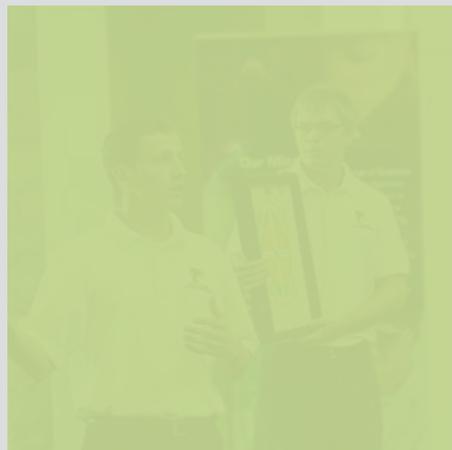
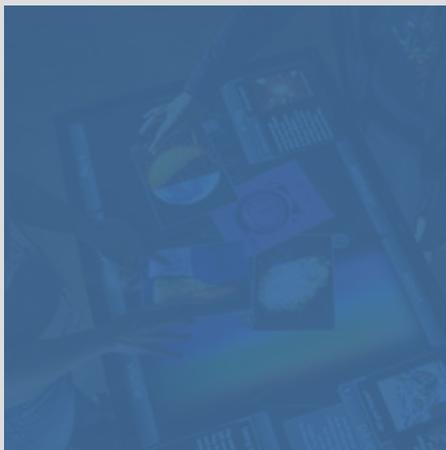


FEDERAL LABORATORIES STATE *and* LOCAL GOVERNMENTS



Partners for Technology Transfer Success

“The federal laboratories are known as key contributors to the national economy, but it is their contribution to local economies—as job creators, partnership facilitators, technology implementers and as mentors to future scientists and engineers—where their impact is most deeply felt.”

- BELINDA SNYDER

These are very interesting times for federal laboratories. Always at the forefront of creating and promoting innovative technologies that benefit the public in so many ways, they now have to balance that mission with a number of external factors, including shrinking federal budgets and increasing competition from other nations.

Establishing partnerships with industry, academia and, in particular, state and local governments has always been a key component of federal laboratories getting the most leverage out of making their technologies accessible to the public; but now these partnerships are proving to be even more valuable as laboratories devise strategies on how to do more with less.

The theme of this updated edition is the value that federal laboratories provide in their many collaborative efforts. The role of the federal laboratory goes far beyond creating a technology and then leaving it on a shelf. Federal laboratories are active participants in the national economy, and in the following pages you will see five ways that federal laboratories present great value for the United States by furthering our technological advancements and stimulating our economy, including:

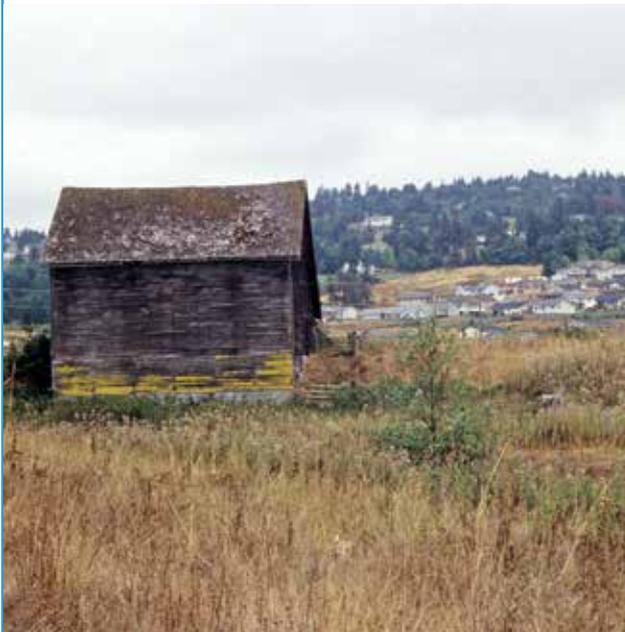
1. **Business and Job Creation** – Partnering with a federal laboratory has the potential to create new jobs, which can have an impact ranging from a small business significantly increasing its staff to the economic revitalization of an entire region.
2. **Multi-agency Cooperation** – The collective strength of federal laboratories lies in their ability to tap into diverse disciplines and agencies to push much-needed technologies forward. Many companies have been able to use the labs’ wealth of resources to their advantage.
3. **Speed of Business** – In today’s global economy, it is important for business to be able to adapt to changes and demands that can occur in an instant. Federal laboratories are adapting as well by developing mechanisms that make it easier and faster to make transfer happen quickly.
4. **STEM** – Federal laboratories have a vested interest in providing today’s students with the tools to succeed in science, technology, engineering, and mathematics (STEM). After all, today’s students will be tomorrow’s inventors, technology transfer professionals, and entrepreneurs.
5. **Technology Deployment** – There are many means available to test federal technologies outside of laboratory walls. State and local governments have been able to leverage their resources to create partnerships with federal labs—with results ranging from improved infrastructure to more dollars in the community.

The Federal Laboratory Consortium for Technology Transfer (FLC) plays a major role in all of these scenarios by actively working with member laboratories to establish lasting relationships with partners that will take their technologies to the next level. The FLC, through its State and Local Government Committee, helps regional, state and local organizations to better harvest value from these laboratories.

Federal laboratories have evolved throughout the years to keep up with the needs of the public they serve. In addition, federal laboratories understand that partnerships are an important component in the fulfillment of their missions, and they will continue to develop approaches that successfully address the changing business landscape. The FLC will continue to be at the forefront of this effort.

BELINDA SNYDER

FLC State and Local Government Committee Chair



FLC

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ABOUT THE FLC

ADVANCING FEDERAL RESEARCH AND TECHNOLOGY

The Federal Laboratory Consortium for Technology Transfer (FLC), a nationwide network of over 250 federal laboratories, is the only government-wide forum for technology transfer (T2). Organized in 1974 and formally chartered by the Federal Technology Transfer Act of 1986, the FLC provides the framework for developing T2 strategies and opportunities by promoting and facilitating technical cooperation among federal laboratories, industry, academia, and state and local governments.

As the recognized leader in maximizing collaborative research for the transfer of technologies, the FLC enhances the socioeconomic well-being of the nation in the global marketplace.

Industry, government, and academic personnel looking to strengthen their T2 capabilities to capitalize on the nation's investment, better their position in the marketplace, or research technology can look to the FLC to foster the rapid movement of federal laboratory research results into the mainstream of the U.S. economy. The FLC advances T2 by expanding communication among industry, government, and academia. The FLC's website, Technology Locator, T2 Desk Reference, *FLC NewsLink*, trade show exhibits, awards program, education and training publications, and network of experts are only a few of the tools it provides for successful T2.

The FLC is a consortium driven by the dedicated people of the federal laboratory system.

These people are the scientists, agency representatives, and T2 professionals who transfer federally funded technology and expertise to the marketplace. Serving as a gateway for industry, government, and academia to access research and development, the FLC also serves as a resource for T2 education and training, news, programming, awards, and initiatives.

 www.federallabs.org

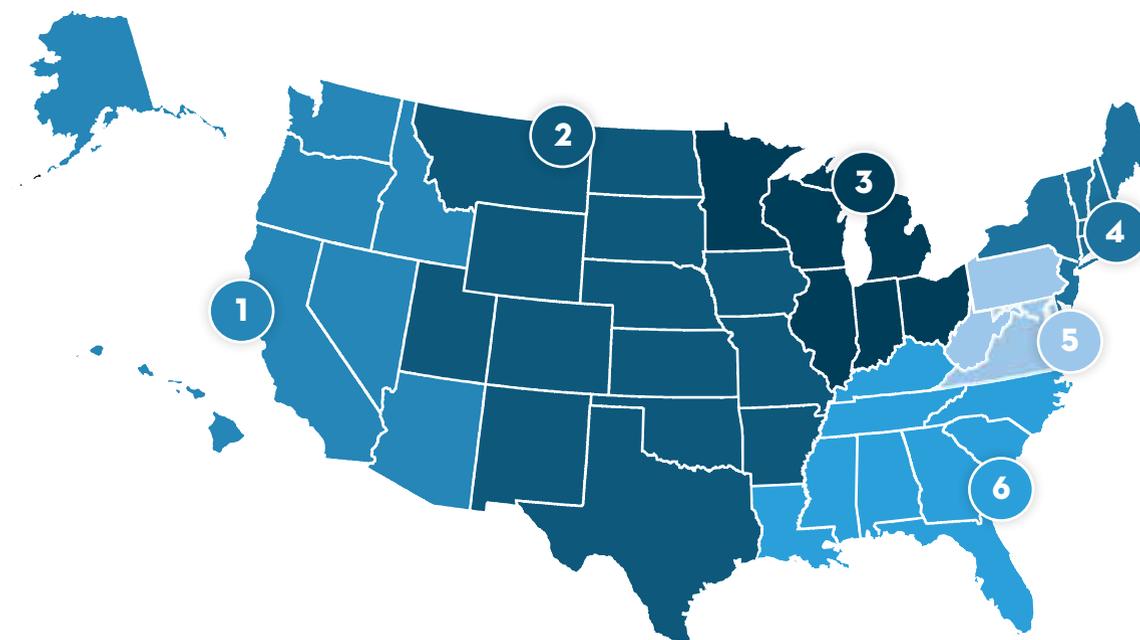
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FLC

FLC REGIONS



1 FAR WEST

www.flcfarwest.org

Regional Coordinator: Brian Suh
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619-553-5118
brian.suh@navy.mil

2 MID-CONTINENT

www.flcmidcontinent.org

Regional Coordinator: Jack James
NASA Johnson Space Center
Phone: 281-483-1175
Email: john.e.james@nasa.gov

3 MIDWEST

www.flcmidwest.org

Regional Coordinator: John Dement
NSWC Crane Division
812-854-4164
john.dement@navy.mil

4 NORTHEAST

www.flcnortheast.org

Regional Coordinator: Robert Braun
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Development & Engineering Center
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Email: robert.m.braun@us.army.mil

5 MID-ATLANTIC

www.flcmidatlantic.org

Regional Coordinator: Dr. Courtney Silverthorn
SAIC-Frederick, Inc.
Frederick National Laboratory for Cancer Research
301-846-6316
silverthorncf@mail.nih.gov

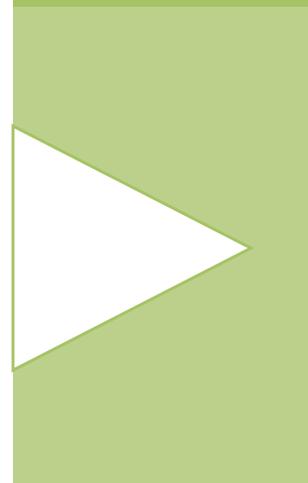
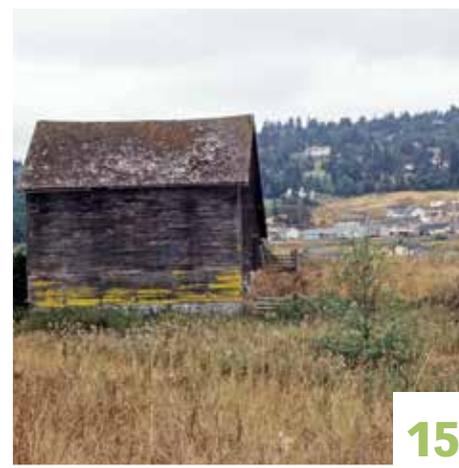
6 SOUTHEAST

www.flcsoutheast.org

Regional Coordinator: Dr. Ramona Travis
Stennis Space Center
228-688-3832
ramona.e.travis@nasa.gov

BUSINESS AND JOB CREATION VALUE #1

When federal laboratories partner with businesses to transfer technologies, it creates positive results for the economy. One such benefit is the creation of jobs to move the technologies from the laboratory to the marketplace. It takes a team of scientists, researchers, entrepreneurs, manufacturers, and others working together to make it happen, and in turn these individuals have the opportunity to strengthen their local economy by patronizing businesses close to home. Ultimately, technology transfer has the ability to move the economy as far as across the world, or as close as the corner store.





MISSISSIPPI

Cleared Woodlands Restored to Sustainable Forests

The USDA Natural Resources Conservation Service partnered with the Forest Service, Fish and Wildlife Service, Mississippi State University, and others to reforest land in the Lower Mississippi Alluvial Valley (LMAV). The reforestation was made possible through the technique of interplanting cottonwoods with other hardwoods such as Nuttall oak. Developed by the Southern Research Station's (SRS) Center for Bottomlands Research (CBHR) in Stoneville, Mississippi, the method quickly creates a forest environment in which slower-growing hardwoods can develop while sheltered by fast-growing cottonwoods.

According to CBHR project leader Ted Leininger, the method jumped from the research to the implementation stage when a Stoneville organization, Wildlife Mississippi, expressed an interest in the reforestation process and its potential. "Wildlife Mississippi in turn knew people at GreenTrees®, and a meeting was set up (in Stoneville) so that SRS research forester Emile Gardiner and I could show them our study and explain the silvicultural and economic advantages behind it."

GreenTrees®, a privately managed forest restoration and carbon sequestration program created for landowners in the LMAV, adopted the interplanting method with the objective of restoring open and marginal farmland in the region to hardwood forest ecosystems capable of sustainably sequestering large amounts of

carbon dioxide, providing habitat for wildlife, and benefiting landowners by both leasing their land and timber harvests. GreenTrees® leases private lands for planting millions of trees in the LMAV, including parts of Arkansas, Louisiana, and Mississippi.

"GreenTrees® has restructured the lease agreement they now offer to landowners," said Gardiner. "It's changed from a 70-year to a 15-year lease." The shorter lease is more aligned with the lease a landowner typically enters into through the USDA Farm Service Agency (FSA) Conservation Reserve Program (CRP). Producers enrolled in CRP plant long-term, resource-conserving covers such as trees. In return, FSA provides participants with rental payments and cost-share assistance. GreenTrees® also offers lease agreements to landowners enrolled in the USDA Natural Resources Conservation Service Wetlands Reserve Program. The USDA Farm Bill offers both of these voluntary programs to provide conservation and economic benefits to landowners.

Two corporations, Duke Energy, one of the largest utility companies in the South, and Norfolk Southern, a Class 1 railroad shipping and transportation company, are currently partnering with GreenTrees® in a reforestation program designed to offset carbon dioxide.

◀ Aerial views of interplanting technique.

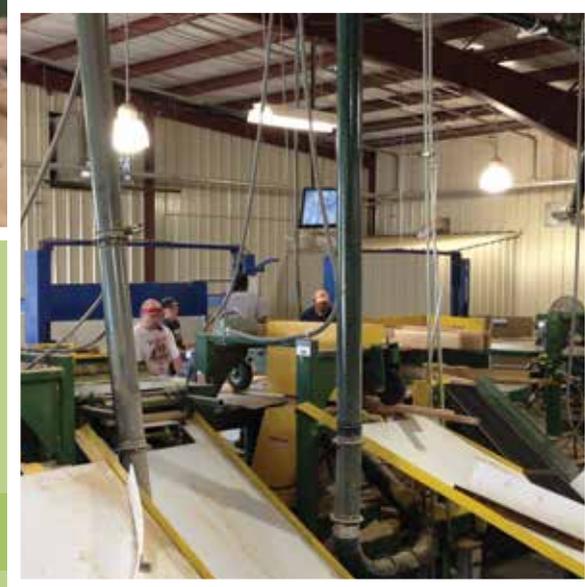
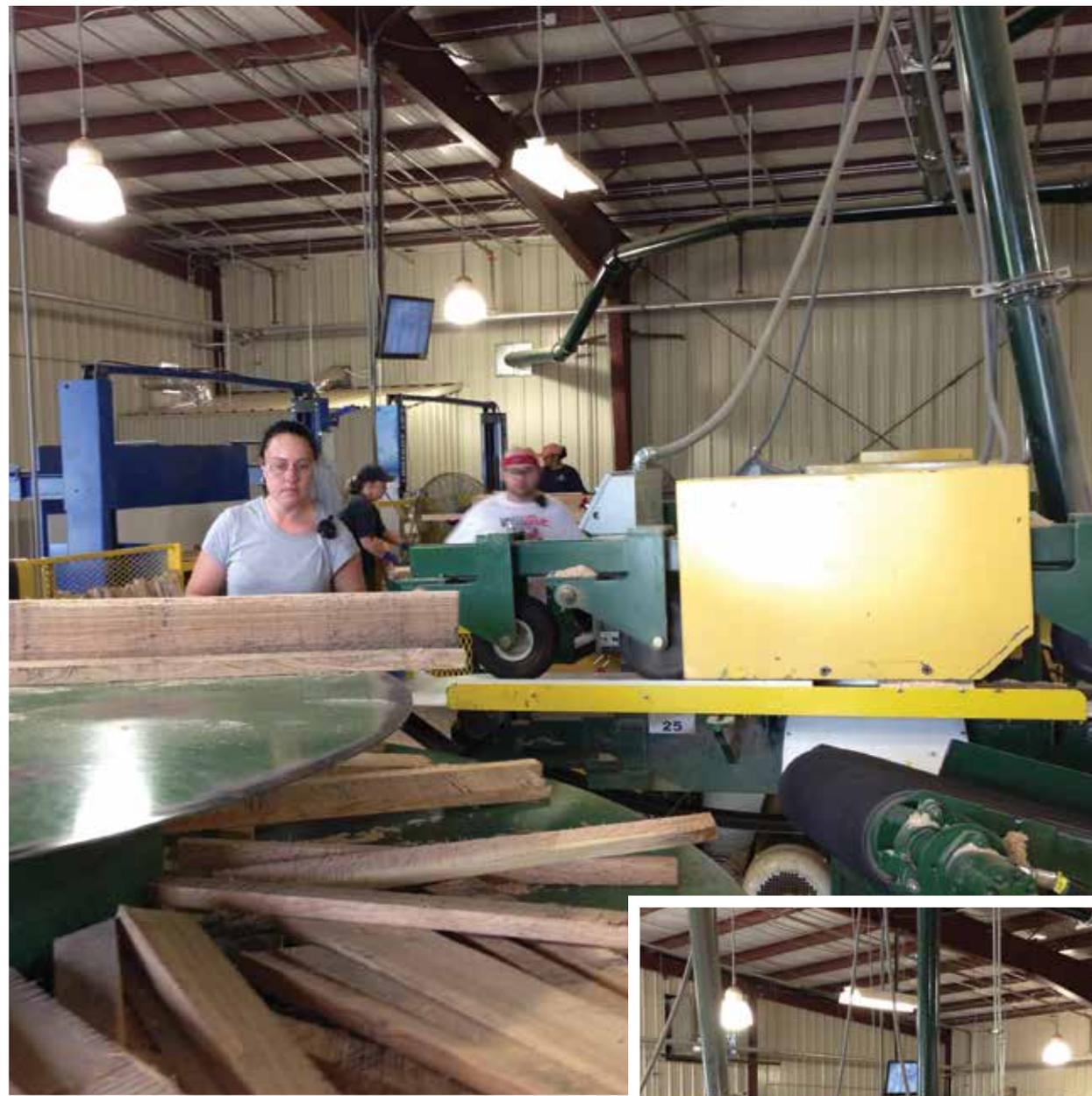
Photo credit: GreenTrees Inc.



 www.srs.fs.usda.gov

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Mill workers turn wood into staves that will be used to create barrels used to store and age Jack Daniels whiskey.

Photo credit: Rick Taylor



New Mill Brings Local Economy Back to Life

Economic conditions from 2005 through 2010 meant bad news for much of the South's forest industry, accelerating mill closings and job losses in small towns across the southern United States. Recently, the Forest Inventory and Analysis (FIA) unit of the U.S. Forest Service Southern Research Station worked with a leading manufacturer to bring good news to one hard-hit community.

"We relied on data and expertise from the FIA headquarters in Knoxville (Tennessee) to lead us to the right place for our mill siting," said Bob Russell, director of Mills Operations for Brown-Forman Cooperages, a subsidiary of the Brown-Forman Corporation, one of the largest American-owned companies in the spirits and wine business.

The right place is the small northeastern Alabama town of Stevenson.

After an "extensive search in the Tennessee Valley," Russell said that Brown-Forman Cooperages picked the Stevenson site because of its plentiful supply of oak trees. Russell learned from studies conducted by Knoxville's FIA forest researchers that there is an abundant supply in that corner of Alabama and into Tennessee and Georgia.

Located north of town, the 55-acre Stevenson mill employs almost 30 townspeople to produce white oak staves, the narrow pieces of wood that make up "aging" barrels for distilleries and vineyards. Some of the workers had been unemployed for years, laid off after a local sawmill closed.

The economic impact means not only new jobs, but also renewed well-being for Stevenson—and beyond. The mill has a salary base of around \$750,000, Russell said. "Employment in the mill has a ripple effect. We employ people who live in town and make purchases at local businesses. We also purchase high-grade white oak from loggers in the area, as well as from private landowners. Many other businesses rely on us, either directly or indirectly, for some of their revenue, up to a 150-mile radius (from the town)."

Brown-Forman plans to open a cooperage in the next year about 90 miles away in Decatur, Alabama. Russell says his company expects to employ around 60 new workers from the surrounding area at the new cooperage. Brown-Forman also operates mills in Jackson, Ohio, and Clifton, Tennessee.



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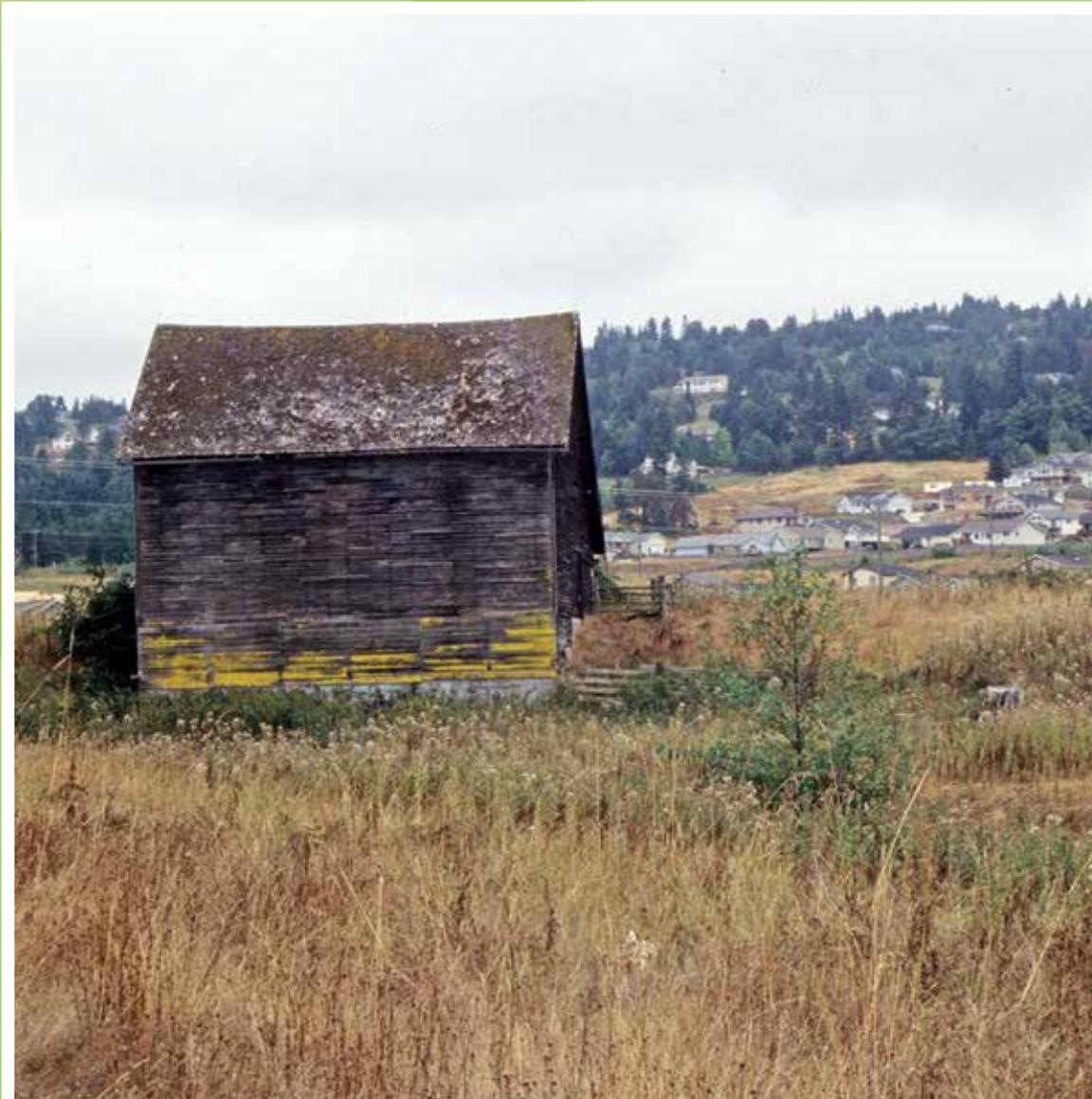
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Land Use Assessment Used as Tool to Balance Population



OREGON



▲ An agricultural area near Sequim, Washington, with recent housing developments nearby.

Photo credit: Andrew Gray, U.S. Forest Service, Pacific Northwest Research Station

Changes in land use have wide-ranging social, economic, and ecological impacts. Not only does urban and residential development reduce the area available to produce farm and forest products, but the pattern of development can affect the productivity of remaining resource lands and their susceptibility to fire, invasive species, and pollution.

State and local governments in Oregon and Washington have used growth management laws in their attempts to accommodate increasing human populations and respond to concerns about the rapid loss of forest and farm lands and urban sprawl. Both states adopted different approaches to managing growth, and state officials needed to assess whether and how trends in development of the states' forests and farms have changed over time.

The USDA Forest Service's Pacific Northwest Research Station's Forest Inventory and Analysis Program (PNW-FIA) developed methods to accurately assess land use change from a grid of photo-interpretation points and field plots. PNW-FIA partnered with the Oregon Department of Forestry to acquire photos, refine analysis techniques to incorporate digital imagery and geographic information systems data, classify change on 37,000 points over time, and synthesize results to be useful to planners and policy makers across the state.

This work has led directly to four reports, many maps, and numerous briefings with state officials and interest groups. The work has been used in

other research to assess habitat changes and predict future development patterns. The PNW Research Station has recently expanded this work in Washington State.

The information published in the Oregon reports has been widely used. The Oregon Progress Board and the Oregon Board of Forestry requested this information and used it to create and populate several Oregon Benchmarks and Indicators of Sustainable Forest Management. Other uses include evaluating the impact of resource land development on salmon habitat; projecting timber availability, vegetation change, and land use change into the future; and crafting of land use policy by interest groups and legislators.

There is ongoing interest in this work by the Oregon Board of Forestry, the Oregon Land Conservation and Development Commission, the conservation groups 1,000 Friends of Oregon and Washington Forest Protection Association, and the Oregon Governor's office. The PNW Research Station plans to provide land use trend updates as they become available.



▲ Areas in red were resource lands (forest, range, or agriculture) in the 1970s and now have been converted to low-density housing or urban uses.



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“Providing assistance and support to local manufacturers represents a natural extension of Glenn’s efforts to be an integral part of the Ohio community and the nation.”

- FORMER CENTER DIRECTOR RAY LUGO



▲ Former NASA Glenn Research Center Director Ray Lugo (left) and NASA Chief Technologist Mason Peck (right)



NASA Offers Solutions to Local Manufacturing Sector



NASA Glenn Research Center has taken an active role in boosting the economy of northeast Ohio by way of an “Adopt-a-City” pilot program, which enables the Center to be involved with local small- and medium-sized manufacturers in the region, specifically in Cleveland. This initiative incorporates the key goals of the White House’s “Strong Cities, Strong Communities (SC2)” initiative. The SC2 program was designed to help communities strengthen their capacity to create jobs and more competitive business climates, implement locally driven community and regional planning approaches for sustained economic growth, and ensure that federal assistance is more efficiently provided and used.

NASA is committed to providing each company with 40 hours of technical assistance to identify potential solutions to challenges the selected companies face with a new or existing product. To support this partnership, the City of Cleveland and Cuyahoga County are making \$450,000 in low-interest loans available to help the companies with any costs that may occur from participation.

“Providing assistance and support to local manufacturers represents a natural extension of Glenn’s efforts to be an integral part of the Ohio community and the nation,” said former Center Director Ray Lugo. “We look forward to sharing our expertise to help keep the economic engine moving in northeast Ohio.”

If it is true that “everything old is new again,” Gotta Groove Records of Cleveland is hoping that NASA Glenn can put a new “twist” on a 1970s vinyl record printing process to improve efficiency and reduce costs. Gotta Groove is one of nine manufacturers in the greater Cleveland area that will benefit from NASA Glenn subject-matter experts thinking out of the box on their behalf. The companies were selected by MAGNET (Manufacturing Advocacy & Growth Network) to participate in the Manufacturing Innovation Project developed through a partnership among NASA, the City of Cleveland, Cuyahoga County, and MAGNET.

Cleveland Mayor Frank Jackson and his Director of Economic Development, Tracey Nichols, were pleased with the results of round one of the Adopt-A-City program, and approached NASA Glenn’s Center Director James Free in the spring of 2013 to continue with this program. Other NASA Centers saw promise in this effort, and are exploring a similar model in Florida at the Kennedy Space Center and in Texas at Johnson Space Center.

IN ADDITION TO GOTTA GROOVE RECORDS, OTHER CLEVELAND-AREA COMPANIES THAT WILL RECEIVE NASA GLENN SUPPORT INCLUDE:

- BioInVision
- Mega Joule
- Morrison Products, Inc.
- Pile Dynamics, Inc.
- Sensor Development Corporation
- Vadxx Energy
- Zuga Medical, Inc.

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Indiana Initiative Encourages Growth of Defense Industry



INDIANA



▲ Lt. Governor Sue Ellspermann launches the new Indiana Office of Defense Development and names Duane Embree as the agency's first Director.

Photo credit: Lieutenant Governor's Staff

The State of Indiana and its only federal laboratory, Naval Surface Warfare Center, Crane Division (NSWC Crane), signed a Partnership Intermediary Agreement (PIA) in February 2013, officially announcing a new level of collaboration to commercialize and leverage assets at the lab.

NSWC Crane's interest and impact on innovation-based economic development in Indiana has soared to include 9 patent licenses, 13 startups, and 18 Cooperative Research and Development Agreements over the last 5 years. These results have come through an award-winning PIA network of local government entities and state universities serving as channels into communities and commercializing NSWC Crane's 300+ protected innovations and other assets. This was just the start.

In March 2013, Lt. Governor Sue Ellspermann announced the formation of a new agency, the Indiana Office of Defense Development (IODD). The IODD was created through an executive order by Governor Mike Pence to provide a focused effort on growing the defense sector business in Indiana and creating jobs. New IODD Director Duane Embree comes to state government after a lengthy career in the defense sector, most notably at NSWC Crane.

The IODD will focus on four main components of economic development within the defense sector: 1) to preserve and grow current military

assets and installations; 2) to promote and strengthen defense industries in Indiana; 3) to attract defense-related industries through local, state and regional economic development organizations; and 4) to promote the use and commercialization of defense and federal intellectual property to create new products, companies, and jobs. It is this fourth component that is in full support of transferring technology from the lab into the state's economy.

The PIA is the next step in leveraging the incredible assets at NSWC Crane and other defense installations, along with Indiana's industry and academic assets for economic development, and makes the most of taxpayer-funded capabilities and research.

The IODD is conducting a series of roundtable discussions to gather information to determine how this agency can best assist all of the defense assets in Indiana. The IODD will join the lieutenant governor's family of businesses, which include the Office of Community and Rural Affairs, Indiana State Department of Agriculture, Office of Tourism Development, and the Indiana Housing and Community Development Authority.



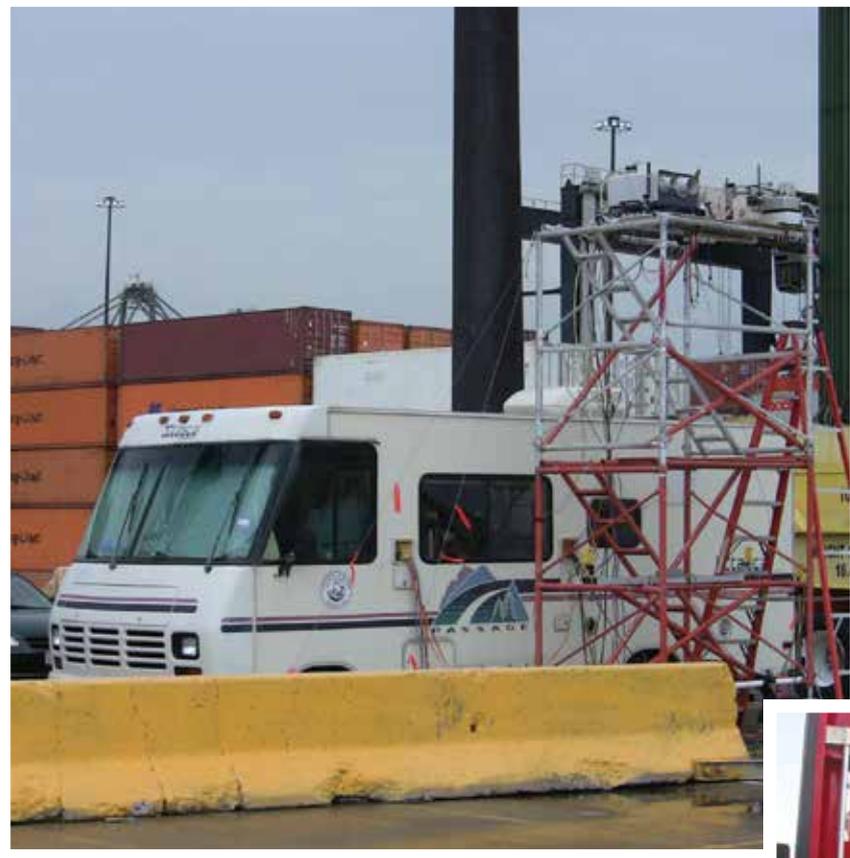
www.navsea.navy.mil/nswc/crane

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Remote sensing technology (RSD) was installed above incoming trucks at the entry point of the port to gather preliminary emissions information to allow for sampling the Houston drayage fleet.

Photo credit: US EPA



PEMS installed on vehicles to gather in-depth "real-world" emissions and activity data.

Photo credit: US EPA



NATIONAL VEHICLE AND FUEL EMISSIONS LABORATORY
U.S. Environmental Protection Agency

Air Quality in Houston-Galveston Subject of EPA Study

Mobile sources contribute significantly to ambient concentrations of air contaminants, including particulate matter. The Environmental Protection Agency's (EPA) National Vehicle and Fuel Emissions Laboratory collaborated to develop a new sampling methodology and technical approaches to determine the amount and frequency of emissions within the Houston-Galveston (Texas) area that pertain to the heavy-duty vehicle population. In particular, heavy-duty drayage vehicles used at ports were studied to determine their emissions contributions. The Portable Emission Measurement System (PEMS), developed by EPA, was installed on over 40 vehicles to gather in-depth "real-world" emissions and activity.

Under a Cooperative Research and Development Agreement (CRADA), the EPA and the Houston-Galveston Area Council, in cooperation with the State of Texas' Commission on Environmental Quality, provided technical expertise, equipment, and specialized skill in statistical sampling and vehicle emissions measurement methodologies. The collaborators also worked with the Port Authority of Houston to enhance the data acquired on vehicle use in the port area.

The EPA reviewed and analyzed the heavy-duty vehicles' emission data to verify the EPA's emission modeling system—Motor Vehicle Emission

Simulator (MOVES)—emission factors for model years 1990 through 2006. This data will be used to update MOVES2013. Some major activity findings for the Houston study may indicate that drayage truck operations may be estimated using MOVES's default "short-haul combination truck" category.

EPA analyzed more than 18 months of visit data from two terminals in the Port of Houston. Most of the analyzed trucks were short-haulers that stayed within the local port metropolitan statistical area. A key finding of the study was that very few trucks visited the port multiple times in a month and often were doing other local, short-hauling work. These analyses helped the Houston-Galveston Area Council gain a much clearer picture of the contributions of port vehicles to the overall air emissions.

In a broader sense, the benefit of this research is the potential for states to more accurately estimate the amount of emissions coming from heavy-duty vehicle usage. As the EPA's models are enhanced to include more real-world data, states can better anticipate how they will comply with National Ambient Air Quality Standards.

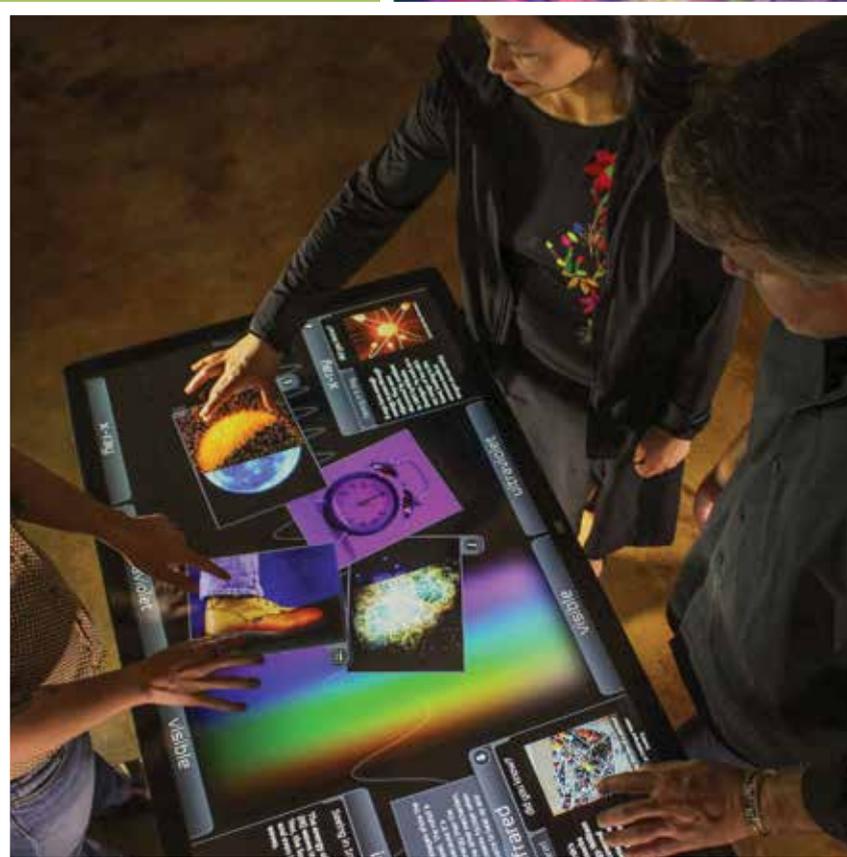
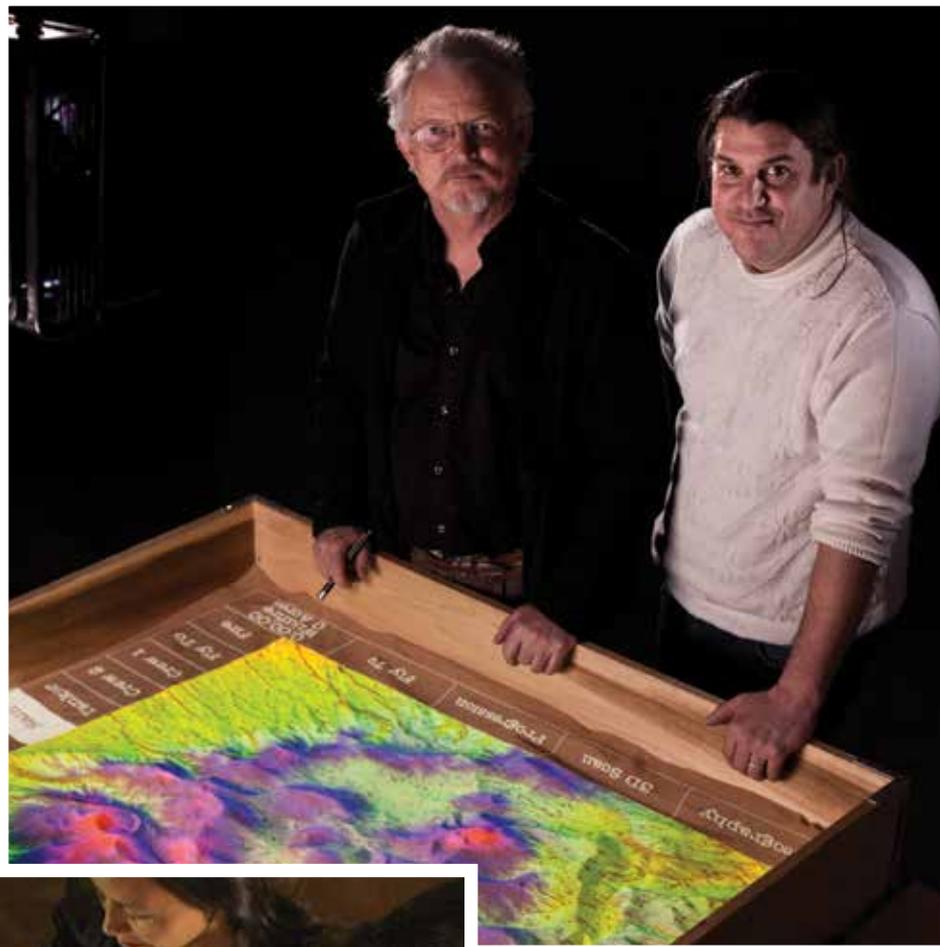


TEXAS

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SimTable projects Google Earth and Geographic Information System data onto a sand surface to create an interactive model that helps predict phenomena such as where a fire is most likely to spread or where traffic will jam during an evacuation.

▶ Multitouch for All: The Platform 46 supports 60 touch points, so the collaborative experience is truly one for all. Learn more and watch the launch videos at www.ideum.com/redefined.

Photo credit: Bill Stengel Photography



LOS ALAMOS NATIONAL LABORATORY
U.S. Department of Energy

New Mexico Small Business Gets Boost From Venture Fund

Los Alamos National Security, LLC (LANS), the manager of Los Alamos National Laboratory (LANL), invests \$1 million per year in economic development through a successful program known as Los Alamos Connect. Managed on behalf of LANS and LANL by Santa Fe-based Regional Development Corporation, Los Alamos Connect offers a variety of business development services to assist entrepreneurs and businesses in northern New Mexico.

One example of the Los Alamos Connect services is the Venture Acceleration Fund (VAF), which was started in 2006 to fill a funding gap encountered by northern New Mexico companies seeking to commercialize laboratory technology. To date, VAF has invested \$2.8 million in 39 companies across 6 counties, and has generated an impressive \$24.7 million, or 9X return on investment, by creating jobs, generating revenue, and attracting additional financing.

Santa Fe-based SimTable, LLC, is one of the companies that received funding from the VAF. SimTable develops innovative technologies, such as a new three-dimensional model for wildfire and emergency response training. This technology projects Google Earth and Geographic Information System data onto a sand surface to create an interactive model that helps predict phenomena such as where a fire is most likely to spread or where traffic will jam during an evacuation. With

VAF support, SimTable improved the user interface for its hardware and software, and moved from proof-of-concept to assembly-line production. Chas Curtis of SimTable said, "The support we received from the Venture Acceleration Fund was the single most positive event that has contributed to the success of SimTable."

Ideum, a custom software and website development company, is another VAF success story. Ideum's founder, Jim Spadaccini, was first drawn to New Mexico by the beauty of Chaco Canyon and project work with NASA and the National Park Service; and he realized that New Mexico would be a great place to start a business. Six years later, Ideum has grown from 2 to 14 employees, and is moving into a larger space in Corrales, a suburb of Albuquerque. Ideum originally specialized in custom software and websites; however, as the company customized interactive exhibits and multi-touch tables for museums, it "...saw the need to create something from the ground up that enables developers to explore new modes of human computer interaction and motion recognition." So Spadaccini and his team developed the first version of a gesture-based software platform named GestureWorks. VAF funding has enabled the company to develop a third version for international release. "GestureWorks would have been sidelined without [Los Alamos] Connect," said Spadaccini.



NEW MEXICO



www.lanl.gov

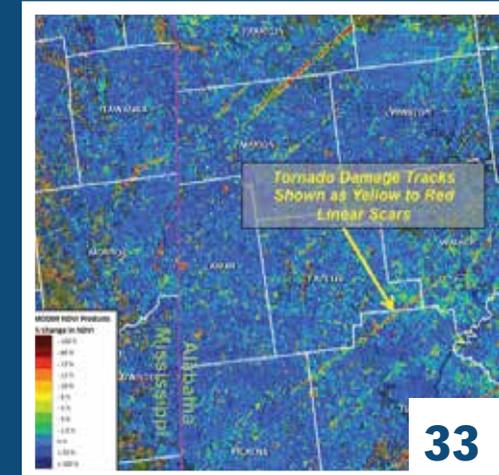
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MULTI-AGENCY COOPERATION

VALUE #2

Federal agencies are reaching across disciplines and geographic lines to use their collective technologies to address problems globally and locally. There are many instances of federal technologies ultimately being used for an unexpected purpose with positive results, thanks to the ingenuity of its inventors and partners.



Brown treesnakes are voracious predators, feeding on a wide array of animals, including birds, bats, lizards, rodents, and small domestic pets. USDA NWRC and the Guam Department of Agriculture are part of a multi-agency effort to reduce the number of invasive brown treesnakes on Guam.

A USDA Wildlife Services field specialist holds an invasive brown treesnake recently removed from a trap. Brown treesnakes cause millions of dollars in damages each year on Guam.

Photo credit, top: USDA Wildlife Services
Photo credit, bottom: U.S. Air Force



NATIONAL WILDLIFE RESEARCH CENTER
U.S. Department of Agriculture

Brown Treesnake Destruction Curtailed by Baiting Technique

One of the most notable invasive species on American soil—the brown treesnake—was accidentally introduced to the island of Guam soon after World War II, probably as a stowaway in ship cargo. With the absence of natural predators, the brown treesnake population on Guam has grown to an estimated 1 to 2 million. Not only is the snake responsible for the extinction of most native bird, bat and lizard species on the island, but also approximately \$1 to \$4 million in damages and lost productivity to the economy and electrical grid each year.

Since the early 1990s, the U.S. Department of Agriculture's Wildlife Services (USDA WS) National Wildlife Research Center (NWRC), located in Fort Collins, Colorado, has been actively involved in collaborative efforts with Guam to reduce the number of brown treesnakes and prevent their spread. NWRC scientists in Colorado and Hawaii have developed and evaluated a wide range of tools and methods, including snake traps, chemical repellents, fumigants for cargo containers, and the only U.S. Environmental Protection Agency (EPA) registered snake toxicant—acetaminophen. More than 150,000 snakes have been removed from the transportation system in Guam, and no live brown treesnakes have been detected at Hawaiian ports of entry in almost 20 years due to a cooperative interdiction and education program.

In 2013 the NWRC, in cooperation with the Guam Department of Agriculture, USDA WS, and the Departments of Defense and the Interior, will deploy an aerial baiting technique to significantly reduce the number of brown treesnakes. The successful aerial delivery of bait is a critical next step toward developing an effective method for large-area control of the snakes. The technique uses dead mouse baits inserted with 80-mg acetaminophen tablets. Earlier NWRC research and environmental assessments showed the method to be safe, with the snakes readily accepting dead mice as bait and the acetaminophen proving fatal typically within 24 hours.

The bait will be fitted to a biodegradable streamer-like device designed to snag onto branches in the dense tree canopy where the snakes feed. The impact of the bait on other species will be minimal, particularly since the snakes have eliminated most of the species that might have been most at risk.

NWRC scientists and partners are hopeful that this new technique will reduce the snake population enough to allow for the eventual reintroduction of native birds and the restoration of Guam's ecosystems.



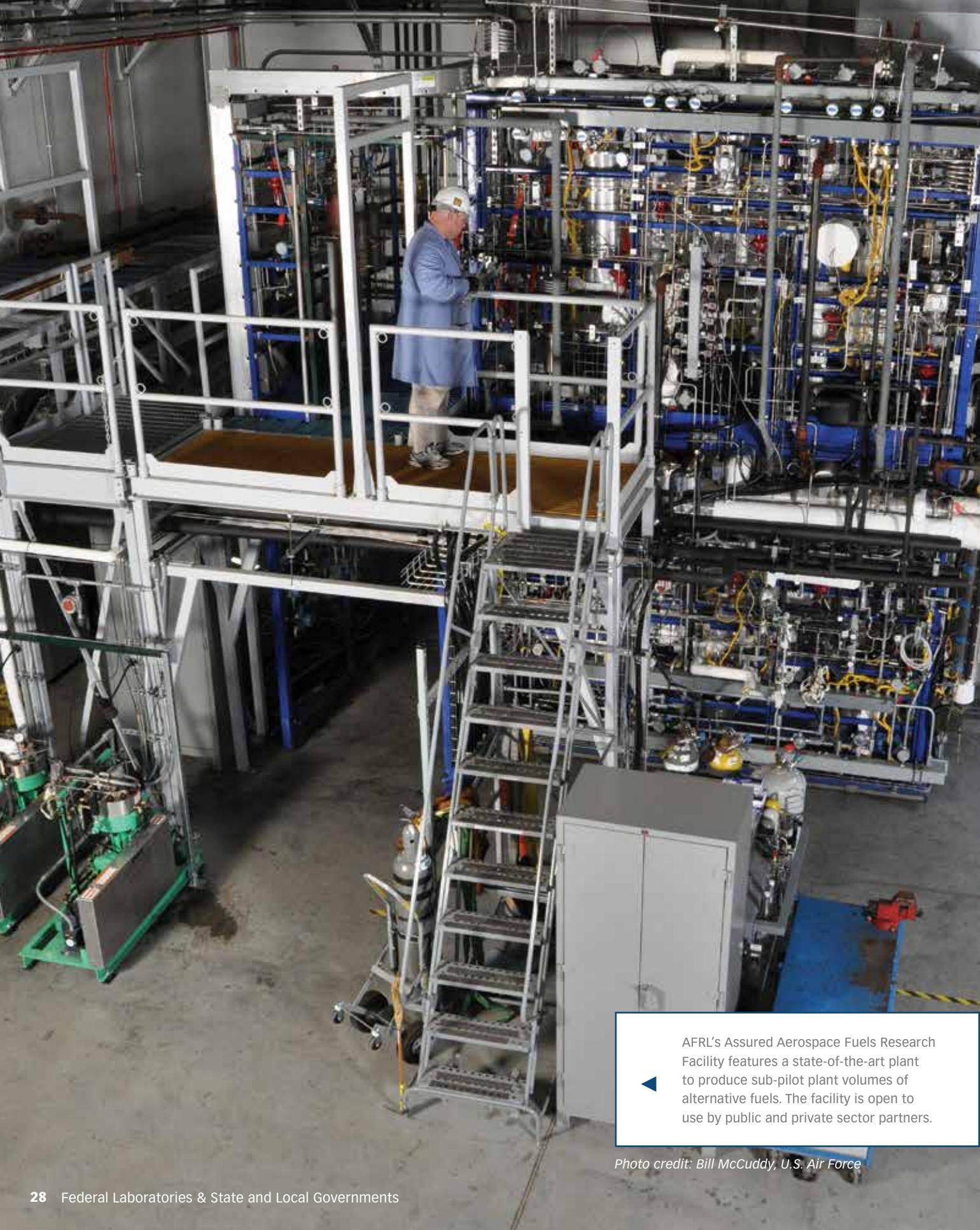
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Collaboration Advances Alternative Fuel Development

In an effort to achieve mutual goals related to alternative fuel development, federal and state agencies are teaming with the Air Force Research Laboratory's (AFRL) Aerospace Systems Directorate at Wright-Patterson Air Force Base, Ohio, to develop alternative aviation fuels. The Federal Aviation Administration (FAA), Department of Energy, Department of Defense, and the Department of Agriculture are all part of the team efforts.

Federal and state agencies have made significant investments in AFRL's Assured Aerospace Fuels Research Facility (AAFRF) at Wright-Patterson so that alternative fuel samples at sub-production levels could be produced for testing and evaluation. The Aerospace Systems Directorate has made the AAFRF available for public- and private-sector use, further contributing to the overall goal of diversifying fuel sources for the Air Force while benefiting budgets, businesses, the economy, and jobs.

In response to this new opportunity, the State of Ohio, through JobsOhio funding, coordinated with the Dayton Development Coalition and Wright Brothers Institute to bring together universities, businesses, and government to more fully utilize the AAFRF. The facility's capabilities were presented to interested parties through an Energy Forum and webinars. Additionally, simplified fee-for-service model and Cooperative Research

and Development Agreement processes were created to enable use of the facility. The Aerospace Systems Directorate makes additional facilities available as well for testing capabilities for drop-in replacement fuels.

Current examples point to the potential benefits arising from this effort. The Aerospace Systems Directorate is in negotiations to produce a slate of fuels derived from alternate sources at the AAFRF for one of the Energy Forum attendees. The company will provide feedback and funding for the AAFRF to produce 1,000 gallons or more of alternative fuels for testing and evaluation. In addition, AFRL has developed a successful relationship with alternative fuel producer Virent, which delivered 100 gallons of its bio-based jet fuel (produced under contract to the FAA), made from 100% renewable plant sugars, to AFRL for testing. Product testing will begin at Wright-Patterson to validate Virent's jet fuel against the standards required for qualification and approval of new aviation turbine fuels established by the American Society for Testing and Materials. The validation plan includes fit-for-purpose, fuel system, and combustor rig testing.

Such collaborative efforts benefit all parties and assure the more complete utilization of a federal asset.



AFRL's Assured Aerospace Fuels Research Facility features a state-of-the-art plant to produce sub-pilot plant volumes of alternative fuels. The facility is open to use by public and private sector partners.

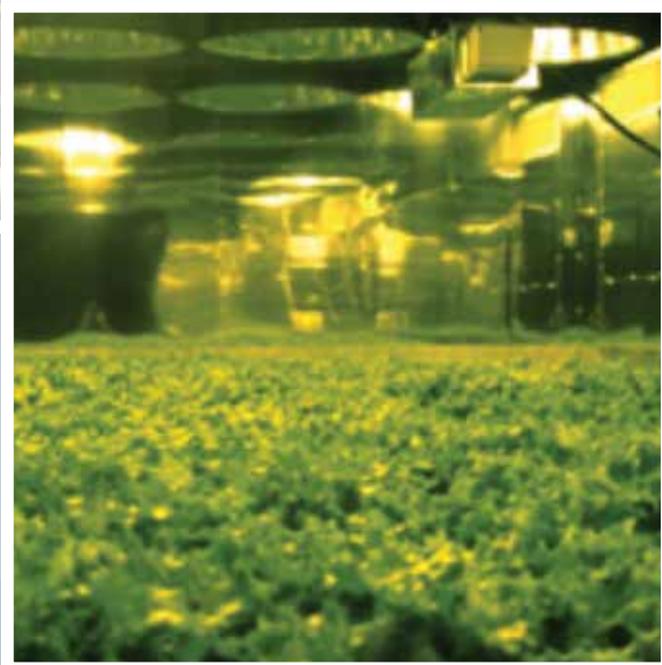
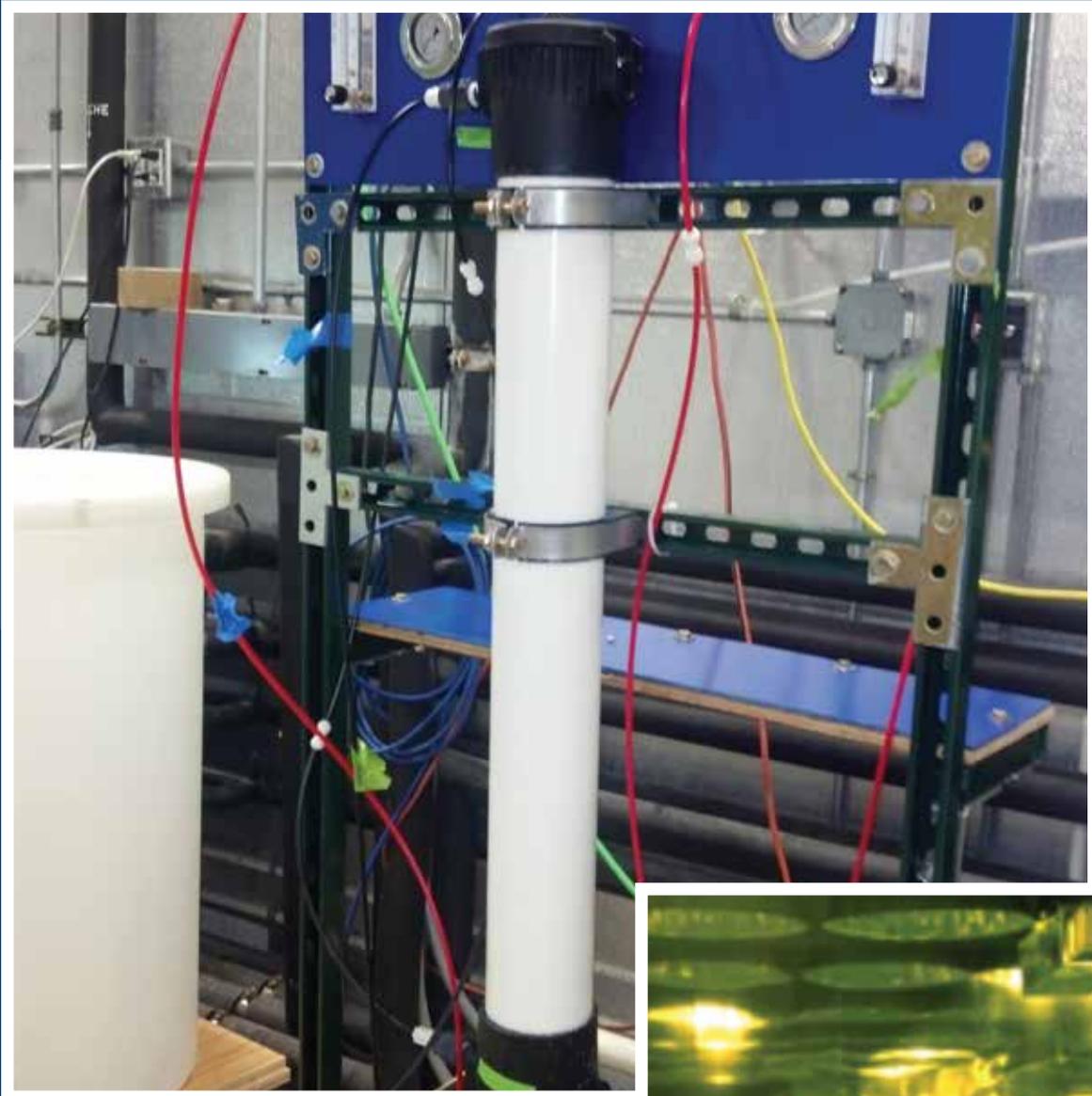
Photo credit: Bill McCuddy, U.S. Air Force



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Water Treatment System ▲

▶ Crop Production Chamber

Photo credit: Dave Bubenheim, NASA



AGRICULTURAL RESEARCH SERVICE & AMES RESEARCH CENTER

U.S. Department of Agriculture & National Aeronautics and Space Administration



Improving Sanitation and Health in Rural Alaska

Personal health in rural Alaskan communities is threatened by energy costs and limited access to clean water, wastewater management, and adequate nutrition. Fuel-based energy systems are significant factors in determining local accessibility to clean water, sanitation, and food. Increasing fuel costs induce a scarcity of access and impact residents' health. The University of Alaska Fairbanks School of Natural Resources and Agricultural Sciences (SNRAS), NASA Ames Research Center, and the USDA Agricultural Research Service (ARS) have joined forces to develop high-efficiency, low energy-consuming techniques for water treatment and food production in rural circumpolar communities. Methods intended for the exploration of space and the establishment of settlements on the moon or Mars will ultimately benefit Earth's communities in the circumpolar north.

In the initial phase of collaboration, funded by USDA ARS, researchers from NASA Ames and SNRAS tested a simple, reliable, low-energy sewage treatment system to recycle wastewater for use in food production and other reuse options in communities. The system extracted up to 70%

of the water from sewage and rejected up to 92% of ions in the sewage with no carryover of toxic effects. Biological testing shows that plant growth using recovered water in the nutrient solution was equivalent to that using high-purity distilled water.

With successful demonstration that the low energy-consuming wastewater treatment system can provide safe water for communities and food production, the team is ready to move forward to a full-scale production testbed. The SNRAS/NASA Ames team will design a prototype to match water processing rates and food production to meet rural community sanitation needs and nutritional preferences. This system will be operated at the University of Alaska Fairbanks, where long-term performance will be validated and the operational needs of the system determined. The testbed will be part of the university education and operator training program.

"Forgotten Alaska" has long awaited this technology to augment the traditional subsistence network and maintain healthy living in the circumpolar north.



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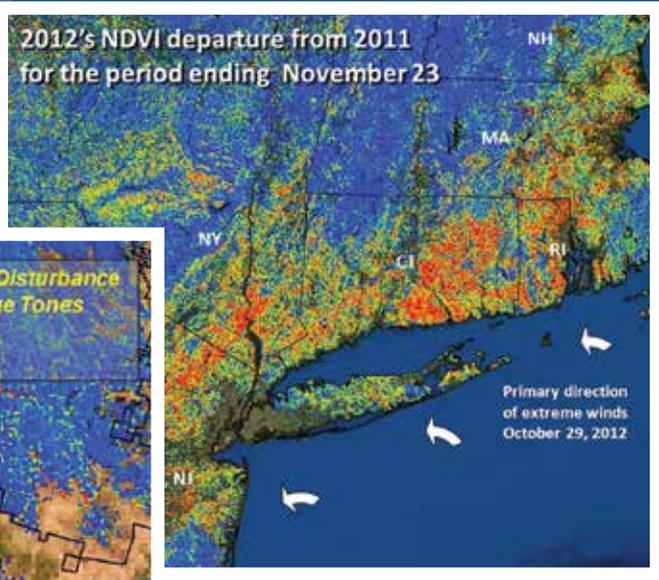
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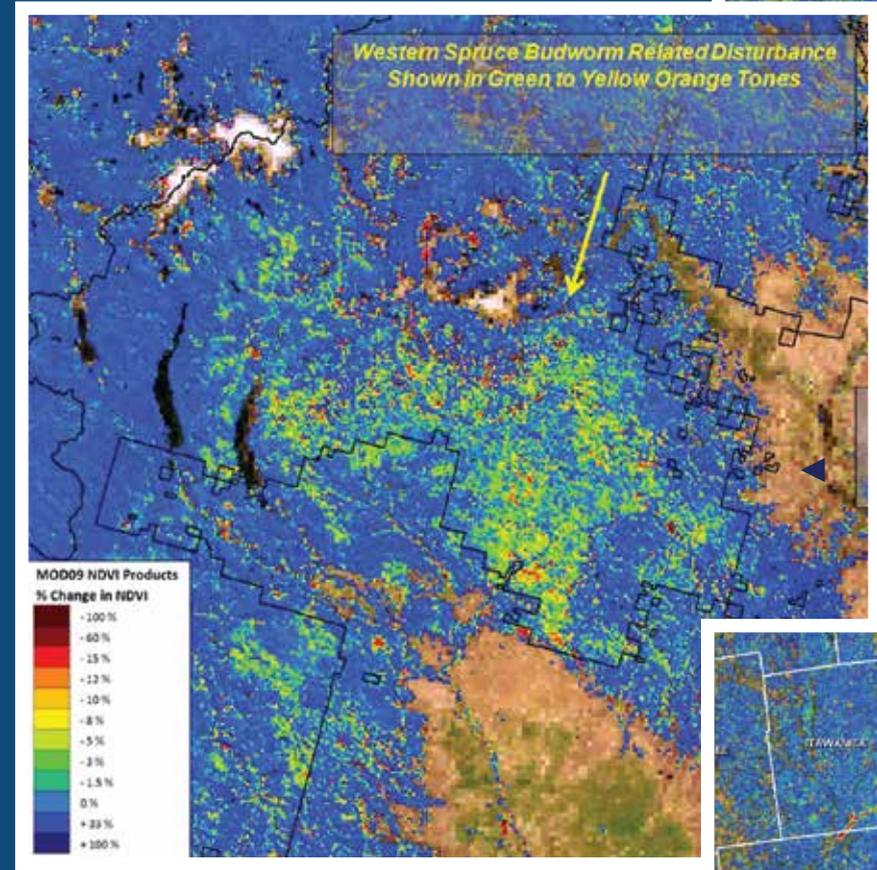
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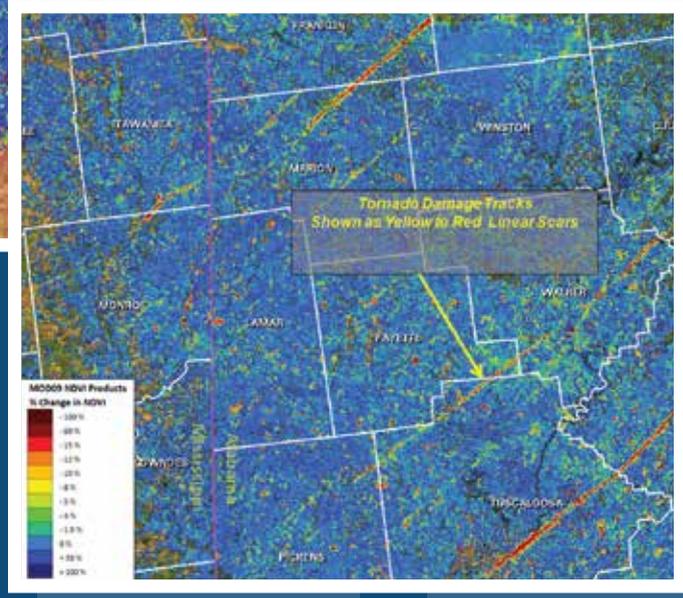


Eastern United States: 2012 ForWarn MODIS view of the initial damaging effects of Hurricane Sandy on the region's forests



Western United States: 2011 ForWarn MODIS view of spruce budworm-induced forest defoliation in Washington State

Central United States: ForWarn MODIS view of April 27, 2011, tornado impacts on forests in Mississippi and Alabama



Satellite-based Tool Monitors Forest Conditions

ForWarn is a satellite-based forest monitoring tool that is being used to detect and monitor disturbances to forest conditions and forest health. The tool has been developed through the synergistic efforts of four federal agencies, including the U.S. Forest Service Eastern Forest and Western Wildland Environmental Threat Assessment Centers, NASA Stennis Space Center, Department of Energy's Oak Ridge National Laboratory, and U.S. Geological Survey Earth Research Observation System. University partners, including the University of North Carolina Asheville's National Environmental Modeling and Analysis Center, were also involved in the process.

New York, and eastern Pennsylvania. The year before, ForWarn was employed to detect spruce beetle-induced tree mortality in Rio Grande National Forest and wildfires in the High Park portion of the Front Range in Colorado. It was also used to monitor springtime caterpillar defoliation and Hurricane Isaac-induced damage in coastal Louisiana wetlands forests.

ForWarn also proved useful for aiding watershed management in North Carolina. Forest damage from a 2012 hailstorm in Asheville was conveyed to the Water Resources Department staff, who were unaware of the hailstorm impacts or the threat the storm damage posed to the watershed's management.

ForWarn produces current health indicator maps of our nation's forests based on satellite data from NASA's MODIS (Moderate Resolution Imaging Spectroradiometer) sensors. To date, ForWarn has been shown to be a robust tool capable of detecting a wide range of regionally evident disturbances for multiple forest and other woody vegetation types. Detected disturbances include those associated with insects, diseases, hurricanes, flooding, harvest, urbanizations, and landslides, all of which result in abnormally low vegetation canopy greenness.

ForWarn is a successful example of how the government has brought the benefit of taxpayer dollars full circle, from the federal back to the state and local levels. It is considered by many to be an innovative, new use of near real-time MODIS satellite data that successfully bridges the gap from research to an important, long-needed operational use. The direct result of this collaborative agency effort is that this truly novel technology has been researched, applied, transferred, and used to transform science into practice.

In 2013, ForWarn was used to detect and assess the effects of Hurricane Sandy on eastern U.S. forests in portions of West Virginia, New Jersey,

Photo credit: ForWarn MODIS



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Wake Turbulence Research Pays Safety and Efficiency Dividends for Busy Airports

The findings from a decade of wake turbulence research are reducing airport delays, shortening final approaches to airports, and reducing fuel burn and emissions. Wake turbulence, the movement of air created by an aircraft in motion, may be an esoteric field of study, but the body of knowledge from this field has enabled the Federal Aviation Administration (FAA) to make operational changes in the National Airspace System (NAS), allowing for smaller minimum aircraft separation distances in some situations and increased rates of takeoffs and landings on runways.

Technical staff at Volpe National Transportation Systems Center have been intimately involved with wake turbulence research for nearly 40 years. Volpe experts—along with scientists and engineers from the FAA, NASA, sensor manufacturers, Eurocontrol, and many other organizations—have improved the methods, sensor technologies, and data processing and analysis techniques for measuring wake turbulence. These improvements have provided a greater degree of fidelity in the characterization of wake turbulence, thereby increasing confidence in the measured results and its associated safety assessment processes.

The implementation of operational changes based on scientific exploration is a success story for the wake turbulence research community. As a federal organization, Volpe not only conducts

quality wake turbulence research, it collaborates with operators and policy makers—in this case air traffic controllers, pilot groups, and FAA headquarters offices—to implement research results. There are three changes in the way operations are conducted that highlight the benefits of this field of study.

First, the FAA has made several changes to increase capacity of the NAS. Beginning at Memphis International Airport, new separation standards, known as recategorization, allow reduced spacing between aircraft. The FAA has moved from a separation distance that is based primarily on aircraft weight, to one that also incorporates several aircraft design characteristics.

Second, three airports—Houston, Memphis, and San Francisco—are currently installing the Wake Turbulence Mitigation for Departures (WTMD) system, which monitors actual and predicted wind at their respective airports. When conditions are within a prescribed safety margin, WTMD informs air traffic operations that a specific runway can be used without wake constraints.

Lastly, the FAA has changed operational procedures at nine airports to allow parallel runway approaches under specific conditions not previously allowed, thereby increasing airport capacity and reducing arrival delays.



◀ A light detection and ranging (LIDAR) system used to measure atmospheric particles in motion.

Photo credit: Volpe Center



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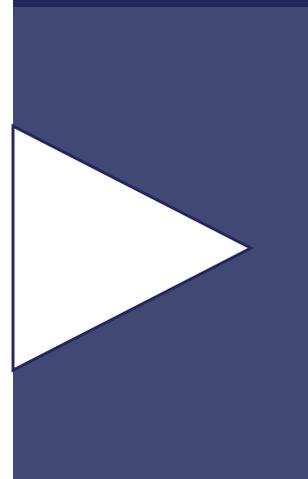
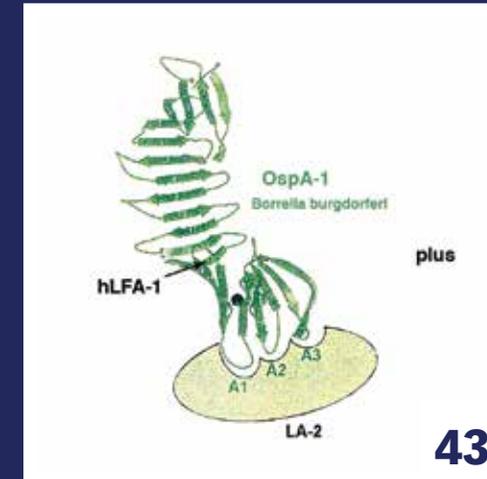
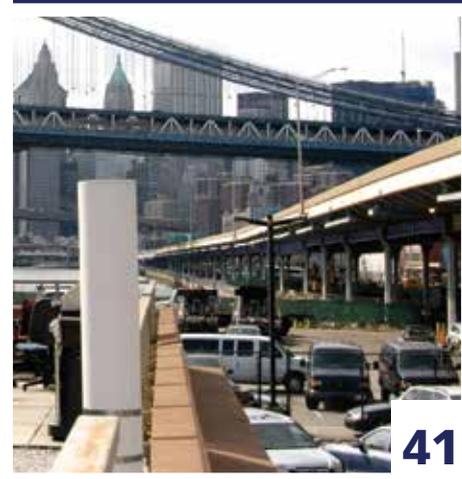
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In today's fast-paced and competitive world, the speed at which a federal technology is transferred can make or break its commercial success. Federal laboratories are developing innovative ways to facilitate transfer more quickly and make the process more accessible to both large and small businesses.





Cutting-Edge Research Could Reduce Highway Noise

Noise created at the tire/pavement interface has been the subject of an increasing level of research in the past decade due to the public's desire for quieter highways and communities. Determining the acoustic properties of different pavement types is important to identifying which are least noisy. The onboard sound intensity (OBSI) method uses microphones mounted near the tire/pavement interface to measure noise at the source. Typically, measurements are performed while the vehicle drives across different pavements.

As an alternative to the conventional OBSI method, Drs. Roger Wayson and John MacDonald are working with the Florida Department of Transportation on a cutting-edge noise research study that features a special test rig attached to a trailer instead of an automobile. The OBSI trailer method provides consistent measurements over extended periods by controlling many specific variables, such as weight on the tire. If this new methodology can be proven to be accurate and reliable, the number of measurements typically taken to quantify roadway noise will be significantly reduced.
Story credit: <http://www.volpe.dot.gov/noteworthy/2013/crchrhn.html>



The Benefits of Transportation Planning for Megacities and Megaregions

Currently, there are 11 accepted major megaregions in the U.S., including areas that cover northern and southern California, the Arizona Sun Corridor, the Texas Triangle, and several that cross into multiple states or cross international borders. These areas have major transportation needs, but lack institutions that are responsible for planning transportation investments or strategies to meet the needs. Volpe tackles a broad range of megaregional projects, including research and case studies on urban and rural areas, organizing a national experts' workshop, developing white papers, and providing support to megaregional research groups, including through the Transportation Research Board. Key principles of

successful planning include a systems approach to transportation with integrated, multimodal and intermodal components, and a "3-C" process of continuing, comprehensive, and cooperative planning. *Story credit: www.volpe.dot.gov/noteworthy/2012/ctpm.html*

On the Ground at Manchester: Making Surface Traffic More Visible

Preventing runway incursions has been a focus of aviation since the 1977 Tenerife disaster when two 747s collided on a runway in foggy conditions. To reduce the probability of airport accidents, Volpe has worked with the Federal Aviation Administration (FAA) to install Airport Surface Detection Equipment, Model X (ASDE-X) at 35 major airports. In 2006, expressing concerns that medium-sized airports were reporting an increasing number of runway incursions, the FAA worked with Volpe to deploy a low-cost ground surveillance (LCGS) deployment system for smaller airports where installation of ASDE-X is not appropriate. Technical performance onsite testing of the system was recently completed at Manchester-Boston Regional Airport, and a Volpe human factors expert is currently collecting data from users to provide a comprehensive evaluation of the system in an air traffic control environment. *Story credit: www.volpe.dot.gov/noteworthy/2012/otgam.html*



Highway Right-of-Way Increasingly Being Considered by States for Innovative Uses With Volpe Center and FHWA Assistance

In a recent report prepared for the Federal Highway Administration (FHWA), Volpe researchers describe the state of practice in accommodating renewable energy technologies and alternative fuel facilities within highway ROWs. Among the findings in the report: a supportive institutional environment is critical for the success of renewable energy projects in the ROW; a variety of public-



private partnership models are used by states; siting concerns and requirements are a principal issue; permitting processes vary by project; and developing the lease agreements is a multifaceted process. *Story credit: <http://www.volpe.dot.gov/noteworthy/2013/rowibciu.html>*

Collaboration is Key to Efficient Freight Movement and Regional Economic Vitality

The efficiency with which freight moves into, out of, and within regions is an important indicator of a region's economic vitality. Businesses that rely on the freight transportation system to obtain supplies and transport products are attracted to regions with well-placed intermodal hubs, roads in good repair, and easy access to rail, water, and air transportation. The Minnesota Department of Transportation (DOT) and the Metropolitan Council, the metropolitan planning organization for the Minneapolis-Saint Paul region, approached Volpe to improve collaboration among entities with a stake in the region's freight movement. The result was several reports that provide guides to other states and metropolitan regions on how to improve freight efficiency, effectiveness, and collaboration among freight stakeholders. One such report, "The Story of Freight in the Twin Cities," highlights the importance of the region's freight transportation system to businesses and residents, particularly in terms of contributions to economic development and quality of life. *Story credit: www.volpe.dot.gov/noteworthy/2012/ckefm.html*



Volpe Rail Trespass Prevention Research Saves Lives

More than 500 people die each year while trespassing on rail lines. One particular stretch of rail in West Palm Beach, Florida, which has had a high incidence of trespass-related deaths over two decades, is currently the subject of a Federal Railroad

Administration (FRA) and local community-based project being led by Volpe. With Volpe's assistance, the FRA is using West Palm Beach as a test bed for its trespass prevention research study. To understand the frequency of trespassing and identify the areas where it is most prevalent, Volpe examined incident data, police citations, and video from cameras installed aboard commuter train locomotives. Three general classes of trespass mitigation strategies are being evaluated. Engineering strategies include improving barriers and building overpasses. Education strategies include signs, pamphlets, school-based education, and public service announcements. Enforcement strategies include patrols, fines, and legislative efforts. *Story credit: <http://www.volpe.dot.gov/noteworthy/2012/rtrpws.html>*



Volpe Supports Hurricane Sandy Relief Efforts, Helps Overcome Transportation Challenges

When Hurricane Sandy was bearing down on the northeastern U.S., Volpe community planner Terry Sheehan was directed to report to the Regional Response Command Center in Maynard, Maryland, as the Department of Transportation (DOT) Regional Emergency Transportation Representative for Region 1. Sheehan was responsible for coordinating the transportation of supplies such as food, water, blankets and generators to affected areas; coordinating the movement of utility crews from other states to affected areas; and assisting with organizing housing for responders who were sent onsite. When it became clear that New York and New Jersey would bear the brunt of the storm, Sheehan reported to an Emergency Operations Center at the base of the Brooklyn Bridge. The overarching priority was to respond to the needs of afflicted New Yorkers, and to ensure that they were given access to available transportation, fuel, shelter, medical assistance, and relief supplies. *Story credit: <http://www.volpe.dot.gov/noteworthy/2012/vshsre.html>*



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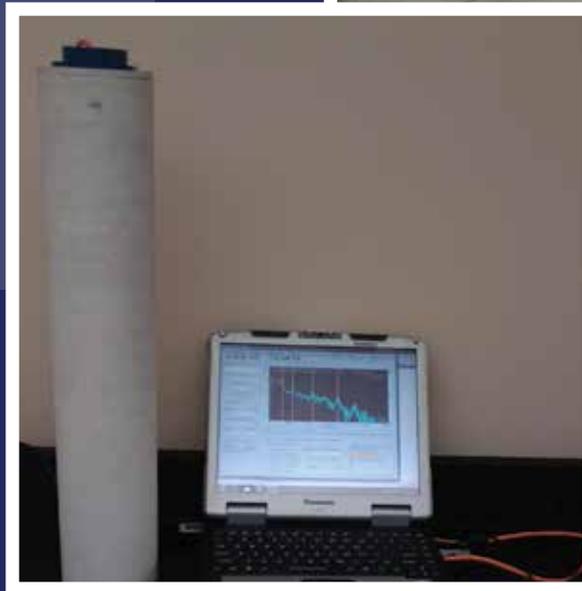
Radiation Detection System Offers Help to First Responders

The Radiological Emergency Management System (REMS) is a post-event gamma radiation sensor network designed for response and recovery after an accidental or deliberate release of radiation in an urban area. History has taught that advance planning, coupled with the availability of accurate, real-time information about an emergency incident, can significantly enhance response capabilities. It is to this end that REMS was conceived, pilot-tested, commercialized, and deployed in New York City.

Organized under the U.S. Department of Homeland Security's Science and Technology Directorate, the National Urban Security Technology Laboratory (NUSTL) is a federal laboratory located in New York City. The Laboratory formed the idea for REMS shortly after the events of September 11, 2001, when NUSTL scientists and engineers began investigating potential designs for the system. Over a six-year period, NUSTL conducted a pilot of a small REMS network comprising sensors located on rooftops in Manhattan. The success of the pilot led the New York Police Department (NYPD) to commit to the citywide implementation of REMS. To support this large-scale deployment, NUSTL's concept and design were commercialized via a Cooperative Research and Development Agreement with a major instrument manufacturer that currently provides REMS sensors for the NYPD.

Each sensor in the REMS network continuously measures environmental radiation levels and sends real-time data to a central command center. In the event of a radiation release, the system provides emergency managers with a single picture of the threat early in the incident. Specifically, the system reports radiation levels before responders enter an affected area, provides guidance on which areas to evacuate versus shelter-in-place, and offers officers timely information about potential radiation exposure. Additionally, data from REMS can be used to predict the path of a radioactive plume when integrated with an atmospheric plume dispersion model, enabling advance warning to affected areas. Not only does REMS serve lifesaving purposes, it also enables economic recovery by preventing unnecessary evacuations and expediting the return of residents to areas that are safe.

NYPD currently owns and operates the REMS network, for which NUSTL continues to provide technical expertise and services in support of its implementation and operation. The successful partnership experience of NUSTL and New York City with REMS provides a model for expansion of post-event radiation detection systems to other cities.



- ▲ REMS sensor installation in New York City
- ◀ REMS sensor undergoing testing at NUSTL

Photo credits: NUSTL staff



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Researchers Partner on Lyme Disease Vaccine

New York's Suffolk County, which is home to Stony Brook University and Brookhaven National Laboratory, is one of the nation's leaders in reported cases of Lyme disease. Thus, it is only fitting that the country's two largest research facilities would collaborate on finding a cure for the disease that causes arthritic problems and can lead to cardiac and neurological complications.

In 1984, Jorge Benach, Ph.D., of Stony Brook University made the landmark discovery of *Borrelia burgdorferi*, the organism that causes Lyme disease. This discovery provided researchers with an important tool to understanding the pathogenesis of the disease. Since the early 1990s, Benjamin Luft, M.D., of the Stony Brook University School of Medicine and the late John Dunn, Ph.D., of Brookhaven National Laboratory spearheaded the initial development of the original vaccine antigen concept.

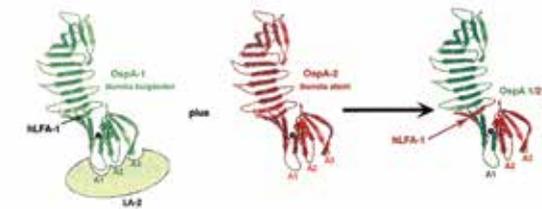
With the aid of technologies and expertise at Stony Brook and Brookhaven, Drs. Luft and Dunn focused vaccine development on the most abundant *Borrelia* outer surface protein. The spirochete bacteria produce this protein predominantly when they reside in ticks, which commonly transmit the disease.

Through the Stony Brook University School of Medicine and Brookhaven National Laboratory, the Research Foundation for the State of New York licensed intellectual property of the Lyme vaccine technology to Baxter International, S.A.,

a global healthcare company that develops, manufactures and markets products that treat people with hemophilia, immune disorders, infectious diseases, kidney disease, trauma, and other chronic and acute medical conditions.

Using the scaffold of the *Borrelia* outer surface protein, called OspA, the doctors collaborated with Baxter researchers to bioengineer a set of unique OspA proteins that were used to formulate the Lyme vaccine. Baxter conducted a European clinical trial that revealed the vaccine to be promising and well tolerated. After a series of refinements, formulations consisting of these new OspA proteins were shown to protect against a broad spectrum of Lyme disease spirochetes.

"The results of the clinical trial conducted by Baxter are promising because the vaccine generated a potent human immune reaction, covered the complete range of *Borrelia* active in the entire Northern Hemisphere, and produced no major side effects," said Dr. Luft. "We hope that a larger-scale, Phase 3 trial will demonstrate not only a strong immune response, but true efficacy in a large population that illustrates protection against Lyme disease."



To formulate a Lyme vaccine that is effective on all *Borrelia* species, researchers bioengineered a set of unique outer surface proteins that share different parts from different strains of the bacteria.



“We hope that a larger-scale, Phase 3 trial will demonstrate not only a strong immune response, but true efficacy in a large population that illustrates protection against Lyme disease.”

- DR. BENJAMIN LUFT



▲ Benjamin Luft, MD, Edmund D. Pellegrino Professor of Medicine, Stony Brook University School of Medicine

Photo credit: Stony Brook University School of Medicine



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“What makes this project unique is that Glenn has installed the first electrolysis-based refueling station in Ohio.”

- BRIANNE SCHEIDEGGER



People waiting to board the Zero Emission Hydrogen Fuel Cell Bus. ▲

Greater Cleveland RTA's fuel cell powered-bus ►

Photo credit: National Aeronautics and Space Administration, Glenn Research Center at Lewis Field



GLENN RESEARCH CENTER
National Aeronautics and Space Administration

NASA Technology Fuels Cleveland Bus Fleet

NASA Glenn Research Center's years of fuel cell research are helping to make traveling by bus a cleaner, quieter experience for passengers of the Greater Cleveland Regional Transit Authority (RTA). In 2009, NASA Glenn began supporting a community-based partnership to establish a hydrogen fueling station and add a hydrogen-powered demonstration bus to the RTA fleet. In 2012, working with subcontractor Sierra Lobo Inc., NASA Glenn installed a refueling station at RTA's Hayden bus garage in East Cleveland. The station, equipped with hydrogen sensors co-invented by NASA Glenn's Dr. Gary Hunter and commercialized under a Small Business Technology Transfer contract, generates hydrogen from water for use as fuel for the city bus.

“What makes this project unique is that (NASA) Glenn has installed the first electrolysis-based refueling station in Ohio,” said Brianne Scheidegger, technical lead for the refueling station under the Space Power Systems Project. “This means we don't have to transport hydrogen tanks; we make the fuel onsite, which is safer and more cost-effective.”

Scheidegger explained that most buses run on diesel- or gas-powered engines and emit the characteristic black plume of smoke when they

accelerate from a stop. Fuel cell buses, however, are powered by an electric motor, and use a fuel cell instead of a battery to generate the electricity. There are no harmful emissions, only water.

In January 2013, RTA invited the local media to learn more about the energy and environmental benefits of the hydrogen-powered bus. NASA Glenn employees, who have worked on the project through the years, joined the media on the bus to educate the public on the Center's role in fuel cell development.

“NASA Glenn has a long history of developing fuel cells, and we want the public to understand how they can be used in an efficient and clean transportation system,” said Dr. Carolyn Mercer, manager of the Space Power Systems Project. “The concept of a ‘fuel cell’ was around in the 1800s, but when NASA developed a fuel cell for the Gemini program during the early days of space flight, it enabled the creation of a viable commercial market for fuel cells—yet another way that NASA technology creates jobs.”



OHIO

FOR MORE INFORMATION, GO TO:

http://www.nasa.gov/centers/glenn/technology/hydrogen_bus.html

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Home Heating Technology Undergoes Emissions Testing

The U.S. Environmental Protection Agency's (EPA) Office of Research and Development (ORD) and the New York State Energy Research and Development Authority conducted a joint research project using a Cooperative Research and Development Agreement to characterize emissions, health impacts, and energy market penetration for a range of wood-fired, residential, hydronic heater technologies.

Four types of residential wood-burning technologies were evaluated and characterized at the ORD combustion laboratories in Research Triangle Park, North Carolina, for a variety of emissions under realistic, homeowner operation scenarios. The types of technologies evaluated included a common hydronic heater, a high-efficiency pellet heater, and a unit with thermal storage. Three types of fuel, namely red oak, white pine, and red oak with supplementary household refuse, were tested. Measurements included emissions of particulate matter, elemental carbon, carbon monoxide, polycyclic aromatic hydrocarbons, volatile organic compounds, semi-volatile organic compounds, and polychlorinated dibenzodioxins/dibenzofurans. This work was complemented

by an energy and market impacts analysis of hydronic heater emissions for the State of New York.

Lastly, the health effects of hydronic heater emissions were evaluated with an exposure study for pulmonary and systemic biomarkers of injury and inflammation. The results of this study are anticipated to be of value to New York State in its efforts to develop a high-efficiency biomass heating market of technologies with acceptable emissions performance. It is also anticipated that these results will be of value to the EPA as it sets new performance standards for biomass-fired hydronic heaters.



▲ Starting up the gasification/combustion unit to collect data on emissions from wood burning via gasification and combustion.
Photo credit: Brian Gullett, USEPA



◀ The wood pellet burning unit set up for collection of data on emissions from high-efficiency pellet heaters.

Photo credit: Brian Gullett, USEPA

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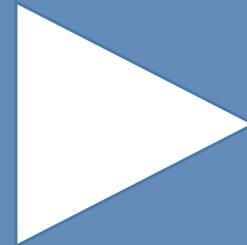
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STEM

VALUE #4

Science, technology, engineering, and mathematics (STEM) education is a key component to the U.S. maintaining its competitive edge over other nations in the 21st century and beyond. Federal laboratories have been leading the charge by initiating STEM programs that encompass all levels of formal education, including K-12, colleges and universities, post-doctoral programs, and nonprofit organizations supporting STEM.





In what turned out to be a most productive summer, the 711 HPW/RHA "GRILL" staff and its highly motivated student developers successfully produced and transitioned two important training simulation products.



High School Students Use Gaming Technology to Develop Training Course

If asked what they did last summer, several Dayton, Ohio students will be able to say that they lived in a "virtual world." But instead of immersing themselves in an exotic Avatar-like setting, these students spent their time developing a high school course to train the next generation of modeling and simulation (M&S) experts, as well as modeling a virtual Joint Command Operations Research Environment (JCORE) to support the training efforts of Wright State University's National Center for Medical Readiness (NCRM).

Drawn primarily from the Wright Scholar Research Assistant Program, the students worked for the Gaming Research Integration for Learning Laboratory (GRILL) of the Air Force Research Laboratory's (AFRL) 711th Human Performance Wing's Warfighter Readiness Research Division (HPW/RHA). Their assignment to GRILL was part of the AFRL's summer effort to support STEM (science, technology, education, and mathematics) education.

The first priority was selecting gaming engine tools that the students would use, based on factors like cost, capabilities, and portability. Ultimately, four alternatives were selected, with the students conducting usability assessments to determine which engine to select. Once the gaming engine and a capstone project, a simulation for a school evacuation, were identified, the students were

divided into teams and given the freedom to manage their time and creatively tackle the objectives of their assignment. Input from their mentors was minimal—and this trust was rewarded.

The students' efforts resulted in an extensive tutorial that served as the basis of teacher instruction for the M&S course, as well as an exemplar of the school evacuation project. After further development by a curriculum team, the course is now being piloted at Tri-Village High School in New Madison, Ohio. It will also be showcased at I/ITSEC, the world's largest modeling, simulation, and training conference, in Orlando, Florida.

After completing this project, the students applied their newly acquired skills to moving a version of the JCORE, developed during previous summers, to a more open environment. This enables JCORE to serve as a human interface layer for Live-Virtual-Constructive C2 integration at NCRM's Calamityville®, a state-of-the-art, collaborative training and research facility that prepares civilian and military medical communities to participate and react in an effective and meaningful manner with traditional disaster responders.



-  www.wpafb.af.mil/AFRL
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Falcon Telescope Network Helps to Identify Space Objects

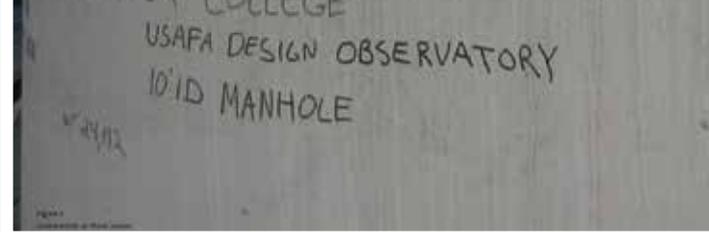
The Center for Space Situational Awareness Research (CSSAR) in the Department of Physics at the U.S. Air Force Academy (USAFA) is developing a \$2.25 million Falcon Telescope Network (FTN) and Cadet Space Operations Center to develop new techniques and algorithms for satellite characterization and data fusion for the space domain, conduct innovative astronomical research, and support STEM activities. The FTN, co-funded by the USAFA and the Air Force Office of Scientific Research, is a low-cost global network of small aperture telescopes that, when used in conjunction with pre-existing methods of space object identification, will demonstrate significant improvements in space situational awareness (SSA) capabilities.

Currently, the U.S. Space Surveillance Network maintains orbit information over 23,000 space objects, approximately 1,200 of which are active satellites. Of these, the U.S. owns and operates about half. As more powerful SSA sensors come online, it is estimated that the space catalog will increase another order of magnitude. Maintaining SSA requires a migration from catalog maintenance to full characterization and assessment of space objects. The ramifications of potential adversaries “hiding” a satellite weapon as a piece of debris or causing one of

their satellites to spawn barnacle satellites with the potential to conduct hostile operations would be catastrophic to the U.S. and its allies. Since the vast majority of space catalog objects are debris, characterizing those objects will enable new technologies for removing them from orbit and making space operations safer for all nations.

The initial FTN will consist of 12 fixed telescope sites and 2 mobile telescope observatories. Five telescopes will be located around Colorado, and at least four will be overseas. All of the FTN partners are educational institutions, and will have access to the entire network to support their own education curriculum, research, and STEM outreach to their local communities.

All of the components of an FTN observatory are commercially available and manufactured in the U.S., Italy or Canada. Each telescope node will be nearly identical in configuration, allowing easier maintenance and enabling robotic operations. The USAFA is providing all telescope equipment to each partner institution, while partners provide an observatory location, utilities, and communications. Some FTN partners are already constructing the observatory building in anticipation of receiving the telescope.



Faculty and staff of USAFA and Otero Junior College pose with a newly installed clamshell dome located on the La Junta campus.

View of the FalconSAT-5 taken from the Falcon telescope at USAFA.

Photo credit: Dr. Francis Chun, USAFA



COLORADO



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“The TCA is just one example of how USI’s Educational Partnership Agreement with NSWC Crane has encouraged innovation and technology transfer at both university and regional levels.”



▲ Matt Harms (left) and Thor Hogberg show off the Smart Target prototype in their product pitch in 2012.

Photo credit: USI Photo Services



NAVAL SURFACE WARFARE CENTER, CRANE DIVISION

U.S. Department of Defense – U.S. Navy

Business and Engineering Students Collaborate to Push Military Patents

An intensive summer program at the University of Southern Indiana (USI) brings students from engineering and business disciplines together to develop existing military patents into commercially viable ideas. Through USI’s partnership with the Naval Surface Warfare Center, Crane Division (NSWC Crane), students in the Technology Commercialization Academy (TCA) participate in a fast-paced ideation and product development process that culminates in prototype development and a final product pitch to community businesses and organizations.

The University piloted a five-week program in 2012, exploring technology transfer possibilities for Smart Skin technology and STMTRC, a milestone and schedule management software program—both Crane-patented technologies. Among the ideas developed were Smart Target, SchedUle, and Smart Cloth.

Smart Target, developed for use in target shooting, provides information about the location, timing, and size of target hits on the user’s smartphone, allowing sportsmen to know where their bullets or arrows landed from longer distances. SchedUle is an advising and scheduling tool to help college students register for classes. The program integrates information from university course offerings with the student’s transcripts and degree

requirements to help them create an efficient on-time graduation plan. Smart Cloth is a pressure-sensitive mat for hospital beds that prevents bedsores by detecting how long a patient has remained in the same position.

Experience pursuing entrepreneurial ambitions is one outcome the Academy hopes to achieve. Participants are encouraged not only to be innovative in the market research and development of their products, but also to present themselves and their ideas professionally and persuasively.

In 2013, the TCA expanded to include more students and five additional weeks of independent work, during which teams sporting strong ideas were encouraged to license and further develop their technologies, form startups, and reach out to potential customers and investors.

The TCA is just one example of how USI’s Educational Partnership Agreement with NSWC Crane has encouraged innovation and technology transfer at both university and regional levels. And NSWC Crane’s participation provides much-needed resources and expertise to the development of southwest Indiana’s economy and infrastructure.



 www.navsea.navy.mil/crane

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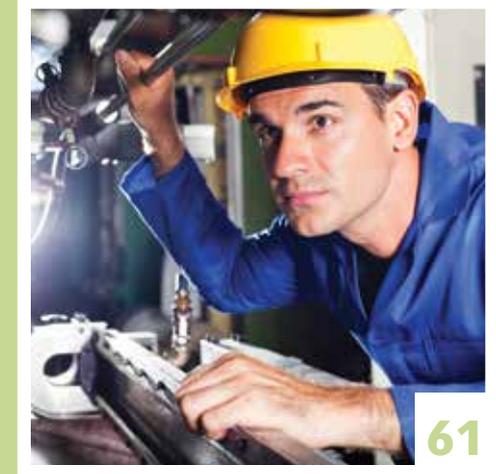


INDIANA

TECHNOLOGY DEPLOYMENT

VALUE #5

Federal laboratories have discovered that nations, state and local infrastructures are ideal testbeds for numerous technologies, including renewable energy, alternative fuels, and national security, among others. This presents the ideal avenue to engage state and local governments in successful partnerships with laboratories.





Partnership Allows South Carolina Businesses to Transfer Navy Technologies

In 2012 SCRA, a South Carolina-based applied research corporation, entered into a Partnership Intermediary Agreement (PIA) with the Space and Naval Warfare (SPAWAR) Systems Center (SSC) Atlantic. The company is using the PIA to leverage its knowledge and relationships to identify small businesses and educational institutions, while working with SPAWAR to transfer technologies. The ultimate objective of the partnership is to improve the economic, environmental, and social well-being of the U.S. in today's global economy by taking advantage of innovations developed in federal laboratories with taxpayer funds.

SSC Atlantic's ability to generate groundbreaking technology, combined with SCRA's ability to help entrepreneurs form successful technology companies, will bring technology and intellectual property generated and developed by SSC

Atlantic researchers and engineers to the commercial market. The Navy is a strong proponent of transferring this intellectual property into widespread use within the United States' industrial base.

"This partnership will serve as a model for growing the knowledge economy at both the state and national levels," said SCRA CEO Bill Mahoney. "Through intellectual property commercialization, we can help the U.S. Navy ensure high returns on investment for their research dollars, which will ultimately strengthen our nation's industrial base. We look forward to a productive and successful partnership with SPAWAR Systems Atlantic."

SCRA facilities
Photo credit: Bryan Bryant, SCRA



-  www.public.navy.mil/spawar/Atlantic
-  facebook.com/spaceandnavalwarfaresystemscommand
-  [@SPAWARHQ](https://twitter.com/SPAWARHQ)





TechLink: A Valued Resource in Licensing Federal Technologies

U.S. government agencies have a legislative mandate to attempt to transfer their inventions to the private sector for conversion into new products and services that benefit the nation's economy. The Air Force has been a leader in using "partnership intermediaries" to accomplish this mission. These state, local government, or nonprofit entities typically help their federal partners with technology transfer in order to generate technology-based economic development in their regions.

In 1999, the Air Force signed a first-of-a-kind agreement with Montana State University (MSU), resulting in the creation of MSU's TechLink, the first national partnership intermediary established by any U.S. government agency. Its mission is to help the national network of Department of Defense (DOD) laboratories become more successful in licensing their patented inventions to industry.

The approximately 100 DOD labs nationwide are awarded around 500 new patents each year. Before TechLink's involvement, the DOD executed up to 30 licensing agreements with industry annually. Since then, TechLink has played a key role in doubling the average number of licensing agreements to 60 per year. Over the past five years, it has brokered or facilitated more than half of all DOD licensing agreements.

To achieve this success, TechLink engages in a rigorous process that includes screening all new

DOD patented inventions; selecting a revolving portfolio of 75 inventions based on readiness level; engaging in highly focused marketing to industry; assisting companies with evaluating new technologies; helping companies prepare license applications and commercialization plans; and facilitating the entire licensing process to achieve "win-win" agreements between DOD labs and companies.

TechLink's efforts have been highly effective. It has established over 330 license agreements that have transferred approximately 860 DOD inventions to industry. In addition, TechLink has brokered an additional 560 Cooperative Research and Development Agreements (CRADAs) and other technology transfer agreements and partnerships between DOD and industry. These partnerships involve nearly 100 DOD labs and R&D organizations.

In 2012, TechLink surveyed companies to determine the total sales of new products and services resulting from TechLink-brokered agreements during 2000-2011. The companies reported that they had generated over \$1 billion in sales directly related to these agreements.

TechLink illustrates how well the Air Force has forged a partnership with a state government entity to achieve widespread technology transfer success for DOD laboratories.



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MONTANA & NATIONAL



AFRL Tech Transfer Critical to Historic Balloon Flight

The Air Force Research Laboratory (AFRL) and ATA Aerospace, LLC, participated in a history-making event when Austrian daredevil Felix Baumgartner jumped from 127,852 feet and broke the sound barrier. The AFRL Space Vehicles Directorate, through a Cooperative Research and Development Agreement (CRADA) executed with ATA Aerospace, developed key technologies for the Red Bull Stratos team.

ATA Aerospace leveraged the CRADA to use AFRL's facilities, equipment, and expertise gained in the lab to conduct testing, launch support, flight operations, and capsule and balloon recovery for Red Bull Stratos. ATA Aerospace's parent company, Applied Technology Associates (ATA), is a small business that was established in 1975 in Albuquerque, New Mexico. Throughout its history, ATA has provided large-scale experiment support to government and Department of Defense-sponsored advanced technology demonstration programs.

The record-breaking descent occurred in October 2012. The Red Bull Stratos team brought together the world's leading minds in aerospace medicine, engineering, pressure suit development, capsule creation, and balloon fabrication. In the jump from a high-altitude balloon capsule, Baumgartner reached speeds of 834 miles per hour, or Mach 1.25, becoming the first person to break the speed of sound in freefall.

While the event achieved extensive publicity, the flight's main purpose was to test new technologies. These tests demonstrated a newly developed pressurized space suit and an improved high-altitude parachute system for high altitude escapes. Tests show that it may have been possible for the Columbia crew to survive the space shuttle disintegration in the Earth's atmosphere if the crew had these technologies. ATA Aerospace worked with the Stratos program alongside AFRL's U.S. Air Force School of Aerospace Medicine, which provided chamber testing of the capsule to prove its flight worthiness and human survivability.

The CRADA with ATA Aerospace was also useful for University of New Mexico students working at AFRL's university research center, which offers numerous programs related to satellite design.

The CRADA has been an extremely valuable tool for ATA Aerospace to use in the transfer of technology—not only into the local community, but the global community as well. It helped organizations that otherwise would not have access to AFRL technology, and provided AFRL researchers with valuable test and design experience.



▲ Felix Baumgartner setting freefall record on October 14, 2012.

ATA Aerospace Launch Crew for Red Bull Stratos. Also in the photo is Vernon Baker (back row, fourth from the left), who was the Air Force Research Laboratory's chief engineer on the project. AFRL's 45-ton Grove crane (in the background) was essential to the launch of the balloon.

Photo credit: ATA-Aerospace



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NEW MEXICO



Maryland Initiative Helps Companies Transfer Biomedical Technologies

The U.S. Army Medical Research and Materiel Command (MRMC) partnered with the Maryland Technology Development Corporation (TEDCO) to conduct the Fort Detrick Technology Transfer Initiative (FDTTI). The initiative was set up as an economic development program focused on small businesses advancing biotech and biomedical technologies of interest to MRMC. In a five-year period, 25 awards of \$50,000 each were made to the small businesses. Applications for FDTTI came from as far away as Hawaii. Company awards were made in New Mexico, Massachusetts, and Maryland.

Currently, a new program called the Joint Technology Transfer Initiative (JTTI) is in the process of identifying small companies to meet the needs of both the Department of Homeland Security (DHS) and MRMC. Ten of 11 awards have been made, and 4 companies have completed their projects.

Several of the companies involved with JTTI have had promising follow-on activities. The first company has raised a \$2 million Series A round of investment to fund commercialization of its project. Targeted markets are the federal government and first responders. Among the investors is a Fortune 500 corporation.

A second company received additional support from TEDCO to build an alpha prototype. The company presented its project to a DHS audience of 40 people, with prospects for further DHS funding being discussed. The company has completed a \$200,000 investment round for the build-out of a demonstration model. In addition, DHS has introduced the company's capabilities to the FBI.

Another company initiated a five-year Cooperative Research and Development Agreement, and approached the Defense Threat Reduction Agency to consider a follow-on purchase order. An Army collaborator involved with the project declared the technology to have a "remarkable capability,"

A fourth company's project was successful, but has not had follow-on federal interest, although it is doing well in the commercial marketplace with another technology.



Dr. Justin M. Hartings, President, Biaera Technologies (first FDTTI recipient next to an early prototype) was assigned to U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID) as an Army captain. He was responsible for supervising all of the aerosol procedures at USAMRIID. In 2003, he licensed his invention from USAMRMC and founded Biaera Technologies. He continues to develop new technologies for aerobiology research. Biaera Technologies products are sold to the federal government and around the world.

Photo credit: R. Kaese, TEDCO



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MARYLAND



Partnership Helps Identify Inventions to Help Cancer Patients

The Technology Transfer Center at the National Cancer Institute (NCI) and the Office of Technology Transfer at the National Institutes of Health (NIH) have formed a partnership with The Center for Advancing Innovation, Inc. (CAI) to identify NCI inventions with commercial potential and to assist with commercialization of the inventions. CAI is a nonprofit whose mission is to accelerate and increase the volume of technology transfer, translational research, and commercialization to expand the impact of research institutes.

The NCI has over 4,000 inventions developed in its laboratories, and many have significant potential for the advancement of science or the public health through commercialization. The goal of this partnership is to move the inventions to companies that can develop them into a commercially viable product.

The partnership allows CAI to promote NCI inventions and co-development opportunities—ultimately benefiting NCI, NIH and CAI. This will be accomplished through organized efforts among the three to establish meetings between NCI inventors and prospective companies, with an expected outcome of increased collaborations or licenses on the promoted NCI technologies. CAI is also establishing connections with many state government organizations to identify how NCI and NIH's valuable assets can drive "growth breakthroughs" for states.

The partnership has already achieved significant milestones in addition to the connections made with state economic development groups. CAI has analyzed NCI's large portfolio against a robust framework to determine commercial viability. Altogether, CAI's assessment model includes 132 variables, including but not limited to market attractiveness, medical/scientific viability, and collaboration potential.

CAI has also interviewed over 100 life sciences venture and licensing organizations, venture capital firms, private equity organizations, foundations and stakeholders to create a "demand database." The database contains the indications and inventions that are of both high and low interest. The NCI and NIH are using their internal expertise organizing collaboration discussions between inventors and licensee prospects throughout the process, and using their resources to support co-development of the technologies.

Working together, NCI, NIH and CAI are supporting the NIH mission by advancing the development of these technologies and accelerating their access to patients. The three parties also are collaborating on a soon-to-be-announced "extreme commercialization" model.



From left to right: Rose Freel¹, Jennifer Wong², John Hewes¹, Tom Stackhouse¹, Rosemarie Truman³, Jasmine Yang¹. Inset³, left to right: Brenda Pan, Cindera Feng, Ravikiran Bhairavabhotla, Jonathan Liu, Julien Senac, Youhong Wang, Tianci (Jessie) Zhang, Mengying Yu. Not pictured³: Adeola Makinde and Victor Pan.

¹National Cancer Institute, Technology Transfer Center, ²National Institutes of Health, Office of Technology Transfer, ³Center for Advancing Innovation



 ttc.nci.nih.gov

 www.thecenterforadvancinginnovation.org

 [@NCITechTransfer](https://twitter.com/NCITechTransfer)





NASA Johnson Opens Center to Help Texas Entrepreneurs

At NASA's Johnson Space Center (JSC), a strategic initiative has been designed to maximize the knowledge base and innovation of JSC's workforce to build on the economic strength of the local communities and the State of Texas. In November 2012, the JSC Acceleration Center was opened thanks to a partnership with the Houston Technology Center (HTC), primarily enabled through funding from the State of Texas.

As part of an innovation strategy, JSC Deputy Chief of Strategic Opportunities and Partnership Development Steven Gonzalez said, "Thanks to JSC having a longstanding partnership with HTC, and the Center Director and the senior partner at HTC's commitment to bringing resources to Clear Lake and southeast Houston area, as well as JSC, to help build company partnerships and to transfer technologies in and out for industry, academia and business organizations."

As part of the agreement with the HTC, the JSC Acceleration Center provides onsite offices to entrepreneurs and startup companies to enhance collaboration for business growth and future technology development. Gonzalez added, "The community, engineers, scientists and industry leaders get inspired by NASA. Through the Acceleration Center, we are enabling more dialogues between NASA and the entrepreneurial society using a very strategically identified and distinctive space." As much as the agency

is focused on technology transfer, JSC is also hoping to grow technology companies, thereby accelerating NASA technology further.

The HTC operates its entire satellite campus in the JSC Acceleration Center. HTC's objective is to harness technical know-how and provide business advice, incubation and acceleration services. Since 1999, the Center has provided feedback to well over 1,000 companies and coached nearly 300. Entrepreneurs and startup companies are provided access to commercial and technical expertise as they explore opportunities to further develop and commercialize emerging NASA technologies. Clients receive help with business incubation, acceleration, recruitment and screening from strategic partners, expert advisors and the broad JSC space community.

The biggest objectives for the Acceleration Center are to commercialize the incredible technologies found within the NASA/JSC community, build stronger businesses, and encourage further economic growth for the area. Former JSC Director Michael Coats summed it up, saying, "This is a strategic initiative designed to maximize the knowledge base and innovation of our workforce, as well as those with local communities and the State of Texas."



Houston Technology Center provides training for potential entrepreneurs and startups in the Acceleration Center. ▲

The Acceleration Center design features an environment that facilitates innovation and entrepreneurship. ►

Photo credit: NASA

 www.nasa.gov/johnson

 facebook.com/NASAJSC

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TEXAS

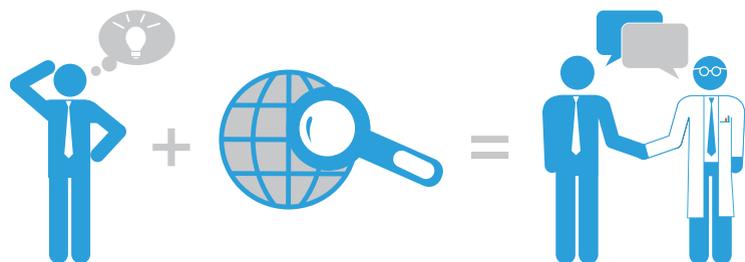
FLC TECHNOLOGY LOCATOR

For industry and other technology seekers, the FLC Technology Locator network serves as a point of entry to federal laboratory expertise and technology. In meeting this need, the network also handles requests from other organizations working with the private sector. These organizations include NASA's Regional Technology Transfer Centers, the National Technology Transfer Center, and state-funded economic development centers.

Through its network of representatives, the FLC puts a potential partner in contact with a federal laboratory with expertise and capability in a specific area of interest. Once the FLC identifies the contact, the arrangements for the technical exchange are between the user and the laboratory. The network does best when the user makes the request as specific as possible and identifies considerations such as technical need, constraints, and intended use. A central FLC Technology Locator helps the network match user technical requests for expertise and facilities with appropriate federal laboratory capabilities.

HOW IT WORKS:

- Identifies laboratory technical resources that can respond to specific requests.
- Provides referrals to other federal resources.
- Uses an FLC technical specialist system to complement information sources and network expertise.
- Publishes directories that focus on special needs such as automotive materials or defense conversion partnerships.
- The unique network structure of the FLC, the person-to-person technical linkages, and the central FLC Technology Locator are vital factors in linking user needs to a federal laboratory person with a special expertise or capability.



The FLC Technology Locator Service helps potential collaborators take advantage of the vast reservoir of technology and expertise located within federal laboratories.

As a direct result of the FLC Technology Locator Service, the Exploratory Advanced Research Program for the Federal Highway Administration's (FHWA) Turner-Fairbank Highway Research Center is now able to explore options to identify large (i.e., no smaller than tennis or basketball courts), multi-story environmental chambers outside the U.S. These chambers must have the capability to subject aircraft to numerous environmental conditions such as temperature, light exposure, humidity, and salt spray.



"I am pleased with the service, response, and quick turnaround the FLC Locator has provided in my search. The resources and content that were provided are an invaluable help to our search for a facility to accelerate the testing of partial or full-scale structures." —**Lance Warren, MLS, Research Librarian, Exploratory Advanced Research (EAR) Program, FHWA Research Library**

A global consumer products company is in contact with several federal laboratories in a continuing effort to improve product performance and reduce the product's environmental footprint.

"With the assistance of the FLC Technology Locator, we have initiated discussions with several federal laboratories to identify technologies that we can incorporate into our products and manufacturing process to meet consumer expectations and achieve our sustainability goals." —**Innovation Manager**



Harlyn Thompson, R.N., of Harlyn Medical, LLC (HM) (www.harlynmedical.com) introduced the Lumbar Vicinity Inflatable Support (LVIS) device at the FLC meeting in Portland, Ore. The FLC Technology Locator has been working with Ms. Thompson to introduce the device to military medical personnel.



"We are collaborating with a military surgeon in Afghanistan who is testing LVIS for use under wounded soldiers during long medical air flight evacuations. We are also working with VA, military, and civilian hospitals across the country. We at HM are nurses finding solutions... and our products are proudly made in the USA." —**Harlyn Thompson, R.N.**

FOR MORE INFORMATION:

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- 856-667-7727
- fkoos@totaltechnologyinc.net
- federallabs.org/locator

ALABAMA

Aeromedical Research Laboratory

Dept. of Defense - Army
www.usaarl.army.mil

Alabama Water Science Center

Dept. of Interior
http://al.water.usgs.gov

Army Aviation and Missile Research, Development, and Engineering Center

Dept. of Defense - Army
www.redstone.army.mil/amrdec/

Marshall Space Flight Center

NASA
www.nasa.gov/centers/marshall/home/index.html

Redstone Test Center

Dept. of Defense - Army
www.rtc.army.mil

U.S. Army Space and Missile Defense Command

Dept. of Defense - Army
www.army.mil/info/organization/unitsandcommands/commandstructure/smdc/

ALASKA

Alaska Science Center

Dept. of Interior
http://alaska.usgs.gov

National Energy Technology Laboratory - Fairbanks

Dept. of Energy
www.netl.doe.gov

ARIZONA

Arizona Water Science Center

Dept. of Interior
http://az.water.usgs.gov

Astrogeology Science Center

Dept. of Interior
http://astrogeology.usgs.gov

Electronic Proving Ground

Dept. of Defense - Army
www.epg.army.mil

Yuma Proving Ground

Dept. of Defense - Army
www.yuma.army.mil

ARKANSAS

Arkansas Water Science Center

Dept. of Interior
http://ar.water.usgs.gov

National Center for Toxicological Research

Dept. of Health and Human Services
www.fda.gov/AboutFDA/CentersOffices/OC/OfficeofScientificandMedicalPrograms/NCTR/default.htm

CALIFORNIA

AMRDEC - Aeroflightdynamics Directorate

Dept. of Defense - Army
www.redstone.army.mil/amrdec/RD&E/AFDD.html

ARS - Pacific West Area

Dept. of Agriculture
www.ars.usda.gov/AboutUs/AboutUs.htm?modecode=53-00-00-00

Air Force Flight Test Center

Dept. of Defense - Air Force
www.edwards.af.mil

Ames Research Center

NASA
http://www.nasa.gov/centers/ames/home/index.html

Biological Resources Discipline - Western Regional Office

Dept. of Interior
www.glsc.usgs.gov/main.php?content=links_BRD&title=Links0&menu=links

California Water Science Center

Dept. of Interior
http://ca.water.usgs.gov

Defense Language Institute Foreign Language Center

Dept. of Defense
www.dliflc.edu

Defense Microelectronics Activity

Dept. of Defense
www.dmea.osd.mil

Dryden Flight Research Center

NASA
www.nasa.govcenters/dryden/home/index.html

FS - San Dimas Technology and Development Center

Dept. of Agriculture
www.fs.fed.us/eng/techdev/sdtcdc.htm

Jet Propulsion Laboratory

NASA
www.jpl.nasa.gov

Lawrence Berkeley National Laboratory

Dept. of Energy
www.lbl.gov

Marine Corps Installations West

Dept. of Defense - Navy
www.mciwest.marines.mil/

NNSA - Lawrence Livermore National Laboratory

Dept. of Energy
www.llnl.gov

NNSA - Sandia National Laboratories - California

Dept. of Energy
www.ca.sandia.gov

Naval Air Warfare Center - Weapons Division - China Lake and Pt. Mugu

Dept. of Defense - Navy
www.navair.navy.mil/nawcwwd/

Naval Facilities Engineering Service Center

Dept. of Defense - Navy
https://portal.navfac.navy.mil

Naval Health Research Center

Dept. of Defense - Navy
www.med.navy.mil/sites/nhrc/Pages/default.aspx

Naval Medical Center - San Diego

Dept. of Defense - Navy
www.med.navy.mil/sites/nmcsd/Pages/default.aspx

Naval Postgraduate School

Dept. of Defense - Navy
www.nps.edu

Naval Surface Warfare Center - Port Hueneme Division

Dept. of Defense - Navy
www.navsea.navy.mil/nswc/porthueneme/default.aspx

Space and Naval Warfare Systems Center - Pacific

Dept. of Defense - Navy
www.spawar.navy.mil

Stanford Linear Accelerator Center

Dept. of Energy
www.slac.stanford.edu

UCLA - Laboratory of Structural Biology and Molecular Medicine

Dept. of Energy
www.doe-mbi.ucla.edu

COLORADO

ARS - Northern Plains Area

Dept. of Agriculture
www.ars.usda.gov/Main/docs.htm?docid=16557

Air Force Academy

Dept. of Defense - Air Force
www.usafa.af.mil

Biological Resources Discipline - Central Regional Office

Dept. of Interior
www.usgs.gov/

Boulder Laboratories

Dept. of Commerce
www.boulder.doc.gov/

Bureau of Reclamation

Dept. of Interior
www.usbr.gov

Colorado Water Science Center

Dept. of Interior
http://co.water.usgs.gov

Earth System Research Laboratory

Dept. of Commerce
www.esrl.noaa.gov

Fort Collins Science Center

Dept. of Interior
www.mesc.usgs.gov

FRA - Transportation Technology Center

Dept. of Transportation
www.aar.com/

FS - Rocky Mountain Research Station

Dept. of Agriculture
www.fs.fed.us/rm/

NTIA - Institute for Telecommunication Sciences

Dept. of Commerce
www.its.bldrdoc.gov

National Renewable Energy Laboratory

Dept. of Energy
www.nrel.gov

WS - APHIS - National Wildlife Research Center

Dept. of Agriculture
www.aphis.usda.gov/wildlife_damage/nwrc/

CONNECTICUT

Naval Submarine Medical Research Laboratory

Dept. of Defense - Navy
www.med.navy.mil/sites/nsmrl/Pages/default.aspx

U.S. Coast Guard Research and Development Center

Dept. of Homeland Security
www.uscg.mil/hq/cg9/rdc/

DISTRICT OF COLUMBIA

Center for Food Safety and Applied Nutrition

Dept. of Health and Human Services
www.fda.gov/Food/default.htm

Missile Defense Agency

Dept. of Defense
www.mda.mil

National Center for Environmental Research

Environmental Protection Agency
www.epa.gov/ncer/

Naval Facilities Engineering Command

Dept. of Defense - Navy
https://portal.navfac.navy.mil

Naval Research Laboratory

Dept. of Defense - Navy
www.nrl.navy.mil

Office of Science Policy

Environmental Protection Agency
www.epa.gov/osp/

U.S. Naval Observatory

Dept. of Defense - Navy
www.usno.navy.mil/USNO

FLORIDA

AFRL - Munitions Directorate

Dept. of Defense - Air Force
www.eglin.af.mil/units/afrlmunitionsdirectorates/index.asp

Air Force Civil Engineer Center

Dept. of Defense - Air Force
www.afcec.af.mil/

Applied Research Center

Dept. of Energy
www.arc.fiu.edu

FISC - Center for Coastal and Watershed Studies

Dept. of Interior
http://coastal.er.usgs.gov/

FISC - Water Resources of Florida - Tallahassee

Dept. of Interior
http://fl.water.usgs.gov

Kennedy Space Center

NASA
www.nasa.gov/centers/kennedy/home/index.html

National High Magnetic Field Laboratory

National Science Foundation
www.magnet.fsu.edu/about/

Naval Aerospace Medical Research Laboratory

Dept. of Defense - Navy
www.med.navy.milsites/nhrc/namrl

Naval Air Warfare Center Training Systems Division

Dept. of Defense - Navy
www.navair.navy.mil/nawctsd/

Naval Surface Warfare Center - Panama City Division

Dept. of Defense - Navy
www.navsea.navy.mil/nswc/panamacity/default.aspx

RDECOM - Simulation and Training Technology Center

Dept. of Defense - Army
www.arl.army.mil/www/default.cfm?page=540

GEORGIA

ARS - South Atlantic Area

Dept. of Agriculture
www.ars.usda.gov/main/site_main.htm?modecode=66-00-00-00

Centers for Disease Control and Prevention

Dept. of Health and Human Services
www.cdc.gov/

CDID Experimentation Division (Network Battle Lab)

Dept. of Defense - Army
www.gordon.army.mil/

Federal Law Enforcement Training Center

Dept. of Homeland Security
www.fletc.gov

Georgia Water Science Center

Dept. of Interior
http://ga.water.usgs.gov

Office of Infectious Diseases

Dept. of Health and Human Services
www.cdc.gov/oid/

Warner Robins Air Logistics Center

Dept. of Defense - Air Force
www.robins.af.mil

HAWAII

NWHC - Honolulu Field Station

Dept. of Interior
www.nwhc.usgs.gov/hfs/

IDAHO

Idaho National Laboratory

Dept. of Energy
www.inl.gov

Idaho Water Science Center

Dept. of Interior
http://id.water.usgs.gov

ILLINOIS

ARS - Midwest Area

Dept. of Agriculture
www.ars.usda.gov/main/site_main.htm?modecode=36-00-00-00

Argonne National Laboratory

Dept. of Energy
www.anl.gov

Center for Advanced Cement-Based Materials

Dept. of Commerce
http://acbm.northwestern.edu

Fermi National Accelerator Laboratory

Dept. of Energy
www.fnal.gov

Illinois Water Science Center

Dept. of Interior
http://il.water.usgs.gov

New Brunswick Laboratory

Dept. of Energy
www.nbl.doe.gov

U.S. Transportation Command

Dept. of Defense
www.transcom.mil

USACE - ERDC - Construction Engineering Research Laboratory

Dept. of Defense - Army
www.erdcl.usace.army.mil/Locations/ConstructionEngineeringResearchLaboratory.aspx

INDIANA

Indiana Water Science Center

Dept. of Interior
http://in.water.usgs.gov

Naval Surface Warfare Center - Crane Division

Dept. of Defense - Navy
www.navsea.navy.mil/nswc/crane/default.aspx

IOWA

Ames Laboratory

Dept. of Energy
www.ameslab.gov

Iowa Water Science Center

Dept. of Interior
http://ia.water.usgs.gov

KANSAS

Kansas Water Science Center
Dept. of Interior
<http://ks.water.usgs.gov>

TRADOC Analysis Center
Dept. of Defense - Army
www.trac.army.mil

KENTUCKY

Kentucky Water Science Center
Dept. of Interior
<http://ky.water.usgs.gov>

LOUISIANA

Louisiana Water Science Center
Dept. of Interior
<http://la.water.usgs.gov>

National Wetlands Research Center
Dept. of Interior
www.nwrc.usgs.gov

MAINE

Maine Water Science Center
Dept. of Interior
<http://me.water.usgs.gov>

MARYLAND

ARS - Beltsville Area
Dept. of Agriculture
www.ba.ars.usda.gov

Aberdeen Test Center
Dept. of Defense - Army
www.atc.army.mil

Army Research Laboratory - Aberdeen Proving Ground Site
Dept. of Defense - Army
www.arl.army.mil

Army Research Laboratory - Adelphi Site
Dept. of Defense - Army
www.arl.army.mil

Center for Biologics Evaluation and Research
Dept. of Health and Human Services
www.fda.gov/BiologicsBloodVaccines

Center for Devices and Radiological Health
Dept. of Health and Human Services
www.fda.gov/AboutFDA/CentersOffices/OfficeofMedicalProductsandTobacco/CDRH/default.htm

Center for Drug Evaluation and Research
Dept. of Health and Human Services
www.fda.gov/Drugs/default.htm

Center for Environmental Health Research
Dept. of Defense - Army
<http://usacehr.amedd.army.mil>

Center for Information Technology
Dept. of Health and Human Services
<http://cit.nih.gov/>

Center for Veterinary Medicine
Dept. of Health and Human Services
www.fda.gov/AnimalVeterinary/default.htm

Clinical Center
Dept. of Health and Human Services
www.cc.nih.gov

DISA - Joint Interoperability Test Command
Dept. of Defense
<http://jitc.fhu.disa.mil>

Edgewood Chemical Biological Center
Dept. of Defense - Army
www.ecbc.army.mil/

Fogarty International Center
Dept. of Health and Human Services
www.fic.nih.gov

Goddard Space Flight Center
NASA
www.nasa.gov/centers/goddard/home/index.html

Institute for Systems Research
National Science Foundation
www.isr.umd.edu

Maryland-Delaware-District of Columbia Water Science Center
Dept. of Interior
<http://md.water.usgs.gov>

NSA - National Information Assurance Research Laboratory
National Security Agency
www.nsa.gov/research/ia_research/index.shtml

National Biodefense Analysis and Countermeasures Center
Dept. of Homeland Security
www.dhs.gov/national-biodefense-analysis-and-countermeasures-center

National Cancer Institute
Dept. of Health and Human Services
www.cancer.gov

National Center for Complementary and Alternative Medicine
Dept. of Health and Human Services
<http://nccam.nih.gov>

National Center for Research Resources
Dept. of Health and Human Services
www.ncrr.nih.gov

National Eye Institute
Dept. of Health and Human Services
www.nei.nih.gov

National Geospatial-Intelligence Agency
Dept. of Defense
<https://www1.nga.mil/Pages/Default.aspx>

National Heart, Lung, and Blood Institute
Dept. of Health and Human Services
www.nhlbi.nih.gov

National Human Genome Research Institute
Dept. of Health and Human Services
www.genome.gov

National Institute of Allergy and Infectious Diseases
Dept. of Health and Human Services
www.niaid.nih.gov

National Institute of Arthritis and Musculoskeletal and Skin Diseases
Dept. of Health and Human Services
www.nih.gov/about/almanac/organization/NIAMS.htm

National Institute of Biomedical Imaging and Bioengineering
Dept. of Health and Human Services
www.nibib.nih.gov/

National Institute of Child Health and Human Development
Dept. of Health and Human Services
www.nichd.nih.gov

National Institute of Dental and Craniofacial Research
Dept. of Health and Human Services
www.nidcr.nih.gov

National Institute of Diabetes and Digestive and Kidney Diseases
Dept. of Health and Human Services
www2.niddk.nih.gov

National Institute of General Medical Sciences
Dept. of Health and Human Services
www.nigms.nih.gov

National Institute of Mental Health
Dept. of Health and Human Services
www.nimh.nih.gov

National Institute of Neurological Disorders and Stroke
Dept. of Health and Human Services
www.ninds.nih.gov

National Institute of Nursing Research
Dept. of Health and Human Services
www.ninr.nih.gov

National Institute of Standards and Technology
Dept. of Commerce
www.nist.gov

National Institute on Aging
Dept. of Health and Human Services
www.nia.nih.gov

National Institute on Alcohol Abuse and Alcoholism
Dept. of Health and Human Services
www.niaaa.nih.gov

National Institute on Deafness and Other Communication Disorders
Dept. of Health and Human Services
www.nidcd.nih.gov

National Institute on Drug Abuse
Dept. of Health and Human Services
www.nida.nih.gov

National Institutes of Health
 Dept. of Health and Human Services
www.nih.gov

National Library of Medicine
 Dept. of Health and Human Services
www.nlm.nih.gov

National Security Agency
 Dept. of Defense
www.nsa.gov

Naval Air Warfare Center - Aircraft Division - Patuxent River
 Dept. of Defense - Navy
www.navair.navy.mil/nawcad/

Naval Explosive Ordnance Disposal Technology Division
 Dept. of Defense - Navy
www.navsea.navy.mil/nswc/eodtechdiv/default.aspx

Naval Medical Research Center
 Dept. of Defense - Navy
www.nmrc.navy.mil

Naval Surface Warfare Center - Carderock Division
 Dept. of Defense - Navy
www.navsea.navy.mil/nswc/carderock/default.aspx

Naval Surface Warfare Center - Indian Head Division
 Dept. of Defense - Navy
www.navsea.navy.mil/nswc/indianhead/default.aspx

Office of Research Services
 Dept. of Health and Human Services
www.ors.od.nih.gov

RDECOM - CERDEC Command, Power & Integration Directorate - CP&I
 Dept. of Defense - Army
www.cerdec.army.mil/directorates/cpi.asp

RDECOM - CERDEC - Intelligence and Information Warfare Directorate
 Dept. of Defense - Army
www.cerdec.army.mil/directorates/i2wd.asp

RDECOM - CERDEC - Software Engineering Directorate
 Dept. of Defense - Army
www.cerdec.army.mil/directorates/sed.asp

RDECOM - CERDEC - Space and Terrestrial Communications Directorate
 Dept. of Defense - Army
www.cerdec.army.mil/directorates/stcd.asp

Test and Evaluation Command
 Dept. of Defense - Army
www.atec.army.mil

U.S. Army Medical Materiel Development Activity
 Dept. of Defense - Army
www.usammda.army.mil

U.S. Army Medical Research Institute of Chemical Defense
 Dept. of Defense - Army
<http://usamricd.apgea.army.mil>

U.S. Army Medical Research Institute of Infectious Diseases
 Dept. of Defense - Army
www.usamriid.army.mil

U.S. Army Medical Research and Materiel Command
 Dept. of Defense - Army
<https://mrmc.detrack.army.mil>

USAMRMC - Telemedicine and Advanced Technology Research Center
 Dept. of Defense - Army
www.tatrc.org/

Uniformed Services University of the Health Services
 Dept. of Defense
www.usuhs.mil

United States Naval Academy
 Dept. of Defense - Navy
www.usna.edu

Walter Reed Army Institute of Research
 Dept. of Defense - Army
<http://wrair-www.army.mil>

Walter Reed National Military Medical Center
 Dept. of Defense - Navy
<http://www.wrnmmc.capmed.mil/>

MASSACHUSETTS

AFRL - Space Vehicles Directorate - Kirtland AFB
 Dept. of Defense - Air Force
www.kirtland.af.mil/afrl_vs/

Electronic Systems Center
 Dept. of Defense - Air Force
www.hanscom.af.mil

Massachusetts/Rhode Island Water Science Center
 Dept. of Interior
<http://ma.water.usgs.gov>

Natick Soldier Research, Development & Engineering Center
 Dept. of Defense - Army
<http://nsrdec.natick.army.mil>

Navy Clothing and Textile Research Facility
 Dept. of Defense - Navy
www.navsup.navy.mil/navsup/ourteam/nexcom/prod_serv/nctrf

RITA - Volpe National Transportation Systems Center
 Dept. of Transportation
www.volpe.dot.gov

U.S. Army Research Institute of Environmental Medicine
 Dept. of Defense - Army
www.usariem.army.mil

MICHIGAN

Great Lakes Science Center
 Dept. of Interior
www.glsc.usgs.gov

Michigan Water Science Center
 Dept. of Interior
<http://mi.water.usgs.gov>

Tank Automotive Research, Development and Engineering Center
 Dept. of Defense - Army
<http://tardec.army.mil>

MINNESOTA

Minnesota Water Science Center
 Dept. of Interior
<http://mn.water.usgs.gov>

MISSISSIPPI

ARS - Mid South Area
 Dept. of Agriculture
www.ars.usda.gov/main/site_main.htm?modecode=64-00-00-00

Engineer Research and Development Center (ERDC)
 Dept. of Defense - Army
www.erd.c.usace.army.mil

Mississippi Water Science Center
 Dept. of Interior
<http://ms.water.usgs.gov>

Naval Meteorology and Oceanography Command
 Dept. of Defense - Navy
www.navmetoccom.navy.mil

Stennis Space Center
 NASA
<http://www.nasa.gov/centers/stennis/home/index.html>

USACE - ERDC - Coastal and Hydraulics Laboratory
 Dept. of Defense - Army
<http://chl.erd.c.usace.army.mil>

USACE - ERDC - Environmental Laboratory
 Dept. of Defense - Army
<http://el.erd.c.usace.army.mil>

USACE - ERDC - Geotechnical and Structures Laboratory
 Dept. of Defense - Army
<http://gsl.erd.c.usace.army.mil>

USACE - ERDC - Information Technology Laboratory
 Dept. of Defense - Army
<http://itl.erd.c.usace.army.mil>

MISSOURI

Columbia Environmental Research Center
 Dept. of Interior
www.cerc.usgs.gov

Missouri Water Science Center
 Dept. of Interior
<http://mo.water.usgs.gov>

NNSA - Kansas City Plant
 Dept. of Energy
<http://nnsa.energy.gov/aboutus/ourlocations/kansas-city-plant>

MONTANA

FS - Missoula Technology and Development Center
 Dept. of Agriculture
www.fs.fed.us/eng/techdev/mtdc.htm

Montana Water Science Center
 Dept. of Interior
<http://mt.water.usgs.gov>

NEBRASKA

Air Force Weather Agency
 Dept. of Defense - Air Force
www.afweather.af.mil

Nebraska Water Science Center
 Dept. of Interior
<http://nevada.usgs.gov/water/>

NEVADA

NNSA - Nevada Field Office
 Dept. of Energy
www.nv.doe.gov

Nevada Water Science Center
 Dept. of Interior
<http://nevada.usgs.govwater/>

NEW HAMPSHIRE

New Hampshire/Vermont Water Science Center
 Dept. of Interior
<http://nh.water.usgs.gov>

Portsmouth Naval Shipyard
 Dept. of Defense - Navy
www.navsea.navy.mil/shipyards/portsmouth/default.aspx

USACE - ERDC - Cold Regions Research and Engineering Laboratory
 Dept. of Defense - Army
www.crrel.usace.army.mil

NEW JERSEY

Naval Air Warfare Center - Aircraft Division - Lakehurst
 Dept. of Defense - Navy
www.navair.navy.mil/nawcad

New Jersey Water Science Center
 Dept. of Interior
<http://nj.usgs.gov>

Princeton Plasma Physics Laboratory
 Dept. of Energy
www.pppl.gov

RDECOM - Communications-Electronics Research, Development and Engineering Center
 Dept. of Defense - Army
www.cerdec.army.mil

Transportation Security Laboratory
 Dept. of Homeland Security
www.dhs.gov/transportation-security-laboratory

U.S. Army Research, Development, and Engineering Command
 Dept. of Defense - Army
www.army.mil/info/organization/unitsandcommands/commandstructure/rdecom/

William J. Hughes Technical Center
 Dept. of Transportation
www.faa.gov/about/office_org/headquarters_offices/ang/offices/tc/

NEW MEXICO

AFRL - Directed Energy Directorate
 Dept. of Defense - Air Force
www.kirtland.af.mil/afrl_de/

AFRL - Space Vehicles Directorate - Kirtland AFB
 Dept. of Defense - Air Force
www.kirtland.af.mil/afrl_vs/

NNSA - Los Alamos National Laboratory
 Dept. of Energy
www.lanl.gov

New Mexico Water Science Center
 Dept. of Interior
<http://nm.water.usgs.gov>

Sandia National Laboratories
 Dept. of Energy
www.sandia.gov

NEW YORK

AFRL - Information Directorate
 Dept. of Defense - Air Force
www.wpafb.af.mil/afri/ri/

Benét Laboratories
 Dept. of Defense - Army
www.benet.wva.army.mil

Brookhaven National Laboratory
 Dept. of Energy
www.bnl.gov/world/

National Urban Security Technology Laboratory
 Dept. of Homeland Security
www.dhs.gov/st-nustl

New York Water Science Center
 Dept. of Interior
<http://ny.water.usgs.gov>

Plum Island Animal Disease Center
 Dept. of Homeland Security
www.ars.usda.gov/Main/docs.htm?docid=3833

NORTH CAROLINA

ARL - Army Research Office
 Dept. of Defense - Army
www.arl.army.mil/www/default.cfm

FS - Southern Research Station
 Dept. of Agriculture
www.srs.fs.usda.gov

National Center for Computational Toxicology
 Environmental Protection Agency
www.epa.gov/comptox/

National Exposure Research Laboratory
 Environmental Protection Agency
www.epa.gov/nerl/

National Health and Environmental Effects Research Laboratory
 Environmental Protection Agency
www.epa.gov/nheerl/

National Institute of Environmental Health Sciences
 Dept. of Health and Human Services
www.niehs.nih.gov

North Carolina Water Science Center
 Dept. of Interior
<http://nc.water.usgs.gov>

NORTH DAKOTA

North Dakota Water Science Center
 Dept. of Interior
<http://nd.water.usgs.gov>

Northern Prairie Wildlife Research Center
 Dept. of Interior
www.npwrc.usgs.gov

OHIO

AFRL - 711th Human Performance Wing
 Dept. of Defense - Air Force
www.wpafb.af.mil/afri/711HPW/

AFRL - Air Vehicles Directorate
 Dept. of Defense - Air Force
www.kirtland.af.mil/afri_vs/

AFRL - Materials and Manufacturing Directorate
 Dept. of Defense - Air Force
www.wpafb.af.mil/afri/rx/

AFRL - Propulsion Directorate
 Dept. of Defense - Air Force
www.wpafb.af.mil/afri/rz/

AFRL - Sensors Directorate
 Dept. of Defense - Air Force
www.wpafb.af.mil/afri/ry/

ARL - Vehicle Technology Directorate - Propulsion Program
 Dept. of Defense - Army
www.arl.army.mil/www/default.cfm?page=34

Air Force - Aeronautical Systems Center
 Dept. of Defense - Air Force
www.wpafb.af.mil/library/factsheets/factsheet.asp?id=6162

Air Force Institute of Technology
 Dept. of Defense - Air Force
www.afit.edu

Air Force Research Laboratory
 Dept. of Defense - Air Force
www.afri.af.mil

Glenn Research Center
NASA
www.nasa.gov/centers/glenn/home/index.html

National Homeland Security Research Center
Environmental Protection Agency
www.epa.gov/NHSRC/

National Institute for Occupational Safety and Health
Dept. of Health and Human Services
www.cdc.gov/niosh/

National Risk Management Research Laboratory
Environmental Protection Agency
www.epa.gov/nrmrl/

Ohio Water Science Center
Dept. of Interior
<http://oh.water.usgs.gov>

OKLAHOMA

FAA - Civil Aerospace Medical Institute
Dept. of Transportation
www.faa.gov/about/office_org/headquarters_offices/avs/offices/aam/cami/

National Energy Technology Laboratory - Tulsa
Dept. of Energy
www.netl.doe.gov

Oklahoma City Air Logistics Center
Dept. of Defense - Air Force
www.tinker.af.mil/units/

Oklahoma Water Science Center
Dept. of Interior
<http://ok.water.usgs.gov>

OREGON

FS - Pacific Northwest Research Station
Dept. of Agriculture
www.fs.fed.us/pnw/

Forest and Rangeland Ecosystem Science Center
Dept. of Interior
<http://fresc.usgs.gov>

National Energy Technology Laboratory - Albany, OR
Dept. of Energy
www.netl.doe.gov

Oregon Water Science Center
Dept. of Interior
<http://or.water.usgs.gov>

PENNSYLVANIA

ARS - North Atlantic Area
Dept. of Agriculture
www.ars.usda.gov/main/site_main.htm?modecode=19-00-00-00

Advanced Technology for Large Structural Systems Center
National Science Foundation
www.atlss.lehigh.edu

FS - Northern Research Station
Dept. of Agriculture
www.nrs.fs.fed.us/

NIOSH - Pittsburgh Research Laboratory
Dept. of Health and Human Services
www.cdc.gov/niosh/contact/im-prl.html

National Energy Technology Laboratory - Pittsburgh
Dept. of Energy
www.netl.doe.gov

Naval Surface Warfare Center - Carderock Division, Naval Ship Systems Engineering Station
Dept. of Defense - Navy
www.navsea.navy.mil/nswc/carderock/default.aspx

Pennsylvania Water Science Center
Dept. of Interior
<http://pa.water.usgs.gov>

PUERTO RICO

Caribbean Water Science Center
Dept. of Interior
<http://pr.water.usgs.gov>

RHODE ISLAND

Naval Undersea Warfare Center - Division Newport
Dept. of Defense - Navy
www.navsea.navy.mil/nuwc/newport/default.aspx

Naval War College
Dept. of Defense - Navy
www.usnwc.edu/

SOUTH CAROLINA

Savannah River National Laboratory
Dept. of Energy
<http://srnl.doe.gov>

South Carolina Water Science Center
Dept. of Interior
<http://sc.water.usgs.gov>

Space and Naval Warfare Systems Center - Atlantic
Dept. of Defense - Navy
www.public.navy.mil/spawar/Atlantic/Pages/Home.aspx

SOUTH DAKOTA

Earth Resources Observation & Science Center
Dept. of Interior
<http://eros.usgs.gov/>

South Dakota Water Science Center
Dept. of Interior
<http://sd.water.usgs.gov>

TENNESSEE

Arnold Engineering Development Center
Dept. of Defense - Air Force
www.arnold.af.mil

Oak Ridge National Laboratory
Dept. of Energy
www.ornl.gov

Tennessee Valley Authority
www.tva.gov

Tennessee Water Science Center
Dept. of Interior
<http://tn.water.usgs.gov>

Y-12 National Security Complex
Dept. of Energy
www.y12.doe.gov

TEXAS

688th Information Operations Wing
Dept. of Defense - Air Force
www.24af.af.mil/units/688thinformationoperationswing/index.asp

ARS - Southern Plains Area
Dept. of Agriculture
www.ars.usda.gov/Main/docs.htm?docid=1860

Air Force - 311th Human Systems Wing
Dept. of Defense - Air Force
www.afhra.af.mil/factsheets/factsheet.asp?id=17649

Air Force Center for Engineering and the Environment
Dept. of Defense - Air Force
www.afcec.af.mil/

Air Force Intelligence, Surveillance and Reconnaissance Agency
Dept. of Defense - Air Force
www.afisr.af.mil

Center for AMEDD Strategic Studies
Dept. of Defense - Army
www.cs.amedd.army.mil/mcic.aspx

Institute for Fusion Studies
Dept. of Energy
<http://w3fusion.ph.utexas.edu/ifs/>

Johnson Space Center
NASA
www.nasa.gov/centers/johnson/home/index.html

NNSA - Pantex Plant
Dept. of Energy
www.pantex.com/

Texas Water Science Center
Dept. of Interior
<http://tx.usgs.gov>

U.S. Army Clinical Investigation Regulatory Office
Dept. of Defense - Army
<http://mrrmc.amedd.army.mil/index.cfm?pageid=home>

U.S. Army Institute of Surgical Research
Dept. of Defense - Army
www.usaisr.amedd.army.mil

UTAH

Brigham Young University
National Science Foundation
www.byu.edu

Dugway Proving Ground
Dept. of Defense - Army
<http://www.dugway.army.mil/>

Ogden Air Logistics Center
Dept. of Defense - Air Force
www.hill.af.mil

Utah Water Science Center
Dept. of Interior
<http://ut.water.usgs.gov>

VIRGINIA

AFRL - Air Force Office of Scientific Research
Dept. of Defense - Air Force
www.afosr.af.mil

ARL - Vehicle Technology Directorate - Structures Program
Dept. of Defense - Army
www.arl.army.mil/www/default.cfm?page=34

Air Combat Command
Dept. of Defense - Air Force
www.acc.af.mil

Army Research Institute for Behavioral and Social Sciences
Dept. of Defense - Army
<https://sslweb.hqda.pentagon.mil/ari/>

Aviation Applied Technology Directorate
Dept. of Defense - Army
www.aatd.eustis.army.mil

Defense Advanced Research Projects Agency
Dept. of Defense
www.darpa.mil

Defense Technical Information Center
Dept. of Defense
www.dtic.mil

FHWA - Turner-Fairbanks Highway Research Center
Dept. of Transportation
www.tfhrc.gov

Langley Research Center
NASA
www.nasa.gov/centers/langley/home/index.html

Marine Corps Systems Command
Dept. of Defense - Navy
www.marcorssyscom.usmc.mil

Mine Safety and Health Administration
Dept. of Labor
www.msha.gov

Naval Air Systems Command
Dept. of Defense - Navy
www.navair.navy.mil

Naval Medical Center - Portsmouth
Dept. of Defense - Navy
www.med.navy.mil/sites/NMCP2/Pages/Default.aspx

Naval Safety Center
Dept. of Defense - Navy
www.safetycenter.navy.mil

Naval Surface Warfare Center - Dahlgren Division
Dept. of Defense - Navy
www.navsea.navy.mil/nswc/dahlgren/default.aspx

Navy Warfare Development Command
Dept. of Defense - Navy
www.nwdc.navy.mil/default.aspx

Office of Naval Research
Dept. of Defense - Navy
www.onr.navy.mil

RDECOM - CERDEC - Night Vision and Electronic Sensors Directorate
Dept. of Defense - Army
www.nvl.army.mil

Thomas Jefferson National Accelerator Facility
Dept. of Energy
www.jlab.org/

U.S. Joint Forces Command
Dept. of Defense
www.jfcom.mil

USACE - Institute for Water Resources
Dept. of Defense - Army
www.iwr.usace.army.mil

Virginia Water Science Center
Dept. of Interior
<http://va.water.usgs.gov>

WASHINGTON

Cascades Volcano Observatory
Dept. of Interior
<http://vulcan.wr.usgs.gov>

DOE - Hanford Site
Dept. of Energy
www.hanford.gov

NIOSH - Spokane Research Laboratory
Dept. of Health and Human Services
www.cdc.gov/niosh/contact/im-srl.html

Naval Undersea Warfare Center - Division Keyport
Dept. of Defense - Navy
www.navsea.navy.mil/nuwc/keyport/default.aspx

Pacific Northwest National Laboratory
Dept. of Energy
www.pnnl.gov

Washington Water Science Center
Dept. of Interior
<http://wa.water.usgs.gov>

Western Fisheries Research Center
Dept. of Interior
<http://wfrc.usgs.gov>

WEST VIRGINIA

National Energy Technology Laboratory
Dept. of Energy
www.netl.doe.gov

West Virginia Water Science Center
Dept. of Interior
<http://wv.usgs.gov>

WISCONSIN

FS - Forest Products Laboratory
Dept. of Agriculture
www.fpl.fs.fed.us/

National Wildlife Health Center
Dept. of Interior
www.nwhc.usgs.gov

Upper Midwest Environmental Science Center
Dept. of Interior
www.umesc.usgs.gov

Wisconsin Water Science Center
Dept. of Interior
<http://wi.water.usgs.gov>

WYOMING

Rocky Mountain Oilfield Testing Center
Dept. of Energy
www.rmotc.doe.gov

Wyoming Water Science Center
Dept. of Interior
<http://wy.water.usgs.gov>

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