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FLC
NewsLink

October 2003

Federal Laboratory Consortium for Technology Transfer
The Only Government-wide Forum for Technology Transfer

T² Events

BioVenture Forum
East 2003
Philadelphia, Pa.
Nov. 17-19, 2003

•

RD&D
Conference and Expo
Washington, D.C.
Nov. 17-20, 2003

•

CMMI
Technology Conference
Denver, Colo.
Nov. 17-20, 2003

•

Technology Transfer
Conference and Expo
Chicago, Ill.
Feb. 23-26, 2004

•

Society of
Automotive Engineers
Detroit, Mich.
March 8-11, 2004

•

World's Best
Technology 2004
Arlington, Va.
March 21-23, 2004

•

FLC National Meeting
Mission Driven
Partnerships
San Diego, Calif.
May 3-7, 2004

Go to:
<www.federallabs.org>
for a complete
calendar of events

T² Fact

In 1889, the first coin-operated telephone, patented by Hartford, Connecticut inventor William Gray, was installed in the Hartford Bank. Soon, "pay phones" were installed in stores, hotels, saloons, and restaurants, and their use soared. Local calls using a coin-operated phone in the U.S. cost only 5 cents everywhere until 1951.

Inside

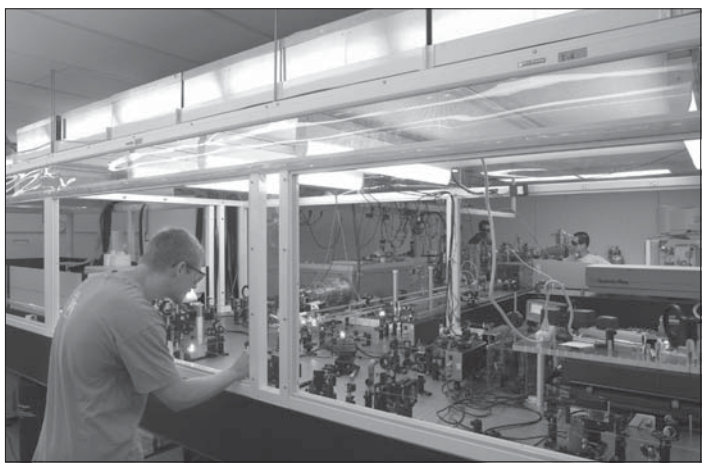
Check out FLC NewsLink online
www.federallabs.org

NSF Awards $68 Million for New Research Centers

Engineering Centers to Tackle Storm Prediction, UV Light, Chemical Manufacturing, and Implantable Electronics

The **National Science Foundation** (NSF), the independent federal agency that supports fundamental research and education across all fields of science and engineering, announced four new Engineering Research Centers (ERCs), an initial estimated NSF investment of $68 million over the next five years.

The centers will conduct pioneering research in emerging technologies and train the next generation of engineers. Each center, while based at a university, is a collaborative partnership, drawing together individuals and resources from such entities as universities, industry partners, and state governments. The maximum possible duration of NSF support is ten years, after which the ERCs are expected to become self-sufficient.



Researchers at work in a facility that will become part of the Engineering Research Center for Extreme Ultraviolet (EUV) Science and Technology.

"The ERCs advance knowledge and develop new technologies to transform U.S. industry.

"The centers foster collaboration among researchers from many disciplines and provide an educational and research environment that prepares a new generation of engineering leaders," said **Dr. John Brighton**, Assistant Director for Engineering at NSF.

NSF will provide roughly $17 million to each center over the next five years, with each center focusing on a specific area:

See Engineering, page 4

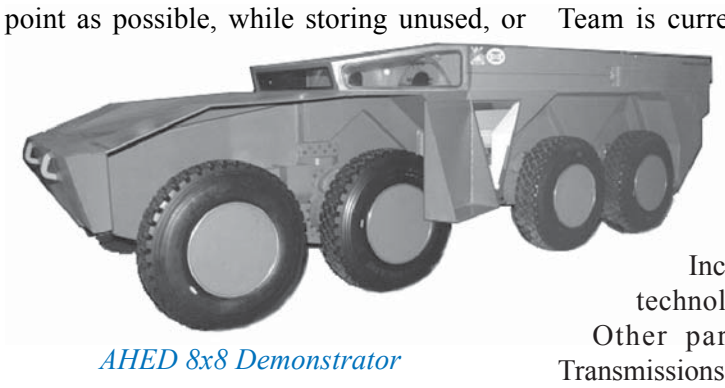
Industry Fuels Nation's Drive to Security

National Automotive Center Drives Hybrid Technology to Industry

By Peter G. DiSante & Jana Paschen
U.S. Army National Automotive Center

The drive to security, as well as prosperity, follows the same road. The trucking industry has a vested interest in the alternative propulsion needs of military vehicles. Just as important, the military vehicle community is synchronized with the trucking industry. Only through cooperation can the Army reasonably obtain the drive technology it requires to be successful. By providing that cooperation, commercial interests can develop the technology to meet military requirements while advancing the trucking industry as well.

The mission of the **National Automotive Center** (NAC), part of the **Tank Automotive Research, Development and Engineering Center** (TARDEC), located in Warren, Mich., is to serve as a catalyst linking industry, academia, and government agencies in the development and exchange of automotive technologies. One focus of the NAC has been to find ways to get more useful work for every gallon of fuel burned. One way is to allow the engine to run as close to its peak operating point as possible, while storing unused, or previously "wasted" energy, to be used for providing the drive during transient stages. This combination of engine power and energy storage is the hybrid concept.



AHED 8x8 Demonstrator

The hybrid electric concept involves batteries for storing electric power generated by the engine during deceleration and idling. The stored power is then used to accelerate the vehicle until steady-state conditions are reached and the engine takes over. The NAC's Wheel and Track Systems Team is currently involved in several hybrid electric drive programs.

The Allison EP-50 parallel electric drive system project involves the NAC and Electricore, Inc., in a dual use science and technology (DUS&T) contract. Other partners include Allison Transmissions, General Motors Defense, and Mack Truck. The project demonstrates dual use by integrating the same hybrid electric transmission in both a light armored vehicle (LAV-III) and a refuse hauler. The main technology involved in the EP-50 system is the EV drive unit, which is a patented

See Industry Fuels Nation, page 4

Nanotech's War on Cancer

by Neil MacDonald
Federal Technology Report

Advances being made in nanotechnology could help to "win the war" on cancer by 2015, a federal official suggested last week at the National Science Foundation's (NSF) Engineering Advisory Committee meeting.

"Nanotechnology will allow earlier detection and diagnosis of [cancer] in cells," NSF senior advisor on nanotech **Mihail Roco** said on October 9. He also forecast that nano devices might deliver potent cancer-fighting drugs to sites of specific malignant or metastisized cancer cells in the body.

Roco, who chairs the National Science and Technology Council's Nanoscience Engineering and Technology (NSET) Subcommittee, made his remarks in a review

See Nano War, page 5

Lab in the Limelight

Since 1949, **Sandia National Laboratories** (SNL) has developed science-based technologies that support our national security.

SNL's precursor, Z Division, was created in 1945 as the ordnance design, testing, and assembly arm of **Los Alamos National Laboratory**. The Division soon moved to Sandia Base in Albuquerque, N.M., to be near an airfield and work closely with the military.

In 1948, Z Division was renamed Sandia Laboratory and became a separate branch of Los Alamos. Both labs were born out of America's World War II atomic bomb development effort – the Manhattan Project.

In 1949, President Harry Truman wrote a letter to AT&T President Leroy Wilson, offering the company "an opportunity to render an exceptional service in the national interest" by managing SNL. AT&T accepted and managed the labs for nearly 44 years.

SNL is raising construction standards to produce structures that can better withstand a wide range of threats. In the Oklahoma City bombing, most of the victims were killed not by the blast but by the building, when its nine floors collapsed like a house of cards.

See Lab in Limelight, page 4

FED LABS FLASH

TECHNOLOGY TRANSFER NOTES FROM WITHIN THE FEDERAL LABORATORY COMMUNITY

AFRL SENSORS SCIENTIST ELECTED SPIE SECRETARY

By Erin Caylor, AFRL Public Affairs

Dr. Paul F. McManamon, senior scientist for the **Air Force Research Laboratory Sensors Directorate**, was recently elected as the 2004 secretary of the International Society for Optical Engineering (SPIE).

Dr. McManamon, who currently serves as a member of the scientific and technical cadre of senior executives, received his doctorate in physics from Ohio State University in 1977. He served more than two and a half years as acting chief scientist for avionics and was the technical lead for more than 500 engineers.

Dr. McManamon has participated in three Air Force Scientific Advisory Board summer studies and is currently developing multi-discriminate electro-optical countermeasure systems. Prior to the election, McManamon was an SPIE Fellow and he served on its Board of Directors from 1999-2002. As secretary, he will rejoin the board and become a member of the SPIE Executive Committee.

In his new capacity on the board and the Executive Committee, he will approve the budgets and spending of society resources and ensure that society bylaws are followed in the manner of society business.

Election to the secretary of SPIE automatically put McManamon in the unopposed race for vice president next year. Dr. McManamon will take over the vice president position in 2005 if he wins the opponent-free election. He will then lead the organization as the SPIE president in 2006.

"I am really excited about being elected as secretary of SPIE. It is a great organization that continues to find ways to serve the technical community," commented McManamon.

"I enjoyed my first three years on the Board of SPIE and very much look forward to the challenge the next four years have in store for me. I will immediately be thinking about projects to accomplish during my presidential year, assuming I win the election next year for vice president."

BUSH SIGNS DHS BUDGET

by Neil MacDonald
Technology Commercialization

The first-ever appropriations bill for the Department of Homeland Security (DHS) was signed by the president on October 1 and provides budget authority of $37.6 billion in FY2004. This includes $30.4 billion provided by Congress and $7.2 billion in fees.

A total of $918.2 million is provided for DHS science and technology activities: $88 million for the National Biodefense Analysis & Countermeasures Center; $75 million for the Rapid Prototyping Program through the Homeland Security Advanced Research Projects Agency; $70 million for Homeland Security University Programs; $66.5 million for critical infrastructure protection; $39 million for developing a database of homeland security-related standards for a variety of detection and sensor devices and equipment; $38 million for BioWatch; and $127 million for development of sensors and countermeasures to prevent the illicit movement and use of radiological and nuclear materials within the U.S.

OUTSTANDING AMERICAN

The **Edgewood Chemical Biological Center** (ECBC) announces that scientist **Dr. Peter Emanuel** has been named one of the U.S. Junior Chamber's Ten Outstanding Young Americans for 2003.

Dr. Emanuel was recognized by the Junior Chamber, also known as the Jaycees, for his work in technologies to defend against the use of biological weapons. At ECBC, Dr. Emanuel has focused on developing, building and patenting devices that improve the state of the art for biological sampling and analysis. Among his achievements are development of the BiSKit, a biological sampling kit that is easier and more efficient for personnel dressed in protective garments to use, especially when collecting samples from a broad area, and a high-throughput robotic system for detecting the presence of biological agents in samples. This system operates with greater levels of efficiency and safety than traditional manually operated analysis systems.

ORNL GRANTS NATIONAL ACCESS

Researchers from around the nation will have access to some of the world's finest scientific tools because of a $3.9-million grant from the National Science Foundation (NSF) to the Center for Computational Sciences at **Oak Ridge National Laboratory (ORNL)**.

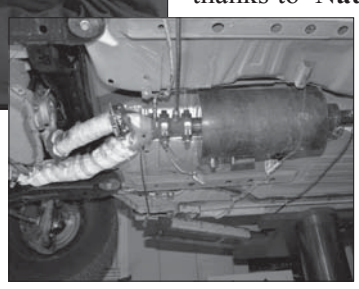
The grant, announced today by NSF, is to establish a network hub and high-performance network connections to support access to ORNL's neutron science instruments across the TeraGrid. The TeraGrid is part of a high-speed network that will provide scientists with extraordinary amounts of data from ORNL's high flux isotope reactor and the $1.4-billion spallation neutron source.

"This award is a wonderful illustration of the continuing partnership between NSF and the Department of Energy's Office of Science on the TeraGrid," said Raymond Orbach, director of the DOE office. "ORNL's Center for Computational Sciences will now be able to provide the nation's research community with expanded access to ORNL's extraordinary neutron science facilities."

LAB WORK

RENEWABLE ENERGY LAB WARMS COLD STARTS

While today's passenger cars emit 95% less pollution than similar cars did 25 years ago (before the catalytic converter was introduced), this is not so for typical sport utility vehicles (SUVs), minivans, or light trucks. Because they are not subject to the same emissions regulations, these vehicles can legally produce up to five times more pollutants than a passenger car. Beginning in 2004, however, SUVs, minivans, and light trucks will have to meet the same standards that cars must meet—and they are tougher than the ones for today's automobiles.



The CVI is a crucial technology incorporated into the catalytic converter. CVI is not only essential for minimizing cold-start emissions, it also has many other applications that range from refrigeration to cooking utensils.

This is good news for the environment. But not as good as it could be, because EPA standards primarily address pollutants that are emitted while a car is warmed up and running. They do not address the warmup, or "cold-start," period, when today's cars and small trucks produce more than 50% of their emissions. The reason for so many emissions during the cold-start period is due to the fact that current technology catalytic converters do not start to work until they reach a temperature of about 300°C (572°F).

To reach this temperature, it typically takes about two minutes of operation. During those two minutes, the vehicle produces 60%-80% of its pollutants. Of all vehicle trips taken, 98% are within 24 hours of the previous trip. Conventional catalytic converters cool down within half an hour after the vehicle is turned off, which means for the great majority of trips, cold-start pollution raises its ugly specter.

This specter soon may dissipate, thanks to **National Renewable Energy Laboratory** (NREL) scientists. They helped develop a prototype catalytic converter utilizing compact vacuum insulation, phase-change materials, and variable conductance that can maintain its operating temperature 24 hours or longer, thus greatly reducing cold-start pollution. And then they collaborated with Benteler Industries, which has licensed the catalytic-converter technology, to engineer a production-ready version. Compared to other concepts on the market, the new converter is cheaper, more versatile, lighter, and longer lasting. And it is the only one that deals with cold-start emissions. The NREL/Benteler catalytic converter reduces emissions of carbon monoxide, hydrocarbons, and nitrogen oxides below the levels called for in the new standards.

More info: Visit the NREL web site at <www.nrel.gov>.

FLC NEWSLINK

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Published by the
Federal Laboratory Consortium for Technology Transfer

Editor: Tom Grayson

Online subscriptions:
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Electronic article submissions:
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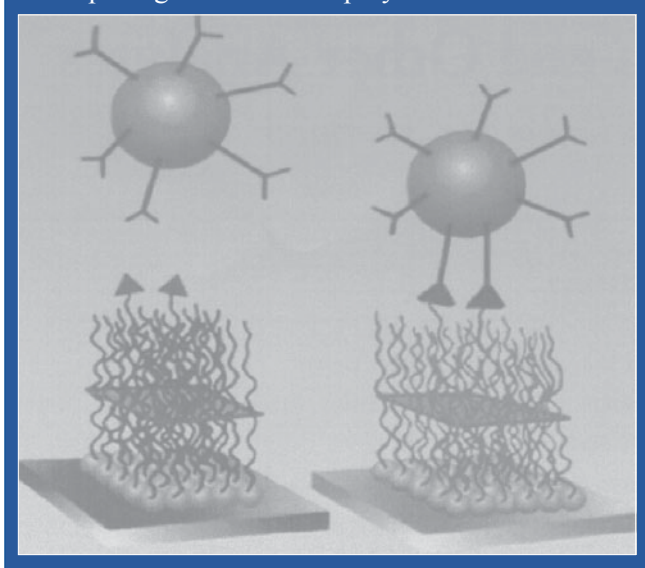
FLC NEWSLINK is published 12 times a year by the *Federal Laboratory Consortium for Technology Transfer* (FLC) and the FLC Marketing and Public Relations Committee.

TECH WATCH: FEDERAL LABORATORY TECHNOLOGIES READY FOR TRANSFER

SENSORS

LBNL RAPIDLY DETECTS INFLUENZA, E. COLI

Researchers at **Lawrence Berkeley National Laboratory** (LBNL) have developed colorimetric biosensors that can be used by a lay person for simple detection of viruses, bacteria, parasites and other pathogens. These biopolymeric materials also can be used for drug development, detecting pollutants, DNA hybridization detection, screening reaction inhibitors, and a wide range of other applications.



The engineered conjugated polymers before (left) and after (right) exposure to a multivalent analyte. Binding to a molecular recognition site induces stresses that are detected by an optical "reporter" element, which signals the binding by changes in the optical absorption spectrum of the polymer.

The assays and biosensors devised by **Deborah Charych**, **Quan Cheng**, **Jon Nagy**, and **Raymond Stevens** are engineered membranes that mimic cell surfaces. They consist of biologically or chemically specific receptor ligands attached to a polydiacetylene backbone. Ligands may include nucleic acids, proteins, antibodies, carbohydrates, gangliosides, peptides, enzymes, or small molecules. The membranes change color when they undergo events that disrupt them. Such events are caused by molecular recognition between ligands and target analytes. The intensity of the color change allows quantification of the analyte's concentration.

LBNL biosensors allow direct detection with reasonably small amounts of analyte. Like conventional immunoassays, they are able to detect biological molecules, but unlike immunoassays they can provide specific detection with ligands other than antibodies.

The LBNL technology can be used to create films on solid supports or to form liposomes. Collaborative research between LBNL scientists and Sandia National Laboratories produced materials that can be encapsulated in sol-gel. Sol-gel encapsulation immobilizes the biopolymeric material, and the resulting composite can be easily applied to surfaces and cast in any shape. The robust nature of the sol-gel converts the assays into a liquidless sensor material that is portable, durable, and flexible, with a longer storage life than films and liposomes. It also allows for recovery and reuse.

General applications for this technology include rapid test kits for influenza and other diseases; simple detection of *E. coli* and other bacteria in foods or on surfaces; drug development and improvement; detection of DNA hybridization; and detecting pollutants.

More info: Visit <www.lbl.gov/tt/collaboration/techs/lbnl0965.html> or call 510-486-6461.

ENERGY

JLAB DETECTS LEAKS

There has been an increased need for a sensitive hydrogen leak detector in view of the expected expanding needs generated for the use of hydrogen fuel technology in numerous applications such as the contemplated national space plane.

The present invention is a sensitive hydrogen leak detector, invented by **Ganapati Myneni** of the **Thomas Jefferson National Accelerator Facility**. The system utilizes passivation of a stainless steel vacuum chamber for low hydrogen outgassing, a high compression ratio vacuum system, and a dry nitrogen pump at the exhaust stage, plus a low-cost residual gas analyzer as a quantitative hydrogen sensor. Also, a getter operating at 77.5 K for effective pumping of hydrogen may be utilized.

The critical aspect of a sensitive hydrogen detector is that, normally, stainless steel is used, with the problem of outgassing of hydrogen, which drastically lowers the sensitivity of such an arrangement. In the present case, stainless steel is the metal of choice, but it is passivated to eliminate, or substantially eliminate, the outgassing of hydrogen.

More info: Visit <www.jlab.org>

PROVEN TO WORK

YOU CAN HEAR ME NOW: SOFTWARE BRINGS CELLULAR CAPACITY TO RURAL COMMUNITIES

Researchers have successfully tested a system that can replace a cellular tower's room full of communications hardware with a single desk-top style computer, making the technology affordable for small, rural communities.

The software is also capable of running emergency communications—such as police, fire and ambulance channels—on the same device as the civilian system, eliminating the need for a separate network of emergency communications towers.

Left: Communications tower in DeLeon, Tex. The base station (below) at the foot of the tower is the host for the Vanu Software Radio testbed. The large brown pieces of equipment are Mid-Tex Cellular's current cellular communications hardware. The small, white devices on the sides are the replacement pieces, including the Hewlett-Packard ProLiant server running Vanu Software Radio's computer programs.

"Rural customers are the first application of the technology, but large carriers are watching to see what happens," said John Chapin, chief technology officer at Vanu, Inc., the Cambridge, Mass., company that tested and markets the software, which it calls Vanu Software Radio™.

Vanu scientists developed and tested the software with funds from the **National Science Foundation** (NSF), the independent federal agency that supports fundamental research and education across all fields of science and engineering.

"There is an economic driver to the small business projects, and both NSF and awardees have to be flexible," said **Sarah Nerlove**, the NSF Small Business Innovation Research (SBIR) program officer who oversees Vanu's awards. "When the telecom industry crashed, Vanu technology caused wireless operators to look at deployments differently. Vanu was an ideal fit for their changing needs," she added.

NSF awards SBIR grants to small businesses for risky, novel research with a potential for commercialization. Through SBIR and the related Small Business Technology Transfer (STTR) programs, NSF encourages partnerships between small business and the academic sectors to develop a technology base for commercialization.

Cellular towers now dot the landscapes of cities and suburbs, providing millions of Americans with access to wireless communications. Currently, at the base of each tower is an air-conditioned shelter filled with expensive equipment called a base station.

"As technology advances, all of that equipment continually needs to be overhauled or replaced," said Chapin. In addition to replacing much of the equipment with a single computer server, radio software can aggregate the equipment from many stations into a single location into what communications engineers call a "base station hotel," he said.

Vanu Software Radio™ is first of its kind to perform all functions of a GSM (a digital cellular standard) base station using only software and a non-specialized computer server. The servers run the Linux operating system on Pentium processors, further simplifying the technology and reducing cost.

The company successfully demonstrated the technology in two rural Texas communities: De Leon in Comanche County and Gorman in Eastland County. When the test ends, the technology will remain as a cellular infrastructure run by Mid-Tex Cellular, Ltd.

The software has been successfully carrying phone calls since it was installed in the Texas towns in June 2003. The researchers have been tracking how many calls successfully go through, how well mobile phones communicate with other mobile phones, and how well mobile phones communicate with landline phones.

Potentially, large carriers could also use the software to establish base station hotels or upgrade and condense their existing equipment. Beyond that, the technology will allow cellular providers to more efficiently use the frequency spectrum reserved for communication and are more flexible if they need to be upgraded to handle even more bandwidth, said Chapin.

INDUSTRY FUELS NATION FROM PAGE 1

compound, split parallel hybrid electric drive. The energy storage used in both vehicles consists of six commercial nickel metal hydride (NiMH) battery packs.

The Advanced Hybrid Electric Drive (AHED) 8x8 Demonstrator, by General Dynamics Land Systems (GDLS) and the NAC, is a series hybrid electric drive, eight-wheeled automotive demonstrator designed to meet the most severe military and commercial vehicle requirements in the 20-ton weight and power class. The AHED uses lithium-ion batteries for energy storage. Key technologies include in-hub wheel motors, advanced pneumatic suspension, high-temperature power electronics, and innovative hybrid wheel/track steering.

M113 Hybrid Electric Drive System

The NAC and United Defense have designed a Hybrid Electric M113 Transformation Technology Demonstrator (TTD). It is built on a stretch M113 light armored tracked vehicle in a series hybrid configuration. The drive package consists of a conventional 250-hp diesel driving a 185-kW AC generator and two 250-hp AC induction motors with mechanical brakes. The primary power unit consists of the diesel engine, induction generator, and cooling system. Regenerative braking and steer-by-wire are utilized in this system. The TTD energy storage system comprises 40 commercial, spiral-wound, lead-acid sealed batteries.

Like its cousin the hybrid electric, the hybrid hydraulic stores otherwise wasted energy during vehicle operation. The energy storage device in this case is a hydraulic accumulator that is pressurized with fluid while the vehicle is braking. The stored energy is then used to deliver additional torque to the drive shaft during periods of peak acceleration. The storing action has the added benefit of reducing the workload of the braking system.

The Army has teamed up with Permo-Drive Technologies, Ltd. of Australia, the leading innovator of this technology, to verify the concept. Working under a Cooperative Research and Development Agreement (CRADA), the Army, through the NAC, has provided two of its Family of Medium Tactical Vehicles (FMTVs) to Permo-Drive for retrofit and test. One of the vehicles is being used for testing in the U.S., and one is undergoing complete testing in Australia.

Early independent testing has shown a 37% reduction in fuel usage in a simulated urban driving cycle, in addition to noticeable improvements in performance. Preliminary tests have also shown an improvement in the 0-30 acceleration of an FMTV from 14.5 seconds to 8.5 seconds. This could be an important factor in increasing survivability in a wartime environment.

This technology is ideally suited to commercial vehicles used for multiple stops and starts, such as delivery trucks, buses, refuse haulers, etc. The U.S. Postal Service has expressed a profound interest in the program. Permo-Drive also will be working with Mack Truck and Waste Management on a project that will involve the NAC, and expects to have prototype commercial vehicles available for testing before the end of 2003, with possible introduction into commercial fleets by 2005.

LAB IN THE LIMELIGHT FROM PAGE 1

In 1956, SNL opened new facilities in Livermore, Calif., to support the nuclear weapons work of the new Lawrence Livermore Laboratory. SNL became a national laboratory in 1979. In 1993, the Department of Energy awarded the SNL management contract to Lockheed Martin.

Today, SNL has two primary facilities: a large laboratory and headquarters in Albuquerque, N.M. (over 6,800 employees) and a smaller laboratory in Livermore, Calif. (about 850 employees). Over 272 million Americans depend on SNL's technology solutions to solve national and global threats to peace and freedom.

Through science and technology, people, infrastructure, and partnerships, SNL's mission is to meet national needs in four key areas.

Nuclear Weapons

SNL's primary mission is ensuring that the U.S. nuclear arsenal is safe, secure, reliable, and can fully support the nation's deterrence policy. Only the most advanced and fail-safe technologies are used to fulfill its responsibilities as steward of the nuclear stockpile.

World-class scientists and engineers are drawn to SNL by opportunities to conduct breakthrough research. SNL designs and integrates over 6,300 parts of a modern nuclear weapon's 6,500 components. And its state-of-the-art laboratories facilitate large-scale testing and computational simulation, supporting efforts to enhance weapon and surveillance technology; create new technologies to safeguard the nuclear production complex; evaluate the nuclear arsenal for safety, security, and reliability; develop new defense options; and update weapons systems to maintain their capabilities.

Nonproliferations and Assessments

SNL's Nonproliferation and Assessments Program reduces U.S. vulnerability to weapons of mass destruction (WMD). These include nuclear, biological, and chemical weapons, as well as nonconventional WMDs such as the hijacked civilian airlines used to commit acts of war against the nation.

A nonhazardous decontaminating foam developed at Sandia begins neutralizing both chemical and biological agents in minutes.

SNL's solutions enhance national security and stable international relations by supporting treaty verification with other countries; creating new technologies for aircraft and satellites to detect proliferation activities; working with the former Soviet Union to safely manage nuclear materials from dismantled weapons systems; enhancing nuclear, chemical, and biological weapon proliferation detection capabilities; and developing physical security technologies, including entry-control devices and electronic monitoring.

Military Technologies and Applications

The Military Technologies and Applications Program develops high-impact responses to national security challenges. As the 9/11 terrorist attacks only begin to indicate, advanced technologies – chemical, biological, nuclear, and informational – create the potential for greater harm than ever to the nation.

SNL's integrated science expertise allows it to develop technologically superior weapons and security systems. From basic research to global intelligence, SNL supports numerous government and industry agencies in combatting terrorism and threats against our armed forces and homeland. SNL applies its scientific and engineering knowledge to identify and neutralize biological and chemical agents, whether released accidentally or intentionally; disable explosive devices, including land mines and bombs; detect and defeat hard-to-find offensive threats, including weapons storage facilities and mobile targets; and generate precise battlefield information. SNL remains ready to provide the nation with the technical capability to respond to threats against the armed forces, the nation, and our survival as a free nation.

Energy and Infrastructure Assurance

The Energy and Infrastructure Assurance Program supports SNL's core purpose of helping the nation secure a peaceful and free world through technology. The goal is to enhance the surety of energy and other critical infrastructures.

Strides are being made in the areas of energy research, earth sciences, transportation systems, risk management technologies, environmental stewardship, and nuclear waste management. SNL is also actively working to improve the nation's critical infrastructure surety, focusing on infrastructure elements in the areas of transportation, electric power grid, oil and gas distribution, telecommunications, finance and banking, and vital human services.

ENGINEERING FROM PAGE 1

- **Engineering Research Center for Extreme Ultraviolet Science and Technology (EUV ERC)**, headquartered at Colorado State University in Fort Collins, will develop short-wavelength, optical measurement instrumentation to further nanoscience and nanotechnology research.
- **Engineering Research Center for Environmentally Beneficial Catalysis (CEBC)**, headquartered at the University of Kansas in Lawrence, will develop environmentally benign catalytic processes to reduce pollution from the manufacture of chemicals.
- **Engineering Research Center for Collaborative Adaptive Sensing of the Atmosphere (CASA)**, headquartered at the University of Massachusetts at Amherst, will develop sensing networks and information systems to improve the detection, understanding and prediction of severe storms and other atmospheric hazards, with the goal of ultimately saving lives and reducing property loss.
- **Engineering Research Center for Biomimetic Microelectronic Systems (BMES)**, headquartered at the University of Southern California in Los Angeles, will develop enhanced microelectronic systems to enable implantable devices to treat blindness, paralysis, and loss of cognitive function.

Including the new awards, NSF supports 24 ERCs in the fields of bioengineering, earthquake engineering, design, manufacturing and product development systems, and microelectronic systems and information technology.

Agency Reps Impressed by National/Regional Initiatives

The FLC regions had a busy September and October as the Mid-Atlantic, Northeast, Mid-Continent, and Far West regions each held regional meetings to discuss initiatives, awards, and techniques.

The **Mid-Continent** and **Far West** regions held a joint meeting in collaboration with the Office of Naval Research (ONR) Pearl Harbor and the Hawaii Economic Business Development and Tourism in Oahu, Hawaii, from date to date.

Aris Melissaratos, Secretary of Business and Economic Development for Maryland, discusses development and technology opportunities during the Mid-Atlantic regional meeting in Flintstone, Md.

With nearly 50 FLC members in attendance, the meeting gave the regions an opportunity to explore Hawaii's technology programs and companies, and to learn more about ONR's resources and expertise.

FLC training, developed by **Laura Barber** of **Los Alamos National Laboratory**, was conducted on intellectual property, licensing, and partnerships.

Mike Schwenk and **Cheryl Cjecka** of **Pacific Northwest National Laboratory** provided overviews on intellectual property techniques and tips.

The **Mid-Atlantic** regional meeting, *Collaborative Opportunities Throughout the Mid-Atlantic Region,* was held at Rocky Gap Lodge in Flintstone, Md., September 9-11. Over 50 representatives from industry, academia and federal labs, as well as state and local government, were in attendance.

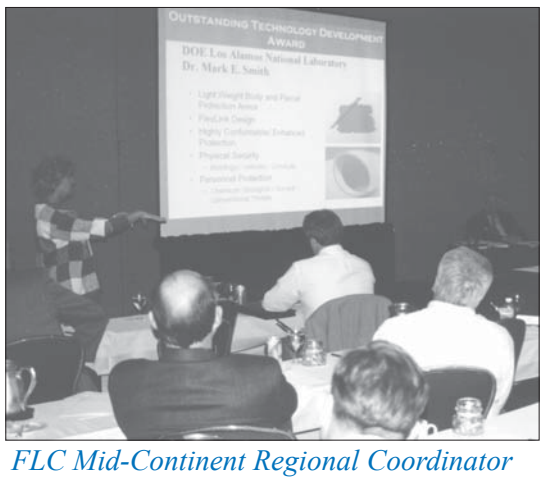
Technology evaluation training was offered by Michelle Riley of Navigant Consulting.

Other topics included Regional Coordinator **Scott Deiter** providing a thorough overview of partnership intermediary agreements, along with presentations from SMART, TEDCO, PENNTAP, OLETC and WVHTF, among others.

Presentations from the meeting can be viewed on the FLC Mid-Atlantic web site at <www.federallabs.org/2003_ma_meeting>.

Aris Melissaratos, Secretary of Business and Economic Development for the State of Maryland, provided an overview of development, technology opportunities, and resources in Maryland.

Christopher Foster, Technology Coordinator for the State of Maryland, provided information on technology growth and entrepreneurial opportunities across the state.



FLC Mid-Continent Regional Coordinator Susan Sprake explains her region's technology transfer initiatives to the FLC Executive Board and laboratory Agency Representatives.

Attendees expressed a lot of enthusiasm with regard to the meeting, as well as FLC activities in the Mid-Atlantic Region. Be sure to check the web site for upcoming events and join us for our regional meeting next year.

The **Northeast/ Midwest** regional meeting, *Building Collaborative Partnerships, The Role of Industry, Academia, and Federal, State, and Local Governments,* was held October 1-3 in New York, N.Y.

Presentions included *Intellectual Property and Government Rights* by patent attorney Jesse Erlich of Perkins, Cohen, and Smith; *Technology Evaluation and Licensing Issues* by Emmett Murtha of Fairfield Resources International, Inc.; and an FLC National Advisory Council panel on how regional laboratory capabilities fit industry.

The **FLC Executive Board** also met in October to discuss budget, the upcoming FLC elections, and committee and regional initiatives.

The meeting, held October 8-9 in Crystal City, Va., also included a presenation by regional committee chairs **Susan Sprake** (Mid-Continent), **Scott Deiter** (Mid-Atlantic), **Kelly McGuire** (Southeast), and Julie Evans (standing in for Northeast Regional Coordinator **Hans Kohler**) to agency representatives **Nancy Groves** (Dept.of Defense-Navy), **Jonathan Root** (NASA), **Richard Brenner** (USDA), and **Cynthia Gonsalves** (Dept. of Defense), **Lynn Murray** (Dept. of Transportation), **Connie Jacobs** (DARPA), **James Wanko** (Dept. of Defense-Army), **Mike Curtis** (Dept. of Energy), and **Bea Droke** (FDA).

Richard Brenner (left) of the U.S. Department of Agriculture and Jonathan Root of NASA learn about FLC initiatives during an FLC Executive Board meeting in Crystal City, Va., October 1-3, 2003.

The agency representatives were impressed with the work and direction of the FLC. "You have a mindset to have a selected set of goals that are achievable and important and I commend you for that," said Root.

Gonsalves added, "I want to commend the Executive Board and what the regions are doing and the support you are giving to the local labs."

Nano War from page 1

of the first three years (2000-2003) of the National Nanotechnology Initiative.

NSF is supporting over 1,600 "active" nanotech awards at about 300 academic institutions in all 50 states, he said, and some 7,000 students and teachers were trained in nanoscience and engineering in FY2003.

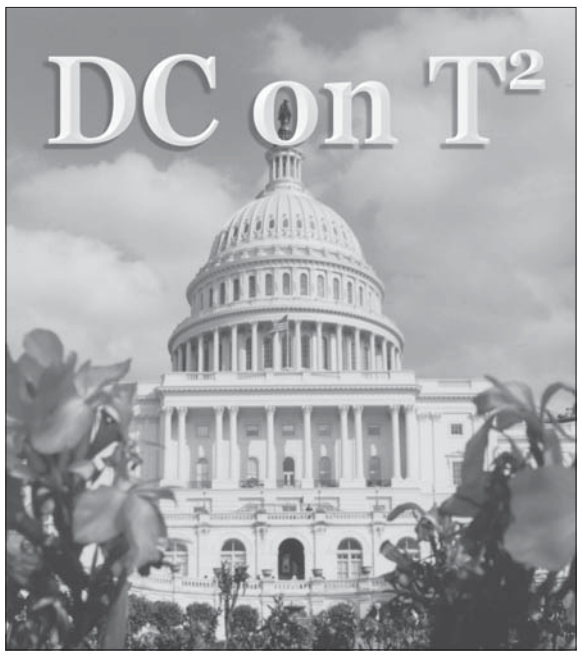
Five entities—the departments of Agriculture, Commerce and Education; the Nanobusiness Alliance; and a national schoolteachers' group — have expressed interest in partnering with NNI on these educational activities, Roco revealed.

Significant infrastructure for nano research now exists, he said, with 60 universities having user facilities and three networks established. More than 10 federal labs have partnerships for use of their nano research and development facilities.

While U.S. corporate investment in medium- to long-term nano research remains about equal to that of NNI, Roco said there's been a shift in emphasis from "if to how." All of the major companies engaged in advanced materials, electronics and pharmaceuticals are now investing in nanotech, he claimed.

Despite their difficult budgetary situations, more than 20 U.S. state governments have committed funds for nanotech since 2002, he said, and 22 regional alliances now exist to support NNI goals.

The U.S. was responsible for over 6,000 (or about 75%) nanotech patents at the U.S. Patent



and Trademark Office in 2002. U.S. venture-capital funding of nanotech doubled in 2002 and is set to double again this year. NNI led the world in programs to examine ethical and environmental implications of nanotech, Roco noted. While the European Union was launching its first activity in this field this year, none have been started in Japan.

Government investment worldwide in nanotech has increased seven times in six years to a current total of about $3 billion, he said, with the U.S. accounting for $0.77 billion.Estimates of revenues from nanotech were likely to be revised to reach $1 trillion by 2010 or 2012 rather than 2015, Roco said. Four areas—materials (including bulk, coating and dispersed systems), chemicals (including catalysts), pharmaceuticals, and electronics—are moving "from discovery to technological innovation," he said.

Roco identified seven "emerging" areas—nanomedicine, energy conversion and storage, agriculture and food systems, molecular architectures, realistic multiphenomena and multiscale simulations, environmental implications, and converging technologies from the nanoscale—for FY2004 support. Roco expects the administration to "revisit" the long-term vision for NNI, first formulated in January 1999, and issue a *Nanotechnology Research Directions II* document offering a 10-year vision in spring 2004.

ETC...

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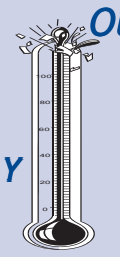

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