

FLC NEWS LINK

February
2004

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

T² Events

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

•
NSTI Nanotech
Conference &
Trade Show
Boston, Mass.
March 7-11, 2004

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

•
World's Best
Technology 2004
Arlington, Texas
March 21-23, 2004

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

•
Bio 2004
San Francisco, Calif.
June 6-9, 2004

•
WorldFuture 2004
Creating the Future Now
Washington, D.C.
July 31-Aug. 2, 2004


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calendar of events

T² Fact

In November 1903, Mary Anderson was granted her first patent. On a trip to New York, she noticed people had to reach outside their car to clear their windshield of rain and snow. To eliminate this annoyance, Mary's invention helped travelers to clear their windshield using a lever installed inside the car.

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Livermore
Dam Threats
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Frequency,
PNNL?
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Fuels Cell
Future
Page 3

A River Runs Through It, or Does It?



Anywhere else it's just dirt...This is the first color image of Mars taken by the panoramic camera on the Mars exploration rover Spirit. It is the highest resolution image ever taken on the surface of another planet. Image credit: NASA/Jet Propulsion Laboratory/Cornell

"Scientists have a crush on Mars, and it's hard not to look only for things we want to see," said Mars exploration rover scientist **John Grant** of Washington, D.C.'s National Air and Space Museum.

For two years, scientists have wanted to go to Gusev Crater because pictures and data taken from the Mars Odyssey and Mars Global Surveyor orbiters have shown evidence that a river may have once flowed into the crater.

Now that Spirit has safely landed in Gusev Crater, scientists must interpret the right clues that will lead them to

DC on T²

by **Dave Appler**
FLC Washington, DC Representative

In late November, the Commerce Department released a contracted study entitled "Partners in a Mission: Federal Laboratory Practices Contributing to Economic Development."

Technology transfer is often dubbed a "contact sport."

This report provides a variety of examples on how these contacts can have an impact on economic development.

In his foreword to the report, Bruce Mehlman, Assistant Secretary of Commerce for Technology Policy, states that "many of our national labs are partnering with entrepreneurs to create

See DC on T², page 5

understand the geologic processes that formed the area.

"We've talked about Gusev Crater being a dry lake bed for so long, there's a danger of getting trapped into believing only in that possibility," warned Grant. Scientists are forcing themselves to be patient as they begin gathering clues to figure out how this site formed.

"To be trite, you can't judge a book by its cover," explained Jeff

Moersch, participating scientist from the University of Tennessee. There can be multiple explanations for the same geologic observation. "For example, take a look at these two pictures on Earth (the Haughton Impact Structure in the Canadian Arctic and Egypt's Saf Saf area), which look very similar to Spirit's landing site on Mars. Look at the shapes of rocks in the pictures, the size of rocks, the number of rocks in a certain area or the 'rock distribution' as we geologists say," said Moersch.

At first glance, these two places on Earth look similar, and one could as-

sume the same geologic processes formed the landscapes. However, geologists have gone to these two sites and discovered that they were formed in different ways.

The Haughton Impact Structure is a crater in the Canadian Arctic that is roughly 23 million years old. The bottom of the crater flooded, and a lake formed inside the crater. Some of the rocks are scratched in a way that tell geologists that glaciers probably transported the rocks into the crater later.

At a glance, the landscape in the Saf Saf area in Egypt looks similar to the Haughton Impact Structure. The Saf Saf landscape, however, doesn't have anything to do with an ancient lake. Although one's eyes are drawn to the flat area, similar rock angles, the rock distribution, the light soil, and further

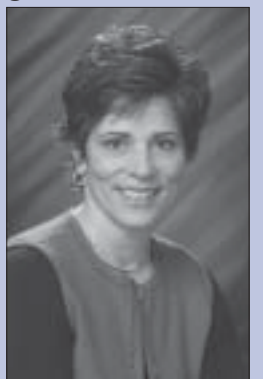
See River Runs, page 4

Correction

The November 2003 issue of *FLC NewsLink* incorrectly named Vic Chavez as the Outstanding Laboratory Representative of the Year for the Far West Region.

The Far West Region's Outstanding Laboratory Representative of the Year was Cheryl Cejka of Pacific Northwest National Laboratory.

Chavez was the Outstanding Mid-Continent Region Representative of the year.



Cheryl Cejka
PNNL

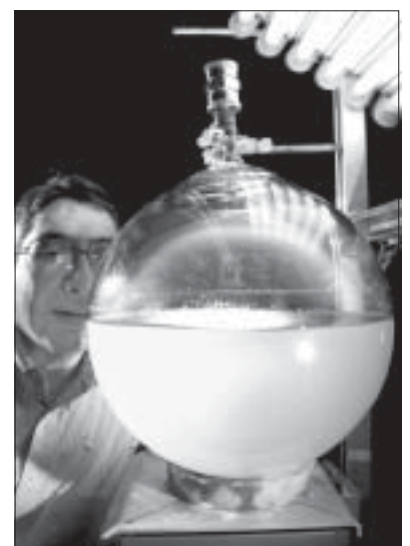
Lab in the Limelight: ORNL Turns 60

Excerpted from an ORNL Review article by ORNL Director William Madia

Among the most cherished artifacts of **Oak Ridge National Laboratory (ORNL)** is a small unassuming logbook with pages yellowed by time. The book was used by a group of researchers doing classified work in 1943 to record experiments at the X-10 Pile, a facility that later became known throughout the American scientific community as the Graphite Reactor.

The book's most famous entry is dated November 4, 1943, and has scrawled handwriting that reveals the author's excitement. The entry records a historic event of profound significance that had taken place in the hours just before dawn.

In the hills of rural eastern Tennessee, the world's first powerful nuclear reactor had gone critical, ushering in the age of nuclear power and forever changing our assumptions about how we view science and its impact on our lives.



ORNL's Eli Greenbaum studies algae being used to produce hydrogen from water in an illuminated flask.

See ORNL Turns 60, page 4

Fed Labs Flash

Technology Transfer Notes From Within the Federal Laboratory Community

AFRL Director Designated Fellow

by Grace Janiszewski

The director of the **Air Force Research Laboratory's** Sensors Directorate has been elected a Fellow of the Institute of Electrical and Electronics Engineers.



Dr. Donald W. Hanson

Dr. Donald W. Hanson was recognized for his technical leadership in the development and realization of sensors science and technology.

"I am honored to receive this recognition," said Hanson. "I am flattered to join the very elite group of electrical and electronics engineers who are Fellows of the IEEE."

As director, Hanson oversees an annual budget of more than \$400 million and directs the activities of more than 1,100 civilian, military, and contractor personnel at three separate locations.

He is responsible for planning, directing, and evaluating sensor and countermeasures science and technology programs, which require extensive coordination with other federal agencies, industry, private research organizations, and foreign governments.

Hanson serves as the Air Force principal for the Department of Defense Sensors, Electronics, and Electronic Warfare Panel,

coordinating all DOD activities within these areas with peers from the Army and Navy.

In addition to his accomplishments as a technical manager, Hanson was a pioneer in the development of adaptive optical systems that compensate for aberrations incurred when optical signals propagate through the atmosphere. Following the successful completion of correcting aberrations for imaging applications, Hanson applied his knowledge of adaptive optical systems to programs related to propagating a laser beam through the atmosphere for various purposes such as laser communications.

Argonne Recycles

by Neil MacDonald

Technology Commercialization

The Department of Energy's **Argonne National Laboratory** (ANL) has signed a five-year cooperative research agreement to find new uses for recyclable items from junked automobiles.

Unveiled last month, ANL's partners in the project are the American Plastics Council and the Vehicle Recycling Partnership of USCAR, a consortium of DaimlerChrysler, Ford, and General Motors.

"This project brings together the American Plastics Council's knowledge of polymers and recycling processes, Argonne's research expertise and USCAR's understanding of the marketplace," ANL Associate Laboratory Director **Harvey Drucker** said.

"Together as a team, we can lead the de-

velopment of a viable solution to the vehicle recycling challenges of today and the future."

Increasing amounts of lightweight and nonmetallic materials are now being incorporated into vehicles to meet demands for improved fuel economy and lower emissions.

Each year, about 15 million vehicles are "junked" or discarded at the end of their serviceable life and are sent to recycling firms for shredding.

However, many nonmetallic components in these junked cars cannot be recycled because of the difficulty of separating and sorting them.

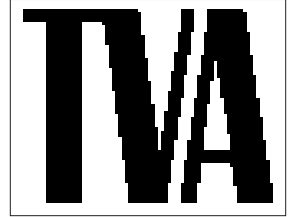
The unshredded residue is estimated to be about 25% of each vehicle, and ANL's project is intended to change that.

TVA Transmission Technology

New transmission technology to help ensure delivery of high-quality, reliable power unveiled in November by the **Tennessee Valley Authority** and American Superconductor Corporation has been named this year's "Most Promising Pre-commercial Technology" by Platts Global Energy.

As the demand for power increases and more electricity is transmitted, power lines become stressed. This may lead to voltage instability, which in turn may result in power outages.

The SuperVAR™ dynamic synchronous condenser stabilizes power grid voltages.



Lab Work

Sandia, Army, Livermore Dam Security Threats

Operators of U.S. dams, hydroelectric facilities, and power transmission systems can make their sites less attractive targets to terrorists using new step-by-step security assessment processes developed by the Interagency Forum on Infrastructure Protection (IFIP), a team of government dam owners, transmission system operators, and antiterrorism experts.

The IFIP includes representatives of the FBI, **U.S. Army Corps of Engineers**, Bonneville Power Administration, U.S. Bureau of Reclamation, **Sandia National Laboratories** (SNL), **Lawrence Livermore National Laboratory** (LLNL), Southwestern Power Administration, Western Area Power Administration, and others.

The two new processes, called RAM-DSM for "Risk Assessment Methodology for Dams" and RAM-TSM for "Risk Assessment Methodology for Transmission," take owners, operators, and security managers of dams and transmission systems through a magnifying-glass examination of each facility's unique situation —



The Risk Assessment Methodology provides a formal process for evaluating and improving the security of critical elements of the U.S. infrastructure.

its potential adversaries, vulnerabilities, consequences of attack, and existing security measures — then provides cost-benefit analyses of possible security upgrades.

The technology is crucial to protecting the integrity of the more than 75,000 dams in the U.S. The methodologies are based on many of the formal risk-assessment tools and techniques used by SNL to protect U.S. nuclear weapons facilities.

SNL is a Department of Energy research and development lab with expertise in the physical security of national facilities and infrastructures.

For more information on this technology and its associated laboratories, visit the U.S. Army Corps of Engineers web site at <www.usace.army.mil>, the SNL web site at <www.sandia.gov>, and the LLNL web site at <www.llnl.gov>.

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Tech Watch: Federal Laboratory Technologies Ready for Transfer

What's the Frequency, PNNL?

Researchers at **Pacific Northwest National Laboratory** (PNNL) are developing miniature radio frequency (RF) tags that are ideal for rapid, remote inventory tracking, and for monitoring a wide variety of items. A few examples of how these tags are being integrated into everyday commerce include:

- Supply chain management—tracking parts and goods from birth to death in the global market
- Asset management—monitoring the location and availability of inventory, tools, vehicles, personnel, and other high-value assets at a given location
- Security—controlling entry, authenticating transactions, wireless alarms, critical interlocks, etc.
- Consumer products—wireless links to appliances, alarms, automobiles, thermo-



In addition to offering general features and benefits for different applications, PNNL also can customize its tag systems to meet specific needs.

stats, entertainment centers and more.

RF tag systems offer an advantage over bar-coding inventory and monitoring systems because line-of-sight access to the tagged items is not necessary. PNNL's RF tags can be read through container walls, paint, dirt, and in cluttered areas.

In addition, PNNL's strength in RF identification systems offers several unique benefits, including extended range, simultaneous reading, ability to monitor inputs and control outputs, and tag location.

PNNL has demonstrated the ability to find the physical location of a tag less expensively and with a higher degree of precision than current commercial products.

More info: Contact Ron Thomas, Senior Program Manager of Technology Commercialization at <ron.thomas@pnl.gov> or (509) 372-6042.

Communication Solution

Los Alamos National Laboratory (LANL) has developed a method for communicating with voice in underground mines.

This system utilizes very low frequency (VLF) electromagnetic radiation, typically several kHz in frequency, to carry the voice. These frequencies penetrate typical rocks over distances of several hundred meters.

Digital audio compression technology running on a digital signal processor (DSP) reduces voice audio to a bandwidth of less than one kHz.

Digital audio compression techniques take advantage of the fact that the information rate in the voice is quite low and that much of the audio content can be discarded while retaining intelligibility.

This wireless technology has been demonstrated with audio communication at distances longer than one hundred meters through solid rock.

In large buildings and tunnels, similar communication problems exist and the technology should, with some adaptation, be used to communicate in those areas as well.

More info: Contact Charles Gibson at 505-667-8087 or <charliegib@lanl.gov>.

Proven to Work Argonne Fuel's Fuel Cell Future

Ceramic membranes developed at **Argonne National Laboratory** (ANL) could bring fuel-cell cars closer to reality by efficiently and inexpensively extracting hydrogen from fossil fuels.

"Ceramic membranes make possible the widespread use of hydrogen," said senior ceramist Balu Balachandran. "Hydrogen is a fuel of choice for the future. This technology provides the means to get there." Balachandran is section manager of the ceramics section in ANL's Energy Technology Division.

Though the membranes currently used for research are only a few millimeters across, once scaled up for industrial use they could be installed at existing refineries or at individual refueling stations.

"Just as conventional cars need gas stations, fuel-cell cars will need an infrastructure to support them," Balachandran said. "Ceramic membranes could eliminate the need for costly, conventional hydrogen-manufacturing facilities; they could one day be small and efficient enough to have one at every gas station."

Membrane design

Industry uses membrane systems to filter wastewater or separate gases. Most work like a sieve, with small holes that allow only smaller molecules to pass through. But these membranes are not selective enough to isolate pure hydrogen, the simplest and smallest of all elements. For this task, ANL ceramists developed a hydrogen-filtering ceramic membrane.

Ceramic membranes such as ANL's new hydrogen membrane lack pores and are made of dense, conductive materials that allow only electrons and certain ions, or charged atoms, to pass through.

"There are no interconnected holes, or pores," Balachandran said. "A molecule cannot swim through from one side to the other side."

These ceramic membranes behave differently depending on the materials used to form them. After studying the conductivity and solubility of various substances, Balachandran's team developed a composite ceramic-oxide that transports only hy-



CERAMIC MEMBRANE — Jack Picciolo of ANL's Energy Technology Division examines a ceramic membrane that could help lead to an inexpensive way to separate hydrogen gas from fossil fuels.

drogen and electrons. This allows the membrane to separate pure hydrogen suitable for use as a clean-burning fuel or to manufacture fertilizer.

At work, a hydrogen-rich gas mixture flows on one side of the membrane. Charged or atomic hydrogen flows through the membrane. The resulting pure hydrogen can be captured for immediate use, storage or transport.

Unlike most membrane systems, ANL's hydrogen membrane tolerates temperatures as high as 900 degrees Celsius (1,650 degrees Fahrenheit). The elevated tempera-

tures are an advantage to hydrogen production as they cause more hydrogen to be pushed through the membrane, accelerating the separation process.

Hydrogen from syngas

The most likely raw material for hydrogen separation with ANL's ceramic membrane will be syngas, Balachandran explained. Syngas is often used to make liquid diesel and other transportation fuels, as well as chemicals for the petrochemical, rubber, plastics and fertilizer industries.

More membrane help

While ANL's ceramic membrane can extract hydrogen from syngas, the challenge is to have an ample and affordable supply of hydrogen for power sources. Syngas can be expensive to produce using the energy-intensive process of steam reforming or by mixing methane with air.


The ceramics group wants to study the possibility of using a membrane they developed about 10 years ago to extract oxygen. They hope it will be a cost-effective alternative to perform the first half of the transition from natural gas to syngas to hydrogen fuel, according to Balachandran. The combination of membranes could be a two-step technique to provide pure hydrogen for transportation and power applications from fossil fuels such as methane or coal gas.

Membrane development

ANL's ceramic membranes were developed as part of a project funded by DOE's Office of Fossil Energy through the **National Energy Technology Laboratory's** Gasification Technologies Program. Balachandran's team also has Cooperative Research and Development Agreements with industry to address the problems of scaling up the separating membrane.

More info: Catherine Foster at 630-252-5580 or <media@anl.gov>

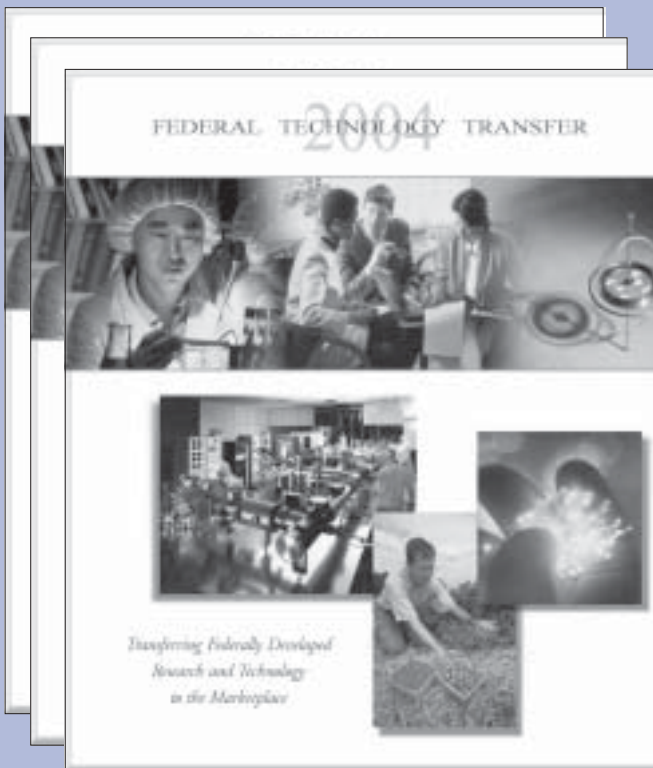
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From exotic medical equipment to items filling supermarket shelves, *Federal Technology Transfer 2004* highlights and describes successful technology transfers having their genesis in the federal laboratory system. Being of high potential impact and human interest, the technologies listed in this publication have completed their transition from research to results via the technology transfer process.

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River Runs, From page 1

subtle clues observed by geologists revealed that no water ever flowed where the rocks are scattered in Saf Saf. A river only flowed behind the rocks in the smoother area above the rocks.

Without other instruments on the rovers, scientists could argue for decades about Gusev's history.

"When I first saw the pictures from Mars, I caught myself saying, 'I know this place,' because it looked like

places I had seen on Earth," said Grant. "But, we're being very cautious right now because we know we have never seen this place before, and we must wait for the other instruments, such as the microscopic imager and Mössbauer spectrometer, to reveal bet-




Members of the Mars Exploration Rover team at NASA's Jet Propulsion Laboratory react to Spirit's landing on Mars.

ter clues about this landscape," explained Grant. "If we only had pictures of the landing site, we scientists would argue for decades and maybe never know for sure how this place formed."

"This is like a book that is being read," explained Moersch, and the science team is working hard not to judge this Martian book by its cover. "Like good detectives, we are looking at everything we can and gathering as many clues as possible to see if water ever was in this crater long enough to provide an oasis for life," said Moersch.

ter clues about this landscape," explained Grant. "If we only had pictures of the landing site, we scientists would argue for decades and maybe never know for sure how this place formed."

"This is like a book that is being read," explained Moersch, and the science team



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ORNL Turns 60, From page 1

The extraordinary scientific breakthrough was the first in what was to be a long and distinguished list of contributions from the staff at ORNL. Sixty years later, ORNL continues on the path of research excellence.

From nanophase materials research conducted at the atomic level, to the galactic scale of our experiments in astrophysics, ORNL for six decades has pushed the frontiers of science for the betterment of humankind.

A recent cover of *ORNL Review* featured the three lab directors who in many ways personify the evolution of ORNL's mission—from a singular focus on developing nuclear weapons in 1943 to a broad and diverse center for world-class scientific research in the 21st century.

First was **Alvin Weinberg**. As research director and later as laboratory director, he was among the first to understand that the laboratory must be a living organism, able to accommodate changes in America's scientific priorities. His leadership was critical in developing energy and environmental research competencies that strengthened ORNL's role in the nation's scientific community during the 1960s and 1970s.



The four current and former ORNL directors, from top left clockwise, are: current ORNL director William Madia, Alvin Weinberg, Herman Postma, and Alvin Trivelpiece. The directors gathered on the 100th anniversary of the birth of former ORNL Director and Nobel Laureate Eugene Wigner, seen in portrait.

Alvin Weinberg's vision was complemented by **Herman Postma**, who guided the laboratory through the transition from the Atomic Energy Commission to the new Department of Energy. Much of the laboratory's current suite of scientific capabilities, including an international reputation in advanced materials, can be traced to Pastma's leadership two decades ago.

These capabilities were enhanced further in the 1990s when **Al Trivelpiece** dreamed that ORNL could one day be home to the world's most powerful pulsed-neutron accelerator, the Spallation Neutron Source (SNS).

Today, atop Chestnut Ridge near the ORNL campus, the SNS has passed the halfway point in construction. When the SNS opens in 2006, ORNL will be the world's foremost center of neutron science research.

As we celebrate 60 years of great science and technology at ORNL, our challenge is to build on Alvin Weinberg's vision of a laboratory whose mission evolves and

strengthens over time. To that end, we continue to build on ORNL's historic competencies in energy, life sciences, neutron sciences and advanced materials, while adding new research missions in the areas of national security and high-performance computing.

Equally important, we are literally rebuilding ORNL by undertaking a \$300-million modernization program that will maintain our laboratory as one of the world's leading scientific research centers. As we move into our new facilities, we will provide a place of distinction for that unassuming logbook that chronicled some of our earliest contributions. We do so knowing that this great event was only the first of many chapters in a story of success that will continue for years to come.

Did you know that partnering with ORNL can help solve your technical problems and increase your bottom line? Hundreds of new technologies have already been invented and patented by ORNL, and more than 800 research projects are underway.

The Commercialization Manager (CM) is your connection to ORNL's technology. A CM is assigned to each research area to help you gain access to the technology and scientific expertise at the laboratory. To determine the status of a technology, obtain additional technical information or discuss licensing options, please contact the associated CM.

To discuss technology transfer opportunities with ORNL, call 866-221-2527.

Get Ready for '04 FLC National Meeting

From May 3-7, 2004, technology and business professionals from around the globe will converge on The Westin Horton Plaza in San Diego, Calif.

The event is the national meeting of the FLC and the Department of Energy's Technology Partnerships Working Group (TPWG).

FLC Program Committee Chair **Sharon Borland** has assembled an extensive list of technology transfer (T²) related events, including the FLC Awards for Excellence in Technology Transfer, T² training, and panels of successful scientists and commercialization experts.

Adding a variety of elements to the agenda, TPWG will co-host the event for the first time. Attendees can look forward to the addition of



The Westin Horton Plaza

sessions discussing venture capital funds and industry perspectives.

Guy Kawasaki of Garage Technology Ventures will be the event's keynote speaker. Kawasaki is the dynamic founder of Garage, a venture capital investment bank for emerging technology companies. Garage works with companies in three ways — providing direct investment of venture capital, private placement services, and advisory services.

Prior to this position, Kawasaki was an Apple Fellow at Apple Computer, Inc. A noted speaker and the founder of various personal computer companies, Guy was one of the individuals responsible for the success of the Macintosh computer.



Guy Kawasaki
Garage Technology Ventures

He is also the author of seven books, including *Rules for Revolutionaries*, *How to Drive Your Competition Crazy*, and *Selling the Dream*.

Look to the FLC to Learn More

The FLC is your source for publications concerning all facets of technology transfer, from process to policy.

Below is just a short list of the many publications produced and/or distributed by the FLC.

The FLC encourages all technology and business professionals to look to the FLC as their first source for professional development.

To obtain copies of these and other technology transfer publications, contact the FLC Management Support Office at 856-667-7727.

The FLC *Technology Transfer Desk Reference* provides a comprehensive introduction to technology transfer and the background, concepts, and practical knowledge required for technology transfer practitioners—whether in government or industry—to facilitate the transfer of federally funded technologies.



Federal Technology Transfer Legislation and Policy (the "Green Book") provides the principal statutory and presidential executive order policies that constitute the framework of the federal technology transfer program. The Green Book assists government policy makers and technology transfer practitioners by serving as a legal reference resource.



Tools for Innovative Partnering: Technology Transfer Techniques highlights effective partnering tools and the techniques used in successful innovative initiatives and partnering arrangements in the FLC's Mid-Continent Region and includes recommendations for replication by other regions.



From exotic medical equipment to items filling supermarket shelves, *Federal Technology Transfer 2004* highlights and describes successful transfers of technologies with their genesis in the federal laboratory system.



DC on T², From page 1

new jobs, products, and companies." He further states that labs are taking many innovative steps to link themselves with industry in ways that both strengthen the labs in meeting their mission and strengthen industry in ways that sustain America's technological and economic leadership.

He goes on to explain that these activities must continue to grow or the U.S. position in the global economy is at risk.

Food for Thought—

I have extracted several portions of the executive summary that provide a menu of lab linkages to local economic development activities, outcomes of such interactions, and some issues, findings, and conclusions that were brought out in the study.

Things labs do to help in economic development

1. The presence of a federal lab attracts highly educated scientists and engineers to an area, thereby creating an attractive area for entrepreneurial development and growth.

2. Some labs assist in establishing incubators and research parks that are incentives for entrepreneurial activities.

3. Other activities sponsored by federal labs include technical and business assistance, capital incentives and link-

ages, business networking, entrepreneurial leave programs, education and training, and information dissemination.

The premise is that these and similar activities promote entrepreneurship, expand high tech enterprises, and advance the capabilities and growth of other firms.

(Note: As an observation on my part, I would suggest that if a federal lab is not doing several of these things, they should be.)

Benefits of federal lab interaction with local economic development activities

1. Over time, labs were able to attract well-qualified employees from a better workforce pool as the local economy grew in ways complementary to the lab.

2. Spouses of lab employees had better job opportunities.

3. School systems were better focused for lab employees' children, *i.e.*, technology-driven local economies demand better schools, and they get them.

4. When labs work with local suppliers and vendors to improve product quality, the lab is better able to meet mission needs.

5. Labs benefit when technologies stemming from their R&D result in dual-use products of benefit to both government and industry. Because of some of the local interactions cited above, these dual-use technology transfers have a better chance to succeed.

Findings and conclusions

While many of the findings and conclusions are reflected in the discussions above, a summary of those related to policy issues or clarifications of policy are reflected in this section.

1. Some federal labs would like to see policy makers make a clearer statement of intent regarding lab participation in technical and business assistance and economic development in general. They would also like to see a resource commitment to go along with it.

2. Further assessment of entrepreneurial leave programs was recommended, with a view to assessing long-

term benefits versus costs.

3. Lab representatives were often confused about allowable work with SBIR firms and would like clearer guidelines on restrictions, waivers, and permissible interactions.


4. As concluded in a number of studies, there continues to be a strong concern in the labs about meeting future demands in filling technical and scientific positions.

The study can be found on the FLC web site at <www.federallabs.org/legislation>.

To learn more about technology transfer legislation and policy, write Dave at <dappler@flcdc.cnhost.com> or contact him at 703-414-5026.



ETC...



Technology Assessment of the U.S. Assistive Technology Industry

February 2003

Office of Strategic Industries and Economic Security, Bureau of Industry & Security, U.S. Department of Commerce

In cooperation with

National Institute on Disability and Rehabilitation Research, U.S. Department of Education

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