

NEWSLINK

FEDERAL LABORATORY CONSORTIUM FOR TECHNOLOGY TRANSFER

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NREL Produces Energy with Sun, Wind, Plants

Picture a world in which skyscrapers are built with an exterior of thin, decorative, plastic solar cells that let in the sun to generate electricity; or a remote jungle or Arctic villages without utility line extensions that are powered successfully in good part by wind turbines; or buses, cars, and trucks that partially run on ethanol produced from fields of corn stover. In the next few years, there will be even more dramatic stories of energy powered by alternative sources that are much more environmentally friendly, less costly, and more effective than conventional fuel resources. Plus, these new technologies are derived from natural energy sources that renew themselves and help save depleting oil and gas reservoirs and precious unspoiled wildlands in the U.S.

NCPV Lets the Sunshine In

At the **National Renewable Energy Laboratory (NREL)** near Denver, **Larry Kazmerski**, director of the **National Center of Photovoltaics (NCPV)**, promises a whirlwind ride in the next few decades with technologies powered by sunlight.

Kazmerski sees relief for power-stressed California with photovoltaics (PV) or solar electricity. PV-generated energy is coming of age—with PV on a housetop or commercial building, for example, the solar tiles act as an energy supply unit. The PVs then generate power and

interact with the utilities when electricity is needed the most, thereby saving fuel. Today, new houses in California subdivisions are sold with PVs as part of the house.

Kazmerski predicts a huge future in photovoltaics. With nanotechnology in devices powered by PV, soon to come are medical “nanoprobes”—allowing novel medical procedures and pharmaceuticals manufactured only in earth-orbiting factories with an anti-gravity space environment.

With a partnership between NREL and **Sandia National Laboratories (SNL)**, NCPV does much of its R&D in its nearby test fields and in SNL’s Albuquerque, N. Mex. test fields. There they enhance PV system reliability, develop new electronic components and storage batteries required in PV systems, investigate new materials for PV devices to improve the current technologies, develop new measurement techniques—down to single atom levels—and pioneer the next-generation PV technologies.

Time and improvements will help reduce PV energy costs. Beyond 2010, Kazmerski says that new PV devices will be much less expensive and account for 20-30% of energy powered in the U.S. “This exciting technology” Kazmerski said,



Possibly a glimpse of the future? Above, solar panels are attached to the top of this PV vehicle.

“...will constantly propel our imaginations to new levels of invention and accomplishment” through this century.

NWTC Goes with the Wind

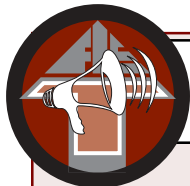
Between Golden and Boulder, Colo., where the wind whips off the Rockies, it’s prime testing time at NREL’s **National Wind Technology Center (NWTC)**.

In support of the **Department of Energy (DOE)** program to develop wind energy as a cost-effective option for utility use, the NWTC’s goal is to assist U.S. industry in developing advanced technology to enable future wind farms to generate cost-effective electricity.

“Wind must be cheap enough to displace fuel costs,

because there has to be backup power during calm periods,” said **Robert Thresher, Ph.D.**, NWTC director. “We need to be economically competitive... below the fuel costs of other energy producers” (oil, natural gas, coal, etc.) and not dependent on subsidies or tax credits.

The NWTC facility is an ideal test site because of the strong-to-calm winds on location. The hydraulic actuators and turbine blades can be tested for strength and fatigue in a variety of wind conditions, including simulated extreme winds in the lab. Hybrid power systems that incorporate wind turbines, solar cells, diesel generators, and batteries for electricity storage



FED LABS FLASH

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

NIH-OTT Stresses Technology Development, Not Dollars

Operating statistics for the **National Institute of Health's Office of Technology Transfer (NIH-OTT)** show it received royalty income of \$52 million and signed 185 licenses in 2000. This amount is an increase of \$6.4 million, despite a decrease of 19 licenses.

Maria Freire, director of NIH-OTT, stressed that the primary aim is not making money from its licensing activities, but ensuring that as many of its technologies as possible get into the marketplace as products to help improve people's health and their quality of life.

OTT currently has about 1700 "active licenses," according to Freire.

NASA Selects Firm to Build Next-Generation Weather Instrument

Gencorp Aerojet of Azusa, Calif., was selected by **NASA** to implement a next-generation satellite package that could improve weather forecasting and assist in the research of global climate changes.

The **Advanced Technology Microwave Sounder (ATMS)** will measure microwave energy emitted and scattered by the atmosphere. ATMS will work alongside an infrared sounder instrument to produce daily global atmospheric temperature, humidity, and pressure profiles—essential to accurate weather forecasting and long-term climate research.

For more info: David E. Steitz, 202-358-1730, or Mark Hess, 301-286-8982

Fund Established by USDA

The **U.S. Department of Agriculture** recently established a "Fund for Rural America" to award up to \$400,000 over the next four years for rural development projects.

Technology transfer, e-commerce, and a focus on disadvantaged rural populations are major areas of interest for the fund.

Iowa State University and the **Iowa Manufacturing Extension Partnership** are looking for interested federal laboratories to explore entering into a joint venture in "e-commerce for rural America."

For more info: Ted Maher, 727-943-9383, t.maher@verizon.net

WIND *from p. 1*

are also run through both real wind tests and simulated conditions.

In terms of production, the mid-continental strip through Texas, Kansas, Nebraska, Montana, Colorado, Iowa, Minnesota, North Dakota and South Dakota offers a good location for potential wind farms because the constant, relatively steady winds could generate large amounts of electricity. Wind energy's primary environmental consideration is the possible impact on bird mortality, so wind farm locations are carefully selected according to guidelines recommended by the **National Wind Coordinating Committee**.

At 29% world growth rate per year, wind energy is the fastest growing energy source today. At the end of 2000, 2,500 megawatts (MW) of wind energy were installed in the U.S., and Europe has about six times that amount. Thresher projects that in four years the U.S. will have 5,000-6,000 MW of wind generators online.

"Wind cannot be the end-all, be-all of electric generation," Thresher said. It can, however, supply 10-20% of the world's energy needs—and by 2020 grow into a \$75 billion a year global industry. Licensing wind energy technologies is a possibility.

NBC Reaps its U.S. "Garden"

At NREL's **National Bioenergy Center (NBC)**, the phrase "amber waves of grain" takes on a new meaning—as one of many useful organic resources that can be converted into fuels and a host of related products. Working with industry and **Oak Ridge National Laboratory (ORNL)**, NBC leads the national effort to develop new market-driven technologies for producing fuels and chemicals from renewable sources.

To date, six NBC technologies from NREL's biotechnology and chemistry divisions have been selected as R&D Magazine 100 Award winners, including ethanol from corn fiber

technology. Today ethanol is the most widely used biofuel, with more than 1.5 billion gallons added to U.S. gasoline each year to increase octane and reduce air pollution. Up 25% in the last year, ethanol production continues to increase.

About 60% of what the corn leaves behind—corn stover—can be harvested as well. There are also a million acres of switch grass on the northern Great Plains, plus hundreds of millions of tons of wood pulp, wheat, straw, rice hulls, grasses, agriculture residues, municipal solid waste, paper, and cellulose—biomass that can be converted into power, steam, electricity, bioethanol or biodiesel fuels, and other new products.

"The beauty of biomass is that it grows on sun, soil and water, and the biomass takes up polluting CO₂ to clean the air," said **Mark Finkelstein**, manager of the Biotechnology Division and co-winner of one R&D award. "The

Save Your Breath, Turn on the Propeller!

Huffing and puffing to blow a house down might have worked for the Big Bad Wolf, but researchers and engineers at the **National Institute of Standards and Technology, Texas Tech University, Oak Ridge National Laboratory,** and the **Department of Energy** prefer a Hercules C-103 turboprop airplane.

Within the next three months, Texas Air National Guard pilots will taxi their C-103 aircraft to the edge of a Texas Tech runway and stop in front of instrument-laden test homes built onsite. Propeller blasts from the planes will subject these buildings to three sustained wind levels—one comparable to a hurricane. The researchers will make detailed measurements of airflow properties and the aerodynamic loads on selected points of the buildings' envelopes. Along with these structural performance measures, important energy performance assessments will be conducted also.

For more info: John Blair, 301-975-4261,
john.blair@nist.gov

Army Scientist to Join Int'l Exchange Program

Dr. Peter Emanuel of the U.S. Army's **Edgewood Chemical Biological Center (ECBC)** has been selected to represent the United States in the 2001 US/UK Young Scientists Laboratory Visit Program. Selected by **Dr. Delores Etter**, Deputy Under Secretary of Defense for Science and Technology, Emanuel was one of only two Army scientists chosen to participate in the program, which allows young scientists to jointly visit select laboratories in each nation.

Dr. Emanuel is currently the scientific advisor to the Director of Chemical and Biological Services at ECBC.

For more info: Jim Allingham, 410-436-4347,
james.allingham@sbccom.apgea.mil

Hearing Enhancement Technologies Wanted

The **Rehabilitation Engineering Research Center on Technology Transfer (T2RERC)** at the **University at Buffalo** is searching nationwide for technologies to improve assistive listening devices. Five problem statements have been developed outlining priority needs in the areas of FM, inductive loop, infrared assistive listening systems, microphones, and earmolds.

Sought-after technology solutions encompass the following areas: computerized ear canal measurement, automated production, advanced materials for earmolds, tabletop wireless and directional microphones, wireless binaural hearing aids, and multimodal assistive listing systems that combine FM, inductive loop, and infrared technologies.

For more info: <http://cosmos.buffalo.edu/hearing> **NL**



Have some news for "Fed Labs Flash"?
Send it to flcnews@utrsmail.com

conversion of biomass to electricity or to sugars and ethanol can generate hundreds of megawatts of power or billions of gallons of ethanol, closing the life cycle loop. It's a tremendous resource."

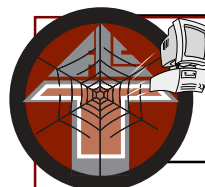
A science for less than 20 years, the bioenergy industry is much like the petroleum industry 120 years ago, when petroleum was studied and developed into chemical industries and, ultimately, a suite of products. The goal of bioenergy is to capture all the biomass value; however, this takes time and money. A good deal more investment in R&D is needed to lower bioenergy costs to be competitive with petroleum.

Over the next nine years, DOE plans to increase by four times the amount of energy produced from

biomass. Seeing great potential in these vast, available resources, entrepreneurial companies such as **Cargill Dow, BC International, and Masada** are raising money to build biomass plants.

"Gas is not going to get cheaper, and we won't run out of biomass—there are great opportunities," said Finkelstein. "Let's take advantage of these domestic resources and invest in them."

For more info:
Renewable Energy—
www.nrel.gov
PV: Larry Kazmerski, 303-384-6600, kaz@nrel.gov
Wind: Robert Thresher, 303-384-6922,
robert_thresher@nrel.gov
Bioenergy: Mark Finkelstein,
303-384-7752,
mark_finkelstein@nrel.gov **NL**



Technology Transfer on the World Wide Web

Ballistic Missile Defense Organization
Technology Transfer

www.bmdotechnology.net

This site is all about innovative technology originally developed for the **Ballistic Missile Defense Organization (BMDO)** to help defend the United States and its allies from ballistic missile attacks. But because the technology is so advanced, it also could be used in a wide range of civilian applications as well.

Organizations may benefit from using BMDO-funded technology to improve existing commercial products or develop new ones. The site provides:

- a searchable database of BMDO-funded technologies
- one- to three-page abstracts about these technologies
- links to companies that developed these technologies
- current news about BMDO-funded companies and technologies

This site has been created by the **National Technology Transfer Center-Washington Operations (NTTC-WO)** for BMDO's Technology Applications (TA) program. The mission of the BMDO TA program is to assist BMDO technology developers in commercializing their innovations. **NL**



TECHNOLOGY WATCH

Federal laboratory technologies available for technology transfer

AGRICULTURE

Fungus Among Us Whacks Tomato Weeds

According to **Agricultural Research Service (ARS)** scientists in Stoneville, Miss., a fungus from the sicklepod plant effectively controls kudzu, a weed that has crept over more than 7 million acres in this country.

Greenhouse and field studies found that the fungus *Myrothecium verrucaria*, found in the southeastern United States, killed 100% of kudzu weeds.

In research done in collaboration with ARS's Southern Weed Science Research Unit and **Louisiana Tech University**, plant pathologists **C. Douglas Boyette** and **Hamed K. Abbas** treated kudzu at different growth stages and under varying physical and environmental conditions. In all cases, the fungus effectively controlled the weed.

Kudzu, which is native to eastern Asia, was introduced into the eastern and southern United States in the 1800s. It was originally promoted for erosion control and as an inexpensive forage for livestock. It is now present from Florida to New York and as far west as central Oklahoma and Texas, with heavy infestations in Alabama, Georgia and Mississippi.

Kudzu resembles a giant bean stalk. It spreads about 120,000 acres a year, resulting in losses due to reduced land productivity. Control costs increase by nearly \$6 million each year. Homeowners have a hard time controlling this weed, which grows up the sides of buildings, along fences, and on telephone poles.

For more info: Tara Weaver-Missick, 301-504-6965, tmw@ars.usda.gov; C. Douglas Boyette, 601-686-5217, dboyette@ag.gov



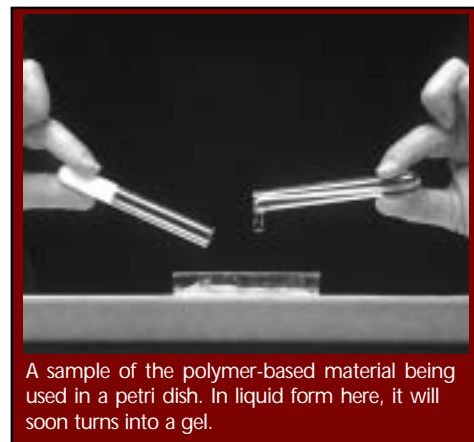
BIOTECHNOLOGY

Polymer Gel Holds Promise for Therapeutic Delivery

A new polymer-based material developed by researchers at the **Department of Energy's Pacific Northwest National Laboratory (PNNL)** has unique gelling properties that have been found to be useful in medical applications ranging from targeted cancer treatment to tissue engineering.

Called a stimuli-sensitive polymer, the material is designed to change immediately from a liquid into a gel in response to a stimulus such as an increase in temperature. This feature would enable physicians to inject the mixture of the polymer and a medicinal solution directly into a specific target in the body, where it would warm and instantly gel.

"Stimuli-sensitive gels show promise for the effective treatment of inoperable tumors," said **Anna Gutowska**, senior research scientist at PNNL and lead developer of the gel.



A sample of the polymer-based material being used in a petri dish. In liquid form here, it will soon turn into a gel.

"While much more research remains to be done before this becomes an accepted medical procedure, we are very excited about its potential."

For more info: Erik Stenehjelm, 509-372-4212. Requests for information on other PNNL technologies should be directed to 888-375-PNNL, inquiry@pnl.gov



ENVIRONMENT

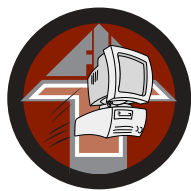
Cleanup Method May Save Oil and Gas Industry Millions

Oil and gas producers may save millions of dollars in cleaning up contaminated soils thanks to an onsite soil sampling and testing method developed by environmental scientists at **Argonne National Laboratory (ANL)**.

Naturally occurring radioactive material accumulates when the production of oil and natural gas from underground reservoirs carries small quantities of radium to the surface. Over time, the radium — usually radium-226 and, to a lesser extent, radium-228 — can concentrate in pipe scale and sludge deposits, which in turn can contaminate soil and equipment. The traditional approach

to cleaning up such sites involves complicated soil sampling techniques and shipping these samples to offsite laboratories for analysis — a time-consuming and costly process. But a recent demonstration has shown that using ANL's Adaptive Sampling and Analysis Program (ASAP) can dramatically cut the time and money needed to characterize and remediate sites contaminated by naturally radioactive materials. ASAP combines real-time data collection techniques with in-field decision making for faster and more precise site characterization.

For more info: www.techtransfer.anl.gov/techtour/asap.html



COMPUTERS

Software Can Calculate Wet Bulb Globe Temperature

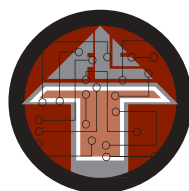
Westinghouse Savannah River Company (WSRC) researchers have developed software that calculates outdoor, with solar load, wet bulb globe temperature (WBGT) using standard meteorological measurements. Using the software reduces costs and expedites the issuance of safety alerts to protect workers in hot weather.

The WBGT index was developed by the U.S. military to model the stress imposed on humans by hot, humid environments. The outdoor, with solar load, WBGT index is a weighted sum of three component temperatures, the first two of which are normally taken with difficulty:

- Globe temperature—a mean radiant temperature (20% of index). Measured by a thermometer inside a black sphere passively exposed to the ambient environment.
- Natural wet bulb temperature—indicates the amount of cooling provided to a human subject through evaporation (70%). Measured by a thermometer bearing a wetted wick passively exposed to the ambient environment.
- Dry bulb temperature—standard temperature of ambient air (10%).

The WBGT calculator uses data collected at a centrally located meteorological tower to simulate the response of globe and natural wet bulb thermometers, providing estimates of the globe temperature and natural wet bulb temperatures. Combining these estimates with a simple measurement of ambient air taken with a standard air thermometer provides a calculation of the WBGT.

For more info: Brenda Boggs, 803-725-3122, brenda.boggs@srs.gov



ELECTRONICS

Protecting Natural Resources ...and Airplanes

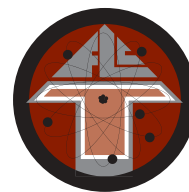
The U.S. Army's Edgewood Chemical Biological Center (ECBC) has developed a satellite-based tracking device small enough to track even migrating birds, which has helped prevent bird strikes on aircraft.

By tracking birds' migratory routes, countries can lessen the incidences of airplane crashes due to collisions with bird flocks. Approximately 100 people worldwide are killed every year due to crashes between airplanes and birds; in the United States alone, \$300 million in damage is done to military and civilian airplanes due to these collisions.

ECBC initially developed the satellite tracking technology to protect biodiversity on military installations and to ensure compliance with federal laws and provisions that direct the Department of Defense's wildlife management. By tagging the animals and tracking them from a remote space satellite, scientists could determine migratory routes, learn about habitats, and see how military activities were affecting the survival of wildlife on installations. This technology is used to track antelope, mountain lions, and wolves, and is integral in saving and conserving endangered species such as the bald eagle.

Meanwhile, Europe, the Middle East, and Africa are also using this technology to track birds that migrate between their regions. By tracking the birds, scientists can also observe the birds' activities and find out where they are being adversely affected by such things as pesticides that some areas may use along their migratory routes.

For more info: Jim Allingham, 410-436-4347, james.allingham@sbccom.apgea.mil



ENERGY

Two Initiatives Yield Wave Power

Catching a wave is one thing. Actually harnessing one and making it somehow useful is quite another. But, that's exactly what engineers at Ocean Power Technologies (OPT) in New Jersey are doing, with Office of Naval Research Small Business Innovation Research (SBIR) funding.

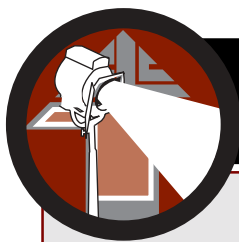
The idea of using the tremendous forces of wave power dates back to the 12th century. But it never worked well, and recent attempts to harness the power of the sea have involved turbines, large monolithic structures, and complex mechanical parts that corrode over time. OPT had a better idea—two of them, as a matter of fact.

One uses piezoelectric polymers (plastics that generate electricity when bent or strained by external forces—fluctuating water currents, for instance) by hanging bits of the stuff—like artificial eels—in the ocean. When placed in a current of water, the strip flexes and flaps like a pennant, thereby producing enough current to trickle charge a battery or power a sensor—about 1 Watt per square meter.

OPT's other ocean wave power initiative involves a simple ocean buoy with an internal piston-type device that rides up and down with the motion of ocean waves. Connected to a cable running to shore, each buoy can generate about 20 kilowatts of power, enough to turn on lights in 20 houses. OPT is in the process of developing 100-kilowatt capacity buoys.

Buoys are planned soon for Hawaii and will be operating in Australia by late summer 2001, with more proposed for the West Coast of the U.S. in the future. By grouping many buoys, OPT plans to make 1 - 100 kilowatt systems for small coastal communities and offshore oil rigs. Multimegawatt systems are on the horizon.

For more info: Gail Cleere, 703-696-4987, cleereg@onr.navy.mil



SPOTLIGHT ON SUCCESS

Success stories from the federal lab community

Argonne, Süd-Chemie Sign Agreement to Accelerate Fuel Cell Development

An ultra-efficient, environmentally friendly electric car is now looking a lot more real, thanks to the Chemical Technology Division at the U.S. Department of Energy's Argonne National Laboratory (ANL).

As a result of their work, ANL and Süd-Chemie Inc. (formerly United Catalysts Inc.) have signed a licensing agreement under which Süd-Chemie Inc.—a leading developer and manufacturer of catalysts for the production of hydrogen from hydrocarbons for more than 50 years—will manufacture and distribute a partial oxidation catalyst developed and patented by ANL. This catalyst forms the heart of a component that will allow fuel cell-powered cars to run on conventional fuel.

The ANL team, led by Michael Krumpelt and Shabbir Ahmed, developed this catalyst for use in the fuel processor of an automotive fuel cell system. It efficiently converts a wide variety of hydrocarbon fuels, including methanol, natural gas and gasoline, into a hydrogen-rich gas. In addition to this fuel flexibility, the novel catalyst has demonstrated excellent resistance to sulfur in the fuel, a property essential for reliable, long-term operation of the processor.

The new catalyst is the result of a long-term focus in ANL's Chemical Technology Division. In the late 1980s, the division began exploring the catalytic conversion

(“reforming”) of liquid fuel to hydrogen inside a fuel cell system. Industry judged this work to be too risky because of the enormous challenge of finding the right catalyst.

Diligent efforts by the Chemical Technology Division team, however, eventually uncovered a class of new materials that support the partial oxidation chemistry for gasoline and other liquid fuels. (Partial oxidation is the primary reaction by which the hydrocarbon fuel is converted into hydrogen.)

By mid-1999, the team had developed an engineering-scale processor with catalytic material that produces hydrogen from commercial gasoline and natural gas. This device produces about one-fifth the amount of hydrogen needed for a conventional car — a major step toward realizing commercially available, fuel cell-powered automobiles.

The partial oxidation catalyst also makes the fuel processor more attractive for other fuel cell applications, such as power for residential buildings and remote

locations. Depending on the commercial success of fuel cells, the worldwide market for such a catalyst could be as high as half a billion dollars per year within 10 years.

For more info: Catherine Foster, 630-252-5580, cfoster@anl.gov at Argonne; or Scott Osborne, 502-634-7208, sosborne@sud-chemieinc.com) at Sud-Chemie **NL**



Michael Krumpelt of Argonne's Chemical Technology Division displays the new catalyst he and his colleagues developed. It could help bring ultra-efficient, environmentally friendly electric cars to the marketplace.

Finding What You Want

Need help finding a technology or facility at a federal lab? In addition to *NewsLink*, the FLC also offers this free service to help you navigate the federal lab system.

Laboratory Locator

Our Laboratory Locator personnel will search the FLC network for the exact technology or facility you are seeking. All you have to do is submit a Technical Request Form describing what you need. To do this, go to www.federallabs.org and click on LABORATORY LOCATOR, or call 856-667-7727 and ask for Frank Koos or Sam Samuelian.



LAW ENFORCEMENT

New System Being Developed to Detect Concealed Weapons

Suppose there's an unruly crowd where law enforcement officers have reason to believe some members are carrying concealed weapons—guns, knives, perhaps even plastic explosives. Word goes out over the police radio to bring an unmarked, nondescript van to within 10 meters of the shouting demonstrators. Within minutes of the van's arrival, the armed personnel are identified and captured before they have a chance to use their weapons.

Far fetched? Not if a new technology under development by the **National Institute of Standards and Technology (NIST)** proves successful.

Working with funding from the **National Institute of Justice** and the **Federal Aviation Administration (FAA)**, members of NIST's Electromagnetic Technology Division in Boulder, Colo., have been testing individual components of a system designed to reveal concealed weapons in a crowd.

The technology involves a radar-like apparatus that illuminates a group with low-level electromagnetic waves. Clothing is transparent to the waves, but objects concealed beneath the clothing are not. Images of guns, knives, and plastic explosives are reflected back to the NIST device, then directed through a set of optics that focus the radiation onto an array of 8-centimeter (3-inch) silicon wafers with millimeter-wave antennas attached. The antennas are so tiny that 120 can fit onto a single wafer. An electronics package converts the concentrated electromagnetic radiation into images, which are then projected onto a laptop computer screen.

Researchers are hoping to have a prototype of the weapons detector ready for testing by year's end.

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



SENSORS

NASA Uses Hands-Off Approach to Land Jet

Imagine being able to land a jumbo jet without ever taking control of the stick. **NASA** scientists recently demonstrated the ability to control a 757 passenger jet simulation, using only human muscle-nerve signals linked to a computer.

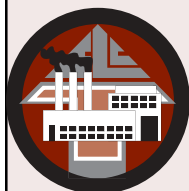
Scientists outfitted the pilot with an armband implanted with eight electrodes. These sensors read muscle nerve signals as the pilot made gestures needed to land a computer-generated aircraft. The pilot also demonstrated the ability to land a damaged aircraft during emergency landing drills.

"This is a fundamentally new way to communicate with machines—another way to talk with our mechanical world," said **Dr. Charles Jorgensen**, head of the neuroengineering laboratory at **NASA's Ames Research Center**. "This new technology is significant in that neuroelectric control of computers can replace computer keyboards, mice and joysticks for some uses," Jorgensen added.

"In the experiment, a pilot closes his fist in empty air, makes movements and creates nerve signals that are captured by a dry electrode array on his arm," said Jorgensen. "The nerve signals are analyzed and then routed through a computer, allowing the pilot to control the simulated airplane." The pilot sees the aircraft and control panel projected on a large, dome-shaped screen while flying the aircraft.

"An advantage of using neuroelectric machine control is that human nerve signals can be linked directly with devices without the aid of joysticks or mice, thereby providing rapid, intuitive control," Jorgensen added. "This technology also is useful for astronauts in spacesuits who need to control tools in space."

For more info: John Bluck, 650-604-5026 or 650-604-9000, jbluck@mail.arc.nasa.gov

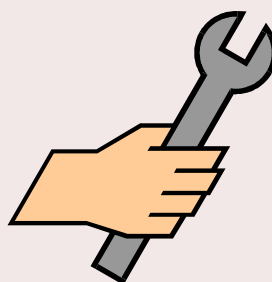


MANUFACTURING

Wrench Makes the Simple Jobs Easier

Colleagues at **Lawrence Berkeley National Laboratory (LBNL)** have designed a wrench that can tighten or loosen fittings with very little clearance around them, while still maintaining enough strength to withstand the stresses applied during use.

The wrench, created by **John Clyde** and **Ray Solbau**, allows minimization of space usage in many applications that are currently limited in design due to the size of commercially available tools.



This tool will be of particular interest to manufacturers of tube and hydraulic pipe fittings, and industries such as aerospace, marine/submarine and scientific information, where size and space are often critical design criteria.

The minimal clearance wrench also works on nuts and bolts or any hex head fitting, allowing it to capture a portion of the hand tool market as well.

For more info: Technology Transfer Department, 510-486-5366, ttd@lbl.gov **NL**

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COMING ATTRACTIONS

<p>August 13-15, 2001 2nd Annual Naval-Industry R&D Partnership Conference Washington, D.C.</p> <p>The conference, Breaking Through the Barriers to Technology Insertions, will provide opportunities to better understand naval technology needs and business opportunities, as well as industry's methods of exploiting and marketing technology. The format includes a combination of keynote speeches, highly interactive panel sessions, solution-focused breakout sessions, business-to-business/government marketplace, and exhibits. Nancy Groves, 703-696-5991, www.naval-industrypartnerships.com</p>	<p>September 10-13, 2001 Instrumental, Systems and Automation Conference and Exhibition (ISA) Houston, TX</p> <p>More than 30,000 visitors are expected to attend this exhibition on industrial measurement and control events. The technical conference is included at no extra cost.</p> <p>Carol Schafer, 919-549-8411, info@isa.org</p>	<p>September 12-13, 2001 Small Business Innovation Research & Development Workshop Charlottesville, VA</p> <p>The conference is designed to enable those interested in sources of funding for high risk, innovative ideas in defense, health, energy, transportation, commerce, agriculture, environment, basic science, and space-related research and technology to apply for SBIR/STTR/ATP funding for research and development. www.sotech.state.va.us/OST/events.htm</p>
<p>October 24-26, 2001 2001 Environmental Technology Conference Atlanta, GA</p> <p>ETE connects buyers and sellers in the environmental management, equipment upgrade, and plant engineering marketplace. The show features an exposition, as well as conference and seminar sessions. Concurrent programs include the Plant & Facilities Expo, World Energy Engineering Congress, and the Cogeneration Congress. www.aeecenter.org/Shows/</p>	<p>November 4-7, 2001 Geological Society of America Annual Meeting and Exposition Boston, MA</p> <p>For geoscience professionals, this show has an anticipated attendance of over 7,000 geology professionals whose interests are dedicated to the earth, education, and environment. Meet face-to-face with influential and key decisionmakers.</p> <p>Brenda Martinez, 800-472-1988, bmartinez@geosociety.org</p>	<p>December 2-5, 2001 National Commercialization Conference Mobile, AL</p> <p>This brings together law enforcement, technology innovators, and manufacturers to understand the needs and requirements of the law enforcement and corrections community. Includes networking opportunities, interaction with developers, and the chance to further refine technologies.</p> <p>Everett Smith, 888-306-5382, www.oletc.org</p>