

# NEWSLINK

FEDERAL LABORATORY CONSORTIUM FOR TECHNOLOGY TRANSFER

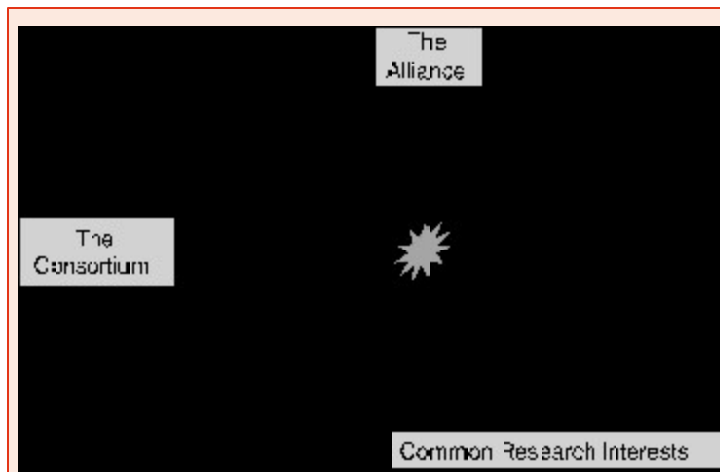
JUNE 2000 VOL. 16, NO. 6

## ARL's FedLab Promises Innovative Sensors, Other Technology

Imagine new technologies to prevent sudden infant death syndrome (SIDS) and monitor dangerous sleep apnea. In the future, adults and children alike may literally sleep easier because of new highly developed sensor applications from the **Army Research Laboratory's (ARL) Advanced Sensors Consortium (ASC)**. The ASC is part of ARL's **Federated Laboratory (FedLab) Program**, which promises a number of new commercial products that will not only improve our lives but protect soldiers in the field as well.

Five years into its "world-class cooperative research," FedLab held a symposium in March to show off and invite further development of the tech transfer successes from its three consortia—ASC, the **Telecommunications and Information Distribution**

**Consortium**, and the **Advanced and Interactive Displays Consortium**. (For examples of some of ASC's successes, see "ASC's Successful Sensors" below.) In all, 28 products were on display. This year, the newly expanded program is forming two additional consortia and actively seeking new partners.



ARL's Federated Lab (FedLab) Program leverages government, industry, and academia's common research interests.

### Successful Consortia Concept

"FedLab is an unmitigated success," says **John Miller**, Associate Director of ARL and senior manager of the FedLab program. The project was also praised by the Senate and awarded one of Vice President Gore's Hammer Awards for innovation in government.

"We've been extremely pleased with the research—and even more with the leveraging and the synergies that resulted," Miller says.

By establishing research partnerships in the three consortia areas, the FedLab concept capitalizes on strong industrial resources in digital technology—both regionally and nationally. In addition, scientists from academia bring their innovative research—as do government labs focused on accomplishing specific military objectives via technology. In the ASC, ARL is joined by partners that

include **Lockheed Martin**, **DRS Technologies**, **Stanford University**, and the **Environmental Research Institute of Michigan**.

Each year, a team of consortium members plan and review research. For

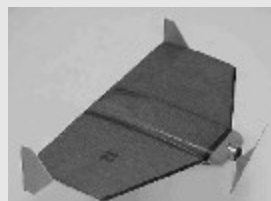
Please see **FEDLAB PROGRAM**, p. 2

## ASC's Successful Sensors

### Sensor for Micro Air Vehicle

Research was conducted on low-power, hardware-reconfigurable, signal processing architectures for microsensors. The result? A proof-of-concept system known as the common architecture for microsensors (CAmS). The knowledge gained was transitioned to the **Sanders (Lockheed Martin) Micro Air Vehicle (MAV)** team and incorporated into their design.

FedLab also initiated a project that allows for MAV experiments using different microsensor payloads in conjunction with unattended ground sensors.



Micro Air Vehicle Sensor

### Dual Band Infrared Camera

Another ASC project involved the development of a dual band infrared camera system that uses both midwave infrared (MWIR) and longwave

Please see **ASC SENSORS**, p. 2

## INSIDE

This issue of *NewsLink* focuses on **ELECTRONICS, SENSORS, and PHOTONICS**. The July/August issue will focus on materials and composites.

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## FEDLAB PROGRAM *from p. 1*

example, the ASC is addressing the Army's needs for timely sensor data in challenging environmental conditions and sensor fusion for real-time situation awareness—as well as the technical areas of multidomain smart sensors, multisensor fusion automatic target recognition, radar sensors, and signal processing. The technology transfer component was added in FY1997.

### New Expanded Program

Benefiting from the lessons learned since its establishment in 1996, the next-generation FedLab program will improve its research methods by combining its internal resources with the “best and brightest elsewhere.” In addition, the program will be expanded to eight years (rather than five) to allow more time to “harvest the fruits of basic research.”

Each consortium must have a minimum of three members besides ARL—including one major industry partner as the consortium lead, one major university, and one Historically Black College or University/Minority Institution (HBCU/MI). In addition, consortia partners must be well-established in the specific technical area. In the second program, additional partners—such as not-for-profit organizations and other federal agencies such as NASA, DOE, and NIST—are encouraged to join. As fully participating members, all team members make their facilities, funding, and personnel available.

### Call for Proposals

“ARL has been able to leverage the best that the private sector has to offer to accomplish more than it could on its own while maintaining—and even increasing—our in-house expertise,” says Miller. “The program has transformed us into a geographically dispersed, virtual laboratory one-third as large. And our private sector partners have gained by working shoulder-to-shoulder with us and each other. They have raised the quality of their work and the intellectual level of their people.”

An opportunity conference in mid-June announced ARL's second program, now renamed **Collaborative Technology Alliances**. This new program is calling for proposals for a total of five consortia. Miller says any organization can respond to the solicitation with a proposal, and “other federal labs are encouraged to join us in this initiative.” **NL**

For more info: [www.arl.mil/alliances](http://www.arl.mil/alliances)

### ASC SENSORS *from p. 1*

infrared (LWIR) detectors to enhance target detection capability by combining the separate images. For years, MWIR and LWIR cameras have been used in the military and industry—with each infrared color used in certain situations. MWIR cameras offer higher spatial resolution, higher atmospheric transmission in humid environments, and reduced cryogenic cooling requirements, while LWIR cameras can detect smaller temperature differences in objects near ambient temperature and see better through haze and dust. By combining the two, image quality has been significantly improved.



Dual Band Infrared Camera

### Acoustic Sensor

An acoustic physiological monitoring sensor developed to monitor the health and performance of soldiers has been licensed for use as a SIDS/sleep apnea monitor and health monitoring device for athletes. These tech transfer efforts were recognized with a 2000 FLC Award for Excellence in Technology Transfer. For more info, see p. 6 of the June 2000 *NewsLink*, which profiled the 2000 award winners. **NL**



Acoustic Sensor



## FED LABS FLASH

*Technology transfer news, notes, and events within the federal lab community*

### HHMI Funds Biomedical Beamlines at Advanced Light Source

The Howard Hughes Medical Institute (HHMI) will spend \$8.05 million for the construction and operation of two new “superbend” beamlines at the **Advanced Light Source (ALS)** at the DOE's Lawrence Berkeley National Lab (LBNL). The beamlines will generate the high-energy X-rays used for protein crystallography research. According to LBNL Lab Director **Charles Shank**, “This is the single largest investment in the ALS ever made by an organization outside of DOE. It reflects the growing importance of X-ray

crystallography as a critical tool for the biomedical research community and recognizes the success and promise of ALS in identifying and characterizing proteins.”

For more info: [www.lbl.gov/Science-Articles/Archive/hhmi-superbends.html](http://www.lbl.gov/Science-Articles/Archive/hhmi-superbends.html)

### NASA Developing Space-Based “Sensor Web”

NASA took the first step toward creating Internet-like connectivity among Earth-sensing satellites by funding

*Please see FED LABS FLASH, p. 3*

## FED LABS FLASH *from p. 2*

30 research proposals from industry, academia, government, and NASA centers. Known as "Sensor Web," this is the first in a series of information technology research initiatives that will help NASA's **Office of Earth Sciences** meet the challenge of collecting, processing, routing, and storing earth science measurement data. Of the 117 proposals submitted, the 30 selected cover a variety of topics, including: satellite on-board processing, data collection and analysis, information transmission and wireless networks, and satellite platform control. The goal is to integrate the satellites into a cohesive network similar to the Internet—allowing scientists to access, direct, and control any on-orbit sensors.

**For more info:** [www.earth.nasa.gov/nra/current/nra99oes08/winners.html](http://www.earth.nasa.gov/nra/current/nra99oes08/winners.html)

### **New Laser Facility Opens**

On June 2, several hundred people attended the ribbon-cutting ceremony for a 29,600-square-foot, \$8.4 million advanced laser research facility. The state-of-the-art facility will be used by the **Air Force Research Lab's (AFRL) Directed Energy Directorate** for research and development of chemical, electrical, and hybrid lasers. A two-story structure, the facility has six major labs—three of which are Class 10,000 clean rooms. Two of the major labs are dedicated to chemical laser research, while the remaining four will be used for solid-state and electrical laser work. The facility also includes smaller labs devoted to chemistry and electronics.

**For more info:** Rich Garcia, 505-846-7681, [garcia@plk.af.mil](mailto:garcia@plk.af.mil)



*The AFRL Directed Energy Directorate's New Laser Facility*

### **Brake Test Facility Could Make Highways Safer**

A new facility for testing the brakes of commercial trucks could help put a screeching halt to hundreds of accidents caused by mechanical failures. The facility will be housed in the **National Transportation Research Center**—a collaborative effort of the DOE, **Oak Ridge National Laboratory (ORNL)**, the **University of Tennessee**, and the **Development Corporation of Knox County**. "Faulty brakes contribute to about one-third of truck-caused crashes," says **Scott Stevens**, project director and researcher in ORNL's **Energy Division**. "The problem is that current methods of inspecting brakes are labor- and time-intensive and subject to considerable error." The new facility will be able to characterize a vehicle's brake performance quickly and accurately. Industry, government, and others will be able to call on the center for expertise in vehicle and engine testing, infrastructure materials, materials packaging,

intelligent transportation systems, composite materials, and geographic information systems.

**For more info:** Ron Walli, 865-576-0226, [9rw@oml.gov](mailto:9rw@oml.gov)

### **State-of-the-Art Horticultural Lab Opens**

On April 17, the **USDA's Agricultural Research Service (ARS)** reaffirmed its commitment to providing cutting-edge research to the agricultural community by dedicating a new \$33 million facility for the **U.S. Horticultural Research Lab** in Ft. Pierce, FL. The new 170,000-square-foot facility is situated on 350 acres adjacent to the **University of Florida's Indian River Research and Education Center**. The new facility is more than double the size of the previous lab, which was located in Orlando. The lab's increased proximity to field sites and agricultural areas allows ARS scientists to be in closer contact with the citrus growers who directly benefit from their research.

**For more info:** Dr. Richard Mayer, 561-462-5810, [rmayer@ushrl.ars.usda.gov](mailto:rmayer@ushrl.ars.usda.gov)

### **DOE Issues FY2001 R&D Portfolio**

**Secretary of Energy Bill Richardson** recently released the **DOE's Research and Development (R&D) Portfolio** for FY2001. The portfolio describes all of the R&D activities the DOE supports to achieve its mission goals in four strategic

business lines—energy resources, environmental quality, science, and national security. According to Richardson, "This R&D Portfolio is helping us analyze where we need to devote more resources and ensure that our research is aligned with our strategic R&D plans...." R&D accounts for 40% of the DOE's annual budget. Among top federal R&D funding

agencies, the DOE is first in support of physical sciences and scientific facilities and the second largest supporter of mathematics and computer sciences. The DOE will spend \$7 billion in R&D this fiscal year and plans to spend \$7.65 billion next fiscal year—an almost 8% increase.

**For more info:** [www.osti.gov/portfolio](http://www.osti.gov/portfolio)

### **Free Automotive R&D Booklet**

The **FLC Midwest Region** recently updated its booklet of technologies and facility descriptions related to automotive R&D. The free publication—*More than 101 Ways to Leverage Your Automotive R&D through Partnerships with Federal Research Labs*—sorts technology descriptions into categories such as electronics, environmental, manufacturing, materials, powertrain, safety, and vehicle systems. **NL**

**To obtain a copy:** Sue Leitner, 513-948-4032, [leitner@iams.org](mailto:leitner@iams.org)





## TECHNOLOGY WATCH

*Federal laboratory technologies available for technology transfer*

### **Using Light to Fabricate Photonic Devices**

A new apparatus and process for fabricating photonic devices—developed for NASA Marshall Space Flight Center by the ALTAIR Center—uses intense, focused laser light projected and/or diffracted in controlled patterns. The technology can be used in a microgravity environment to form microscopic three-dimensional device structures and can be used on Earth to fabricate two-dimensional device structures. The apparatus generates and controls the ponderomotive effects of intense laser light on molecules and other small particles. These effects include radiation pressure and optical trapping forces—as well as secondary effects such as dipole/dipole interactions. The process exploits these effects to arrange particles in patterns that correspond to the microscopic photonic device being fabricated.

**For more info:** Dr. Sergei Krivoshlykov, 508-845-5349, [altairctr@aol.com](mailto:altairctr@aol.com)

### **Tiny Canals Expand Uses for Microfluidic Devices**

Researchers at the DOE's Sandia National Labs have created a new microchip processing technique that creates raised, microscopic canals on chips through which liquids or gases can flow from one chip feature to another.

These canals are useful for emerging families of minuscule gadgets called "microfluidic" devices, which use the chemical properties of liquids or gases and the electrical properties of semiconductors on a single chip or among nearby chips. Better detectors for airborne toxins, rapid DNA analyzers for crime scene investigators, and new pharmaceutical testers for drug development are among the possible future uses for these devices. The technique's compatibility with standard semiconductor batch processing tools should allow future microfluidic devices to be made quickly and cheaply in a microchip factory.

**For more info:** [www.sandia.gov/media/NewsRel/NR2000/canals.htm](http://www.sandia.gov/media/NewsRel/NR2000/canals.htm); John German, 505-844-5199, [jdgerma@sandia.gov](mailto:jdgerma@sandia.gov)

### **Regional Testbed for Optical Access Network**

The AFRL Information Directorate has awarded a two-year, \$1,832,851 contract to the Microelectronics Center of North Carolina (MCNC) (Research Triangle Park, NC) to develop a regional optical testbed network carrying Internet

Protocol (IP) traffic over light. "The planned regional testbed network will carry IP traffic between MCNC, Lucent Technologies, University of North Carolina, North Carolina State University, and Duke University," said Robert L. Kaminski of the directorate's Information Grid Division. According to Kaminski, "MCNC will develop a testbed architecture consisting of interconnected access networks. The access networks and the interconnecting network each will use an optical single-hop architecture. The regional testbed will provide several innovative features, making it more valuable—relative to other work in this area—in terms of scalability, collision-free scheduling, adaptability, and support for multicast and differentiated services." The MCNC contract is funded by the Defense

Advanced Research Projects Agency (DARPA) as part of the government's Next Generation Internet (NGI) program—an interagency effort to advance networking technologies and new applications via deployment of national-scale testbeds that are vastly superior to today's Internet.

**For more info:** Francis Crumb, 315-330-3053, [crumbf@rl.af.mil](mailto:crumbf@rl.af.mil)



**Sandia researchers** Carol Ashby (foreground) and Carolyn Matzke prepare to put a wafer sample into a high-density plasma chamber used to deposit thin films on wafers. At the center of the wafer is a thumbnail-sized chip laden with the makings of tiny fluidic canals. (Photo by Randy Montoya)

### **PPPL Physicists Work to Improve TV Technology**

During the next decade, televisions will change substantially with the advent of High Definition Television (HDTV) and flat panel, hang-on-the-wall displays. At the

DOE's Princeton Plasma Physics Lab (PPPL), researchers Hyeon Park and Hideo Okuda are working on an experimental diagnostic method and computational model that will allow designers of flat panel displays to better characterize the plasmas (ionized gases) used to produce light in the displays. The researchers' work may lead to less expensive displays that are larger, last longer, and provide higher resolution images.

**For more info:** Lew Meixler, 609-243-3009, [lmeixler@pppl.gov](mailto:lmeixler@pppl.gov)

### **Electro Osmotic Pulse Technology Prevents Wet Basement Damage**

Work at the U.S. Army's Construction Engineering Research Lab (CERL) has demonstrated that Electro Osmotic Pulse (EOP) technology can dry damp basements using sets of electrodes placed inside a concrete structure and in the surrounding soil. The pulsating electrical field created causes the movement of water molecules, which results in the drying of the concrete and prevention of water intrusion.

## TECH WATCH *continued*

The systems are easier to install and more permanent than other solutions to wet basements. The industry partner is **Drytronic, Inc.** (LaCrosse, WI).

**For more info:** <http://owwww.cecer.army.mil/eop/index.html>

### **Nanomachining with High Aspect Ratios**

The DOE's Lawrence Berkeley National Lab (LBNL) is seeking partners for licensing and/or collaborative development of a new nanomachining technique that will produce high aspect ratio, precision structures with feature sizes as small as 20 nm and aspect ratios potentially as high as several thousand. These capabilities far exceed current microfabrication techniques such as electron-beam lithography, x-ray lithography, and LIGA. The new technique allows structures to be fabricated from a wide range of materials (such as inorganic insulators and plastic) that cannot be used in conventional processes. The technique may be applicable to: micromachining sensors, detectors, and actuators; quantum devices, semiconductor devices, heat sinks, and high aspect ratio lithography; medically implanted and surgical devices and sensors; nondestructive microcircuit inspection; and packaging and integration of miniaturized components.

**For more info:** LBNL Tech Transfer Department, 510-486-6467, [TTD@lbl.gov](mailto:TTD@lbl.gov)

### **AFRL Research Yields Essential Plasma Etching Techniques**

The AFRL's Propulsion Directorate Power Division has developed advanced plasma etching techniques for silicon carbide (SiC) devices—including optimal gas ratio mixtures and operating pressure regimes for etching SiC using SF<sub>6</sub> diluted with argon (Ar) and helium (He). These techniques are essential for high-power switch and high-temperature MEMS or MOMS fabrication. The research achieved electronic device and MEMS pattern definitions that yield desired profiles, minimal physical damage, high etch rates, mask selectivity, large aspect ratio features, and minimal source gas and effluent hazard. The most significant accomplishment was the development of a tool and operating parameters that obtain high anisotropic etch rates with excellent surface smoothness. Applications include pressure and temperature sensors, high-temperature integrated circuits, improved power devices, high-voltage switch and power conditioning uses in utilities, automotive sensors, and medical implants. Tech transfer options include the transfer of the tool design and operating parameters (including providing specs or instruction to help organizations

build and use the process independently) and collaborative efforts and research to further scale-up the process.

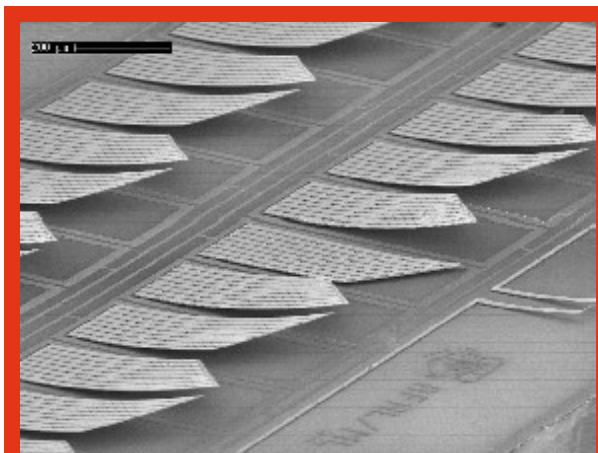
**For more info:** Kristen Schario, 937-255-3428, [kristen.schario@wpafb.af.mil](mailto:kristen.schario@wpafb.af.mil)

### **Device for Modulating, Amplifying Optical Signals**

Two of the most daunting problems facing the communications industry are the high cost of modulating data onto a laser beam and switching signals from one data channel to another. A new Optical Modulator/Switch (OMS) solves both of these problems. Developed by researchers at the DOE's Kansas City Plant, the DOE's Lawrence Livermore National Lab, and University of Maryland at

College Park, the OMS both modulates and amplifies optical communication signals at nanosecond rates. It is smaller and cheaper than current devices—occupying the same space as a medium-sized integrated circuit and significantly cheaper to manufacture.

**For more info:** Carl Watterson, 816-997-2729, [cwatterson@kcp.com](mailto:cwatterson@kcp.com); Curt Theisen, 925-423-0366, [theisen1@llnl.gov](mailto:theisen1@llnl.gov)



**Sample MEMS:** Research conducted by AFRL's Propulsion Directorate resulted in plasma etching techniques for SiC devices (often used in MEMS fabrication). This array of residual stress cantilevers will function as vorticity generators for turbine flow control.

### **New MEMS Facility Opens in Boulder**

The Department of Commerce's National Institute of Standards and Technology (NIST) has opened a world-class MEMS facility at its Boulder, CO lab. MEMS research will be performed in a microfabrication cleanroom where mechanical and electronic components are integrated. Similar facilities are used by industry to build microchip accelerometers for controlling air bags, gyroscopes, and microfluidic devices. NIST will use the facility to improve metrology at the microscale and nanoscale levels. One goal is to develop imaging technologies to examine nanometer-scale magnetic phenomena. This project will also integrate tiny thin-film devices into MEMS magnetometers that can measure very small magnetic moments and can then be discarded. Such

*Please see TECH WATCH, p. 6*

### **Don't see what you're looking for?**

Looking for a specific technology or facility at a federal lab? Submit a Technical Request to the **FLC Laboratory Locator**, who will find the answers you need—at no cost! Go to the FLC web site at [www.federallabs.org](http://www.federallabs.org) and click on LABORATORY LOCATOR or call 888-388-5227.

## TECH WATCH *from p. 5*

devices are desired by the data storage industry for deposition and process monitoring. NIST will also use the facility to fabricate microstructures to electromagnetically trap ions.

**For more info:** Fred McGehan, 303-497-3246, mcgehan@boulder.nist.gov

### **Determining Concentration of a Compound in a Multiple Component Fluid**

This USDA Agricultural Research Service (ARS) invention accurately determines the concentration of a selected compound(s) in a fluid test sample by reducing or eliminating interference from nonselected compounds. The technology uses either amperometric or potentiometric membrane sensors to simultaneously measure responses to the test fluid. The sensors are connected to a circuit or computer to compute signals representative of the selected compounds while minimizing cross-interference. Applications include situations where specific compound levels must be accurately determined and maintained—such as food processing, drinking water, and wastewater treatment. The invention is particularly useful for adapting chlorine dioxide in poultry processing—a process that was recently approved by the FDA to control microbial contamination. However, if chlorine dioxide is not maintained at the proper levels, its effectiveness is reduced and harmful gases can be created. The technology's monitoring system could allow chlorine dioxide to be more readily used by the food processing industry. **NL**

**For more info:** Mary Ann Gwodz, 301-504-5345, mag@ars.usda.gov



### **Subscribe to the FLC's Environmental E-Mail Newsletter!**

The FLC is offering a free e-mail newsletter focused on environmental technologies, facilities, and resources available from federal labs. Topics covered will include pollution prevention, recycling, waste reduction, and more. Our industry readers are invited to submit their technical needs and problem statements as well.

**To subscribe:** Send an e-mail to jbegley@utrsmail.com and type "Environmental E-Mail Newsletter" in the subject line.

**To submit material:** You can submit contributions via e-mail (jbegley@utrsmail.com), fax (856-667-8009), or mail (J. Begley, 950 N. Kings Hwy., Suite 208, Cherry Hill, NJ 08034). We're also open to suggestions for topics for other e-mail newsletters.

## Tech Transfer on the Web

### **New Navy Night Vision Web Site**

[www.crane.navy.mil/swnveo/Index.html](http://www.crane.navy.mil/swnveo/Index.html)



The Crane Naval Surface Warfare Center (Crane, IN) has established a new web site to provide management support for the development of night vision electro-optic devices for U.S. Navy and Coast Guard forces. The site showcases a variety of products developed for use during darkness and electronic silence.

### **Report on Clean Coal Technology Benefits**

[www.fe.doe.gov/programs\\_coalpwr.html](http://www.fe.doe.gov/programs_coalpwr.html)

A new report—*Clean Coal Technology: The Investment Pays Off*—is now available on the DOE's Fossil Energy web site. The report summarizes some achievements from the joint government-industry **Clean Coal Technology Demonstration Program**. Technologies to control smog, eliminate acid rain, generate clean electric power, convert coal to new forms, and improve the performance of the nation's basic industries are summarized in the report.

### **SBIR Discussion Forum**

[www.inknowvation.com/cgi-bin/db4/ForumNS.html?breakout=ds&fname=IhaveQuestion.html](http://www.inknowvation.com/cgi-bin/db4/ForumNS.html?breakout=ds&fname=IhaveQuestion.html)

At this URL, you'll find a "behind the scenes" area that gives the SBIR community access to a useful new resource—the "I Have An SBIR Question" discussion forum. By going to this page, you'll see the questions previously posted and the subsequent responses and discussion. If you see something of interest, you can join the forum at no cost by completing the registration process.

### **Office of Law Enforcement Standards**

[www.eeel.nist.gov/810.02](http://www.eeel.nist.gov/810.02)

Go here to learn about the Office of Law Enforcement Standards (OLES) at NIST. OLES helps state and local police and corrections agencies, fire services, and forensic labs by researching law enforcement equipment and writing standards for police equipment. Funding comes primarily from the Department of Justice's National Institute of Justice. The web site includes descriptions of current OLES projects and publications.

### **Report Urges Energy Tech Transfer Initiative**

[www.isa.org/isaolp/journals/pdf/other/20003epri.pdf](http://www.isa.org/isaolp/journals/pdf/other/20003epri.pdf)

Go here for a summary report that calls for a web-based backbone to speed much-needed technical information from government and other labs to electric utilities. The report summarizes the **Advance Control Systems Technology Transfer Initiative** planning meeting, which focused on organizing an effective tech transfer initiative to accelerate state-of-the-art advanced control systems and their efficiency and cost-effectiveness. **NL**





## SPOTLIGHT ON SUCCESS

*Success stories from the federal lab community*

### Congress Briefed on NVESD Microfactory Program Success

In February, the FLC and the American Society of Mechanical Engineers (ASME) hosted a congressional luncheon briefing on successful tech transfer at work—the U.S. Army Communications-Electronics Command Research, Development and Engineering Center (CECOM/RDEC) Night Vision and Electronic Sensors Directorate's (NVESD) microfactory program. Speakers and representatives included: **Dr. Jack Dinan**, NVESD/Program Director; **Dr. Jose Arias**, Rockwell Science Center; **Karen Gordon**, NVESD/FLC; and **Dave Appler**, FLC Vice-Chair.

Dr. Dinan described the role of the NVESD microfactory, the phases of technology development, and the tech transfer tools used to get third-generation cooled technology into the industrial sites that will manufacture infrared cameras for the Army. In Phase I, a consortium—which included major players such as **Rockwell Science Center**, **Hughes Research Lab**, **General Electric Laboratory**, **Texas Instruments**, and **Georgia Tech Research Institute**—was formed to exchange information and gather data to validate material and tool choices. NVESD then invested \$2 million to build a microfactory to test the advanced fabrication techniques being developed.

#### **Ideal Tech Transfer Tools**

In Phase II, a **Small Business Innovation Research (SBIR)** award helped develop the equipment needed to produce focal plane arrays. Once the newly developed equipment was integrated into the microfactory line, the large business community was able to try it out before buying. In fact, industry scientists worked closely with NVESD scientists at the microfactory before purchasing the

equipment for their own plants.

In Phase III, one-on-one relationships were established with various small and large business partners seeking to exploit the microfactory for prototyping new device concepts. Cooperative Research and Development Agreements (CRADAs) proved to be the ideal tech transfer tool at this stage because of their ease in dealing with proprietary information issues. Five CRADAs have since been established with **Rockwell Science Center**, **SY Technology**, **Texas Instruments**, and **Raytheon**.

In Phases I and II, NVESD sought out partners; in Phase III, industrial firms began seeking out NVESD. Dr. Arias explained Rockwell's role as a consortium member and CRADA partner in the development of semiconductors—describing areas in which **Boeing/Rockwell** has collaborated with NVESD and the technologies that have been transferred to his organization.

#### **Government-Industry Benefits**

The original vision of the microfactory as a national resource for next-generation cooled technology development has been fulfilled—benefiting the



**Tech Transfer Works!** Dr. Jack Dinan (left) and Dr. Jose Arias listen as FLC Vice-Chair Dave Appler poses a question at a congressional briefing sponsored by the FLC and the American Society of Mechanical Engineers.

government, small businesses, and large sensor manufacturers. With dwindling lab budgets, industry-federal lab collaborations are a common and effective method for developing technology. As FLC Vice-Chair Dave Appler said, "Partnerships are becoming so seamless that you can't draw a line in the R&D process. It's a blending...collaboration that makes this work. You try to draw the line, but, if you take any partner or role out of the picture, it won't work." **NL**

**For more success stories, visit the FLC web site at [www.federallabs.org](http://www.federallabs.org)**

**Free Exhibit Passes! Free Exhibit Passes! Free Exhibit Passes!**

**Instrument Society of America (ISA) 2000** ♦ August 21-24 ♦ New Orleans, LA

**Composites 2000** ♦ September 27-30 ♦ Las Vegas, NV

**Society of Petroleum Engineers (SPE) 2000** ♦ October 1-4 ♦ Dallas, TX

**To receive your passes:** Send an e-mail with your name, mailing address, phone number, and the number of passes needed for each show to [jbegley@utrsml.com](mailto:jbegley@utrsml.com).



## COMING ATTRACTIONS

**August 9-11, 2000**

**Naval/Industry R&D  
Partnership Conference  
Washington, DC**

The first annual Naval-Industry R&D Partnership Conference will promote dialogue among government, industry, and academia through which the Navy can better leverage corporate R&D efforts. The conference will focus on reducing barriers to integrating commercial products and R&D into Navy and Marine Corps systems.

[www.navalranddconf.com](http://www.navalranddconf.com)

**August 21-24, 2000**

**Instrument Society of America (ISA)  
Conference and Exposition  
New Orleans, LA**

The ISA 2000 show will feature technological innovations in automation and control, MEMS, next-generation manufacturing, and real-time computing. More than 40,000 measurement and control professionals are expected to attend—along with exhibitors from leading equipment manufacturers and service firms. Visit the FLC in Booth 2557!

[www.isa.org/events](http://www.isa.org/events)

**September 26-28, 2000**

**Symposium on  
Optical Fiber Measurements  
Boulder, CO**

Sponsored by NIST, IEEE Lasers and Electro Optics Society, and the Optical Society of America, this symposium will provide a forum for reporting the results of recent measurement research in the area of lightwave communication, including optical fibers. Private companies, government labs, and universities are encouraged to attend.

[www.boulder.nist.gov/div815/current.htm](http://www.boulder.nist.gov/div815/current.htm)

**September 27-30, 2000**

**Composites 2000  
Las Vegas, NV**

Sponsored by the Composite Fabricators Association, Composites 2000 is *the* composite convention and trade show. Join more than 5,000 composite professionals to network, attend educational sessions, and browse the largest composite-oriented exhibit hall in the U.S. Educational topics focus on industry segments such as cast polymer, corrosion, transportation, and advanced materials. Visit the FLC in Booth 879!

[www.cfa-hq.org/composites2000](http://www.cfa-hq.org/composites2000)

**October 1-4, 2000**

**Society of Petroleum Engineers (SPE)  
Conference and Exhibition  
Dallas, TX**

The SPE's flagship annual meeting is the upstream oil and gas industry's most comprehensive international event. The exhibition is a showcase of leading-edge applications for petroleum exploration, drilling, and production services, while the conference provides sessions to help identify strategies for improving the bottom line. Visit the FLC in Booth 1724!

[www.spe.org/events/2000atce](http://www.spe.org/events/2000atce)

**October 30 - November 2, 2000**

**Technology 2000 Series  
Technology Expo and Conference  
Seattle, WA**

The 11th Annual Technology 2000 Series Technology Expo and Conference will showcase new and next-generation technologies and resources and partnership opportunities for developing and selling in the global marketplace. Colocated events include the Third Annual Small Business Tech Expo and the National SBIR Conference.

[www.t2kexpo.com](http://www.t2kexpo.com)

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