



Federal Laboratory Consortium Mid-Continent Region

What's new? Special report on South Padre Island meeting.

September 2004

SENSATIONAL SEVEN LEAD TECHNOLOGY DEVELOPMENT

Each year, notable technology achievement is highlighted at the Mid-Continent regional meeting, and this year was no exception. The technologies are chosen based on the problems they solve, market availability, partnerships involved, and patents filed or awarded. For 2004, extra consideration was given to technologies applicable to homeland security, fire fighting and control, and reducing oil fuel emissions and consumption. The following are our top seven:



Meet ADAM!

Vehicle Thermal Comfort DOE National Renewable Energy Laboratory (NREL)

Air conditioning in vehicles alone consumes 7.1 billion gallons of petroleum every year making up 10% of our annual oil imports. Air conditioning increases emissions of pollutants such as carbon monoxide. The Vehicle Thermal Comfort project develops tools to analyze and improve the efficiency of climate control in vehicles. The tools to accomplish this include the world's most advanced thermal comfort manikin, ADAM (ADvanced Automotive Manikin), which mimics human responses such as sweating and breathing, and includes computer models that simulate human physical and psychological responses. Partnering with industry enables the group to offer innovative solutions to meet specific needs. Most importantly, the improved fuel economy resulting from more effective climate control systems strengthen the nation's energy security, while protecting the nation's environment, public health, and driver safety.

NREL's Advanced Vehicles & Fuels Project

The Advanced Vehicles and Fuels project creates research partnerships with industry to reduce transport-

(Continued on page 2)

TWO REGIONAL LABORATORIES JUDGED OUTSTANDING

The Mid-Continent Region is so diverse in its laboratories and expertise, it chose to honor two of its laboratories at this year's annual meeting. The Institute of Telecommunications Sciences in Boulder and the Great Plains Research Systems Unit Fort Collins were deemed outstanding for their innovated research and dedicated research staff.

Institute of Telecommunications Sciences (ITS) is the chief research and engineering arm of the National Telecommunications and Information Administration. ITS promotes advanced telecommunications and information infrastructure in the United States enhancing the domestic and foreign telecommunications trade and market. It also facilitates the effective use of the radio spectrum—not an insignificant task. Among the labs many accomplishments includes the development of the Video Quality Measurement

VQM

New ANSI standard

(VQM), a first of its kind and a new ANSI standard. VQM is a reduced reference measurement paradigm that assesses the performance of new digital video systems by extracting and comparing video features communicated across the telecommunications network. The benefits of this technology are numerous and include producing a higher quality video surveillance used for public safety and homeland security. With better surveillance systems, agencies at all levels can do a much better job of protecting people and assets. The laboratory is under the direction of Dr. Al Vincent.

The **Great Plains Research Systems Unit** of the USDA Agricultural Research Service develops integrated computer models of agricultural systems used to improve the economic and environmental sustainability of agriculture. The tools provide farm-level decision support to farmers, ranchers, agricultural consultants, and action agencies for evaluating the sustainability of alternative integrated farming and ranching systems. The unit's most comprehensive software is Great Plains Framework for Agricultural Resource Management (GPFARM), a strategic planning tool. GPFARM has been widely acclaimed by the ag community.

Users have saved up to \$9,000 per year of unnecessary input costs by comparing historic and yield monitor yields with simulated model output – based on 1,800 acres. The software also allows comparison of potential rotation crops based on soil type and moisture levels. ■



Dr. Lajpat Ahuja, Research Leader with Dr. Gale Dunn (on right), the scientist leading the technology transfer of GPFARM.

TECHLINK CO-HONORED FOR OUTSTANDING PARTNERSHIP

TechLink of Montana State University received the Outstanding Partnership Award from the Mid-Continent and Far West Regions for its work with federal laboratories, in particular those with the Department of Defense and NASA. Federal labs rely heavily on the excellent support of the TechLink organization to assist in the marketing and licensing of their technologies. The Naval Research Laboratory has especially found TechLink's help essential since workloads have exceeded current staffing levels. Techlink has ably assisted NRL by providing licensing leads, assisting potential licensees with preparing Applications for License, market projections and detailed business plans, assessing the market for new technologies, and facilitating Cooperative Research and Development Agreements (CRADAs). Because of TechLink's help, the Navy Research Laboratory will execute a near record number of licenses satisfying corporate customers while keeping their inventors motivated. TechLink was represented by Joan Wu-Singel, Chief Technology Scout.

TechLink
techlink.msu.montana.edu

FLC Mid-Continent Contacts

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tation-related petrochemical use and emissions. The project brings innovation and technical value through collaborations with light, medium, and heavy vehicle manufacturers, equipment suppliers, and fuel suppliers. The project supports the National Renewable Energy Laboratory's (NREL) mission to reduce the nation's dependency on foreign oil and improve air quality. Areas of interest range from Vehicle Systems Analysis to Energy Storage and Fuel Cells to Petroleum and Nonpetroleum-based fuels. NREL has five state-of-the-art transportation focused laboratories supporting this project including: ReFUEL Laboratory, Fuel Chemistry Laboratory, Energy Storage Laboratory, Ancillary Loads Reduction Laboratory, and Renewable Power Management Laboratory. NREL's Program Manager Bob Rehn and Director of Technology Transfer Tom Williams received the awards on behalf of the laboratory.

Midwest Forensics Resource Center DOE Ames Laboratory

The Midwest Forensics Resource Center (MFRC) is a support and research facility at Ames Laboratory. The Center partners with 25 crime labs in 11 states, and teams with such giants as Iowa State University (ISU), the Bureau of Alcohol, Tobacco and Firearms, the FBI as well as 13 colleges and universities. Currently funded research addresses both pragmatic and needed technology in forensic science. Currently funded research addresses both pragmatic and more developmental questions in crime laboratory practice and forensic science. One of the first projects developed by the MFRC was a latent fingerprint development chamber that resulted from the interactions among Ames Laboratory personnel, ISU researchers and fingerprint experts at the Iowa Criminalistics Laboratory. Its design allows easy use and observation while controlling both temperature and humidity. The crime lab has been using the glove box for nearly a year, and its users report developing 200 to 300 percent more fingerprints than with the previous system. Other projects include linking gun-metal alloys to the most effective acid etching techniques, and another that improves existing magnetic particle imaging methods for firearms and toolmark examiners. Longer term MFRC research is developing statistical and quantitative techniques for characterizing machining marks, and aptamers for methamphetamine drug identification. Each MFRC research project must have a crime laboratory partner to assure that the research is significant to the community of forensic scientists.



Todd Zdorkowski (center) accepts the award from the region's Deputy Vic Chavez and Coordinator J. Susan Sprake.

Fire Science and Technology Program DOE Sandia National Laboratories



Sandia National Labs using science and technology to solve high-consequence fire problems.

The Fire Program provides solutions to high-consequence fire problems. Experimental and phenomenological fire research and validated modeling tools are used to solve problems in fire prevention, fire consequence analysis, and fire mitigation or firefighting. Historically, Sandia has lead experimental research in the survivability of nuclear weapons and hazardous material containers exposed to large fires. The laboratories were also leaders in fire and gas explosion studies involving weapons and nuclear power plant safety. As computational capabilities made the modeling of fires possible, efforts expanded in the fire arena. Unique large-scale facilities are used in conjunction with new technology. The Fire Laboratory for Accreditation of Modeling by Experiment,

(Continued on page 3)

(Continued from page 2)

or FLAME, is an enclosed fire test facility. The Radiant Heat Facility provides an environment for studying the response of systems to fire-like temperatures up to 2,200°C. In 2005, construction will be completed on a new \$36 million thermal test complex. In addition, a CRADA exists between and FM Global Insurance that involves producing new computer models simulating high-consequence fires.



Sandia was represented by Kevin McMahon, Manager of Licensing & Intellectual Property Management and Victor Chavez, Manager of Advocacy & Small Business Development

Sandia's Radioactive Source Registry Tracking System

Small radioactive sealed sources, designed to provide useful tools in a variety of industrial and laboratory settings, can be potentially used in dirty bombs. These devices detonate conventional explosives to scatter radioactive material across a target area. The recurring loss, theft, or misplacement of radioactive sources worldwide has long been an issue for public health and law enforcement officials. In May 2003, the Secretary of Energy chartered DOE's Office of Plutonium, Uranium, and Special Materials Inventory (SO 62) to create a database for tracking sealed sources. In response, Sandia coordinated with the Nuclear Regulatory Commission and the International Atomic Energy Agency and developed the Radioactive Source Registry Tracking System (RSRT). The system tracks all DOE sealed radioactive sources and provides decision makers with some estimation of the potential threat posed. Sandia team members built the RSRT system by using an existing, operational database, the National Inventory of Sealed Sources, which contains some 55,000 entries of select nuclear materials, actinide isotopes, and sealed sources.

FIRETEC: A Physics-Based Wildfire Model

Los Alamos National Laboratory & Rocky Mountain Research Station

FIRETEC is the first physics-based, three-dimensional (3-D) computer code designed to simulate the constantly changing, interactive relationship between fire and its environment. It does so by representing the coupled interaction among fire, fuels, atmosphere, and topography on a landscape scale (hundreds or thousands of meters). Firetec is unlike the empirically based models in current use because it can simulate the dynamic processes that occur within a fire and the way those processes feed off and alter each other. Applications include predicting wildfire behavior in rugged terrain under varied atmospheric conditions to optimizing fuel-management strategies to providing realistic simulations for training fire fighters. FIRETEC is a joint project of Los Alamos National Laboratory (LANL) and USDA Forest Service's Rocky Mountain Research Station.

LANL's ROB: Reagentless Optical Biosensor

Modeled on host-pathogen interactions, Reagentless Optical Biosensor or ROB is a membrane-based assay that provides highly specific and sensitive detection of pathogens. ROB is hand-held biosensor battery operated, reagent free, simple to use (a single step), and fast (yields results in less than 15 minutes.) Because the assay is contained in an inexpensive disposable cartridge, ROB can detect different pathogens with the quick switch of the cartridge. Applications include detecting contamination in food and water supplies to identifying infections



Accepting the award from the ROB team were Dr. Basil Swanson & Dr. Karen Grace.

MEETING WINS HIGH MARKS WHILE CHAVEZ'S TIE A TOTAL LOSS

South Padre Island, the location of the Mid-Continent and Far West Regional Meeting, was a beautiful place. The hotel was great, the people friendly, the food good, Ivan held-off in the Gulf – but, island life is taken seriously. After receiving a warm welcome from island officials, participants were immediately advised that no neck ties were allowed anywhere on the island. After learning of the anti-tie ordinance, participants gleefully whipped their neckties off whisking them out of sight for the duration. One casualty was reported by Victor Chavez—a classic red print. (See insert.) Later, ties were smuggled in for the awards dinner although rumor had it that Officer Ready was downstairs with scissors loaded. (*Lagniappe: As soon as participants departed, the beach was closed because of high winds and dangerous undertow produced by Ivan.*)



The two day meeting contained training and quality speakers that focused on fundamental and advanced licensing and commercialization concepts, Intellectual Property, and lab spin-outs. Techniques and computer software were studied and compared for assessing technology markets. Focused technology areas discussed in length included Emergency Response, Fire Fighting, and Reduction of Petroleum Fuels and Air Emissions in Cars.

It is impossible to go in great detail of the highlights as it would require a description of the majority of agenda and speakers. Instead, we offer you a look at the meeting proceedings (available on CD) and downloadable from our website.

Proceedings:

www.zyn.com/flc/meeting



Measurement
Science
Meets
Bioscience
Nov. 9-11, 2004
Albuquerque, NM
irdsummit.org

Region Wins Triple Crown for Distinguished Service



The Distinguished Service Award honors individuals who may or may not be a direct employee of a government laboratory or facility, but who have made notable and unique contributions to the Federal technology transfer program in the Mid-Continent Region. It was impossible to choose among our three winners.

Lawrence "Marty" Murphy, Manager of Enterprise Development Program of the National Renewable Energy Laboratory, designed, developed and implemented NREL's Enterprise Development Program and Industry Growth Venture Forums. Both programs benefit and encourage the creation and growth of clean, efficient and renewable energy companies. In the past few years Enterprise Development activities have resulted in at least \$5 million in private capital and \$5 million in state and local funds for clean energy commercialization, and over 1,000 jobs created in successful clean energy companies.

NREL's Enterprise Development activities, including its leadership role in the National Alliance of Clean Energy Business Incubators (NACEBI), are all focused on increasing and strengthening the partnership base available to commercialize DOE technologies. The partnership base includes incubators,

venture capital firms, investment groups, and state and local governments. It has a variety of activities including a Clean Energy Investor Directory, that contains information about 104 investors currently interested in clean energy technology businesses and the NREL Growth Link, a web-based directory of clean energy companies seeking financial, partnering, and growth opportunities.



Dr. Lawrence "Marty" Murphy



Dr. Edward S. Yeung



Dr. Benjamin P. Warner

Edward S. Yeung of Ames Laboratory is an ISU Distinguished Professor, and 4 time R&D 100 Award winner. Yeung has an enormous and impressive volume of research in the area of chemical separations. In his thirty year career and as Director of Chemical & Biological Sciences, he has received 20 patents, and currently has 4 patents pending. Eight of his patents or patent applications have been licensed. His technologies have contributed to making Ames the third highest royalty income producer of the DOE labs. Dr.

Yeung pioneered the method of multiplexed capillary electrophoresis. In 1995, he combined it with a fluorescence-based DNA sequencer that yields an individual's genetic makeup more rapidly. In addition, he founded a start-up company with his Absorption Detection System in Multiple Capillaries technology that deciphers genetic code faster, more accurately, less expensively.

Dr. Benjamin P. Warner of Los Alamos National Laboratory conducts research in nanotechnology solving problems in energy efficiency, biotechnology, and chemical and radiation protection. He currently holds three patents in radiation protection with an additional 12 patents pending in chemical protection, biotechnology, and energy efficient architectural windows. All of these patents and pending

patents have been licensed or are in active negotiations and were the subject of three of the first five licenses having an equity component from Los Alamos National Laboratory. His inventions include developing a faster, less expensive method for testing pharmaceuticals' side-effects and Radiation Litmus Paper for use in deployed chemical weapon detection kits. In addition, Dr. Warner has recently formed a spin-off company for the development of new therapeutic compounds. ■

Emergency Responders' Top Ten Needs

The Emergency Response Technology (ERT) Program has identified and prioritized the top ten need areas and are asking for help in finding the appropriate technology for the following categories:

1. BIO AGENT DETECTORS
2. INTEGRATED SPATIAL RECOGNITION, TRACKING, HEALTH MONITORING, AND ALERTING SYSTEM
3. CASUALTY LOCATION AND ASSESSMENT SYSTEM
4. EXTENDED MISSION OR REDUCED WEIGHT MISSION AIR SUPPLY RESPIRATORS
5. NON-TOXIC DECONTAMINATION AGENT
6. FIRST RESPONDER WORK UNIFORM
7. CASUALTY/PATIENT CARE DATA AND MONITORING SYSTEM
8. REINFORCED CONCRETE BREACHING/CUTTING TOOL
9. BUILDING AND FACILITY EMERGENCY RESPONSE INFORMATION/SURVEY TOOL
10. APPROACHING TRAFFIC WARNING DEVICE FOR EMERGENCY RESPONSE VEHICLES

If you have information regarding any of the above technology needs, contact: ERTProgram@nttc.edu or Malcolm Webster at mwebster@nttc.edu. ■

Calendar

- National Wildland/Urban Interface Conference, November 4-6, 2004, Double Tree Hotel, Denver, CO, firewise.org/2004conference/
 - AIRDS Conference (see page 3), November 9-11, Albuquerque, NM, irdsummit.org
 - Symposium in the Sun Mapping the Future of Volunteer/combination Fire Service, November 11-14, 2004, Orlando, FL, iafc.org/conferences/vcos/index.asp
 - Wildland Fire 2005, Albuquerque NM, February 16-18, 2004, iafc.org/conferences/wildland/index.asp
 - NREL Growth Forum, Orlando, FL, October 18-20, 2004, cleanenergyforum.com
 - World's Best Technologies, March 28-30, 2005, Arlington, TX, wbt02.com/wbt/wbtwebsite.nsf
- SBIR Related Meeting: www.zyn.com/sbir**
- Salt Lake City, UT * Oct 23 - 27, 2004, SRA Small Business Initiative
 - Boise, ID * November 1 - 4, 2004, National SBIR Fall Conference 2004
 - Omaha, NE * March 7 - 10, 2005, National SBIR/STTR 2005 Conference