



**Federal Laboratories and
State and Local Governments**
Partners for technology transfer success

“When industry, academia and government come together in the spirit of innovation, the true value of the FLC is revealed. For the federal laboratories that comprise the FLC, this is where the rubber meets the road. This is where technology transfer has the opportunity to make a real impact on people’s lives.”

- **Kathleen Graham**
FLC State and Local Government
Committee Chair

Letter of Introduction

As we face new environmental realities and technological challenges, the Federal Laboratory Consortium for Technology Transfer (FLC) advances its efforts to foster collaborations with local governments, communities, and businesses to spur innovation.

As these articles demonstrate, federal labs in partnership with states, local governments, and community groups have addressed these changing conditions by developing systems and technologies that lead to improvements in agricultural planning, water monitoring, and highway safety, to name a few. You will see the development of networks to leverage regional expertise and industry, development of a state-of-the-art virtual emergency operations center, and coordination of regional planning efforts to combat the effects of climate change.

These partnerships improve local economies, bring critical technologies to the public, and keep society moving forward. When industry, academia and government come together in the spirit of innovation, the true value of the FLC is revealed. For the federal laboratories that comprise the FLC, this is where the rubber meets the road. This is where technology transfer has the opportunity to make a real impact on people’s lives.

As you read these articles, I hope that you will also appreciate the benefits of these collaborations and the improvements they bring in the areas of systems and operations, development of networks, education and outreach, environmental monitoring, and emergency response and medicine.

The FLC’s State and Local Government Committee strives to develop an awareness among state and local government organizations of the benefits of partnering with federal laboratories, and the technology transfer opportunities that can develop from these partnerships. Within this publication you will see highlighted many fine examples of these partnerships, which have proven valuable to local economies, communities, and individuals.

Kathleen Graham

FLC State and Local Government Committee Chair

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About the FLC

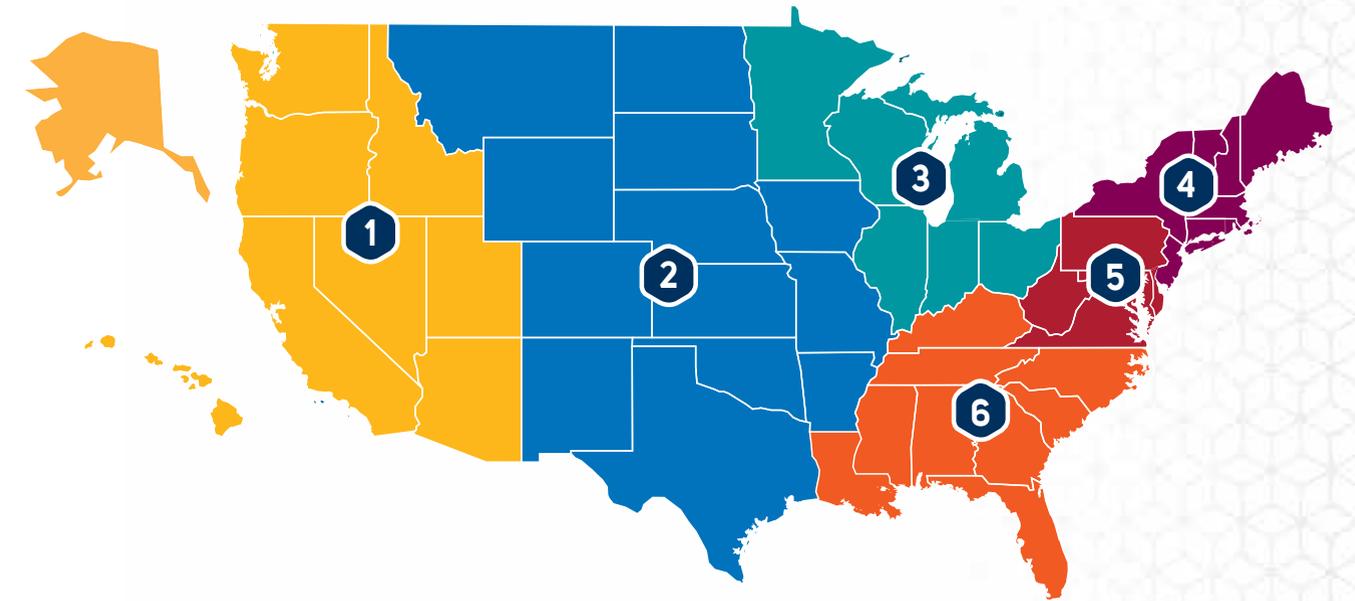
Promoting, educating and facilitating technology transfer

Formally chartered by the Federal Technology Transfer Act of 1986, the Federal Laboratory Consortium for Technology Transfer (FLC) is a nationwide network of over 300 federal laboratories, agencies and research centers that fosters commercialization best practice strategies and opportunities for accelerating technologies from out of the lab and into the marketplace. The American taxpayers' investment in our national laboratories' research and development (R&D) efforts has spurred scientific and technological breakthroughs that can return dividends for our economy, such as creating new industries, businesses and jobs, when introduced to the marketplace.

The FLC's mission is to promote, educate, and facilitate federal technology transfer (T2) among its member labs and institutions so they can easily reach their commercialization goals and create a social and economic impact with new innovative

technologies. Through the various resources, education and training, tools and services the FLC creates and provides for its members, federal labs are better able to create partnerships, navigate the commercialization process, and achieve market success.

By serving as the touchstone for technology transfer communication, education and open data services tools, the FLC plays a central role in providing the skilled tech transfer workforce that our country desperately needs. These highly motivated tech transfer professionals are the driving force behind improving federal labs' ability to effectively partner with the private sector. The FLC strives to support the dedicated individuals who make up the federal laboratory system by continuing to serve as a gateway for industry, government and academia to access R&D in an effort to stimulate our nation's economic health.



FLC Regions

1 Far West
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4 Northeast
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Regional Coordinator: Valerie Larkin
Naval Undersea Warfare Center
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2 Mid-Continent
www.flcmidcontinent.org
Regional Coordinator: Jack James
NASA Johnson Space Center
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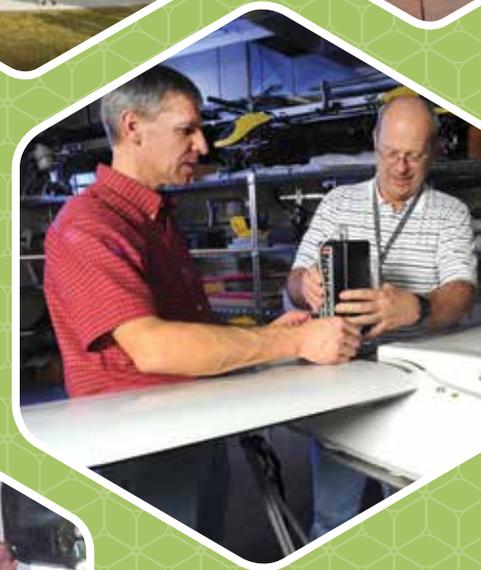
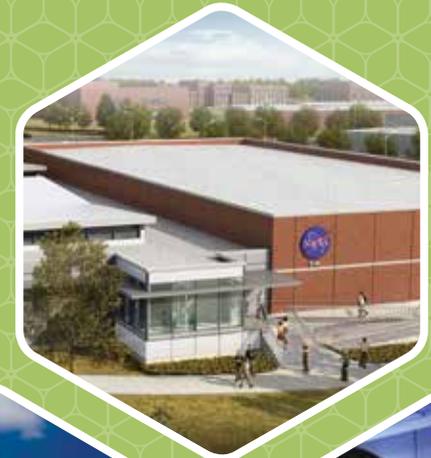
5 Mid-Atlantic
www.flcmidatlantic.org
Regional Coordinator: Dr. Robert Griesbach
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3 Midwest
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6 Southeast
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Improving Systems and Operations

Innovations stemming from partnerships between federal laboratories and local and state organizations may quickly impact people's daily lives. From improving our commutes to providing outside scientists with access to a state-of-the-art accelerator, researchers in federal laboratories work diligently in collaboration with industry and local organizations to innovate and apply improved processes in the real world.



Autonomous Systems Center of Excellence Fosters Cooperation and Innovation

Connected and autonomous vehicles are expected to provide huge economic, social, and industrial benefits to the planet. As we hasten our efforts to provide energy, water, and food for over nine billion people, deployment of these advanced technologies that have access to things such as wireless Internet will be critical for the agricultural sector.

Modern agriculture is high-tech. Geographical information systems (GIS) software is used to plant farm fields, Global Positioning System (GPS) guides field operations, and auto-steer systems make tractors follow GPS guidance without human hands. For agriculture-intensive states like Idaho to remain globally competitive, it must continue to transition to full autonomy technologies and take advantage of advanced data analytics to deploy these technologies.

Understanding these factors led to a series of discussions among the Idaho Department of Commerce, the Department of Energy's Idaho National Laboratory, the Center for Advanced Energy Studies (CAES), and several universities and private companies in the state. These discussions underscored the need to act rapidly and to

develop a regional Autonomous Systems Center of Excellence (ASCE). The ASCE enables the swift development, deployment, and commercialization of technologies that advance the competitiveness of Idaho, especially in the area of agriculture technology.

The Idaho Department of Commerce and CAES launched the Autonomous Systems Center of Excellence in April 2015 with a novel funding model for public-private-government collaborations. ASCE solidified the strategic partnerships between the state and local governments and Idaho National Laboratory (one of the five members of CAES). ASCE has already generated regional economic benefits and is driving new partnerships among business, university, and government entities.

Additionally, ASCE is bringing new businesses into Idaho, developing innovative techniques for assessing plant stress as it is happening, and stimulating new research directions for universities. ASCE is intent on using unmanned aerial systems to take Idaho agriculture to the next level of high tech.



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

commerce.idaho.gov/asce

Matthew Anderson (left) and Jodie Boyce (right) work on an unmanned aerial vehicle in Idaho National Laboratory's Autonomous Systems Laboratory.

Photo credit: Idaho National Laboratory



Diverging Diamond Interchange in the U.S.—From Innovative Concept to Mainstream Adoption

The concept of the diverging diamond interchange (DDI) for roads originated in France in the 1970s and has flourished in the U.S. in recent years. The first American DDI opened in 2009 at I-44 and MO 13 in Springfield, Mo. The project was completed in five months at a cost of about \$3.3 million, which is 67 percent less than the cost for a single point urban interchange design, the nearest viable design for serving the traffic demands.

The DDI design at this interchange eliminated frequent mile-long queues. Within one year of its opening, the number of crashes at this interchange dropped by over 50 percent. This hugely successful project attracted widespread interest, and stimulated the broad adoption of DDI design in solving congestion and safety problems. As of June 30, 2015, 51 DDIs in 20 states have been constructed. There are now more DDIs in operation in the United States than in all other countries combined.

The DDI design moves all northbound traffic to the left side of the interchange bridge at the first ramp terminal, which allows the left-turn on-ramp traffic to proceed without conflict. The through traffic is then channeled back to the right side of the road after traveling over the length of the interchange bridge. All conflicts between northbound traffic, the westbound off-ramp left-turn and southbound through traffic are relocated to the first ramp

terminal. Additionally, the pedestrian path can be placed parallel to traffic lanes, eliminating the protected left-turn and pedestrian crossing phases.

To address the safety concerns of potential driver confusion regarding signs and markings, the Federal Highway Administration (FHWA) partnered with the Missouri Department of Transportation (MoDOT) to implement the DDI design in Kansas City into the FHWA Highway Driving Simulator in its Human Factors Laboratory, and conducted a series of driver behavior tests. MoDOT’s Southwest District seized the opportunity to design and construct the nation’s first DDI in Springfield, Mo.

After its opening, Donald Saiko, MoDOT’s Project Manager, worked tirelessly with FHWA staff to promote DDI by co-authoring articles and presenting lessons learned at multiple events. The broad interest generated by this DDI prompted the FHWA to launch the “Field Evaluation of Double Crossover Diamond Interchange” research in 2010, led by Dr. Wei Zhang; and the “Intersection and Interchange Geometrics” initiative under FHWA’s Every Day Counts program, led by Mark Doctor. During the past 10 years, FHWA staff delivered numerous training and technical support as requested by state DOTs. In the U.S., DDI design has become a mainstream solution, rather than a special case design.



Turner Fairbank Highway
Research Center

This aerial photograph shows the nation’s first DDI interchange, located in Springfield, Mo.

Photo credit: MoDOT

 www.fhwa.dot.gov/research/tfhrc

 [/FederalHighwayAdmin](https://www.facebook.com/FederalHighwayAdmin)

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



Illinois Accelerator Research Center

The Illinois Accelerator Research Center (IARC) provides a state-of-the-art facility for accelerator research, industrialization and training. Accelerators allow scientists to investigate subatomic particles. Scientists and engineers from Fermilab, Argonne National Laboratory, and Illinois universities will work together with industrial partners to develop breakthroughs in accelerator technology and new applications in energy and environment, medicine, industry, national security, and discovery science. The Illinois Department of Commerce and Economic Opportunity and the U.S. Department of Energy's (DOE) Office of High Energy Physics provide funding for the IARC facility.

Located on the Fermilab campus, the facility houses 83,000 square feet of technical, office, and meeting space. It provides space for both laboratory staff and industrial partners to work side-by-side to solve complex problems. IARC will have areas for test accelerators, cryogenics infrastructure, temperature-controlled workspaces, high-capacity electrical power systems, and industrial cooling water.

In a unique partnership between the Illinois Department of Commerce and Economic Opportunity and the DOE's Office of High Energy Physics, IARC will provide the opportunity for Illinois to become a world leader in the development of industrial accelerator technology.

The center is already attracting top scientists and engineers from existing industries, as well as hosting entrepreneurs as they launch new companies, which are using federal technologies developed at Fermi as an enabling technology in their processes.

IARC's mission is to partner with industry to translate technology developed in the pursuit of science into the next generation of industrial accelerators, products, and applications.

IARC's vision is to be the preeminent technology source for accelerator-based products and services, serving as the seed for industry growth.

Physicists have been inventing new types of accelerators to propel charged particles for more than 80 years. Today, besides their role in scientific discovery, scientists estimate that more than 30,000 accelerators are at work worldwide. They contribute to \$500 billion per year in products and services, in areas ranging from diagnosing and treating disease to cheaper, greener alternatives to traditional industrial processes. Accelerators also provide exciting new opportunities to solve problems of national importance, such as prevention of acid rain, screening cargo for national security, or destruction of nuclear waste, while at the same time spawning major new industries.

With Fermilab and nearby Argonne having the largest concentration of accelerator scientists and engineers in the world, Northern Illinois is uniquely positioned to become a global center for accelerator science and development. With a strong focus on the industrialization of these technologies, IARC will attract high-tech companies and train Illinois citizens in advanced technologies.

IARC will bring economic benefits to Kane and DuPage counties, with federal funding for accelerator development supporting about 200 high-tech jobs in Illinois. The number of new industrial jobs created in Illinois as a result of industrial accelerator development at IARC is potentially much larger. In addition, IARC will strengthen Fermilab's and Argonne's links to Illinois universities and industry, and harness their creative energy to create new accelerator technology-based applications and industries.



Top: Front view of IARC with Wilson Hall in the background. Left: The IARC OTE Building roof garden is visible through the windows of the building. Robert Rathburn Wilson Hall is visible to the left, and the Feynman Computing Center is visible to the right.

Photo credit: Katie Kosirog, ESH&Q

Volpe Helps Major Cities Increase Bike and Pedestrian Safety

The Volpe Center has played a central role in studying a simple yet promising technology that has been proven to save the lives of bicyclists and pedestrians on roadways. Side guards can be installed on large trucks to protect bicyclists and pedestrians from falling underneath the vehicle. After side guards were required on most heavy-duty vehicles in the United Kingdom, bicyclist fatalities were reduced by 61 percent and pedestrian fatalities by 20 percent in side-impact crashes involving large trucks.

These convincing statistics have captured the attention of cities such as Boston, which is taking the initiative to require this new piece of equipment on large trucks. Boston Mayor Marty Walsh proposed a rule to the Boston City Council requiring side guards on all large city vehicles or trailers.

The initial data was brought to light by Volpe engineer Dr. Alex Epstein, who proposed a study to examine the safety and potential fuel economy benefits of truck side guards during Volpe's first-ever Innovation Challenge. Although Dr. Epstein's team didn't win the competition, he delivered a talk about the potential benefits of side guards at a LivableStreets event in Cambridge, Mass., in early 2013. An advisor to then Boston Mayor Thomas Menino heard it and contacted Dr. Epstein to learn more about his research. This led to a pilot initiative that added side guards to 19 Boston Public Works Department vehicles.

In 2014 Mayor Walsh proposed an ordinance that would require side guards on all city vehicles or trailers exceeding a gross weight of 10,000 pounds and on semi-trailers exceeding a gross weight of 26,000 pounds. In his letter to Boston City Council, Mayor Walsh stated that the ordinance establishes requirements for protection equipment to be installed on vehicles contracted by the City of Boston, to be constructed and/or equipped as to offer effective protection to unprotected road users against the risk of falling under the sides of the vehicle and being caught beneath the wheels. The Boston City Council passed the Truck Side Guard Ordinance the following month.

New York City has also asked Volpe to study and develop pilot initiatives on side guards for the largest-in-the-nation municipal truck fleet. New York's Department of Citywide Administrative Services (DCAS) recently funded Volpe to study the use of side guards on its trucks. This effort is part of New York's Vision Zero, a sweeping policy agenda to reduce road traffic fatalities and serious injuries to zero within a decade.

To date 100 trucks have been equipped with protective side guards, but 500 will be deployed by the end of 2015 in Boston, Cambridge, Somerville and Newton, Mass., as well as in New York City, Washington, D.C., and Portland, Ore. Discussions are underway with Chicago and San Francisco.



Above: The Volpe project team is shown with a Boston Department of Public Works truck equipped with panel-style side guard. Right: A close-up of the side guard.

Photo credit: Volpe Center

www.volpe.dot.gov [/USDOT](#) [@volpeusdot](#)



NASA Langley Computational Research Facility is a state-of-the-art consolidated data center that allows for advanced computational research and development in a new, energy-efficient and sustainable facility.

Photo credit: NASA

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NASA Langley Research Center's Revitalization Program

For nearly 100 years, NASA Langley Research Center (LaRC) has made significant contributions to aeronautics, space exploration, and earth science missions through research, technology, and engineering core competencies in aerosciences, structures and materials, characterization of Earth and planetary atmospheres, aerospace systems analysis and, more recently, in technologies associated with planetary entry, descent, and landing.

LaRC developed and has begun to implement a major 20-year revitalization strategy that includes eight new state-of-the-art facilities, renovation of critical infrastructure, and demolition of nonessential assets, all of which enable LaRC to respond to the strategic and infrastructure challenges of the agency while making the Center more efficient to operate.

To date, two new buildings were designed, built and occupied. The Computational Research Facility (CRF), the third new building in the Revitalization Program, has been released for construction, and a fourth is being designed for construction starting in FY2016. To be successful, LaRC had to work closely with local city and county governments, as well as other federal agencies to plan for and implement this program. This included its implementation partners—the General Services Administration (GSA) from the Mid-Atlantic Region and the U.S. Army Corps of Engineers (USACE) from the Norfolk District.

GSA helped LaRC implement the design, construction, and activation of the first two buildings. USACE is helping to design and build the CRF, and has managed the completion of many of the demolition projects. GSA and USACE provide project management, contract administration, construction

management, and technical support to manage these large design and construction projects.

These new facilities represent a great collaborative effort, and are exciting new additions to LaRC. They are modern, energy-efficient, and custom-designed for their intended purposes. The buildings modernize, yet blend in with the architectural décor of this historic campus. The Langley project team provides strategic direction, management oversight, and timely reviews and decisions on technical matters.

Funding is provided by the NASA Construction of Facilities budget and the NASA Langley Revitalization Program. This partnership works well because both parties bring unique areas of expertise to the table. As the Revitalization Program has progressed, LaRC has coordinated with the cities of Hampton, Newport News, and Poquoson; its Joint Base Langley Eustis neighbors; the State of Virginia; area congressional and community leaders; and the NASA Aerospace Support Team.

The economic impact of this program is significant. For the first three projects, over \$120 million of design and construction work has been awarded to contractors, most with local firms in Virginia and with 35 to 45 percent of the awarded amounts going to small businesses.

In addition, LaRC has donated obsolete excess furniture and equipment to the community. The old cafeteria dining room tables and chairs were donated to Page Middle School in Gloucester, Va., which was damaged by a tornado. Overall, the Revitalization Program at NASA LaRC has been a successful partnership, and has provided a significant economic impact on the local community.

Developing Networks

The positive impact from research and technology that come out of our federal laboratories is often felt well beyond laboratory walls. Establishing a process to share resources, innovations and ideas leads to the development of powerful networks and opportunities. This in turn boosts economies and provides solutions to regional and national needs.



Support From EPA Creates Regional Water Treatment Opportunities and Boosts Economy

The U.S. Environmental Protection Agency (EPA) launched a water technology innovation cluster in the Greater Cincinnati, Ohio region in 2010. Innovation clusters are geographic concentrations of interconnected entities—businesses, suppliers, service providers, local government, business chambers, universities, investors, and others—that work together to promote technological innovation and economic growth.

The Cincinnati region was selected as a location for a cluster due to its many entrepreneurial businesses ready to develop water technologies. By uniting with local government and public utilities, research partners and others, ideas and technologies have a greater opportunity to move from concept to the marketplace, helping to drive local economic growth.

Below are some examples of the ways EPA's water technology innovation cluster is collaborating with local governments and businesses to make an impact on the local economy.

EPA provided technical guidance for local startup CitiLogics to demonstrate its innovative real-time model water analytical technology toolbox to various Kentucky and Ohio water utilities. In less than two years, CitiLogics has signed its first contract with the Greater Cincinnati Water Works, allowing the company to hire its first employee. CitiLogics is bringing economic growth into the region, generating \$300,000 in research grants in 2013, \$500,000 in 2014, and an expected \$2.5 million in 2015.

EPA's cluster effort is working with three states—Ohio, Kentucky and Indiana—to streamline and

harmonize the approval process of emerging drinking water treatment technologies. This has the potential to fast-track permitting in this three-state area, bringing new cutting-edge treatment options to the region.

EPA also developed and patented a green-infrastructure detention basin retrofit device (the KRAKEN), which is being demonstrated in collaboration with the Boone County Conservation District and Sanitation District #1 of northern Kentucky. A northern Kentucky company is in the process of licensing the KRAKEN technology from EPA to distribute in the Midwest.

This cluster region has produced or co-produced nine conferences, workshops, symposiums and summits in the Cincinnati area, bringing nearly 2,500 people and over \$2 million to the state of Ohio since 2011. In collaboration with the city of Cincinnati, EPA sponsored the International Water Association and held a major conference on Water Efficiency and Benchmarking in Cincinnati in April 2015. This was the first time this conference was held in the United States. According to the Greater Cincinnati Convention and Visitors Bureau, conservative estimates predicted an economic impact of over \$500,000.

Finally, the University of Cincinnati (UC) selected water as one of its five focus research areas over the next five years, investing \$12-\$15 million in this effort. This allows UC to hire six new faculty members, creating a fertile future workforce around water in support of this effort.



Photo credit: Craig Fry, Northern Kentucky Sanitation District #1



Pictured: Rajib Sinha (CB&I Federal Services), Jim Goodrich (EPA, ORD), Matt Jacobs (Boone and Kenton County Conservation District), Mark Wooten (Northern Kentucky SD#1), Jason Burlage (Northern Kentucky SD#1), Dave Elstun (CB&I Federal Services), Tim Kling (CB&I Federal Services).

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NIST

State and local public safety practitioners took time out from the 2013 International Association of Fire Fighters (IAFF) Occupational Health & Hazards of the Fire Service and Emergency Medical Services Conference for a tour of the PSCR Public Safety Broadband Demonstration Network. Here, Institute for Telecommunication Sciences engineer Anna Paulson describes audio intelligibility testing equipment and techniques.

Photo credit: Ken Tilley



U.S. Department of Commerce

Institute for Telecommunication Sciences

National Telecommunications and Information Administration

Colorado

Public Safety Broadband Demonstration Network Enhances Emergency Communications

For more than five years, the U.S. Department of Commerce’s Public Safety Communications Research (PSCR) program has been operating the Public Safety Broadband Demonstration Network, a test bed used to evaluate advanced public safety communications equipment and software. Over 60,000 federal, state, tribal, and local public safety organizations in the U.S. stand to benefit from PSCR’s work, and many already have.

PSCR is a joint effort of the National Institute of Standards and Technology (NIST) and the National Telecommunications and Information Administration (NTIA), with sponsorship and collaboration from the Department of Homeland Security and the First Responder Network Authority (FirstNet). NTIA’s research and engineering lab, the Institute for Telecommunication Sciences, and NIST’s Communications Technology Lab jointly operate this test bed, which provides objective technical support—research, development, testing and evaluation—to foster nationwide interoperability in public safety communications. The results of these tests are used nationwide by state and local emergency operations to inform the purchase of emergency communications equipment.

For over 20 years, NIST and NTIA laboratories have collaborated with other governmental entities and public safety organizations to realize the benefits of digital narrowband land mobile radio technologies for public safety practitioners and other users. Their efforts were instrumental in developing technologies and standards for public safety land mobile radio equipment, ensuring that the equipment works in the challenging noise environments where public safety works.

While public safety practitioners continue to rely on land mobile radio for mission-critical voice communication, several years ago the focus turned to ensuring that next-generation broadband technologies can meet public safety needs. FirstNet, an independent authority within NTIA, was created to establish, operate, and maintain an interoperable public safety broadband network. Anticipating the move to broadband communications technology, the PSCR program partnered with industry to develop the Public Safety Broadband Network, an over-the-air broadband demonstration network and laboratory operating in the public safety 700 MHz band.

Using this network, researchers and practitioners can test the deployment of long-term evolution (LTE) systems in a multi-vendor environment. It serves as an educational site for public safety by allowing interested agencies to observe these systems and execute specific test cases that are unique to their operational environment. Industry, in turn, is educated about the special needs of public safety communications through practitioner-developed use cases.

Based in part on test bed evaluations to date, the PSCR has worked with industry organizations to get public safety requirements included in next-generation (LTE) communications standards and contributed data to support standards for FirstNet.

The original version of the PSCR demonstration network was developed with equipment and support from more than 75 vendors, and approximately 45 vendors have signed new, five-year Cooperative Research and Development Agreements to participate in the next phase of the test bed program, which will operate through April 2020.

www.its.bldrdoc.gov

www.ntia.doc.gov

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www.nist.gov

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Students brainstorm ideas for transforming Naval Surface Warfare Center, Crane Division military technology into commercially viable products as part of the University of Southern Indiana's Technology Commercialization Academy.

Photo credit: USI Photography and Multimedia



U.S. Department of Defense

Naval Surface Warfare Center, Crane Division

Indiana

NSWC Crane Collaborates With USI to Drive Successful Technology Commercialization

In recent years, the University of Southern Indiana (USI) has partnered with Naval Surface Warfare Center, Crane Division (NSWC Crane) and, sponsored by the Indiana Office of Defense Development (IODD), created a visual value stream model highlighting processes and resources available to move military innovation into the marketplace.

In the summer of 2015, USI reinforced its commitment to working with NSWC Crane, signing a renewed intermediary agreement. While NSWC Crane has significantly increased the pipeline of intellectual property available for licensing, growing from 40 licenses in 2007 to more than 400 in 2015, much remains to be done toward marketability and job creation.

During a rural tech transfer summit in Indianapolis in December 2014, national and regional experts identified the need for more business and industry involvement throughout the technology transfer process, as well as a more coordinated approach. Hindrances to successful technology commercialization include:

- Limited tools, assets and critical mass to exploit innovation
- Disjointed elements in urban centers, with lack of resources in between
- Lack of sophistication in technical and commercial applications and deal making
- Shortage of easily accessible venture capital
- Underutilized leadership to drive and coordinate processes
- Need for a culture of innovation and entrepreneurial mindset.

USI assisted in the creation of a visual model that shows the tangible steps to produce results, as well as intangible network-driven opportunities. It also identified state resources and programs to enhance the likelihood that ideas make their way from the lab into commercial application. The overall vision is to develop a knowledge-based ecosystem around NSWC Crane. The process has the opportunity to become a model for federal labs nationwide, especially in locations lacking population density. It leverages federal, state and local assets to strengthen and revitalize communities, while also increasing value for military bases.

Benefits include increased ability to hire and retain talent, faster scale-up processes, access to innovation, and enhanced procurement. In addition, the IODD funded a collaborative effort between USI and the Purdue Foundry to work with three startups piloting the visual value stream model. That collaboration expanded to include Indiana University Law Clinic and local economic development entities.

The objective is to validate the elements and resources available, and to identify gaps and needs that could benefit from additional funding. Elements include identifying commercial-ready technology, fostering entrepreneurship by assisting potential startups and highlighting marketable opportunities for military technologies, and providing local economic development programs assets to assist startups.

Through an atmosphere of collaboration and innovation, the University of Southern Indiana is helping to pave the way for and removing the barriers to successful technology transfer in Indiana and beyond.

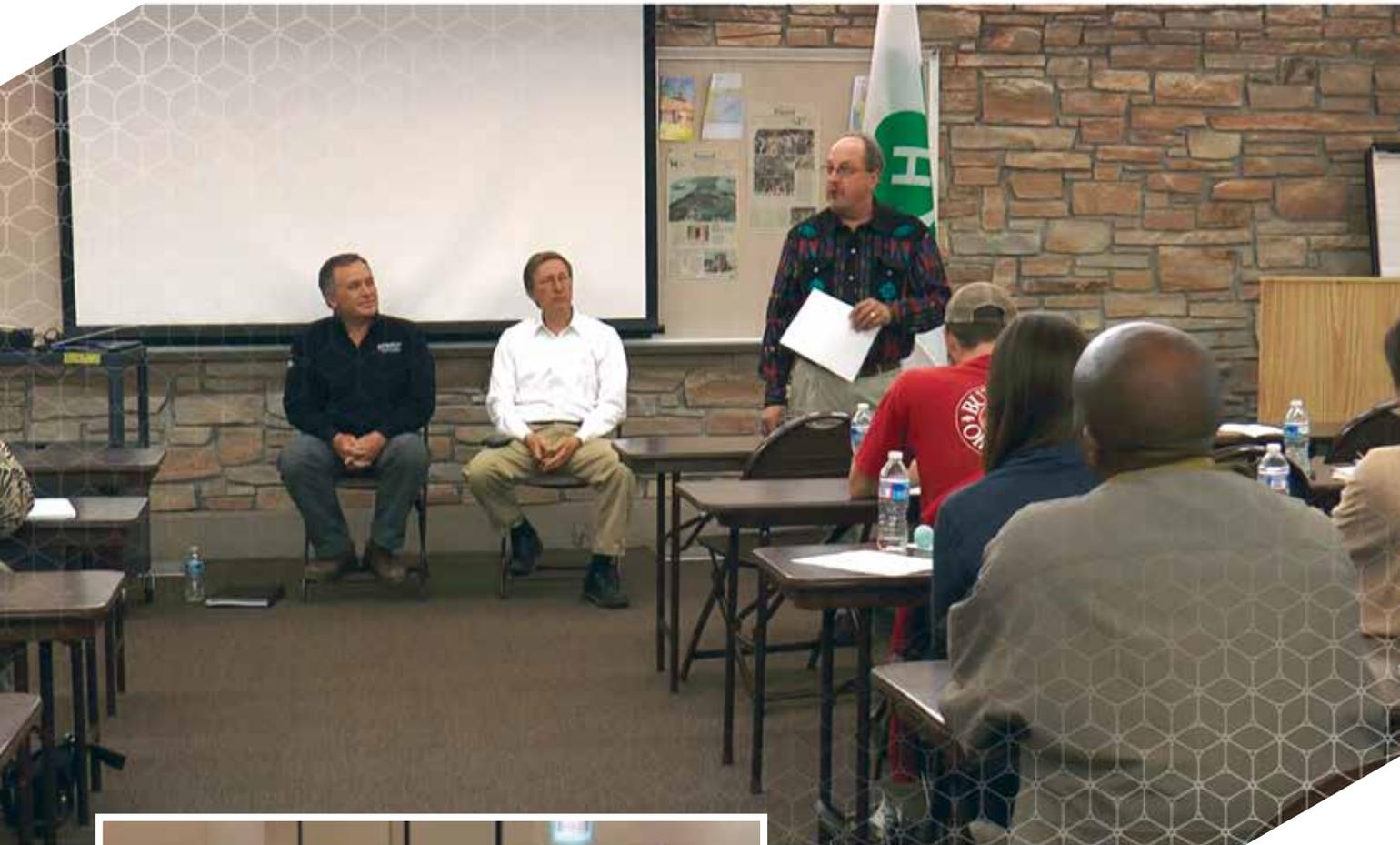


An ARP Network event enlisting the help of partners to spark economic development, entrepreneurship and community development.

Photo credit: USDA-ARS

www.ars.usda.gov

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



The Network of Networks

The Agricultural Research Partnerships (ARP) Network was developed to enhance the likelihood that work from the Agricultural Research Service (ARS) would be adopted by the private sector for commercialization. This “network of networks” was established to provide complementary assets such as mentoring, marketing and networking to the private sector to foster successful businesses.

The mission of the new ARP Network is to extend the impact of ARS research by supporting a sustainable and competitive agricultural economy. ARS research outcomes can provide economic and other opportunities for citizens, communities, and society as a whole. To further this mission, the ARP Network assists ARS with creating new partnerships and supporting existing partnerships to advance ARS research and development, and subsequent utilization, including commercialization.

In 2014 the membership base was developed to include any organization interested in agriculture-based economic development. The ARP Network consists of players in an innovation ecosystem, and has members spanning the U.S. with a shared vision to grow and sustain a competitive agricultural economy. The 34 members include ARS and stakeholders interested in agriculture-based economic development, including but not limited to rural agribusiness; urban, community and/or economic development groups; organizations that support farmers, growers, and/or food processors; and capital programs for business attraction and acceleration. Membership in the ARP Network is formalized through Non-funded Cooperative Agreements.

ARP Network collaborative efforts provide resources and guidance to entrepreneurs and companies. For example, ARP Network member Ben Franklin Technology Development Authority introduced ARS to a Pennsylvania company called OGA Health. The company saw possibilities for American ginseng if the quality and shelf life could be improved. OGA Health entered into a Cooperative Research and Development Agreement with ARS scientists located in Wyndmoor, Pa. This cooperative research has already resulted in a six- to seven-month increase in the shelf life of fresh ginseng, a commodity in great demand in Asian medicinal markets. The technologies developing through this partnership are likely to translate into applications for other high-value root and tuber crops such as carrot, daikon, horseradish, parsnips and ginger.

In addition to providing one-on-one matchmaking and mentoring to companies, the ARP Network hosts regional forums to transfer ARS technologies, facilitate collaborations, and provide business strategies to agricultural businesses. For example, ARP Network member Ag Innovators of Northern Colorado is an industry-specific group focused on accelerating agricultural solutions. It held a quarterly members meeting at the ARS facility in Fort Collins, Colo., to learn about ARS research and resources, and to encourage partnerships and technology transfer. Ag Innovators is a collaboration of Rocky Mountain Innosphere, Colorado BioScience Association, Colorado State University Ventures, Colorado State University, local entrepreneurs, producers, and agricultural businesses.

Monitoring the Environment

Technologies developed in laboratories around the country have the potential to change lives for generations to come. From improving air and water quality to offering solutions to habitats fragmented by roadways, partnerships between federal laboratories and state and local governments bring enormous promise to the future of environmental monitoring and planning.





EPA Collaborates to Ensure Safe Drinking Water at Schools and Childcare Facilities

Water is essential to our lives and plays an important role in overall health. Accessible drinking water in schools and childcare facilities, where children spend a significant portion of their days, offers children a healthy drinking option. As we encourage our children to drink tap water, we need to ensure that the water they are drinking is safe.

The Environmental Protection Agency (EPA) is partnering with the W.K. Kellogg Foundation and Calhoun County, Mich., in a three-year project to reduce children's exposure to lead in drinking water. The project, a Cooperative Research and Development Agreement (CRADA), involves multiple EPA offices, and is spearheaded by EPA's Office of Water (OW) and supported by the Office of Research and Development (ORD), as well as numerous regional laboratories.

The best way to know whether a school or childcare facility's water might have elevated levels of lead, for which children are at a particular risk of exposure, is by testing tap water at these facilities.

Under the CRADA, the Calhoun County Public Health Department is testing for lead in drinking water at approximately 75 facilities in the Calhoun County area. EPA's OW and ORD are providing technical assistance; and Regions 2, 3, 5, 6, 7, 9, and 10 are conducting the analyses on the samples collected. The W.K. Kellogg Foundation is providing financial support to Calhoun County for this effort.

Where unsafe lead levels are discovered, various technologies will be implemented to remediate or

mitigate the contamination. Currently, nine schools or childcare facilities had outlets with lead levels above 20 ppb. The remediation included flushing and plumbing component replacement. ORD and OW are assisting with identification of the appropriate remediation technology.

The data collected for this project provides valuable information on lead variability in schools and childcare facilities, before and after remediation. This data will help inform other schools across the nation about the frequency with which they should conduct lead testing. The project highlights cost-effective remediation practices and technologies that schools can implement to reduce lead in drinking water. It also provides valuable cost information on these technologies, assisting EPA and communities in better understanding the costs involved with this type of lead remediation. And overall, the project will result in a decrease in lead exposure to children and staff at the facilities where these children spend a significant portion of their day.

In 2005, EPA announced the Drinking Water Lead Reduction Plan, which outlined actions the Agency would undertake in response to its review of the Lead and Copper Rule. Under the plan, the Agency stated it would continue to work with partners to promote research in key areas and efforts to protect children from lead. This CRADA allows EPA to further these goals, and helps Calhoun County make its schools and childcare facilities healthier.



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Remotely Detecting Harmful Algal Blooms in the Great Lakes

The National Aeronautics and Space Administration (NASA) Glenn Research Center partnered with the National Oceanic and Atmospheric Administration's (NOAA) Great Lakes Environmental Research Laboratory and the State of Ohio to address the recurrence of harmful algal bloom (HAB) events in the Great Lakes.

Generally within a 4- to 8-week period in late summer, HABs pose a significant threat to humans and wildlife, form, spread, and then disappear. HABs commonly contain a toxin called microcystin, which poses a threat to human health and wildlife. For humans, microcystin can cause serious liver damage and has been linked to pancreatitis, a condition in which body fat becomes inflamed. Some scientists suggest a link between the presence of microcystin in drinking water and some forms of liver and colorectal cancer.

The toxin also can cause mass deaths of fish, and consuming them proves harmful. Early detection can minimize threats of toxic drinking water, provide alerts to close recreational areas around the Great Lakes, and decrease the potential for toxic fish entering the marketplace. Current remote sensing technologies used to monitor these events are limited. High-resolution satellite data (i.e., Landsat) provide spatial data, but are not capable of providing the spectral resolution needed to differentiate a HAB from a non-harmful algal bloom. Water sampling methods, which are time-consuming and expensive, had been prevalent.

The NASA-NOAA-Ohio collaboration used a hyperspectral imager mounted to NASA research aircraft. Hyperspectral imaging divides the electromagnetic spectrum into a multitude of bands that can be used to identify a spectral "signature" for

a range of organism types. Hyperspectral imaging was used to detect the pigment phycocyanin, an indicator of microcystis, in low concentrations. NASA aircraft flew several missions over the Great Lakes while NOAA collected water samples for direct comparison. The hyperspectral imager scanned several sites in the central and western basins of Lake Erie, documenting concentrations of the algal pigment phycocyanin. The teams calibrated the results between the aerial remote sensing and the water sample measurements.

The close match suggested the unique hyperspectral signature for HABs, potentially allowing scientists to identify their formation early and reliably through remote sensing. The Great Lakes are the nation's most important freshwater resource, with more than 60 million people in the region utilizing them for drinking water, transportation, recreation, food production, and manufacturing.

The Great Lakes:

- Contain over 80 percent of the U.S. supply of surface freshwater
- Contain 18 percent of the total global supply of freshwater
- Provide more than 500 beaches for recreation
- Supply drinking water to more than 40 million U.S. and Canadian citizens
- Provide 56 billion gallons of water daily for municipal, agricultural, and industrial use.

These numbers demonstrate the imperative nature of monitoring the Great Lakes to address toxic conditions and underscore the importance of improved technologies to do so.



Photo credit: MODIS image courtesy of NASA.
Inset: Marvin Smith, NASA Glenn Research Center



Algal bloom covers a significant portion of Lake Erie.
Inset: Roger Tokars and John Lekki

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Photo credit: Scott Sandberg, NOAA

Intrusive Ozone: When Good Ozone Goes Bad

Officials at the Department of Air Quality in Clark County, Nev., asked National Oceanic and Atmospheric Administration (NOAA) researchers to help them solve a mystery: Why is the region experiencing episodes of high ozone pollution in the springtime—so high that the county sometimes exceeds the federal standards for air quality?

NOAA researchers from Boulder, Colo., traveled west in the spring of 2013 to Angel Peak, about 30 miles northwest of Las Vegas, to investigate. They brought with them a unique technology known as the “Tunable Optical Profiler for Aerosol and oZone,” or TOPAZ for short.

TOPAZ incorporates state-of-the-art technologies to measure ozone and fine particles in the atmosphere. Sending out a laser beam pointed at heights of about 40 feet to 2 miles above ground level, TOPAZ detects the light that returns after being absorbed or scattered by ozone and particles, yielding information about their distribution and abundance in the atmosphere.

TOPAZ’s design makes it compact and lightweight, with modest power consumption—all traits that allow it to be deployed on small aircraft or, as in the Las Vegas study, in a truck outfitted as a mobile ground research platform. Researchers found that in the Las Vegas region, the unwelcome ozone was coming from above—the atmosphere’s natural motions were bringing down air from the region of the atmosphere called the stratosphere, where the ozone layer is located.

The TOPAZ measurements of ozone at different heights in the atmosphere were just the diagnostic needed to document these naturally occurring “intrusions” of ozone-rich stratospheric air. During

the six-week study, researchers showed that stratospheric intrusions led directly to three of Clark County’s instances of surpassing the federal ozone standard.

“Stratospheric intrusions are nothing new. But in today’s more polluted lower atmosphere, the ozone coming down from the stratosphere sometimes pushes Clark County over the limit,” said Andy Langford, a research chemist at NOAA.

Clark County has used the NOAA information in its documentation of the 2013 high levels. The stratosphere, a region 8 to 30 miles above Earth, contains the ozone layer and over 90 percent of the atmosphere’s ozone. This is the “good ozone,” filtering harmful ultraviolet radiation from the sun. But at Earth’s surface, ozone is a pollutant that’s harmful to human health and other living things. Areas at higher elevations, particularly in the intermountain western United States, have always been especially prone to stratospheric intrusions. With background levels of surface ozone gradually rising over the last few decades due to increases in human emissions of pollutants, the “extra” ozone that comes occasionally from the stratosphere now sometimes pushes some areas over the federal limit.

“For air quality managers in Clark County, these results explain why high ozone values sometimes occur in springtime—well before the midsummer peak expected for ozone formed as a result of local pollution,” Langford said.

For atmospheric researchers, it’s a classic illustration of how good ozone goes bad when it moves from the protective ozone layer to ground level.



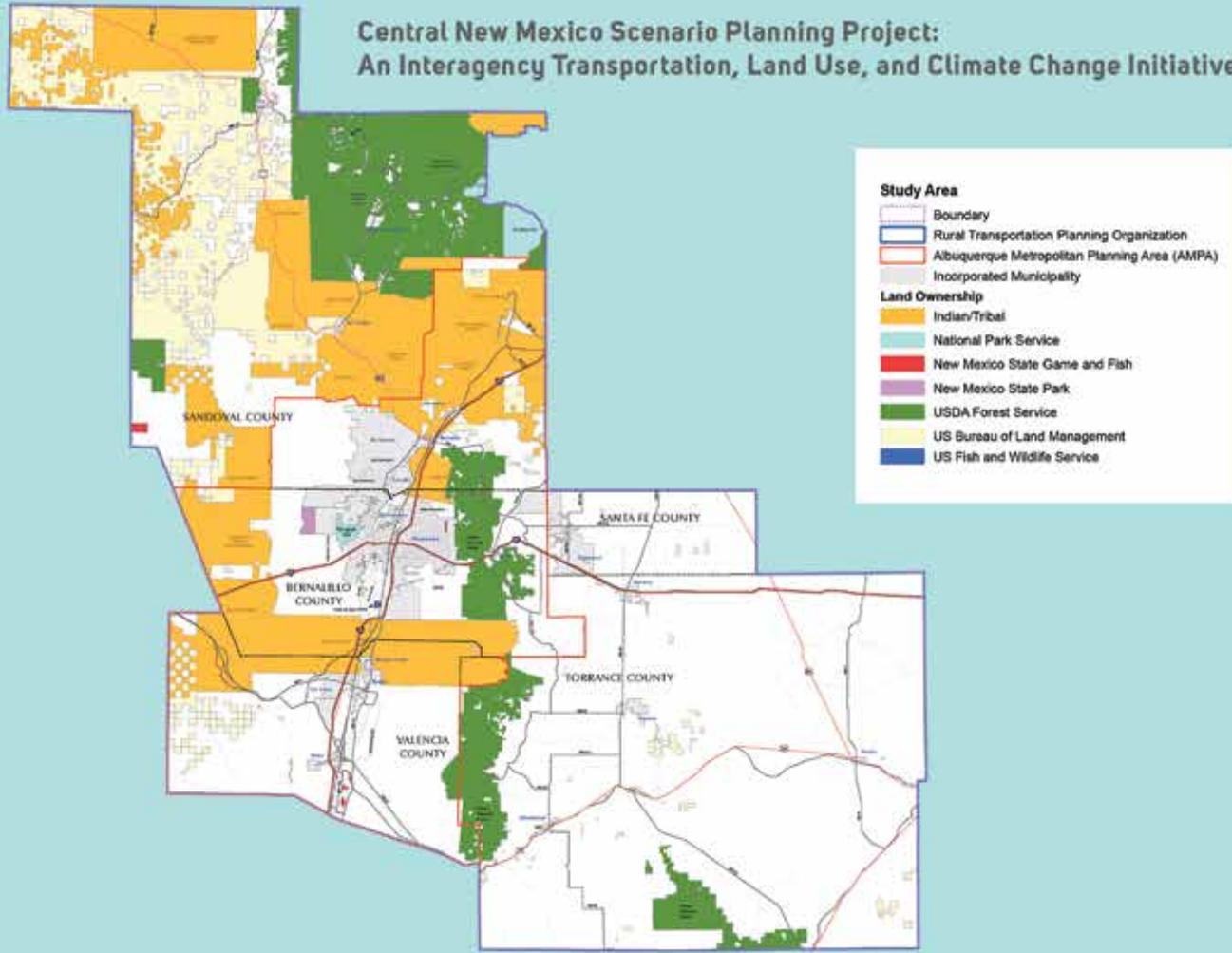
Closeup of the TOPAZ instrument inside the mobile measurement truck.

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**Central New Mexico Scenario Planning Project:
An Interagency Transportation, Land Use, and Climate Change Initiative**



U.S. Department of Transportation

Volpe, The National Transportation Systems Center

Massachusetts

Volpe Leads Climate Change Plans for Cape Cod and New Mexico

Many local agencies are now accounting for climate change in their community planning. A disjointed climate change plan may result, however, when numerous local agencies in one region address climate change in different ways while trying to comply with federal guidance and regulations. To achieve the positive environmental impacts that planners envision, the Volpe Center is working to ensure that climate change strategies are cohesive and regionally focused.

is now a vision for all planning agencies in that area for the next 20 years. A cohesive plan for climate change greatly increases the odds that transportation and land use planning in Cape Cod will lead to fewer negative impacts from climate change.

Volpe transportation planners successfully supported the Federal Highway Administration (FHWA) and numerous other state and local agencies in creating models of collaboration in Cape Cod and central New Mexico. The teams worked to address climate change through an integrated scenario planning process in transportation and land use plans. The FHWA asked Volpe experts in environmental, transportation, and community planning to facilitate and coordinate a climate change scenario planning process in Cape Cod and central New Mexico. Volpe held bi-weekly talks with federal and local partners and agencies, and organized technical committees to identify greenhouse gas reduction strategies and likely climate change impacts in both regions. FHWA and Volpe included numerous agencies and public stakeholders to develop climate change risk mitigation and adaptation solutions that are implementable and realistic.

Volpe and FHWA chose central New Mexico out of 10 regions interested in conducting a similar climate change and scenario planning project. Volpe and community stakeholders tackled issues related to congestion, sprawl, wildfires, flash flooding, energy use, natural resource protection, emissions, and water scarcity. Volpe identified resilience and greenhouse gas reduction strategies for transportation and land use planning through monthly calls with stakeholders and technical committees. The Center created five climate change future scenarios and, together with the Mid-Region Metropolitan Planning Organization (MRMPO), helped develop a single transportation and land use development strategy that will be resilient and sustainable under any of the five futures.

MRMPO in Albuquerque integrated analysis from the central New Mexico project into its Metropolitan Transportation Plan, which guides federal, state, and local transportation investments. Project findings are now being shared with local planning agencies and used in climate change hazard-mitigation plans. Federal agencies that manage land in the region, such as the Bureau of Land Management and the U.S. Fish and Wildlife Service, are also using the Volpe Center's results in their management plans.

The Cape Cod study area covered 15 towns and the Cape Cod National Seashore. Volpe coordinated a two-day workshop with local, regional, and federal stakeholders that allowed the participants to confront the tradeoffs between transportation improvements, new development, and climate change. The scenario planning process led to a preferred future for transportation and land use development that anticipates climate change impacts, reduces greenhouse gas emissions, and reduces development in areas vulnerable to rising sea levels, erosion, and storms. The refined development scenario for Cape Cod

Through its expertise and coordination efforts with local communities, Volpe has facilitated enhanced transportation and community planning with an emphasis on addressing issues related to climate change. This type of collaboration brings added value and enhanced coordination to the transportation and community planning processes from the federal laboratories, specifically through their expertise, advanced tools, and facilities.



Above: A map of the central New Mexico project's study area. Right: Using downscaled climate data, the Volpe Center developed five possible climate futures for the central New Mexico region by the year 2040.

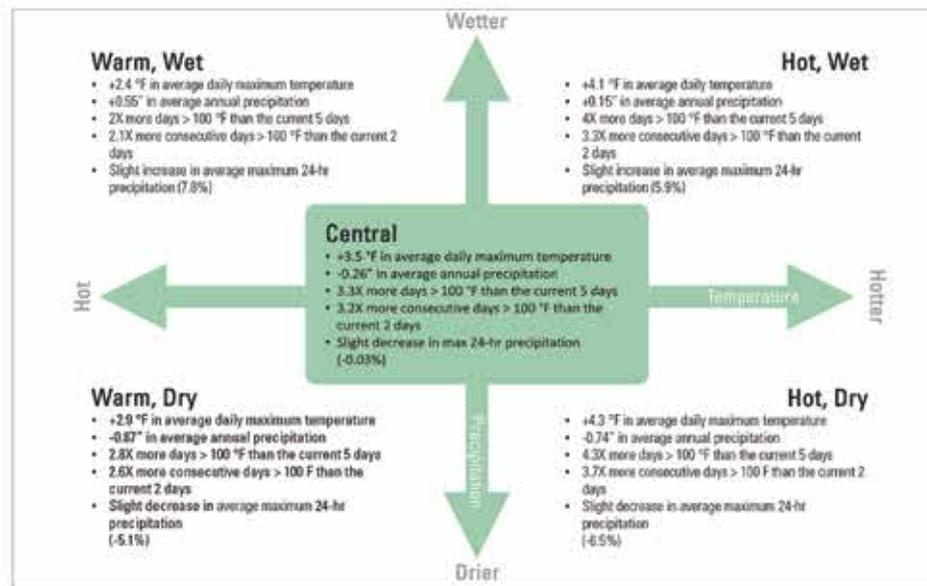


Photo credit: Volpe Center



Innovative Forest Service Research Maps Help Improve Air Quality

Air pollution from heavy metals and polycyclic aromatic hydrocarbons (PAHs) has been linked to major health problems, including cancer, cardiovascular disease, and adverse birth outcomes, with children being particularly vulnerable to airborne toxins.

Unfortunately, measuring air pollutants with conventional air-quality monitors is prohibitively expensive; most cities lack detailed information about the sources and amounts of airborne toxins. Scientists Geoffrey Donovan and Sarah Jovan of the USDA Forest Service Pacific Northwest Research Station are conducting an inventive study that measures the levels of air pollution in Portland, Ore., using samples of moss.

Mosses and lichens are like sponges—they absorb moisture and nutrients from the air and rain. In doing so, they also pick up contaminants, which are stored in their tissue, making them a living record of pollution levels from the nearby environment. Because moss and lichen are so widespread, they provide a handy and inexpensive method of sampling air pollutants and mapping pollution sources.

“In addition to measuring air quality and figuring out why pollution levels are higher in some places than others, we also want to track whether kids in lower income neighborhoods are experiencing higher levels of air pollution,” Donovan said.

Scientists collected moss at 360 points around Portland and had the samples analyzed for all 16 PAHs identified by the U.S. Environmental Protection Agency as priority pollutants, as well as heavy metal concentrations. In addition, they collected moss from 110 K-12 schools to determine the pollutant levels that school children are exposed to.

The Oregon Department of Environmental Quality (DEQ) followed the results of this intensive sampling from the beginning. The mission of Oregon DEQ’s Air Quality Program is to protect and enhance Oregon’s air quality for the health of all Oregonians through industrial source control and regulation. The detailed deposition maps based on the collected data show the location and concentration levels of airborne toxins across the Portland area.

This information has helped Oregon DEQ to site new permanent air quality monitors, as well as several temporary mobile monitors in “trouble spots” showing previously unknown sources of heavy metals.

Scientists are also measuring the air quality impact of tree cover near schools to determine whether trees can present a potential low-cost way of mitigating air pollution.

“You can’t move schools away from freeways, but you can plant more trees,” Donovan said.

Scientists with the Pacific Northwest Research Station collected moss from 110 K-12 schools. One school took the opportunity to engage several 3rd and 5th grade science classes in their study. The students got to meet the scientists and an environmental education specialist, and had a chance to collect moss samples and learn how trees help clean the air.

Photo credit: Sarah Jovan





Collaborative Forest Research Benefits State Trust Land and Rural Communities

The USDA Forest Service maintains a network of 81 experimental forests and ranges. These “living laboratories” allow federal and nonfederal researchers to conduct operational-scale experiments—where the study areas are big enough to give indications of what the results would be if applied in the “real world.”

At 270,000 acres, the Olympic Experimental State Forest (OESF) is the newest and largest experimental forest in the Forest Service’s network. Established in 2009 on the west side of the Olympic Peninsula in Washington state, this working forest is composed of mostly state trust lands managed by the Washington Department of Natural Resources (WADNR). The experiments here focus on learning how to better integrate revenue production, primarily through timber harvests, with ecosystem values such as habitat conservation.

The USDA Forest Service Pacific Northwest (PNW) Research Station collaborates with WADNR on various studies in the experimental forest. An overarching study includes monitoring the status and trends of riparian and aquatic habitats in 54 watersheds ranging from 70 to 1750 acres.

“This project is critically important to WADNR, as it supplies information for inferences about management effects on habitat as a basis for adaptive management,” said Allen Estep, Habitat Conservation Plan and Scientific Consultation Section Manager. “On important projects such as these, WADNR values and actively seeks collaboration with organizations such as the PNW Research Station for the benefits such partnerships provide, such as sharing data, expertise, and experience.”

WADNR’s primary goal is to chart the recovery of these habitats by applying innovative forest management strategies that are being tested in the

OESF. A primary goal of the PNW Research Station is to establish an aquatic and riparian monitoring program suitable for cross-site and regional comparisons with other experimental forests and long-term research sites.

To accomplish these goals, state and federal researchers identified monitoring indicators and designed sampling protocols that build a solid foundation for future corollary studies.

“PNW has been a valuable research partner to WADNR for many years. Our agency has always counted on high quality scientific expertise, and it has invariably been delivered,” said Teodora Minkova, a WADNR employee and research and monitoring manager for the experimental forest. “Two aspects distinguish PNW as a research partner on the current riparian monitoring project: One is a deep understanding and experience in applied science that is relevant to uncertainties faced by a land management organization such as WADNR, and the second is the reputation of an impartial scientific expert, which evokes stakeholders’ confidence and trust.”

WADNR land managers and their stakeholders (forest industry, tribes, private forest land owners, and environmental groups) benefit from the research partnership because it provides the groundwork for examining alternative riparian management strategies relative to threatened Pacific salmon plus other aquatic-riparian species of concern and their habitats.

WADNR is the major timber producer on the peninsula, so management practices that sustainably produce timber while protecting and restoring habitat for threatened Pacific salmon benefit the region’s rural communities, whose economies are tightly linked to natural resource commodity production.



Field crew collects stream data from the Olympic Experimental State Forest, Wash. The study findings will benefit the management of state and federal lands.

Photo credit: Jacqueline Winter



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Schematic of the I-90 wildlife overcrossing on the east side of Snoqualmie Pass, Wash. Below: Staff from the U.S. Forest Service, Conservation Northwest, Forterra, Sierra Club, WSDOT and other partners pose in front of the overcrossing rendition.

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Photo credit: Chase Gunnell/Conservation Northwest; Washington Department of Transportation



U.S. Department of Agriculture,
U.S. Forest Service

Pacific Northwest
Research Station

Washington

Wildlife Overpass Constructed With Help of Forest Service Research

For people, highways are an efficient way to navigate the landscape. But for wildlife, highways can be imposing barriers to movement, inhibiting their ability to find food and mates. In Washington State, Interstate 90 (I-90) is the main east-west thoroughfare, essentially bisecting the central Cascades ecosystem. From the western terminus in Seattle, I-90 heads east, passing through the Mount Baker-Snoqualmie National Forest, cresting the Cascade Range at Snoqualmie Pass into the Okanogan-Wenatchee National Forest, and on toward Idaho.

Approximately 27,000 cars and trucks travel daily along the Snoqualmie Pass segment of the interstate. Habitat connectivity is a focus for the national forests on both sides of the pass. So in 1998, an ecologist with the USDA Forest Service Pacific Northwest (PNW) Research Station led a team that studied animal movement patterns around I-90 at Snoqualmie Pass.

The researchers used a geographic information system (GIS), remote cameras, snow tracking, and roadkill surveys to identify where human and animal transportation routes overlap, and where animal movement and habitat connectivity were a concern. In 1999, the Washington State Department of Transportation (WSDOT) began planning for what would become a \$1 billion safety improvement project along the 15 miles of interstate over Snoqualmie Pass.

Having the research findings available was instrumental as the safety improvement proposal developed. Biologists with the Okanogan-Wenatchee National Forest were able to reference the findings, ensuring that planning documents considered the transportation safety of wildlife as well as humans.

This information also provided the groundwork for subsequent assessments conducted by the Okanogan-Wenatchee National Forest and local university collaborators, which ultimately identified where under- or overcrossings would have the most potential benefit for wildlife. WSDOT incorporated these findings into plans for the multiphase improvement project.

Skip ahead 12 years. All necessary environmental reviews have been completed, funding is secured, and land easements have been granted. On June 9, 2015, the State of Washington held a groundbreaking ceremony for phase 2 of the improvement project. During this phase, the first of two wildlife overcrossings will be constructed. The overcrossing is a constructed land bridge planted with native vegetation. High fences direct wildlife such as bear, deer, and possibly even wolves to the bridge so they can safely cross the interstate. This will be the first such wildlife crossing over an interstate highway in Washington; a similar one is in use in Banff National Park, Canada, with great success.

Three of the other areas the researchers identified as key wildlife transportation routes will feature undercrossings. Two of the undercrossings include streams. Ranging in width from 120 to 180 feet, the planned undercrossings are much wider than traditional culverts. The added width allows the streams to flow naturally so that wildlife and fish can move unencumbered either in the stream or alongside it.

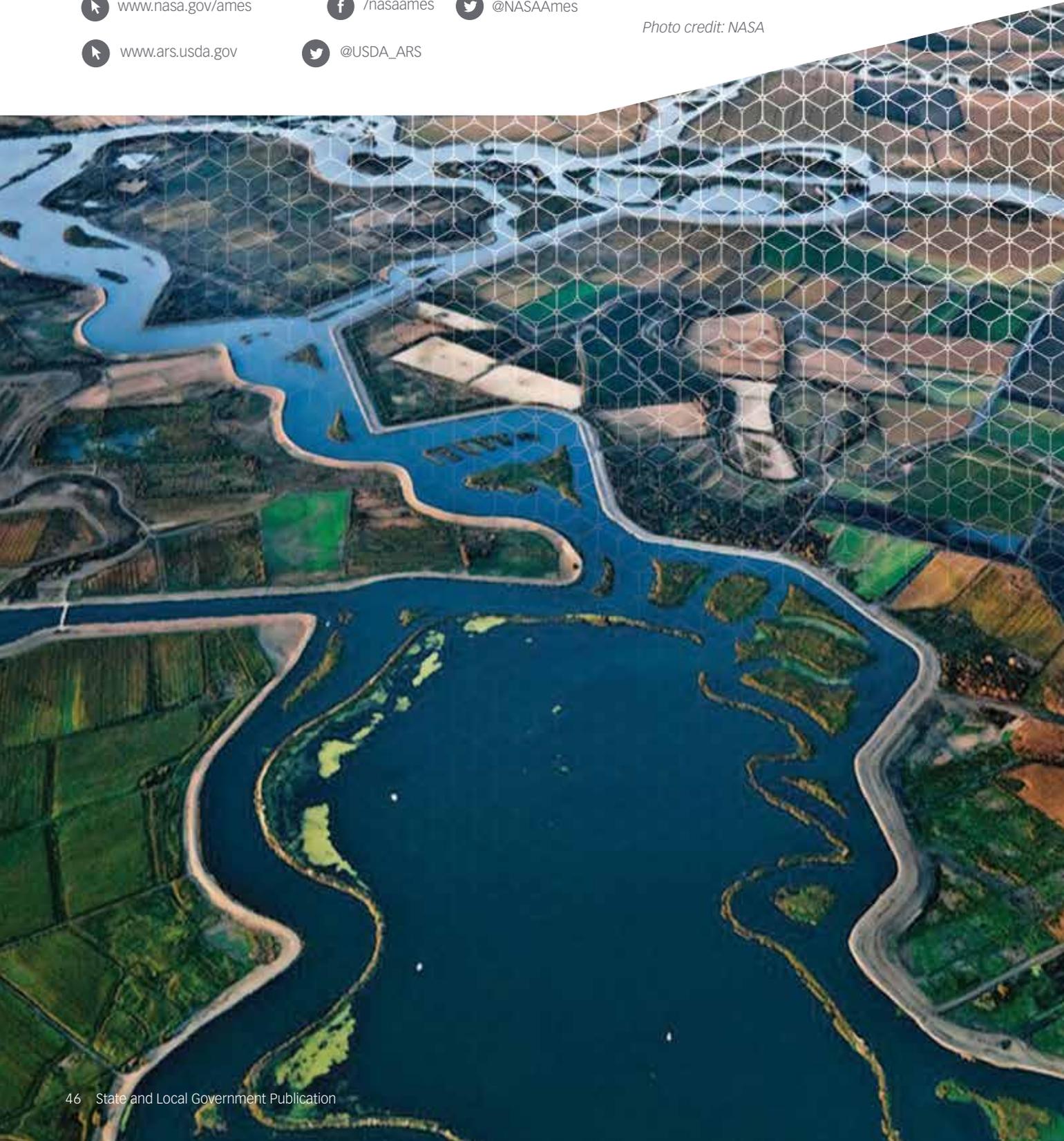
The information on habitat connectivity and wildlife travel patterns provided by the scientists was instrumental in planning for improvements that will make travel safer for both humans and wildlife as they traverse this segment of the central Cascades.



Management of aquatic weeds in the Sacramento-San Joaquin Delta ecosystem for protection of critical water resources, wildlife habitats, navigation, water conveyance and California agriculture.

Photo credit: NASA

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NASA

Ames Research Center

U.S. Department of Agriculture

California

Protection of Critical Water Resources Important for California Agriculture and Health

The California Sacramento-San Joaquin River Delta is the hub for California's water supply. It conveys water from Northern to Southern California agriculture and urban communities while supporting important ecosystem services in the Delta. The expansion of invasive aquatic plants threatens ecosystems, impedes current ecosystem restoration efforts, and is economically, environmentally, and sociologically detrimental to the Delta. These invasive plants negatively impact the redistribution of water and disrupt the ecology of the San Francisco Bay/Delta complex.

In response to these challenges, NASA Ames Research Center (NASA-ARC) and the U.S. Department of Agriculture-Agricultural Research Service (USDA-ARS) partnered with the State of California and local Delta governments to develop science-based, adaptive-management strategies for the California Sacramento-San Joaquin River Delta. The group focuses on altered environmental conditions in the Delta resulting from climate and drought, and the proliferation of aquatic invasive weeds.

The team is working to provide a comprehensive understanding of land use, drought and climate impacts on weed growth and strategies for integrated management. The project provides aid to local Delta stakeholders in developing assessment methods to determine the type and magnitude of impact from invasive weeds and developing integrated management strategies. An early product developed by NASA-ARC is a Water Hyacinth Mapping Tool, currently in use by the California Department of Boating and Waterways (CA-DBW) to monitor these non-native, invasive plants and direct management efforts.

A significant science gap is understanding how important native and invasive plants respond to the altered environmental conditions of the Delta. NASA-ARC uses unique controlled environment facilities to define plant response. USDA-ARS conducts research in aquatic weeds control practices such as the introduction of biological weed control agents (pathogens and insects), and increasing the effectiveness and efficiency of chemical sprays and physical removal.

University of California-Davis and the local governments focus on understanding how the weed communities provide habitat for mosquitoes, impact the Delta aquatic food web, and how land use in the Delta affects water quality. CA-DBW provides the project with operational testing of candidate control strategies, and is an initial adopter of decision support systems.

The project combines the science, operations, and economic implications related to various scenarios for integrated management of aquatic weeds in the Delta to help land and waterway managers make science-informed decisions regarding management and outcomes. Methods developed by the project can become routine land and water management tools. New high-resolution NASA sensor systems could provide standard data packages specifically designed for water system and ecosystems assessment and management. It is the hope of project personnel that these methods developed and demonstrated in the California Delta will provide a template for improved management of resources in complex river delta systems worldwide.

Education and Outreach

Reaching out to the communities that surround federal laboratories is a critical step in getting technologies into the marketplace and recruiting future researchers, entrepreneurs, and tech transfer professionals. By developing and maintaining strong relationships with state and local governments, schools of all levels, and individual business owners, federal labs have the ability to extend the effectiveness of technology transfer activities into the future.



Volpe Active in Local Community to Promote STEM Education and Engagement

In an effort to encourage STEM (science, technology, engineering, and math) education and greater community engagement, Volpe researchers and staff are actively providing opportunities for students and adults to participate in an array of transportation activities at Volpe.

In February and June 2015, Volpe staff participated in two STEAM (science, technology, engineering, art and math) Nights held at the Fletcher Maynard Academy and the Peabody/Rindge Upper School in Cambridge, Mass. These events brought together local organizations as a way to reach out to neighborhood residents and engage them in STEAM activities. The events also provided an opportunity for area residents and corporate staff to meet.

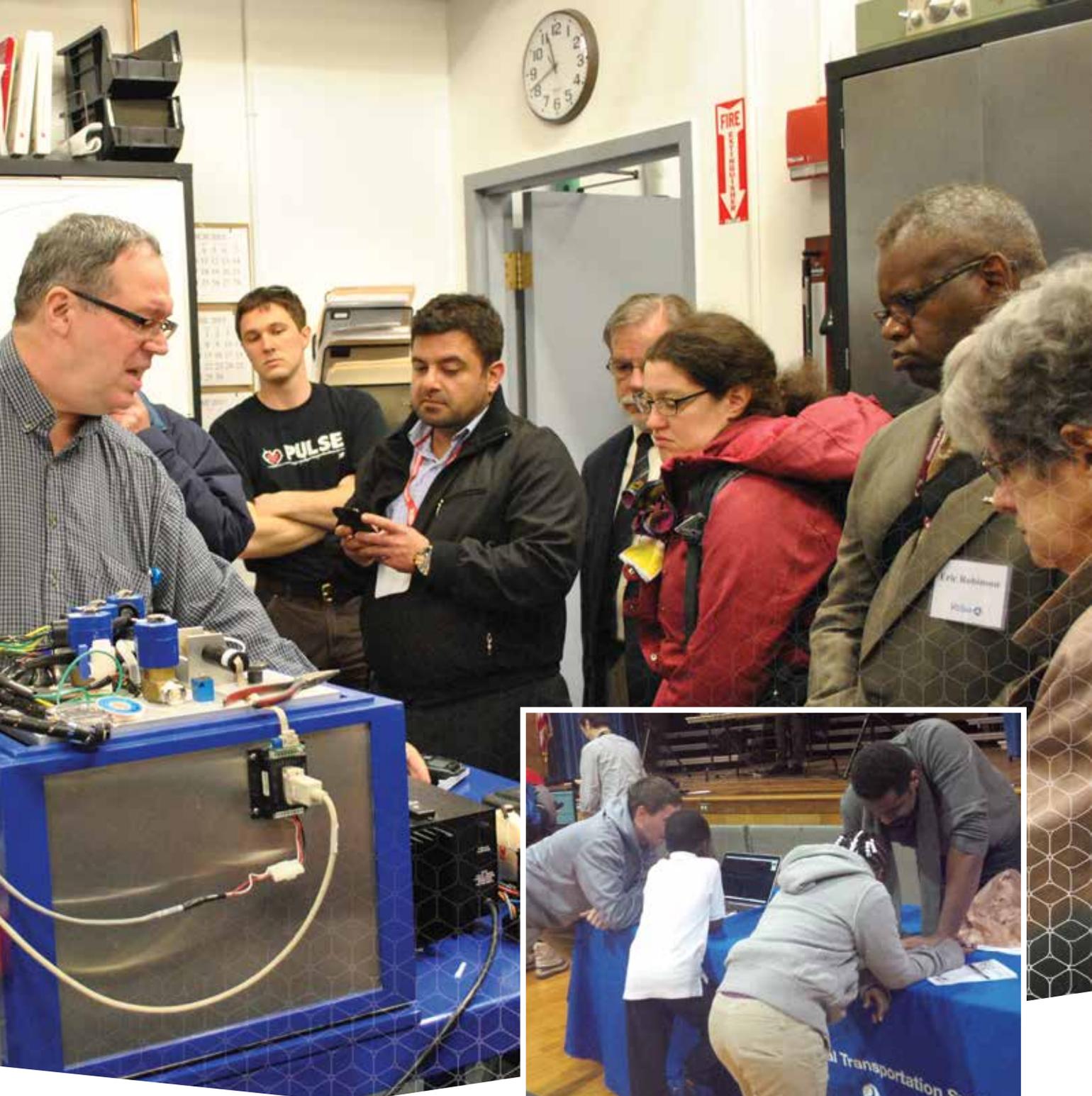
Volpe employees Shawel Negussie and Brandon Van Acker engaged 100 students in grades K-8 with their lively demonstrations. Van Acker's demonstration, Air Traffic in the United States, demonstrated two state-of-the-art computer programs used by air traffic controllers around the world to safely manage all of the traffic in the sky. Negussie's Is Transportation Safety on Your Mind? demonstrated the SaferBus and SaferCar apps, which provide safety information about buses and cars at your fingertips.

During the spring and summer Volpe hosted over 200 students from a variety of schools and programs. Students from the Federal Highway Administration's (FHWA) Summer Transportation Institute, Farr Academy, Putnam Avenue Upper School (NetPals), South Shore Public Charter School, and E2@MIT toured the Center, heard presentations, and had hands-on time with the human factors simulators.

In April, as part of the Cambridge Science Festival (CSF), Volpe hosted 40 visitors from the Cambridge community for "Volpe Talks: Transportation Ideas Worth Sharing." "Volpe Talks" featured an informative series of short, live talks from Volpe team members working on emerging transportation issues, such as maritime security, nonmotorized transportation, planning for climate change, and advancing the flow of aviation traffic.

The talks concluded with a tour of the Volpe aviation, rail and automotive simulators, showcasing how Volpe is advancing transportation innovation for the public good.

Through these various outreach activities, the Volpe Center is doing its part to provide STEM education and resources to the local community.



Above: Edward Conde demonstrates to Volpe CSF attendees the blood alcohol simulator (BASS) used to verify commercial breathalyzer testing accuracy. Below: Brandon Van Acker (left) and Shawel Negussie (right) show students the Air Traffic in the United States program and the SaferCar/Safer Bus apps at a STEAM Night.

Photo credit: Volpe Center

Amanda Mattson, a Volpe human factors safety expert, demonstrates the Volpe driving simulator used to test driver perception of road hazards and reaction times, as well as to improve the efficiency of dashboard safety messages.



NASA's Kennedy Space Center Inspires Local Entrepreneurs

NASA's John F. Kennedy Space Center (KSC) Technology Transfer Office has partnered with CareerSource Brevard on two innovative training programs for aspiring Florida entrepreneurs: Startup Quest and Energy Launch.

CareerSource Brevard administers the Workforce Investment Act (WIA) and Welfare Transition programs in Brevard County, as well as grants and other employment support activities. Startup Quest was funded through a \$12 million, 5-year grant from the Department of Labor to provide entrepreneurial training in nine Florida regions, including training conducted by CareerSource Brevard in Brevard County.

The program provides training to unemployed and underemployed degreed persons to help them learn how to transform a discovery or invention into a product for sale in the marketplace. KSC and other NASA centers provided patented technologies to the CareerSource Brevard training program to give the trainees an opportunity to evaluate real-world, space-related technologies from renowned NASA inventors.

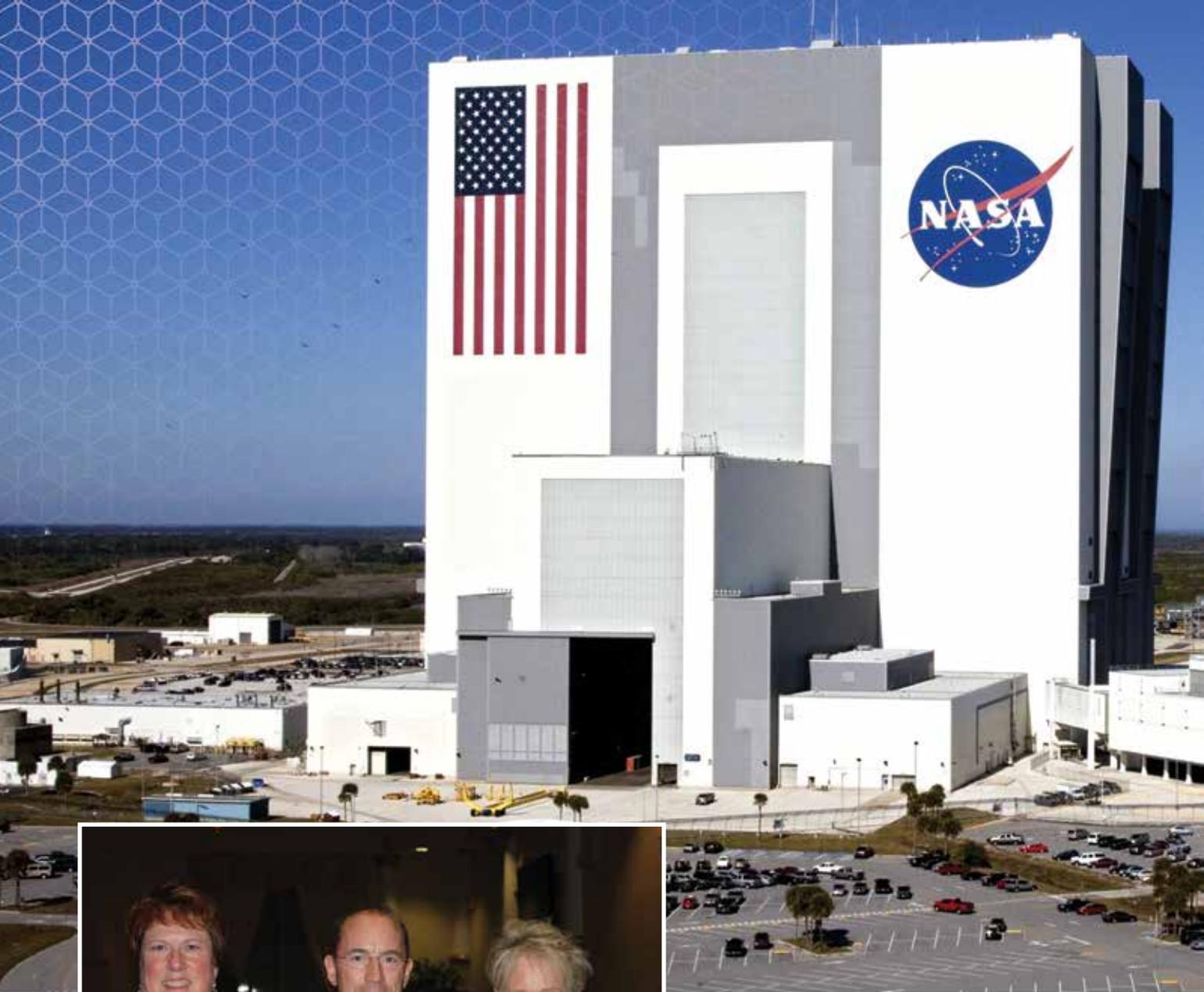
A similar program, Energy Launch, was a cooperative effort involving CareerSource Brevard, KSC, and the Florida Institute of Technology (FIT). Similar

to Startup Quest, Energy Launch was designed to train entrepreneurs to develop NASA or FIT energy-related and patented technologies for the purpose of expanding business and creating jobs. This program was funded by the Clean Energy Jobs Accelerator grant.

The Space Coast Clean Energy Jobs Accelerator was one of 20 projects nationwide sharing a total of \$37 million in federal funding. Success for both programs was measured by the number of participants that become employed as a result of the training, as well as the number of startups created. The programs are expected to create over 4,000 jobs statewide.

The initial round of Startup Quest in Brevard County was very successful. Of the more than 70 participants in the program, 34 have become employed, and 20 have become self-employed. Sixteen new businesses have started, and 10 of those have made it past the 6-month mark.

The KSC Technology Transfer Office is currently negotiating a license with one of the startups for two technologies developed at the Center.



Jeff Kohler (center) from the NASA KSC Technology Transfer Office with CareerSource Brevard leaders at the Startup Quest kickoff meeting.

Photo credit: NASA; CareerSource Brevard



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Commercialization Academy students studying the AFRL/RI patent wall.

Photo credit: Albert Santacroce



U.S. Department of Defense

Air Force Research Laboratory,
Information Directorate

New York

Commercialization Academy Offers Young Entrepreneurs Access to Intellectual Property

Since the summer of 2013, the Air Force Research Laboratory Information Directorate (AFRL/RI) in Rome, N.Y., has planted the seeds for two new and innovative commercialization initiatives that allow a broad spectrum of potential startup candidates to harvest the Directorate's intellectual property (IP) portfolio for startup activities.

The first step is the Commercialization Academy, a three-stage experiential education and technology acceleration program run by the Directorate and its collaborators. The goal of the academy is to develop student entrepreneurs who can contribute meaningfully to startups and industry. Students are paired with the Directorate's IP portfolio and inventors to develop investor-grade commercialization plans.

The Academy attracted 24 students from 11 New York colleges and universities. After an intense semester of business modeling and venture development, an impressive five Academy teams formed new startup companies. In addition, the teams licensed their AFRL technologies, and will continue development via local seed funds and business accelerators that were attracted to invest in the AFRL commercialization effort.

The Technology Transfer Accelerator program is the second initiative. Partnering with the Department of Defense, AFRL/RI managed this new, innovative startup accelerator called NY Furnace. The initiative is contracted through Arizona State University, and is designed to form, fund, incubate and launch new companies. Furnace is an intensive, nine-month accelerator experience for startups that provides seed funding, office space, and access to top industry mentors to commercialize discoveries made in Air Force laboratories.

This new process helps entrepreneurs create new startup companies, while also offering some technologies to existing companies in the New York region to help them grow and develop. Through AFRL/RI initiatives, the program attracted the support of a wide range of local, regional, and state economic development organizations, colleges and universities, startup incubators, accelerators, angel investors, and venture capitalists.

"I am excited about the fabulous success of this first true hometown effort and am looking forward to doing all I can to help propel the program forward, as they become a leader nationwide in defense research commercialization," said Martin Babinec, founder of Upstate Venture Connect.

State and local economic development organizations pledged \$400,000, and venture capitalists offered the potential of \$1.5 million in seed funds. NY Furnace has eight teams proceeding to create small businesses and competing for funding and entry into future markets.

Through the Commercialization Academy and the Technology Transfer Accelerator programs, students have the opportunity to work with real-world technologies and have unique access to government labs and researchers. The labs have increased visibility into their portfolio of technologies and other resources, leading to more licenses, better access to talent, and more innovative thinking. In the end, the local community benefits through new ventures, innovative homegrown talent, and a new channel into the gold mine of laboratory technologies previously seen as inaccessible.



www.technology.nasa.gov/t2u

@NASAsolutions

NASA mechanical engineer Bruce Farner (left) demonstrates a desktop prototype of his patented conical seat shutoff valve for Professor Marshall from Alcorn State University in Alcorn, Miss., during a visit to Stennis Space Center.

Photo credit: NASA



NASA

Stennis Space Center
Marshall Space Flight Center

Mississippi
Alabama

Tech Transfer University Brings Patents to Students

The NASA Technology Transfer Program established a Technology Transfer University (T2U), which focuses on bringing real NASA-developed technologies into the classroom. Business students choose from the high-tech NASA patent portfolio to create market assessments and business plans to implement the skills taught in the classroom. They also receive access to the NASA innovators who developed the technologies, which provides them the unique opportunity to learn from the inventor and discover the details of the technology with which they are working.

Through this program, NASA field centers nationwide engage business schools and hundreds of undergraduate and graduate students each year, providing entrepreneurial experience to tomorrow's business leaders. Students learn that these assets are available and how industry can benefit from using these technologies developed under laboratory research and development programs in commercial applications.

As a part of this new program, NASA's Stennis Space Center (SSC) entered into a Space Act Agreement with Alcorn State University (ASU), Alcorn, Miss., to enable undergraduate students in the School of Business and graduate students in the Master of Business Administration (MBA) program to use an SSC patented technology to prepare a business plan to enter into a business plan competition.

This activity prepares young African-American men and women to become entrepreneurs and gives them the experience of conceiving business ventures, commercializing technology, and preparing and presenting business plans. SSC and ASU have worked together for two years.

In addition to SSC's collaboration with ASU, NASA's Marshall Space Flight Center's (MSFC) involvement

with T2U began with an outreach arrangement that its Technology Transfer Office cultivated with the University of Alabama in Huntsville (UAH). In this collaboration, MBA students have been exploring the commercial potential of actual MSFC innovations. In return, the NASA center is able to tap into eager minds that are being exposed to the latest empirical findings and analytical techniques.

To date, MSFC and UAH have worked together for three semesters.

Marshall has also completed its first semester of a T2U partnership with the University of Alabama (UA). In this arrangement, MSFC is specifically working with UA's science, technology, engineering, and math (STEM) path to the MBA program, which enables a student to complete both a BS and an MBA in 5 years. Marshall has worked with more than 700 students who were organized into 160 teams of 4-5 people to develop commercialization strategies for 10 NASA-patented technologies over a 6-week period.

The success of the partnerships SSC developed with ASU, and MSFC with UAH and UA, is leading to similar collaborations with other institutions of higher learning. Details of MSFC's participation with Alabama A&M University are being finalized, as well as SSC's progress with agreements for other colleges and universities in both Mississippi and Louisiana.

In addition to these agreements, most NASA centers are engaged with one or more state and private universities in T2U partnerships. As the value of these partnerships spreads, more and more academic institutions will take advantage of the wide range of resources available from federal labs.

Improvements in Emergency Response and Medicine

Technology transfer can immediately impact local communities when emergency responders in the medical field are provided with tools to make their jobs safer and more efficient. These technologies, developed in federal labs or in collaboration with universities or local government labs, offer lifesaving innovations with the potential to be applied in communities across the country.





Virtual Platform Streamlines Emergency Communication in Public and Private Sectors

In emergency response scenarios, agencies have seconds and minutes to work, not hours. The Virtual Business Emergency Operations Center (vBEOC), developed by the U.S. Department of Energy's Argonne National Laboratory for the Illinois Emergency Management Agency (IEMA), is a virtual public/private sector portal that allows businesses and not-for-profit private entities to receive and provide critical situational awareness information before, during, and after a disaster event.

The vBEOC provides critical information for emergencies, such as road closures, utility service status, ongoing response actions, weather, analysis and more to facilitate private sector cooperation with government responders to promote mutual resiliency. Built off the nationally deployed Virtual Community Platform (onVCP) application engine, it provides a single stage for emergency management communication, collaboration, and community.

The vBEOC application joins the list of other successful onVCP applications, and demonstrates how the platform can be extended to meet the needs of thousands of users on federal, state, local, tribal and private sector levels. The application-driven virtual workspace provides a powerful set of baseline capabilities that custom applications, such as vBEOC, can extend to allow users to collaborate and communicate. The platform includes calendars, contacts, discussion boards, a document repository, help, news, announcements, instant messaging, videoconferencing, screen sharing, photos and surveys.

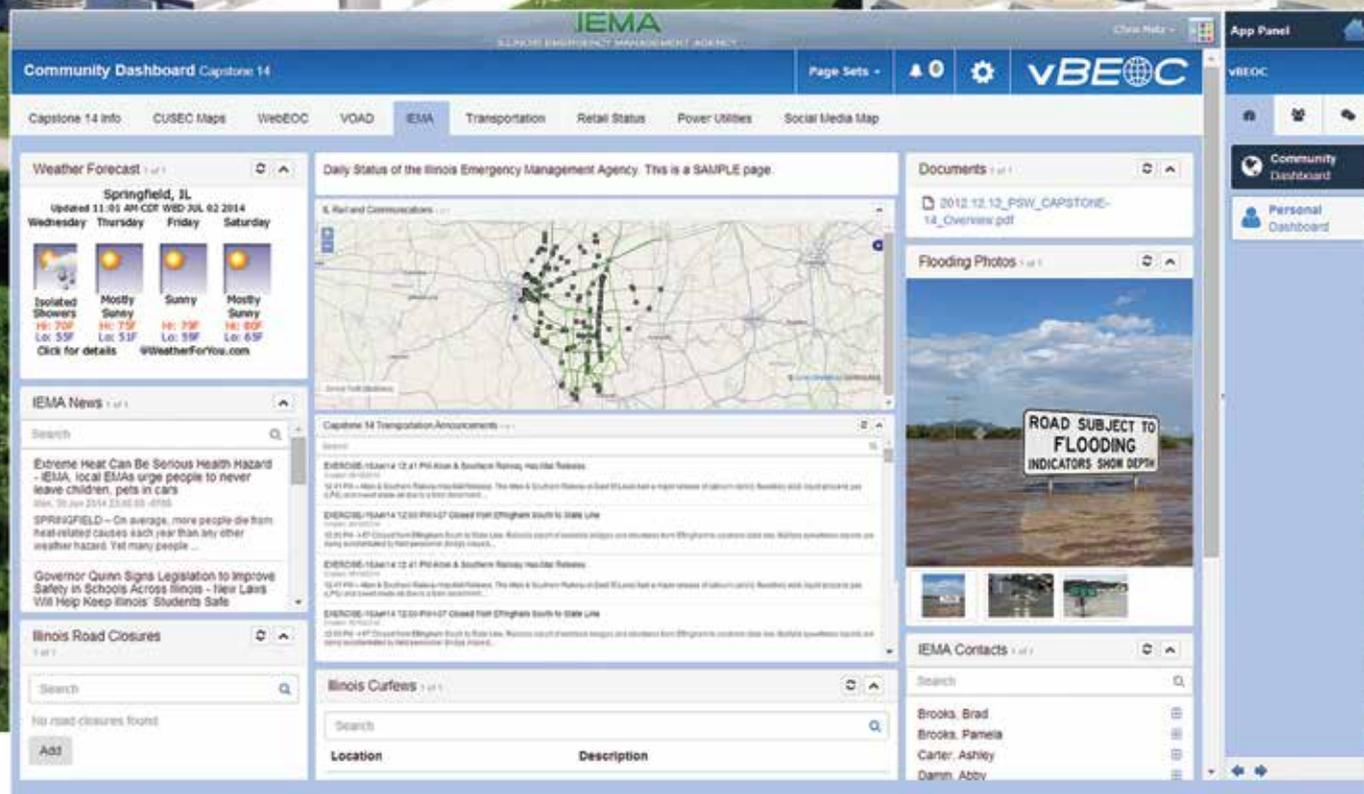
In order for the State of Illinois to use onVCP, on which the vBEOC application is based, Argonne licensed the unique, lab-developed solution to IEMA. The license gave Illinois the ability to use the system as needed during a period of three years after the

initial development project was completed. Argonne also trained IEMA and industry users on how to use the system.

The vBEOC was piloted during CAPSTONE-14, a multi-state exercise designed to test response and recovery capabilities following a major New Madrid Seismic Zone earthquake. In direct support of the President's National Preparedness Directive 8, CAPSTONE-14 was the culmination of three years of planning and preparedness activities led by the Central U.S. Earthquake Consortium. CAPSTONE-14 also served as a regional and national model for the emergency management community by incorporating new technologies such as the vBEOC, the Mutual Aid Support System, a regional common operating picture, and more.

A statement from IEMA said, "The test of the vBEOC app on Argonne's Virtual Community Platform during the CAPSTONE-14 Exercise marks a significant leap forward in how information is shared and response and recovery are coordinated between the public and private sectors. For the first time, a single point of access gave participants the means to communicate and visualize information coming in from 440 counties in seven states in an unprecedented fashion. With continued commitment and development, we can fundamentally change the way we prepare for, respond to, recover from, and mitigate against disasters at all levels."

CAPSTONE-14 participants who utilized the vBEOC included: Ameren, AT&T, ComEd, Alton & Southern, American Institute of Architects, American Water, Bank of America, Baxter, BCBS, FCB Banks, Honeywell, Home Telephone Company, HTC, IBA, Marathon, Monsanto, Motorola, Philips, Prairie State, State Farm, Walgreens, Walmart, USS, and Verizon.



The vBEOC App offers a user-configurable dashboard of situational awareness tools that combines content produced in the vBEOC Initiative's Standards Apps, as well as external data provided by partners.

Photo credit: Argonne National Laboratory/IEMA

 www.anl.gov
 [/argonne](https://www.facebook.com/argonne)
 [@Argonne](https://twitter.com/Argonne)



C-STARS Simulator Brings Research and Training to Emergency Response Teams

To bring simulation to the medical arena, the U.S. Air Force School of Aerospace Medicine (USAFSAM) and the Air Force Expeditionary Medical Skills Institute (AFEMSI) entered into a Cooperative Research and Development Agreement (CRADA) with the University of Cincinnati Health (UC Health) and the University of Cincinnati College of Medicine's Department of Emergency Medicine.

This agreement provides the AFEMSI Center for Sustainment of Trauma and Readiness Skills (C-STARS) Cincinnati program with 12 high-definition medical patient simulators for research and training activities, which will be conducted in a new medical simulation center developed and operated by UC Health at its Cincinnati campus. This cooperative agreement enhances the training of Air Force en-route care teams, including the USAFSAM Critical Care Air Transport Team and the Tactical Critical Care Evacuation Team training program.

UC Health medical training and research programs benefit from access to the Air Force simulators, using them to train resident physicians, medical students, nursing staff, ancillary staff, and emergency medical services crews. Simulation research and training scenarios are expected to produce enhanced knowledge that will contribute to the ongoing development of new and improved Air Force Medical Service training methods and content. Cincinnati-area EMS crews, fire departments, UC Health employees, and UC students enrolled in a health care degree program will also have supervised access to the new simulation center for training courses.

Colonel Michael Petro of USAFSAM commented that the development of this simulation center will benefit

both the military and the civilian community beyond a shared investment of dollars and equipment. As USAFSAM develops and runs new simulations for the military, local health professionals at UC and in the Cincinnati community will gain from that sharpened expertise.

While universities and private industry around the country have built some larger, more expensive simulation centers, none of them have the size and depth of cadre of this center. A great simulation center requires space, a good supply of equipment, and a huge commitment of personnel and knowledge. By combining the assets of the military and civilian programs, this collaboration has brought exactly that to USAFSAM and Cincinnati.



From left to right: UC College of Medicine Dean Dr. Thomas Boat; UC Health President and CEO Dr. Richard Lofgren; UC Medical Center President and CEO Ms. Lee Ann Liska; Department of Emergency Medicine Chair Dr. Arthur Pancioli; and Commander, 711th Human Performance Wing Brig. Gen. Timothy Jex at the ribbon cutting of the C-STARS Simulator grand opening.



One of the mannequins in the new Cincinnati C-STARS (Center for Sustainment of Trauma and Readiness Skills) simulator.

Photo credit: Marvin Shelton, USAFSAM/ETS

 www.wpafb.af.mil/afri
 /Team-AFRL
  @Team_AFRL

The T2 Toolkit

Our goal is to make technology transfer as clear and easy as possible for local business to navigate – putting everything at the fingertips of commercial industry. We want to guide businesses looking to get off the ground, help them expand and fill the technical needs in existing product lines.

Facilitating T2 With Innovative Tools and Resources

The core of the FLC’s mission is to facilitate the technology transfer process by providing information and introductions for a more accessible path for our members, their cooperative partners, and industry to make market and partnership connections. To speed the process for federal labs, inventors, businesses and entrepreneurs with everything from gaining market exposure for their technologies to offering introductions for potential long-term partnership opportunities, the FLC has created several FREE and easy-to-use tools that anyone can utilize or search.

Your T2 Toolkit



Available Technologies Tool

The FLC Available Technologies tool provides a free one-stop shop to locate licensing opportunities for a particular type of technology anywhere in our nationwide system of federal labs and research centers. federallabs.org/techs



Technology Locator

For industry and other technology seekers, the FLC Technology Locator is the federal lab matchmaker who identifies laboratory resources that can respond to any specific technology need and provides referrals to other federal resources. techlocator@federallabs.org



FLCBusiness

FLCBusiness is a comprehensive database designed for industry, agencies, and academia to search the abundance of federal laboratories, facilities and equipment, programs, and funding resources available to aid business development and accelerate T2. flcbusiness.com

Lab-to-Market Successes



Pioneering Achievements

The following featured lab-to-market successes are examples of revolutionary technologies that continue to advance our world today thanks to the research, development, and commercialization partnerships that took place between federal labs and private companies.

Promoting Lab-to-Market Success

Technology transfer doesn’t happen overnight. For many scientists, engineers, inventors and lab professionals, it is a process that can take years to complete depending on the technology, licensing, market needs and partnership agreements.

Fortunately, the FLC understands the T2 process and how rewarding it can be when a technology is finally introduced to market, which is why we have made it a point to honor the hard work and dedication of our members.

Through annual publications, daily communication and media promotion, and the FLC awards program, we assist our members’ R&D and technology transfer missions by shining the spotlight on their scientific and technological advancements.

The FLC’s mission

Connecting federal laboratories with industry to accelerate technology transfer for economic impact.

PROMOTE



EDUCATE



FACILITATE



FLC Member Directory

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/marshall

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/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/NCTR

CALIFORNIA

Aviation and Missile Research, Development, and Engineering Center - Aeroflightdynamics Directorate

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

Agricultural Research Service - Pacific West Area

Dept. of Agriculture
www.ars.usda.gov/pwa

Air Force Flight Test Center

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

Ames Research Center

NASA
www.nasa.gov/ames

Biological Resources Discipline - Western Regional Office

Dept. of Interior
http://biology.usgs.gov/wro

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

Forest Service - San Dimas Technology and Development Center

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

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

National Nuclear Security Administration - Lawrence Livermore National Laboratory

Dept. of Energy
www.llnl.gov

National Nuclear Security Administration - 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/nawcwg

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

Naval Medical Center - San Diego

Dept. of Defense - Navy
www.med.navy.mil/sites/nmcscd

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

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

University of California, Los Angeles - Laboratory of Structural Biology and Molecular Medicine

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

COLORADO

Agricultural Research Service - Northern Plains Area

Dept. of Agriculture
www.ars.usda.gov

Air Force Academy

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

FLC MEMBER DIRECTORY

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

Federal Railroad Administration - Transportation Technology Center

Dept. of Transportation
www.aar.com

Forest Service - Rocky Mountain Research Station

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

National Telecommunications and Information Administration - Institute for Telecommunication Sciences

Dept. of Commerce
www.its.bldrdoc.gov

National Renewable Energy Laboratory

Dept. of Energy
www.nrel.gov

Wildlife Services - Animal and Plant Health Inspection Service - 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

U.S. Coast Guard Research and Development Center

Dept. of Homeland Security
www.uscg.mil/acquisition/rdc

DISTRICT OF COLUMBIA

Center for Food Safety and Applied Nutrition

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

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

Air Force Research Laboratory - Munitions Directorate

Dept. of Defense - Air Force
www.eglin.af.mil/units/afrlmunitionsdirectorate

Air Force Civil Engineer Center

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

Applied Research Center

Dept. of Energy
www.arc.fiu.edu

Florida Integrated Science Center - Center for Coastal and Watershed Studies

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

Florida Integrated Science Center - Water Resources of Florida - Tallahassee

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

Kennedy Space Center

NASA
www.nasa.gov/kennedy

National High Magnetic Field Laboratory

National Science Foundation
www.magnet.fsu.edu

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

U.S. Army Research, Development and Engineering Command - Simulation and Training Technology Center

Dept. of Defense - Army
www.arl.army.mil/rdecom

GEORGIA

Agricultural Research Service - South Atlantic Area

Dept. of Agriculture
www.ars.usda.gov/msa

Centers for Disease Control and Prevention

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

Capability Development Integration Directorate - 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

National Wildlife Health Center - Honolulu Field Station

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

IDAHO

Idaho National Laboratory

Dept. of Energy
www.inl.gov

FLC MEMBER DIRECTORY

Idaho Water Science Center

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

ILLINOIS

Agricultural Research Service - Midwest Area

Dept. of Agriculture
www.ars.usda.gov/mwa

Argonne National Laboratory

Dept. of Energy
www.anl.gov

Center for Advanced Cement-Based Materials

Dept. of Commerce
<https://engineering.purdue.edu/Engr/Research/LabsFacilities/CACM>

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

U.S. Army Corps of Engineers - Engineer Research and Development Center - Construction Engineering Research Laboratory

Dept. of Defense - Army
www.erd.c.usace.army.mil/cerl

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

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>

U.S. Army Training and Doctrine Command 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

Agricultural Research Service - 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

Center for Drug Evaluation and Research

Dept. of Health and Human Services
www.fda.gov/Drugs

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

Chemical Security Analysis Center (CSAC)

Dept. of Homeland Security
<http://www.dhs.gov/st-csac>

Clinical Center

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

Defense Information Systems Agency - Joint Interoperability Test Command

Dept. of Defense
<http://jitic.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/goddard

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>

National Security Agency - National Information Assurance Research Laboratory

National Security Agency
<https://www.nsa.gov/ia>

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

FLC MEMBER DIRECTORY

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://www.nga.mil>

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.niams.nih

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
<http://www.navsea.navy.mil/Home/WarfareCenters/NSWCIndianHeadEODTechnology>

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

Naval Surface Warfare Center - Indian Head Division

Dept. of Defense - Navy
www.navsea.navy.mil/nswc/indianhead

Office of Research Services

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

Test and Evaluation Command

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

U.S. Army Medical Materiel Development Activity

Dept. of Defense - Army
www.usammma.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.detrick.army.mil>

U.S. Army Medical Research and Materiel Command - Telemedicine and Advanced Technology Research Center

Dept. of Defense - Army
www.tatrc.org

U.S. Army Research, Development and Engineering Command - Communications-Electronics Research, Development and Engineering Center Command, Power & Integration Directorate - CP&I

Dept. of Defense - Army
http://www.cerdec.army.mil/inside_cerdec/cpi

U.S. Army Research, Development and Engineering Command - Communications-Electronics Research, Development and Engineering Center - Intelligence and Information Warfare Directorate

Dept. of Defense - Army
www.cerdec.army.mil/inside_cerdec/i2wd

U.S. Army Research, Development and Engineering Command - Communications-Electronics Research, Development and Engineering Center - Software Engineering Directorate

Dept. of Defense - Army
www.cerdec.army.mil/inside_cerdec/sed

FLC MEMBER DIRECTORY

U.S. Army Research, Development and Engineering Command - Communications-Electronics Research, Development and Engineering Center - Space and Terrestrial Communications Directorate

Dept. of Defense - Army
www.cerdec.army.mil/inside_cerdec/stcd

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

Air Force Research Laboratory - Space Vehicles Directorate Kirtland AFB

Dept. of Defense - Air Force
www.kirtland.af.mil/afri_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
<https://www.mynavyexchange.com>

U.S. Army Research Institute of Environmental Medicine

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

Volpe National Transportation Systems Center

Dept. of Transportation
www.volpe.dot.gov

MICHIGAN

Great Lakes Science Center

Dept. of Interior
www.glsc.usgs.gov

Michigan Water Science Center

Dept. of Interior
<http://mi.water.usgs.gov>

U.S. Army 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

Agricultural Research Service - Mid South Area

Dept. of Agriculture
www.ars.usda.gov/msa

Engineer Research and Development Center

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/stennis>

U.S. Army Corps of Engineers - Coastal and Hydraulics Laboratory

Dept. of Defense - Army
<http://chl.erd.c.usace.army.mil>

U.S. Army Corps of Engineers - Environmental Laboratory

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

U.S. Army Corps of Engineers - Geotechnical and Structures Laboratory

Dept. of Defense - Army
<http://gsl.erd.c.usace.army.mil>

U.S. Army Corps of Engineers - 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>

National Nuclear Security Administration - Kansas City Plant

Dept. of Energy
www.nnsa.energy.gov/nsc

MONTANA

Forest Service - Missoula Technology and Development Center

Dept. of Agriculture
www.fs.fed.us/eng/techdev/mtdc

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

National Nuclear Security Administration - Nevada Field Office

Dept. of Energy
www.nv.doe.gov

Nevada Water Science Center

Dept. of Interior
<http://nevada.usgs.gov/water>

NEW HAMPSHIRE

New Hampshire/Vermont Water Science Center

Dept. of Interior
<http://nh.water.usgs.gov>

Portsmouth Naval Shipyard

Dept. of Defense - Navy
<http://www.navsea.navy.mil/Home/Shipyards/Portsmouth>

U.S. Army Corps of Engineers - 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

FLC MEMBER DIRECTORY

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
<http://www.ardec.army.mil>

U.S. Army Research, Development and Engineering Command - Communications-Electronics Research, Development and Engineering Center

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

William J. Hughes Technical Center

Dept. of Transportation
www.tc.faa.gov

NEW MEXICO

Air Force Research Laboratory - Directed Energy Directorate

Dept. of Defense - Air Force
www.kirtland.af.mil/afrl_de

Air Force Research Laboratory - Space Vehicles Directorate - Kirtland AFB

Dept. of Defense - Air Force
www.kirtland.af.mil/afrl_vs

National Nuclear Security Administration - 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

Air Force Research Laboratory - Information Directorate

Dept. of Defense - Air Force
www.wpafb.af.mil/afri

Benét Laboratories

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

Brookhaven National Laboratory

Dept. of Energy
www.bnl.gov

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/plum

NORTH CAROLINA

Army Research Laboratory - Army Research Office

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

Forest Service - 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

Air Force Research Laboratory - 711th Human Performance Wing

Dept. of Defense - Air Force
www.wpafb.af.mil/afri/711HPW

Air Force Research Laboratory - Aerospace Systems Directorate

Dept. of Defense - Air Force
www.wpafb.af.mil/afri/rq

Air Force Research Laboratory - Materials and Manufacturing Directorate

Dept. of Defense - Air Force
www.wpafb.af.mil/afri/rx

Air Force Research Laboratory - Sensors Directorate

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

Army Research Laboratory - Vehicle Technology Directorate - Propulsion Program

Dept. of Defense - Army
<http://www.arl.army.mil/>

Air Force - Aeronautical Systems Center

Dept. of Defense - Air Force
www.wpafb.af.mil/asc

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/glenn

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

Federal Aviation Administration - Civil Aerospace Medical Institute

Dept. of Transportation
<https://www.faa.gov>

FLC MEMBER DIRECTORY

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

Oklahoma Water Science Center

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

OREGON

Forest Service - 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

Agricultural Research Service - North Atlantic Area

Dept. of Agriculture
www.ars.usda.gov

Advanced Technology for Large Structural Systems Center - National Science Foundation

www.atlss.lehigh.edu

Forest Service - Northern Research Station

Dept. of Agriculture
www.nrs.fs.fed.us

National Institute for Occupational Safety and Health - Pittsburgh Research Laboratory

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

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

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

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.spawar.navy.mil

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
http://www.24af.af.mil/
units/688thinformationoperationswing

Agricultural Research Service - Southern Plains Area

Dept. of Agriculture
www.ars.usda.gov/npa

Air Force - 311th Human Systems Wing

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

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

Institute for Fusion Studies

Dept. of Energy
http://w3fusion.ph.utexas.edu/ifs/

Johnson Space Center

NASA
www.nasa.gov/johnson

National Nuclear Security Administration - 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://mrmc.amedd.army.mil

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

FLC MEMBER DIRECTORY

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

Air Force Research Laboratory - Air Force Office of Scientific Research

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

Army Research Laboratory - Vehicle Technology Directorate - Structures Program

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

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

Federal Highway Administration - Turner-Fairbanks Highway Research Center

Dept. of Transportation
www.tfhrc.gov

Langley Research Center

NASA
www.nasa.gov/langley

Marine Corps Systems Command

Dept. of Defense - Navy
www.marcorsyscom.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

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

Navy Warfare Development Command

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

Office of Naval Research

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

U.S. Army Research, Development and Engineering Command - Communications-Electronics Research, Development and Engineering Center - 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

United States Army Corps of Engineers - 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

Department of Energy - Hanford Site

Dept. of Energy
www.hanford.gov

National Institute for Occupational Safety and Health - Spokane Research Laboratory

Dept. of Health and Human Services
http://www.cdc.gov/niosh/contact/im-srl

Naval Undersea Warfare Center - Division Keyport

Dept. of Defense - Navy
www.navsea.navy.mil/nuwc/keyport

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

Forest Service - 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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