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T² EVENTS

FLC Midwest/Southeast
Regional Meeting
Nashville, Tenn.
October 25-27, 2006

SSTI Conference
Oklahoma City, OK
October 31-November 2, 2006

Partners in Environmental
Technology Technical
Symposium
Washington, D.C.
November 28-30, 2006

FLC National Meeting
Arlington, Texas
May 15-18, 2007

World's Best Technologies
Arlington, Texas
May 15-16, 2007

T² FACT

An immigrant from Belgium in 1889, Leo Hendrik Baekeland invented Velox, a photographic printing paper that could be developed under artificial light. Baekeland sold the rights to Velox to George Eastman and Kodak for one million dollars in 1899. He then started his own laboratory in Yonkers, New York, where he invented Bakelite in 1907, a synthetic substitute for the shellac used in electronic insulation.

- Mary Bellis, About.com

FLC NEWS LINK

September 2006

THERAPEUTIC AGENT APPROVED FOR TREATMENT OF HIV



The novel protease inhibitor, Prezista™ (darunavir), has been granted accelerated approval by the U.S. Food and Drug Administration for the treatment of human immunodeficiency virus-1 (HIV-1) in patients who are nonresponsive to existing antiretroviral therapies. Prezista™ embodies a breakthrough in the struggle against the notorious obstacle of current HIV treatments: drug-resistance conferring mutations.

The antiviral activity of Prezista™ has been established against multi-protease inhibitor-resistant HIV-1 variants and demonstrated effective in patients with widespread resistance to the currently available protease inhibitors.

Prezista™ is approved for use in combination with low-dose administration of ritonavir, which helps decrease the breakdown of Prezista™ in the body, thereby enhancing drug efficacy.

See NIH HIV Treatment, page 4

GEOLOGY SUMMER SCHOOL

by Melissa Miller, Scott
Baldrige, and Anthony
Mancino

At a time when nearly all indicators of scientific and engineering dominance (e.g., patents, publications, new PhDs, and citations) show the U.S. losing its competitive edge, Los Alamos National Laboratory (LANL) recognizes that energy security and economic competitiveness are intertwined and that both rely on educating and maintaining a sound scientific workforce.

To help keep the U.S. at the forefront of carbon sequestration science and engineering, and the underpinning geophysics, LANL has been conducting education programs to recruit and train early career professionals in related fields.

Choosing a scientific or engineering field is easier if one can get outside the classroom and experience what specialists do firsthand. Giving students that opportunity is the goal of two LANL-hosted summer geology education

RECS students gather around a CO₂ injection well at Kinder Morgan's SACROC site in Snyder, Texas.

programs, RECS and SAGE.

SAGE (Summer of Applied Geophysical Experience) has operated in the Rio Grande rift in New Mexico since 1983.

The program promotes careers in geophysics by introducing students to hands-on exploration and research. Students, U.S. and foreign, are predominantly upper division or graduate students in geophysics or related disciplines, or professionals from various earth science fields. Students combine geophysical data, acquired using a variety of techniques, with knowledge of

See LANL Summer School, page 4

DC ON T²: R&D BUDGET

by Gary Jones, FLC Washington, DC Representative



Greetings from DC. As I write this, Congress has just left for its August recess. They will return the first week of September, then most will leave again the first week of October for a final month of campaigning. The implication is that there are scant few days remaining for work on this year's legislative agenda which, of course, includes the federal budget (and its R&D component).

While Congress is on break, I thought I would briefly highlight where the R&D budget appropriation efforts stand, then point to the work already underway at outlining R&D budget

See DC on T², page 5

TEAMING WITH ROCKWELL COLLINS SENDS MINISAR SOARING

by Jerry Langheim and Nancy Welsh

"It's like a long-distance relay race: we're in it for the long haul and every member of the team covers a critical leg of the race."

That's how Sandia National Laboratory's (SNL) Director of Industrial Communications Jerry Langheim and Rockwell Collins' Director of Business Alliances Steve Kennell characterize the newly expanded relationship between the two organizations. Langheim and Kennell are managers of the relationship.

Aerospace and defense company Rockwell Collins designs, produces, and supports communication and aviation electronics for

See Sandia, Rockwell, page 5



FED LABS FLASH | TECHNOLOGY TRANSFER NOTES

AFRL ENGINEER RECEIVES VOLUNTEER EXCELLENCE AWARD

by Allen Geobagan, AFRL

Dr. Craig Ewing, an engineer at the Air Force Research Laboratory (AFRL) Munitions Directorate was recently named the Eglin Air Force Base Volunteer Excellence Award (VEA) winner for 2005.

Dr. Ewing was noted for being "instrumental in providing a much needed benefit to the community, by serving as the Blood Drive coordinator for two organizations on Eglin for more than eight years and continues to do so." He schedules blood mobile drives six times each year with the North West Florida Blood Center, promotes the drives through posters and e-mails, answers donor questions, and donates his own blood every eight weeks. The drives he has organized have turned in an average of 30 pints of blood each, helping to save numerous lives over the years.

According to his Division Chief, James Moore, "Craig is a very talented and dedicated individual. In addition to being the Technical Advisor for the Advanced Guidance Division's Guidance Simulation Branch, he still finds time to volunteer for outside activities from Boy Scouts to local blood drives. This shows his dedication to helping others as well as setting a great example for others to follow."

LBLN WINS FOUR R&D 100 AWARDS

Lawrence Berkeley National Laboratory recently captured four R&D 100 Awards, the most the lab has won in a single year since 1987. Three out of this year's four technologies are already in commercial development.

The winning technologies are: the Carbon Explorer, developed by Jim Bishop of the Earth Sciences Division and colleagues at the Scripps Institution of Oceanography and WET Labs of Oregon, to monitor ocean carbon; the High-Efficiency Multiband Semiconductor Material for Solar Cells, developed by Wladek Walukiewicz and Kin Man Yu of the Materials Sciences Division; the Laser Ultrasonic Sensor for Papermills, developed by Rick Russo and Paul Ridgway of the Environmental Energy Technologies Division, along with colleagues at the Institute of Paper Science and Technology at Georgia Tech; and the Compact High-Output Coaxial-

Target Neutron Generator, invented and engineered by Ka-Ngo Leung, Jani Reijonen, Frederic Gicquel, and Stephen Wilde, members of the Accelerator and Fusion Research Division and the Engineering Division.

For a press release on the winning technologies, visit <<http://www.lbl.gov/Publications/Currents/archive/#1>>.

ORNL'S CLIMATE TECH



Climate modeling of tomorrow will feature precision and scale only imagined just a few years ago, say researchers David Erickson and John Drake of Oak Ridge National Laboratory's (ORNL) Computer Science and

Mathematics Division.

Tremendous computational capabilities at ORNL's Leadership Computing Facility, combined with other software tools, now make it possible for researchers to create models that take into account the complete carbon cycle, terrestrial biology, El Ninos, and hundreds of other factors. The goal is to provide what scientists call a fully integrated Earth system model that can be simulated every 15 minutes for centuries.

"Before, we had to make compromises that ultimately limited the resolution and scope of our models and subsequent predictions," said Drake, who noted that climate modeling is an enormous multi-agency effort. "Now, using what we have learned and with computing power exceeding 50 teraflops, we can make our models far more sophisticated."

Drake, Erickson and other researchers from ORNL are working with colleagues at the National Center for Atmospheric Research, NASA, Duke University, Georgia Tech and national labs across the country to develop a climate end station.

The primary objective of the station will be to upgrade and maintain the Community Climate Systems Model, which has already been used to generate almost 12,000 climate simulations.

"The upgraded model will incorporate the most recent atmospheric, oceanic and glacial ice data as well as improved chemistry, biology and physics," Drake said. "The new model will have the resolution capacity necessary to make conjectures about regional climate change, a capability that until now has been limited primarily by inadequate computational resources."

NETL'S CO₂ SEQUESTERING

Tapping into rock formations at sites thousands of feet deep, a government-industry team is using seismic testing to help determine whether those sites can serve as reservoirs to safely store carbon dioxide (CO₂), a major greenhouse gas.

The Department of Energy's National Energy Technology Laboratory (NETL) is sponsoring the tests in a program to develop carbon sequestration technology as part of the President's Global Climate Change Initiative. The initiative is aimed at reducing greenhouse gas intensity (the ratio of greenhouse gas emissions to economic output) by 18 percent by 2012.

"The seismic testing in the Appalachian Basin helps to transfer carbon sequestration technology from the laboratory to the field," said Assistant Secretary for Fossil Energy Jeffrey Jarrett. "The tests move the nation's carbon sequestration program one step closer to determining the technologies, permitting, and infrastructure best suited in each region of the country for permanently storing greenhouse gases and addressing global climate change."

FLC NEWSLINK

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TECH WATCH | LABORATORY TECHS READY FOR TRANSFER

THWARTING COCCIDIOSIS

Agricultural Research Service (ARS) researchers have developed a method for controlling avian coccidiosis, a major poultry disease caused by several species of the intestinal parasite *Eimeria*.

ARS's method is a pretreatment regimen that could be administered either orally to poultry or injected into embryonated eggs.

Coccidiosis is a leading disease that costs the poultry industry more than \$3 billion worldwide in total annual economic losses from treatment expenses, bird losses, and low bird weight (critical for marketing broilers). Current disease control strategies include drug-treatment regimens; however, the parasite is developing resistance to these treatments. The industry needs a combination of preventative and control strategies to control poultry coccidiosis. A lack of efficient vaccines, consumer concerns, and regulatory bans have given way to drug-independent approaches like ARS's.

ARS researchers have demonstrated the proof-of-concept for this technology and are seeking a commercial partner to expand the concept to other intestinal poultry diseases, including coccidiosis. Researchers in the ARS Animal Parasitic Diseases Laboratory need a partner to conduct basic and applied research studies to help move the technology to the field.

More info: Tara T. Weaver-Missick, 301-504-6965, twm@ars.usda.gov

PROTEIN ANTIBIOTIC

Due to the increase in drug resistance among bacteria, continued progress in the development of new antibiotic treatments is needed.

Available for licensing and commercial development is the small protein SrgT, its analogs and related peptides.

SrgT is a 43-amino acid protein that effectively inhibits bacterial growth. Developed by researchers Carin K. Vanderpool and Susan Gottesman of the National Institutes of Health, this protein likely exerts its antibiotic action by inhibiting the metabolism of glucose in these microorganisms. The claimed invention includes methods for SrgT synthesis and suggested modifications for production of SrgT analogs and related peptides, which may remain effective against potential SrgT-resistant bacteria. Thus, the current technology provides a novel approach to the treatment and prevention of bacterial infections. Applications include therapeutics and prophylactics for bacterial infections.

More info: Cristina Thalhammer-Reyero, Ph.D., 301-435-4507, thalhamc@mail.nih.gov

LANL, AES CORP. FORM PARTNERSHIP

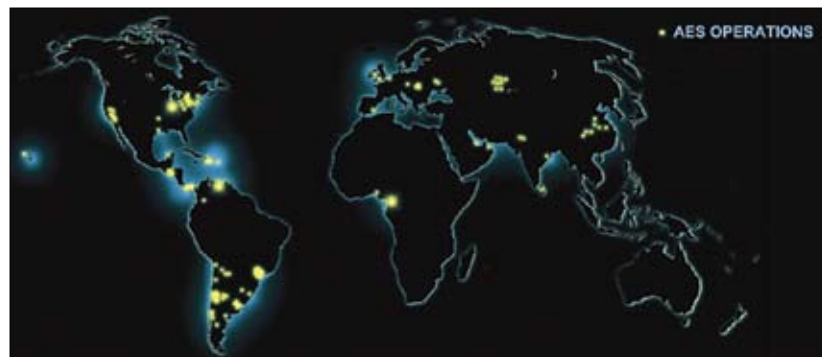
Los Alamos National Laboratory (LANL) and AES Corporation have recently formalized a strategic partnership that will enable the two entities to identify, evaluate, and develop a range of mutually beneficial technologies that have broad energy applications.

Headquartered in Arlington, Va., AES Corporation is one of the world's leading power companies, generating and distributing electric power in 26 countries through an array of world-class power businesses.

Potential areas of collaboration include:

- Greenhouse gas offset technologies
- Smart networks
- Technology grids
- Generation technologies
- Water technologies
- Energy storage
- Biofuels
- Operational reliability and efficiency
- Separation technologies
- Power-aware computing
- Fuel cell technologies.

LANL and AES have also executed an exclusive license option agreement for a unique technology called



“EnergyFit”—a transparent software layer that reduces the power consumption of high-performance computing systems. Because the algorithm minimizes the energy consumed by individual CPUs in a cluster, EnergyFit can dramatically reduce overall power consumption in a data center.

EnergyFit delivers typical system energy savings of 10 to 25 percent, with a bounded performance reduction of less than 5 percent. Energy consumption is the largest portion of a typical data center's budget. EnergyFit's novel, patent-pending algorithm has been proven to yield the maximum energy savings while delivering computational results within a deadline.

LANL and AES envision a long-term cooperative effort that will involve a variety of important and mutually beneficial energy-related projects.

More info: Laura Barber, 505-667-9266, ljbb@lanl.gov

FLC Technology Locator

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Need assistance locating information on federal technologies, federal laboratory expertise, or collaboration possibilities?

Contact the FLC Technology Locator, Frank Koos, at 856-667-7727

NIH HIV Treatment, from page 1

The enzyme HIV-1 protease facilitates the processing of essential HIV-1 structural proteins and is required for virus assembly. Prezista™ and other currently available protease inhibitors have been designed to compete with the protease substrate by binding to the enzyme's active site. However, Prezista™ retains the unique ability to inhibit drug-resistant mutants due to its distinctive points of interaction with the enzyme.

Prezista™ binds inside the protease substrate-binding site, a region of limited variability due to the highly specific nature of the protease-substrate interaction. Other protease inhibitors extend outside the substrate binding site to a location of high mutation rate, which renders these drugs ineffective after repeated use.

Darunavir, marketed as Prezista™, has its origins at the National Cancer Institute's (NCI) Frederick laboratories of Dr. John Erickson, who headed the Structural Biochemistry Program for the NCI contractor, Science Applications International Corp. (SAIC), and scientists at the University of Illinois-Chicago (UIC).

The inventors determined that darunavir had a unique HIV-resistance profile and immediately recognized its potential value treating drug-resistant HIV infections.

A joint National Institutes of Health (NIH)-UIC patent application was filed through the NIH Office of Technology Transfer (OTT) in 1999, describing ana-

logs of darunavir and methods of their use.

Inventors on the original patent application include Drs. John Erickson and Sergei Gulnik (SAIC Frederick), Dr. Hiroaki Mitsuya (NCI), and Dr. Arun Ghosh (UIC). The NIH OTT facilitated the nonexclusive licensing of the Prezista™ precursor to Tibotec, Inc., the current manufacturer of the drug. Meanwhile, Dr. Erickson and several colleagues left SAIC and joined Tibotec.

While there, Dr. Erickson's group suggested several structural modifications to the original compound to enhance its drug-like properties. The current molecule Prezista™, which was specifically covered by the original NIH patent application, was eventually developed by Tibotec, a division of Ortho Biotech Products, L.P.

Presently, two randomized clinical studies have demonstrated Prezista's™ safety and efficacy in lowering HIV-1 viral load in drug-resistant patients. Prezista™ has not been shown to completely eradicate HIV-1 in patients; however, the drug's commercial availability offers considerable hope for individuals who have developed or were initially infected with protease inhibitor-resistant HIV-1. Thus, Prezista's™ approval represents a significant turning point in HIV-1 therapy that will likely influence the development of new therapeutic agents that specifically target drug-resistant retroviruses.

LANL Summer School, from page 1

the geological setting to derive integrated subsurface interpretations. These data are processed and modeled using state-of-the-art software. Various academic institutions and industrial affiliates provide modern field equipment and vehicles. The SAGE faculty consists of active and experienced researchers.

RECS (Research Experience in Carbon Sequestration) is a newer effort sponsored by the Department of Energy and conducted over the past two years. RECS focuses on the scientific and engineering challenges specific to geologic carbon sequestration. Unlike geophysics, carbon sequestration is not a well-defined discipline and involves students from many fields, including geophysics, geology, geochemistry, chemistry, biogeochemistry, atmospheric chemistry, engineering, economics, and law. The program was designed to help young researchers and professionals in diverse fields to network and establish a foundation for U.S. academic, scientific, and technical excellence in carbon sequestration.

The RECS curriculum is aligned with the three pillars of the Department of Energy's Carbon Sequestration Program: 1) separation/capture, 2) long-term storage, and 3) monitoring/mitigation. Twenty



SAGE students gather geophysical data using portable instrumentation.

graduate students from the U.S., Canada, and Mexico attended the two-week program in July 2005, which took place at the College of Santa Fe, N.M., and at the Kinder Morgan oil field (SACROC) in Snyder, Texas. Experts from industry, academia, and national laboratories provided presentations and lectures. The program also included hands-on fieldwork, demonstrations, and student presentations.

LANL and EnTech Strategies, LLC, a Washington, D.C.-based carbon sequestration consulting firm, hosted RECS. The program was a followup to 2004's U.S.-Norway summer program on carbon capture and geologic storage—a collaboration among the National Energy Technology Laboratory, DOE's Office of Clean Energy Collaboration, and the Norwegian Research Council

More info: www.ees1.lanl.gov/SAGE, and www.recs.lanl.gov

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Sandia, Rockwell, from page 1

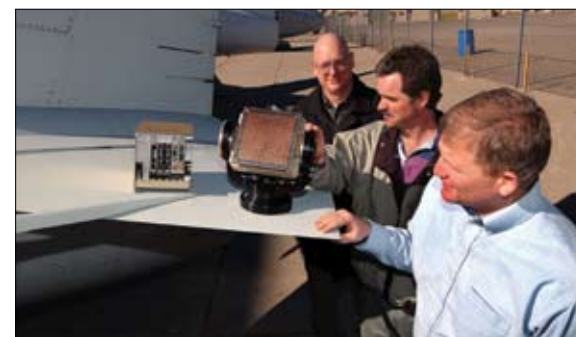
commercial and government customers. The company delivers industry-leading surveillance solutions worldwide.

Rockwell Collins has announced that it will spend several million dollars over the next two years to turn SNL-developed miniSAR technology into a product that can be deployed into tactical unmanned aerial systems. MiniSAR is a small form-factor synthetic aperture radar system that can “see” through clouds and in the dark.

SNL's Defense Systems and Assessments Strategic Management Unit (DS&A SMU) has worked with Rockwell Collins for the past three years to identify a viable market opportunity for miniSAR. Rockwell Collins is now ready to move forward.

“The miniature SAR product is targeted for use on both manned and unmanned vehicle platforms to provide small, persistent surveillance, intelligence, and reconnaissance capability to the military,” said Ron Hornish, VP and General Manager of Sensor Systems for Rockwell Collins Government Systems. He added that because of its compact size, the miniSAR product could free up payload space for additional communication systems and integrated systems products and services.

“Sandia's strategic objectives include teaming with industry to transition advanced capabilities developed at the national labs to the end-user,” said Brett Remund, Deputy Director, Microwave Intelligence, Surveillance, and Reconnaissance. “This alliance with Rockwell Collins provides a strong and complementary match to achieve these objectives, bringing advanced radar re-



SNL Researchers, front to back, George Sloan, Dale Dubbert, Armin Doerry examine miniSAR assemblies.

mote sensing capability to the warfighter.”

“I can't overstate the importance of these kinds of

See Sandia, Rockwell, page 8

DC on T², from page 1

priorities for FY 2008. According to the American Association for the Advancement of Science (AAAS), Congress made significant headway in the appropriations bills before the recess, but “left so much unfinished that nearly all the major R&D funding agencies will have to wait until well after the October 1 start of FY 2007 to receive their final budgets.” Specifically, while the House and Senate Appropriations Committees have each drafted all 11 appropriations bills covering the R&D budget, the full House has passed 10 of 11 and the full Senate has passed only 1 of 11. This means a great deal of work is left in the Senate alone, even before going to House-Senate conference on each bill.

The current R&D funding amounts in each set of appropriations bills are greater than the President's budget request (up to \$138.3 billion in the Senate and \$139.4 billion in the House); however, these numbers are almost certain to be revised during the reconciliation process.

By and large, both houses of Congress have strongly supported the President's American Competitiveness Initiative (ACI, see the March DC on T² column) by proposing substantial increases in funding for the National Science Foundation, the Department of Commerce's National Institute of Standards and Technology core functions, and the Department of Energy's Office of Sciences.

In addition, they have supported the requested boost in spacecraft and weapons technology (where the bulk of the

increase in investment would go), as well as the flat or declining budgets for the National Institutes of Health and Homeland Security R&D funding.

For an in-depth analysis of the current state of appropriations for each agency and its respective programs, see the AAAS R&D update at www.aaas.org/spp/rd/upd806.htm.

While the FY 2007 R&D budget remains an ongoing effort, the annual budget cycle rolls along. On June 23, Director Marburger, Office of Science and Technology Policy, and Director Portman, Office of Management and Budget, sent a six-page memo to the heads of executive departments and agencies outlining the Administration's FY 2008 R&D budget priorities.

As the memo states, it “... highlights the President's American Competitiveness Initiative, provides guidance for setting priorities among R&D programs, identifies interagency R&D efforts that should receive special focus in agency budget requests, and reiterates the R&D Investment Criteria that agencies should use to improve investment decisions for and management of their R&D programs.”

The document reaffirms the President's commitment to the ACI (supporting basic research in the physical sciences and engineering), specifically by staying on track to double the investment at NSF, NIST, and DOE's Office of Science over the next ten years.

A seven-percent annual increase at each

agency is required to meet this “doubling” objective. In addition, similar “high impact basic and applied research” at the Department of Defense should also be a priority.

Guidance for setting priorities in agency R&D efforts is based on a number of underlying conditions, not the least of which is the ever-present concern over “finite resources” and the commitment to the ACI. Agencies are expected to employ a rigorous evaluation process for existing and proposed new programs. Specifically, any new programs must demonstrate their “merit, quality, importance and consistency with national priorities.”

Moreover, any requests for new programs should “identify potential offsets by elimination or reductions in less effective programs ...”

The memorandum further identifies ten “types” of R&D programs favored by the Administration.

These include programs that: 1) advance fundamental scientific discovery to improve quality of life, 2) support high-leverage basic research, 3) align with efforts of the Academic Competitiveness Council and the National Match Panel to enable performance in science, math and engineering education, 4) enable potentially high payoff activities that require a federal presence (i.e., national security, energy security, air transportation), 5) sustain specifically authorized agency missions, 6) reduce the burden of illness and increase productivity, 7)

ensure a scientifically literate population, 8) strengthen our ability to understand global environmental issues, 9) maximize efficiency of the S&T enterprise by expanding use of merit-based, peer-review processes and phasing out marginally productive programs, and 10) encourage interdisciplinary research and expand international partnerships.

Six areas are identified that will require strong interagency coordination. These include homeland security, energy security, advanced networking and high-end computing, national nanotechnology initiative, understanding complex biological systems, and the environment.

Finally, the memo directs all agencies to utilize R&D investment criteria to improve their investment decisions and program management efforts. Relevance, quality and performance comprise the three primary criteria agencies should apply in their management and decision-making.

Specific activities required to meet these investment criteria are spelled out in an earlier document, linked in the current memorandum. Many have already been incorporated into the Program Assessment Rating Tool (PART), which should be used as an “instrument to periodically evaluate fulfillment of the criteria at the program level.”

The President's memorandum can be found at www.ostp.gov/html/budget/2008/m06-17.pdf.

Gary can be reached at gkjones@flcdc.cnchost.com.

NASA WIND ENERGY RESEARCH REAPS REWARDS



NASA's first experimental wind turbine at Plum Brook Station in Sandusky, Ohio.

by Jan Wittry, NASA Glenn Research Center

We've all been tempted. Some of us have tried it more than once.

For some reason, it never crossed Larry Viterna's mind to type his own name into a search engine until late last year. An accomplished NASA engineer and manager

with a Ph.D., he could expect to find plenty of entries.

But when Viterna finally Googled himself, he could hardly believe the results: hundreds of references to an analytical model he developed in 1981 to predict the power generated by wind turbines during high winds. These clean and efficient machines look like enormous fans and convert wind into electricity.

At the time of publication, wind energy experts had dismissed his

theory. "It was quite controversial because it contradicted existing theories," Viterna said. "I was known around the world as a bit of a quack."

Viterna and NASA got involved in wind energy during the energy crisis of the 1970s. Increased consumption and an oil embargo against the United States

and other western countries had contributed to record-high gas prices and lines at the pump. In response, President Richard Nixon set up a federal task force to explore renewable energy sources, such as solar panels, hydrogen and wind turbines. From 1974 to 1981, NASA's Glenn Research Center (GRC) in Cleveland, Ohio, led the U.S. Wind Energy Program for large horizontal-axis wind turbines—the most popular systems used today. The center's mission was to develop the technology and transfer it to private industry.

With funding from the National Science Foundation and the Department of Energy, NASA constructed and operated its first experimental wind turbine at Plum Brook Station in Sandusky, Ohio. Throughout the program, NASA developed a total of 13 experimental wind turbines.

"It was a fun project," said Viterna, who led the aerodynamics team from 1978 to 1981. "Wind energy was a very hot topic. It was key in the minds of Americans, and we were right in the middle of leading the effort."

In 1981, a group of engineers in Denmark contacted GRC about a problem they were having with fixed-pitch wind turbines—turbines with blades that do not change position.

"The performance didn't make sense," Viterna said. "Nobody could predict the relationship between wind speed and

power. That's effectively a major design flaw."

To address the issue, Viterna and research engineer Bob Corrigan began running tests on the Plum Brook turbine. Corrigan changed the pitch of the blades to match the machine in Denmark, and Viterna used data from the tests to reverse-engineer an analytical model to predict power in high winds. Viterna and Corrigan presented the model that year at an international workshop, where it received a tepid response. The wind energy program ended later that year, and both engineers moved along in their careers. Viterna became GRC's Lead for Center Strategy and Business Development, and Corrigan went on to manage an International Space Station support project.

Neither of them thought much about the paper until, on a whim, Viterna searched the Internet for his name and the word "wind." Experts in the wind energy field commonly referred to the analytical model as "Viterna & Corrigan" or "the Viterna method."

"I couldn't believe it," he said. "It had become the leading method for predicting wind turbine performance, and I had no idea this was going on."

Corrigan was just as surprised. "When Larry told me, I said 'you're kidding me.' It made me feel good that something we did back then is still used today and by such a large audience," he said.

See *NASA Wind Energy*, page 8

Federal Technology Transfer 2006

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POLLUTION CONTROL

Maintaining air quality is essential for human safety and environmental protection. Numerous industrial processes require airborne particulate monitoring, concentration and filtration.

Escalating fears of airborne toxic contaminants and biotoxins are driving the emergence of new monitoring and filtration requirements.

The Aerosonic acoustic concentrator technology, developed by scientists at Los Alamos National Laboratory (LANL), is a novel method of particle concentration that can be used in these critical areas.

Aerosonic devices are low-power, inexpensive, and have no moving parts. Employing a small piezoelectric tube to generate standing waves, the Aerosonic method uses sound pressure to locally concentrate many types of aerosols ranging from smog particulates to suspended microorganisms.

More info: Laura Barber, 505-667-9266, ljbb@lanl.gov; www.lanl.gov/partnerships/license/technologies

NREL'S POWER

A method and apparatus for maximizing the electric power output of a photovoltaic array connected to a battery, where the voltage across the photovoltaic array is adjusted through a range of voltages to find the voltage across the photovoltaic array that maximizes the electric power generated by the photovoltaic array and then is held constant for a period of time, has been developed by Roger Taylor and Eduard Muljadi of the National Renewable Energy Laboratory (NREL). NREL is looking for an organization to develop and commercialize this innovative technology.

More info: Richard Bolin, 303-275-3028 for licensing, CRADA, and Work for Others opportunities

PNNL RF TAGS

Researchers at Pacific Northwest National Laboratory (PNNL) have developed miniature radio frequency (RF) tags that are ideal for rapid, remote inventory tracking and monitoring a wide variety of items. The PNNL technology provides long-range readings, simultaneous readings, the ability to monitor inputs and control outputs, and location tracking. 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.

The PNNL RF tags exhibit superior performance in difficult environments.

More info: <http://availabletechnologies.pnl.gov/securityelectronics/rftags.stm>

No COLLIMATION

Scientists at the Department of Energy, National Nuclear Security Administration's Special Technologies Laboratory have developed a fiber-array-coupled wide-field Michelson interferometer for use in multichannel VISAR.

This optical and mechanical design leads to significant improvements in optical efficiency and interchannel isolation. The device differs from previous designs in that the light from the fibers is not collimated in the interferometer, but instead is imaged to discrete locations at the cavity mirrors, which are curved and serve as field elements. This approach makes possible the use of more precise fiber arrays with increased space between the fibers for greater isolation. A patent application has been filed with the U.S. Patent and Trademark Office.

More info: B.J. Willeford, Jr., ips@nv.doe.gov, 702-295-0256, www.bechtelnevada.com/techtrans/index.html

IMMUNOTHERAPY

Abnormalities in immunoregulation are responsible for a wide variety of disorders such as autoimmune disease, chronic inflammatory diseases, and allergic diseases. These diseases include systemic lupus erythematosus and rheumatoid arthritis. The defining event for induction of an immune-mediated disorder is the loss of T cell tolerance to self-antigens, which is provided by regulatory T cells.

This latest invention, headed by the National Institutes of Health, provides methods for generating regulatory T cells by culturing CD4+CD25- T cells.

More info: Dr. Peter Lipsky, 301-594-0596, lipsky@mail.nih.gov.

LANL FUEL CELL STACK

Los Alamos National Laboratory (LANL) scientists have created a novel and efficient direct methanol fuel cell (DMFC) stack. This new stack has a circular footprint, within which are a cathode and anode manifold, tie-bolt penetrations, and tie-bolts.

Each fuel cell uses two graphite-based plates. One plate includes a cathode active area that is defined by serpentine channels connecting the inlet and outlet cathode manifold. The other plate includes an anode active area defined by serpentine channels connecting the inlet and outlet of the anode manifold, where the serpentine channels of the anode are orthogonal to the serpentine channels of the cathode.

Application(s)

- Portable electronics
- Electric scooters
- Battery chargers
- Wearable power packs.

More info: Laura Barber, 505-667-9266, ljbb@lanl.gov

ANL'S FUEL SYSTEM

To reduce the nation's dependence on foreign oil, Argonne National Laboratory's (ANL) Dr. Michael Wang has created a transportation analysis tool that allows users to accurately evaluate the energy and environmental benefits of technologies and fuels.

The GREET (Greenhouse gases, Regulated Emissions, and Energy use in Transportation) software model addresses the need for truly comparative full fuel cycle (or well-to-wheel) analyses. Developed in a user-friendly Microsoft® Excel platform with a graphical user interface, the model is available to the public free of charge at www.transportation.anl.gov/software/GREET/index.html.

Already, more than 2,000 GREET users in both the public and private sectors are registered throughout North America, Europe, and Asia.

More info: Dr. Michael Wang, 630-252-2819, mqwang@anl.gov

INL'S NOVEL GAS METER

Mass flow meters are the most prevalent method used to accurately measure flow rate. However, mass flow meters must be calibrated separately for each gas or gas mixture in order to be useful.

Idaho National Laboratory has developed a novel gas flow meter that measures the flow rate of mixed gases, pure gases, and gas systems. The device has been tested to give accurate values for flow rates as low as 5 mL/min.

This is especially useful in situations where the composition of the flowing gas changes over time.

More info: Jason Stolworthy, 208-526-5976

NASA Wind Energy, from page 6

Twenty-five years after publishing their paper, the two engineers are being recognized for their work.

Both received a Space Act Award from NASA's Inventions and Contributions Board, and in June, Viterna will accept a Blue Marble Award at NASA's Environmental and Energy Conference.

To top it all off, last August the Department of Energy approved the code as part of its design tools for worldwide certification of wind turbines.

With recent increases in the price of oil and concern growing over pollution, Americans again are turning their attention to alternative sources of energy.

Many experts believe that wind is one of the most promising options. As the wind power industry grows, the Viterna method will surely be an important tool for turbine designers everywhere.

Sandia, Rockwell, from page 5

strategic relationships," said DS&A VP Jerry McDowell. "Sandia's science, technology, and engineering can benefit the nation, and our DOD customers through industrial alliances. We have great expectations for this alliance with Rockwell Collins."

Industrial alliances integrate strategy and teamwork. "One of the keys to management of this relationship is its joint Steering Committee," said Jerry Langheim. "Members from executive and technical communities of both Sandia and Rockwell Collins sit on this board and guide the direction taken by the alliance."

SNL has had an umbrella Cooperative Research and Development Agreement with Rockwell Collins in place for several years. The steering committee concept was implemented at the time of the first project, which was jointly funded by Rockwell, SNL, and the DOE.

Numerous team members have been involved in the process of discovery that has led to the identification of the miniSAR project as an ideal joint effort between SNL and Rockwell.

SNL contributors to the successful establishment of this relationship include Michael Callahan, Marion Scott, David Williams, Jay Jakubczak, Kurt Sorensen, George "Sandy" Sanzero, Ann Adams, and Sarah Low.

In addition, SNL and Rockwell Collins are collaborating on project/task statements in the following areas: human cognition, hypervelocity vehicle GPS (Prompt/Precision Global Strike), chem/bio, miniaturization, UMBRA modeling and simulation, and anti-tamper. Rockwell Collins will also support future manufacturing needs for Monitoring Systems and Technology Center 5700.

"It takes teamwork to hand off the baton in a relay race, and we believe that Sandia and Rockwell Collins are uniquely suited to take miniSAR the distance together," said Steve Kennell, Director of Business Alliance for Rockwell Collins.

"We share a vision and expect to see more from this alliance in the future," said Jerry McDowell.

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