits and Employee Services UPDATE at www.sandia.gov/health/update/

Plastic card but what one does oneself. Understanding that we do day to day has either a positive or negative impact on our lives can play a huge role in the activities we choose, the foods we eat, and the lifestyles to which we aspire.

Here are a few “own it" ideals that you can immediately put into practice:

• Love it. Put your whole heart into whatever you choose to do in the name of health. Often, we begin a positive lifestyle change without actually accepting it as a positive move. Instead, we begin to discount our choices. Expecting ourselves to fail, in fact, lead us down that very road.

Next time you meet with a doctor, begin an exercise program, or make adjustments to your health, try to be as positive about it as possible. Maintain a healthy perspective and believe in your ability to follow through;

• Learn it. Educate yourself on the aspects of health that you need to change. When you understand more about the components of health, you will become better equipped to make healthy choices, more open to changing your lifestyle, and more capable of making the necessary adjustments.

• Live it. Once you start taking steps in the right direction (towards better health, watch what you eat, exercising, eating right, etc.), reinforce the change you’ve made by accepting it into your ever-growing list of behaviors that are meaningful to your health. Often, we begin a positive lifestyle change without actually accepting it as a positive move. Instead, we begin to discount our choices. Expecting ourselves to fail, in fact, lead us down that very road.

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Sandian is a really good neighbor: Fire victims find temporary shelter due to kindness of this stranger

By Nancy Garcia

Watching TV news the morning of March 23, systems analyst Navid Jam (8941) realized the six-alarm fire that left 250 apartment dwellers homeless was not far from his San Jose neighborhood, where helicopters were circling and sirens sounding.

He told his father, who is on the governing board of the Bahá’í Center two blocks from the fire, that he wanted to open its doors as a temporary shelter.

Some didn't even have shoes

“Some didn’t even have shoes...”

He drove over and offered the shelter to the Red Cross representatives at the temporary command center. “They were jumping up and down for joy because they didn’t have a place to take the displaced residents,” Navid recalled. “This was a perfect place for them to hang out. ... What’s the purpose of having a church if you can’t open your doors when people are in need?”

A staging area, where the displaced residents warmed up, had refreshments, used the facilities, and (the children) played with toys, the Red Cross later moved them to a middle school that also offered showers and could be used as temporary lodging for residents unable to go to a hotel or friends or family to stay. Navid busied himself setting up the coffeepot, picking up spare diapers, and making photocopies, along with several other members of the Bahá’í Community who showed up to help.

Other nearby residents also showed up, willing to help, dropping off food, clothes, and other items. “It was amazing so many people brought so many things,” he said. He himself provided an extra Macintosh power cord to a programmer who was frantically clutching his laptop, lost in worry about a software release due the next day.

He was also impressed with the logistics of the Red Cross, whose crew focused on lining up medications and relief kits. The fire was the worst displacement in that area in roughly a decade. The Bahá’í of San Jose in conjunction with the Red Cross sponsored an emergency preparedness class for residents on April 9 and had a fundraiser on April 17 to raise cash donations to replenish the Red Cross disaster assistance fund.

Feedback

Voicemail etiquette applies to all Sandia sites

Q: I have called or e-mailed employees only to find out they were either on vacation or on their 9/80 day-off. Friday off. I’ve mentioned this issue to some line managers and some don’t appear concerned their employees fail to notify their customers. Is there a corporate requirement or practice requiring employees to change their voicemail and their e-mail when they are out of the office due to absences or their 9/80 day-off?

A: There is no corporate requirement direct-ly setting employees to keep their voicemail or e-mail options current so that they detail an individual’s presence at or absence from work. At the same time, there is an expectation that Sandians demonstrate professional behavior and Sandians, simply put, do the right thing. Failing to manage your voicemail is not doing the right thing. The lack of concern and professional behavior demon-strated by failing to keep people who tried to reach others via e-mail or phone is especially bad when it’s members of service organizations who drop the ball and keep others waiting and guessing with what really are bogus e-mail or voicemail greetings. e.g., “Hi, this is Andrew Smyth’s phone. Leave a message.”

In fact, there is a reprint of an item that ran in the Sandia Daily News early this year: “Voicemail etiquette: The e-mail team says it makes you more accessible and helpful, while temporary absence greetings can make visitors a laboratory or place of work. It’s considered important that all key depart-ments, whether elaborate or simple. Ideas include exhibits, poster displays, science experiments, talks or presentations, or even an “open house” to show visitors a laboratory or place of work. To register or for more information, please see http://www.9.m.sandia.gov/shak/index.html.
To all Sandians

(Continued from page 1)

a 21st century national security laboratory. Although that level of investment will not continue, we must assure that the pace is maintained. Perhaps the most significant investment in our history is the MESA complex, almost a half-billion dollar government investment. That’s unprecedented. MESA represents one of the largest national commitments to developing the essential integration of design, modeling, and simulation, and microsystem technology.

In addition, we’ve purchased one of the world’s largest supercomputers, upgraded our power facilities, and we are revisiting our test areas in Coyote Canyon and parts of Area 3. These are all vital measures in our continued ability to serve the nation.

Well-poised to meet challenges

We are well-poised to meet the challenges ahead. But that’s not to say we don’t have challenges of our own. We must address and focus on operational excellence. We have to ensure that especially in the area of operational safety and our safety basis, there is hard work ahead. We need to make sure our customers have confidence in our safety performance and that we continue to develop and refine the culture of a safety.

We have challenges in security. Again, we’ve made good progress, but even more can be done. And we need to be perceived by our customers and our stakeholders as leaders in the area of operational efficiency. We want to be seen as the institution that sets the benchmark for standards of effectiveness and efficiency.

As we plan for our future, we must all be aware that there will be some transformation of the nation’s nuclear weapons enterprise. People in policy-making positions are asking important questions about the future of the weapons complex. How can the components of the complex work together more effectively and efficiently? How can we be sure this several-billion-dollar investment is spent in the best way for the nation’s security? How do we look forward and see the road available and have the right infrastructure for the missions we’ll have at that time?

These are not unreasonable questions and we need to be ready to answer them. It is my hope that we will help lead the transformation of the nation’s nuclear weapons complex.

I understand that during any transitional time uncertainties will occur. I ask you not to put stock in rumors and speculation, but to watch what we do. Our actions will be clearly deliberate. Over the next 60 days or so, we are going to spend time trying to structure and position the pieces of the laboratory so that they align with the future. But we don’t start this process with a blank slate. As we move forward, we’ll have principles to guide us, and we’ll continue to develop and refine those over time. I believe very strongly in building on the foundations we have and making only the changes that will clearly move us forward.

We are one Sandia

There is a principle that underpins all the others. We are one Sandia. As we move forward, we’ll make every effort to be clear about assignments and responsibilities, and we’ll also make it emphatically clear that we are all in this together. The future that we design will be one that we all aspire to and that we all can achieve together.

Another principle in national matters, the nation comes first. That principle was set down in writing by then-Martin Marietta president Norman Augustine in 1993 and it certainly holds true today, as it has throughout our history. And, likewise, in corporate matters, in our engagement with Lockheed Martin, Sandia comes first. Lockheed Martin, to its credit, not only agrees with this principle, but insists upon it.

There is a long-standing Sandia value that I will continue to embrace and work to embody: Each person matters. The core value of each person and the core value of what we stand for together matter to us as an institution and as individuals. Anything less is not worthy of Sandia or Sandians.

I hope everyone understands that we are not considering radical transformation of Sandia. We are aiming to make sure every step we take is a step forward, every action builds on what we have and makes it better.

As I take on this new role, I need your support. And I pledge you mine. I have come to believe that, at the end of the day, our success, as individuals and as an institution, derives from our ability to trust, enable, and support each other.

And finally, I want you to know that I’ll do everything I can, as your leader, to make sure Sandia remains in a place where we feel privileged to come to work every day, where each person is valued and respected and where our country continues to turn to us for exceptional service in the national interest.

TOM HUNTER
Sandia Labs President and Director

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Tire pressure

(Continued from page 1)

The high-pressure bottle concept is similar to systems used in airplanes and aircraft emergency slides. A high-pressure bottle with a pressure regulator can be placed on each wheel of almost any vehicle. Product pricing issues, however, include costs of the high-pressure-rated parts and possible regulatory maintenance requirements such as periodic testing of the system components.

The gas generator concept would use materials already in use in automobiles today to inflate airbags. A series of small, hot-wire-ignited pellets (e.g., sodium azide) could provide nitrogen gas for petrochemical applications such as gas tank inflation. The pellets could be mounted on a flex circuit board, which would be strapped around the tire rim inside the tire volume along with a battery, pressure sensor, microcontroller, and ignition electronics. John says the gas generator concept is potentially the lowest cost manufacturing solution, but, says Petty, “Hopefully someday all vehicles will have a reasonable cost through private sources.

Air compressor

The air compressor concept was chosen in the preliminary design of an automatic tire pressure maintenance system. A prototype system was built under the small business assistance program to address the safety and economic issues of under-inflated automobile tires frequently driven on America’s roadways.

A portable prototype has been created to handle carry to trade shows and potential customers. The portable system is designed for demonstrations, and may be powered either by a portable 12-volt, sealed lead-acid battery (with a 110-volt AC battery charger), or by a 12-volt DC output, 110-volt AC power converter. The system features a mounted tire and wheel, attached to a pedestal by a bearing, with a handle for manually rotating the tire. A carrying case is included. The pedestal contains an air compressor, pressure switch, and vent valve, with associated tubing and wired connections to a control box with an internal pressure sensor.

The prototype has some features similar to the Dana Corporation’s central tire inflation systems (CTIS) which have found utility in the trucking industry, particularly in off-road vehicles, and have been employed with both trailer axle vehicles and tractor drive axle vehicles. The CTIS is currently available on some models of the Hummer, but, says Petty, “Hopefully someday all vehicles will be equipped with a device that will help save lives.”

High pressure bottle

With the assistance of John’s brother David, an automotive technician at Galles Chevrolet in Albuquerque, Dale also created an automatic tire pressure maintenance system using wheel-mounted high-pressure nitrogen bottles.

The system has been installed on all four wheels of a 1966 Ford Mustang.

Testing of the system included tire balance check and various bottle road tests. The bottle road tests test tire and rim assemblies, shock and vibration from various highway speeds, and the structural integrity of the system. In addition, tests were conducted to detect leaks and simulation of upper pressure of the automatic tire pressure maintenance system.

Small idea, big concept

Petty says the idea for the system came after his son came home with a homework assignment. The assignment was to not to reinvent the wheel but to make it better. Petty sat on the idea for a year and soon contacted Sandia’s Small Business Assistance Center.

Besides being tired of changing flats and dealing with blowouts, Petty says the idea was also based on safety.

Petty was alarmed with the 2000 recall of Bridgestone/Firestone’s 6.5 million tires. Close to 300 complaints had been received by the National Highway Traffic Safety Administration about the tires. Several hundred lawsuits were filed because of fatal accidents due to the faulty tires.

After meeting with Mariann Johnston (13021), the Small Business Assistance Program team leader, he knew his ideas would soon be developed.

“I am pleased with all the assistance Sandia provided,” Petty says. “Sandia took the lead and helped out tremendously.”

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DALE PETTY got tired of having to check his tire air pressure all the time, so he developed a system that does it automatically. (Photo by Randy Montoya)
Innovative Kansas City Plant process yields lubricant of unprecedented thinness — with help of Sandia

This story, reprinted from the Kansas City Plant’s internal newsletter, Connections, offers a vivid account of a collaboration between Sandia and the Kansas City Plant to solve a tricky friction challenge.

By Monta Morris, Kansas City Plant

Mark Smith doesn’t like to say no. So when customers at Sandia and the National Nuclear Security Administration came to him with a requirement that — as far as any of them knew — had never been met, he considered it a challenge.

The requirement was for an extremely thin layer of lubricant — thinner than has ever been achieved either within the weapons complex or in industry — to be applied to small bearings and parts for the W76 and W80.

“Oil can’t be used on these parts because oil flows and could eventually spread to parts of the system where it might interfere with performance,” said Smith, principal engineer in materials engineering at the Kansas City Plant. “Also, for systems that are likely to remain in stockpile for years at a time, oil can settle, leaving parts unprotected by lubrication.”

What the lab asked for was a layer of lubricant to be applied at a maximum thickness of 0.05, or 50 microns.

For comparison, typical paints and coatings go on at 1.0 to 3.0 mils thick. Bonded solid film lubricants, which are applied as a solid lubricant powder mixed with a liquid adhesive, are generally thinner, at 0.6 to 0.9 mils, but that’s still more than 10 times too thick. The Kansas City Plant’s production paint department, using their expert techniques, can apply those adhesively bound lubricants at 0.1 to 0.3 mils, but that’s also too thick to meet the new requirement.

“We were trying to solve a ‘micro’ problem with a ‘macro’ solution,” said Smith. Faced with these impediments, he determined that an entirely new approach was called for.

Initially, Smith, who has extensive expertise in spray coating with powder, considered incorporating the lubricant into a powder coating that could be sprayed onto the substrate. But because the goal was thinness, and lubricant by itself is as thin as you can get, Smith tried something unusual — spraying the solid lubricant directly onto the substrate without using an adhesive.

The lubricant he used, molybdenum disulfide (MoS2), is a dry powder in the form of microscopic flakes or plates. Senior engineering technologist Mike Hester dry-blasted the MoS2 at high pressure onto clean substrates in a dry nitrogen atmosphere. When the dust settled, and the loose material was washed away, Smith and Hester were greeted by a pleasing sight: the substrate had a smooth, even, and very thin layer of MoS2 embedded into its surface.

It was Mike Dugger, Ph.D., distinguished staff member at Sandia Laboratory, who had initially suggested to Smith the possibility of blasting the lubricant directly onto the substrate. Dugger is a tribologist — an expert in friction and lubrication — with years of experience analyzing lubricants and their properties. And he’s frankly impressed with the Kansas City Plant’s success.

“This process generates a thin film of unprecedented thinness and excellent friction behavior,” said Dugger.

Lubricant is measured using a coefficient of friction: the lower the coefficient, the less friction exists. “This process provides an excellent friction coefficient,” said Dugger. “Typically, for the kinds of products we build in the weapons complex, we get friction coefficients of 0.15 to 0.12. This process is significantly lower. The lowest we’ve measured with the new process is 0.03, which is so low it is getting hard to measure.”

The thickness of the MoS2 lubricant is what pleases Smith most about the process. “That’s what we were after,” he said. “It’s a good lubricant, and it’s as thin as you can get. Adhesive and binder are what make the lubricant thicker, and we’ve eliminated them.”

He’s also extremely pleased with the simplicity of the process. “It’s easy and inexpensive to perform, and unlike many other methods of applying lubricant, it uses no hazardous solvents or other pollutants.

“This process can be easily applied to production throughout the nuclear weapons complex,” said Smith. “It will lend itself to new weapon designs that require or can make good use of extremely thin permanent lubricants.”

The Air Force is highly interested in the new lubricating process and has asked the Kansas City Plant to consider reproducing 2,000 gyroscopes — containing 20,000 individual parts — for them. The MoS2 dry-blast coating will allow the gyro to remain in long-term storage without losing lubrication protection.

What we really need is a material that can be applied with a thickness so small that we don’t have to allow for it in the dimension of the part,” said Dugger, “and this lubricant is providing that. I’ve looked at a lot of solid lubricants over the years, and this is one of the best I’ve seen.”
Working to make New Mexico's chile industry high-tech and healthy

By Will Keener

Across southern New Mexico and into Texas and Arizona, a major effort is underway to modernize harvesting and production of a product near and dear to many lovers of Southwestern cuisine — chile. Mechanization is coming gradually to an industry that has been synonymous with handpicking and hand-cleaning for many decades. Survival is now at stake.

Mechanization of this valuable crop ($300 million in New Mexico alone) is a critical step toward success, says Roy Pennock, a Cooperative Extension research specialist at New Mexico State University who has spent his life in the industry. As labor costs and availability fluctuate and availability of red chile powder from Peru, Africa, India, and China increases, the industry has come together to fight back. The New Mexico Chile Task Force combines growers, processors, crop consultants, university extension experts, and others "... to get everyone working on the same page," says Pennock. Add Sandia Labs to that mix, as Chris Wilson, Maritza Muguira, David Novick, Jon Salton, and Jesse Scheidbach, all of Intelligent Systems Control Department 15234, are working hard to play a contributing role. Now moving into the fourth year of a project with the task force, Chris and his team took high-tech contributions to the effort on the road for last year's harvest.

New machines

Working with Pennock, New Mexico State University Extension Engineer Ed Eaton, and others, Chris and the Sandia team have developed an imaging system that can measure the effectiveness of mechanical harvesters, cleaners, and sorters for chile producers. "We looked at the mechanical devices under development and decided we could help most with a measuring system," says Chris. The system measures chile on a conveyor belt and quantifies the percentages of chile and "field trash," which generally consists of stems, leaves, and other natural debris.

The system was used in connection with a two-stage mechanical chile cleaner developed by Eaton during last year’s harvest. But it may also be of use to processors in the future, Pennock believes. "Mechanically harvested chile isn’t always perfect. You get pods, but you get leaves, branches, and maybe a few other things," Pennock says. Without the “vision device” developed by Chris and his team, laborious before-and-after sampling is needed to gauge success.

"This is a system that has tremendous potential for processing plants. You could have it at the beginning and at different stages of the system and it would tell you quantity and quality of the chile during harvesting," says Pennock, who operated the system last year as part of the evaluation project.

The original idea of how Sandia might help the task force evolved over the past three years. Chris says, he started out with the goal of doing a survey to provide some factual information on which methods of mechanical cleaning work and which do not. Originally, he thought Sandia’s robotics group might be brought to bear on developing machines, but others, including researchers at NMSU, were ahead of the curve in this area, as Chris found another niche. He continues to consult with Eaton on design issues but has focused on measurement.

Cleaning chile fresh from the field is complicated by the fact that the peppers change through-out harvesting season. Early in the season, the plants are green and fresh and there’s little field trash, later as the plants turn red, mature, and endure frost, mechanical harvesters tend to pull up large amounts of red chile branches and leaves with the pods. "Chile has been a good sounding board for me," says Eaton. "He’s someone I can talk to who listens and is very helpful." Eaton plans to take a new version of his cleaner, mounted on a conventional chile harvester, into the field this year. "We need investment to help us go forward to the commercial stage," he says.

Examining different imaging technologies, Chris and his team developed a system that analyzes the chile and debris on a conveyor belt based on color differences. A digital camera connected to a portable computer takes still images of cleaned product on the conveyor belt. Software then analyzes the image, segmenting it according to color into product, trash, or background. Then the system counts pixels and provides feedback to the operator on percentages of product and waste. The operator can then adjust the cleaner and recheck the output plots to see the effect.

More variables

The project has thrown problems at Chris that he hadn’t seen before. "There are a lot more variables out in the field than there are in a laboratory space," he says. Given the variety of difficulties, Chris believes the lab force led by NMSU’s Rich Phillips, is doing a good job. "They’ve reduced the scope of the problem significantly. Part of what we do involves educating customers as well as trying to listen to them."

"Right now, most measurements are made by ‘eyeball,’" says Chris. "There is no standard for estimating the amount of product. An objective metric, system needed."

To achieve segmentation or determine what part of the image is actually the conveyor belt, debris, or chile, the system operator must "train" the software. The operator can develop appropriate masks to screen the images, based on hue and saturation values plotted as histograms. “This makes it easy to move from one conveyor belt to another with different color belts, or to measure differences in chile color based on the variety being harvested,” says Chris. "We should be able to work with our customers to make changes as necessary."

"This work builds on and adds to what we are doing at Sandia. Here, I work as a lot of 3-D imaging, and this is a switch to 2-D. We are stretching ourselves in some different directions, but I think it will make us stronger."

CHILE CLEANER — Ed Eaton, an agricultural engineer with New Mexico State University’s Cooperative Extension Service, fine-tunes a prototype mechanical field cleaner for chile peppers. (Photo by: Victor Bispinioa)

Chile cleaning sponsored by NM Small Business Assistance Initiative

The automated chile cleaning effort in collaboration with the New Mexico Chile Task Force was one of 12 leverage projects sponsored by the New Mexico Small Business Assistance Initiative at Sandia last year. Leveraged projects are a group of five or more (limited to 25) small businesses working with Sandia to investigate a single industry issue, relating to all the small businesses involved. The anticipated length of a leveraged project is three years or less to determine a solution for the industry issue involved. Fifteen to 20 private companies have been involved in the New Mexico Chile Task Force over its three-year duration. The benefit of Sandia’s work will continue to affect the New Mexico chile industry along with each of the participating small businesses growers and producers. Through the Small Business Assistance Program, New Mexico and Sandia have invested more than $300,000 in the task force for research and development efforts. The Small Business Assistance Program is a cooperative arrangement between Sandia National Laboratories and the New Mexico State Small Business Assistance program to provide technical assistance to small businesses in the state.
Emotional intelligence: Are you as smart as you think?

Have you had any injuries attributed to repetitive motion?

Cindy Turner (2305): I first noticed my hands and fingers going numb and tingling when I was pregnant with my third child. I asked my obstetrician about it. He suggested it might be carpal tunnel syndrome. I went to a neurologist (after the baby was born) and was tested and diagnosed with carpal tunnel on both wrists.

I came back to working on a computer 95 percent of the time. Physical therapy and wrist bands did not alleviate the pain. My hands and fingers would get completely numb and would tingle at night. The pain would wake me two to three times a night. I experienced total numbness driving to work. I consulted with a surgeon and had an operation on my left wrist (which was the worse).

Physiotherapy is something I have been doing twice a year and am glad I did. My left hand does not become numb anymore and I'm finally sleeping through the night. I can use my wrist band (which was not feasible).

Linda Lovato-Montoya (12654): Pills didn't help. Shots and splints helped (for a while). Numbness, tingling (pins and needles), and sharp shooting pains in the hands are symptoms of carpal tunnel syndrome. I never thought about how being a typist for many years, using a computer and a mouse on a daily basis, and pushing a wheelchair (my mom's) for so many years, would affect my ability to use my hands. The pain often wakes me at night requiring me to get up and "carry" my mom's wheelchair because I am unable to "walk" on my own. It took almost a year to achieve full range of motion. The other shoulder healed a bit quicker since the cause had been determined. The only ergonomic fix was to try to use different machines instead of the same one continually since the cost to reconfigure these machines was not feasible.
Betty Boop gets an ergonomic evaluation. You can too!

By Iris Aboytes

The mere mention of an ergonomic evaluation would make me cringe as I imagined my body in a totally distorted maneuver. It was not a pretty sight. Besides, I never had time. One day my coworkers were all scheduling evaluations, so I decided, why not?

The assessment scheduled, the evaluator came to my office. Some of the first questions were relatively simple: “Do your feet always dangle from the chair that way? Don’t you have a foot rest?” It was great. I was actually getting an evaluation and was not asked how tall I was or how much I weighed. Not bad, I thought to myself. This was a good decision on my part.

I always knew about sitting up straight. My mom taught me that. Taking breaks to relieve eye strain was not hard. In my arrogance I believed I had all the answers. What a rude awakening. I found out I was doing more things wrong than right. I was a prime candidate for carpal tunnel syndrome, plus back and neck pains were waiting around the corner. My arrogance was transformed into meekness and humility as I asked more questions.

Most of us do not look to find out what we are doing wrong, only what we are doing right. I was not any different.

My arms from my elbow to my keyboard were not straight; mine pointed up. My monitor was not positioned the recommended 18"-24" from my eyes. The evaluator asked if I had last had my eyes checked. I answered, “Two years.” She suggested I get an eye exam and get a prescription for computer glasses. I wear reading glasses. Why computer glasses? I made an appointment anyway.

My mind being a steel trap, I was wrong. It had been six years since I had my eyes checked. So after getting scolded by my ophthalmologist for not going sooner, I got a prescription for computer glasses.

She also suggested I get a new chair. The chair I had would not go any lower. The new chair would help my feet touch the ground. I was scheduled for a chair evaluation. I got to sit on several chairs, and then the evaluator recommended the chair she thought would be best for me. Our administrative assistant ordered the suggested chair. Now my feet actually touch the ground and I am ready for take-off (just kidding).

Oh, you have to hear this. Sandia paid for my glasses. All I paid for was the $25 copay to my ophthalmologist. I took my prescription to my ophthalmologist, selected my frames, had my glasses. All I paid for was the $25 copay to my ophthalmologist (just kidding).

The evaluator also suggested I get a new chair. The chair I had would not go any lower. The new chair would help my feet touch the ground. I was scheduled for a chair evaluation. I got to sit on several chairs, and then the evaluator recommended the chair she thought would be best for me. Our administrative assistant ordered the suggested chair. Now my feet actually touch the ground and I am ready for take-off (just kidding).

I have always worked at eating healthy and exercising for a healthy heart, but I had omitted

Repetitive motion

(Continued from preceding page)

the elbow, through the forearm and wrist into the hand), tendons and the carpal bones. The nerve becomes irritated and swollen due to repetitive motions, causing the numbness and pain in the middle and index fingers. After ignoring my symptoms for much too long, I had a special electrical test confirming I had carpal tunnel. I wanted a quick fix. The quick fix is medication, shots, and splints. I’m still getting relief from shots, but I will need the surgery. I’m hoping for a new form of treatment. My experience with carpal tunnel has made me be very aware of ensuring that people I work with all receive an ergonomic assessment and have the necessary equipment to help them perform their job with as much comfort and safety as possible.

<table>
<thead>
<tr>
<th>Year</th>
<th>Cases with repetitive motion as cause</th>
<th>Cases related to computers</th>
<th>% Related to computers</th>
</tr>
</thead>
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<tr>
<td>2004</td>
<td>69</td>
<td>47</td>
<td>68%</td>
</tr>
<tr>
<td>2005</td>
<td>13</td>
<td>9</td>
<td>69%</td>
</tr>
</tbody>
</table>

Ergonomic Resources For You

Chair Fittings: Be accurately fit for a chair, call Maggie Ferguson, 845-8661.

Keyboard Trays: For keyboard and wrist support to assist with proper posture, call Sandra Garcia, 844-6447, or Maggie Ferguson, 845-8561.

Headsets: For custom ear molds and/or a custom headband, a manufacturer is onsite every Thursday in the Thunderbird Cafe on Thursdays from 1:30-3 pm. Walk-ins are welcome, or to make an appointment call Maggie Ferguson, 845-8561.

Workstation Evaluation or Relocation: To assess your workstation to ensure ergonomic accuracy, call Sandra Garcia, 844-6447, Maggie Ferguson, 845-8561, or Mark Warner, 214-6670.

Computer Mouse: For a specialized ones (like left-handed), call Sandra Garcia, 844-6447, or Maggie Ferguson, 845-8561.

Do you spend a lot of time in front of your computer?

If you are working on a computer for more than two hours a day — not two hours in a row, but at any time in one day — then you are a candidate for an ergonomic evaluation in a new corporate ES&H initiative.

“The good news is that we have launched a comprehensive ergonomics program to prevent injuries within our corporate initiative to rank Best-in-Class for ES&H within three years,” Jaime says. “This year, we have launched a laboratory screening program to evaluate everyone who sits at a computer for more than two hours. It will be accomplished by either going building by building or division by division.”

You may want to be proactive and schedule your assessment ahead of time — before going away for summer vacation. An ergonomic assessment lasts 10 to 20 minutes, depending on your work situation. Sandia also has a screening tool available to detect 85 percent of existing ergonomic problems in the workforce.
Sandia writers, artists, editors win 11 Communicator Crystal Awards

Sandia writers, editors, and photographers captured 11 of the top-level Crystal Awards of Excellence in the 2005 Communicator Awards print competition. The Communicator Awards is an international competition honoring excellence in communications.

Here are the Sandia Crystal Awards winners:

- Sandia Lab News, writing/newsletter, Lab News Staff
- Labs Accomplishments 2004, newsletter/special edition, Bill Murphy
- Gigapixel, photography, Randy Montoya
- Lab on a Chip, writing/technical, Chris Burroughs
- Wes Martin in Iraq, writing/news article, Iris Aboytes
- Sandia 2005 Calendar, photography, Randy Montoya, Bud Pelletier, Diana Helgesen, and Randy Wong.
- Juan Ramirez biography, writing/other, Sherri Mostaghni
- Sandia Overview, brochure/company overview, Larry Perrine, Michael Vittitow, Randy Montoya
- Sandia Technology, magazine/government, Will Keener, Doug Prout (Technically Write), Sherri Mostaghni
- State of the Labs speech, writing/speech, Bill Murphy
- Strategic Education Plan, writing/communication plan, Sherri Mostaghni
- Sandians also received 16 Awards of Distinction and 6 Honorable Mentions.

Three Sandia writers take awards in Press Women media contest

Three Sandia writers were recognized recently with awards in the 2005 Media Communications contest sponsored by New Mexico Press Women (NMPW).

Lab News writer Chris Burroughs (12651) took first place in news reporting-special articles for the article she wrote on a well blowout in Carlsbad. She also got a first place for a news release she prepared about using chemlab-on-a-chip for medical purposes.

Iris Aboytes (12651) won a first place for an article she wrote on United Way. It was in the category of Public Service Campaign or Program for the Public Good. She also won an honorable mention in the category of Features Special Publication.

Noel Fletcher (6330) won several awards. She took a first place in the category of speeches for a speech she wrote for Sandia; a second place for an article she wrote for the Catholic News Service, and a third place in the category of writing for the web for a piece she did for Sandia.

The Lab News won a first place in the category of magazine/pamphlet.

Results of the annual contest, which is open to all New Mexico media professionals, were announced April 15 during NMPW’s annual conference.

First-place winners go on to compete in a national competition sponsored by the National Federation of Press Women, of which NMPW is an affiliate.
Water a key theme at Sandia’s Earth Day 2005

The focus was on water at Sandia’s version of Earth Day 2005, held April 14 at the Technology Laboratory at Sandia’s site in New Mexico. Two speakers looked at scientific aspects of water shortages in the western US, applicable to other hot spots around the world. Several activities highlighted water issues, including a xeriscaping booth, a water conservation survey, and information from the New Mexico state engineer and the Interstate Stream Commission.

And firefighters thought they might have to use a little water, too, when they responded to check out the building. But they quickly determined that smoke from a nearby barbecue for check out the building. But they quickly determined that smoke from a nearby barbecue for check out a hybrid Toyota Prius during a lunch break. About 160 attended. (Photo by Danielle Nieto)

Alternative fuels capture attention at youth environmental conference

In the auditorium at the South Broadway Cultural Center, some 140 high school students from around Albuquerque are watching a movie. The subject is a reciting, forward-thinking mechanic-philosopher, who gets Telluride, Colo., restaurants to pay him to pick up the oil they use for deep-frying. He in turn refines the sticky fluid into vegetable diesel, which he calls “grassoline” and runs it in an open-top four-wheeler he cruises about town in.

“The students loved it,” said Jennifer Payne (6331), who helped organize this year’s Eighth Annual Youth Conference on the Environment. Sandia has been a key sponsor of the event for the past several years and helped make this year’s April 13 conference a big success.

This year’s focus fell on alternative fuels. Students — largely from the metro area but also from Laguna and Acosta pueblos — along with their teachers started with a big picture view from New Mexico Public Regulation Commissioner Jason Paul. They outlined the state’s commitment to renewable energy and noted that 10 percent of New Mexico’s energy is already being supplied by wind, with a second 100-megawatt wind power facility coming on line in the near future.

Students also learned about geothermal energy, large solar power, and wind power in breakout sessions. A lunchtime hybrid car demonstration was a hit, says Jennifer. After lunch, the students listened to several presentations and then engaged in a hands-on activity, made from wood and other elements they had collected during the day.

ALTERNATIVE TRANSPORT — Students at the 8th Annual Youth Conference on the Environment check out a hybrid Toyota Prius during a lunch break. About 160 attended. (Photo by Danielle Nieto)

other Sandia colleagues (all 6331) acted as guides and filled other roles on conference day. They included Stephanie Salinas, Amber Montoya, Bryn Stuart, Katrina Wag- ner, Joanna Eckstein, Tes Geering, and Robert Ziock. Four Rio Grande High School students also worked on planning for the event and presented opening remarks to frame the conference, Jennifer said. The City of Albuquerque donated space for the event.

“Our department manager, Su Hwang, has been a key participant in the conference and to reaching out to the community and providing education on relevant environmental issues,” said Jennifer. “This is a good investment in the future of New Mexico.”

New Mexico has a good future in renewable energy and the students are the future of New Mexico. It’s great that Sandia is playing a part in it. — Will Keener

Feedback

Readers have questions about Carlisle gate, parking

Q: The closest gate to my residence is the Carlisle gate, so I have been using it for entry to KAFB. A Carlisle gate guard recently told me that unless I work on the west side of the base, I couldn’t use the Carlisle gate. I was just wondering if this is a new Kirtland entrance policy. Are there any changes to which gates Sandia employees can use?

A: We have verified with the Air Force that all gates are open to people with the proper credentials for entry. There may have been some confusion during recent construction activities; however, Sandians are welcome to use the Carlisle gate or any other gate if it is most convenient for their entry to KAFB. — Ed Williams (10864)

Q: I regularly park in front of Bldg. 701 and have had a number of issues with other vehicles parking so close to my car that I can’t even open the doors. I am in early, am generally one of the first on the head, and try to park as far to the edge as I can to make sure I have space, but still I have this problem (in most cases, there are no other cars in the lot when people choose to park adjacent to my vehicle). Recently, it has been the same SUV and it occurs literally every day. I do not know who the owner of the SUV is, so I am unable to approach them directly. In this case, the person parks their vehicle literally half in one spot and half in another. What can I do to see that this doesn’t occur again? I realize that the 701 parking lot doesn’t have lines, but I would think that most of us are intelligent enough to understand that the concrete divider at the end of a parking spot defines the parking spot.

A: I can certainly understand your perspective, and not being able to enter a vehicle because another driver is encroaching into a parking space is not acceptable. If you observe this, please immediately contact the Security Desk Lieutenant at 844- 3155 and they will dispatch a Security Police Officer to ticket the offending vehicle. If this is a recurring violation you may contact the Desk Lieutenant with the number from the bay description and the exact location where you will provide an appropriate follow up investigation. — Ed Williams (10864)