Office of National Laboratories

Harnessing a Network of Laboratories Built to Meet Tomorrow's Homeland Security Challenges

Homeland Security

Science and Technology

"Science and technological innovation are force multipliers for our country and are essential for the successful execution of our mission sets of the Department of Homeland Security."

~ Dr. Reginald Brothers
Under Secretary for Science and Technology
Department of Homeland Security

OFFICE OF NATIONAL LABORATORIES

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LETTER FROM THE DIRECTOR

Jamie Johnson

I am pleased to present an overview of the work we do at the Department of Homeland Security (DHS) Science and Technology Directorate (S&T) Office of National Laboratories (ONL). Our dedicated ONL team manages S&T's use of Department of Energy (DOE) National Laboratories and the DHS Laboratory complex infrastructure, technical expertise, and capabilities.

ONL facilitates use of the DOE National Laboratory capabilities and operates, maintains, and—when needed—constructs and upgrades DHS's own laboratories to ensure access to state-of-the-art capabilities necessary for meeting current and emerging homeland security needs.

During the 20th century, our national laboratories emerged as our greatest institutional resource for producing the innovative capabilities that preserve our way of life, allow us to respond to national emergencies, and keep our homeland secure. Following the terrorist attacks that occurred at the dawn of the 21st Century and points thereafter, it became apparent that our collective laboratory complex must feature highly coordinated partnerships, strong management, secure and efficient operations, and the cutting-edge facilities needed to provide enduring capabilities in a more sophisticated threat environment. Now, in the face of a constricted fiscal reality, ONL remains primed to meet these challenges head-on.

Our five DHS Laboratories are ever focused on providing vital contributions to the entire homeland security community. The DHS Laboratories are unique in their streamlined emphasis on homeland security mission success and strong customer alignment. With our resources, we are demonstrating a real impact in technological innovations and scientific breakthroughs, and we are making smart investments in the infrastructure needed to meet mission needs. These investments have resulted in enduring capabilities that include technical reachback in response to emerging chemical threats and hazards, the continuous ability to address biological threats, technical and knowledge-based support to the first responder community, and developmental testing and support for new explosives detection technologies, among others. We are also prepared to meet future needs by advancing the new, state-of-the-art, National Bio and Agro-Defense Facility (NBAF) that will ultimately replace the Plum Island Animal Disease Center (PIADC).

ONL is coordinating efforts with the DOE National Laboratories and partners throughout government, industry, and academia to provide the best homeland security solutions while realizing efficiencies that maximize the American public's return on investment. ONL's stewardship facilitates the delivery of enduring capabilities vital to DHS and the national homeland security mission.

I look forward to sharing our world of work with you as we continue to utilize the laboratories to deliver critical homeland security capabilities that make a real impact to keep our nation safe.

~ **Jamie Johnson**
Director of the Office of National Laboratories

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AN INTRODUCTION TO THE OFFICE OF NATIONAL LABORATORIES

Who We Are

The Department of Homeland Security (DHS) Science and Technology Directorate (S&T) Office of National Laboratories (ONL) oversees a coordinated network of five DHS Laboratories and as many as 13 Department of Energy (DOE) National Laboratories vital to the national homeland security mission. This extensive network enables America's brightest scientists and engineers to apply their expertise and develop solutions that address our most dangerous threats and homeland security vulnerabilities.

Our Mission: Strengthen America's security by providing expertise and innovative technology solutions for America's homeland security community.

Our Vision: A safer and more resilient America through an integrated laboratory network providing the most effective science and technology solutions to enhance our security.

Our People: Dedicated public servants and support staff who bring determination and focus to the mission. At ONL, we maintain the critical laboratory assets and coordination of activities that provide efficient delivery of effective solutions to secure our homeland.

With our resources, we are demonstrating a real impact in technological innovations, breakthroughs, rapid response capabilities, and deployment of solutions to meet DHS mission needs.

What We Do

Our Role in Helping to Secure the Homeland

Whether operating in times of calm, preparedness, crisis, or response, our new reality is that American scientific and technological know-how must exist on the cutting edge of innovation to provide technological solutions and capabilities. ONL embraces its oversight role with all laboratories that provide developmental assistance for products and solutions to support the homeland security community and keep America safe. ONL is arranged into three branches that work collaboratively with the laboratories and key stakeholders to deliver mature vital science and technology capabilities:

- Our Utilization Branch focuses on the effective use of the DOE National Laboratories and the five DHS Laboratories for research, test and evaluation, and technology transition activities in service of homeland security missions. The branch develops policies and proposals for the effective use of laboratories for DHS work. The branch is also responsible for policies that address how DHS uses laboratories as Federally Funded Research and Development Centers (FFRDCs) to take advantage of their core capabilities. In addition, the branch is a primary driver in setting the laboratories' research agendas and assuring continuity of capabilities; establishing, managing, and maintaining strategic partnerships; leading strategic alignment initiatives; and representing ONL on technology and science interagency working groups.

FFRDCs are unique entities sponsored and funded by the U.S. government to meet special long-term research or development needs which cannot be met as effectively by existing in-house or contractor resources.

- Our Construction Branch oversees planning, budgeting, and management of DHS Laboratory infrastructure, construction, and upgrade projects. The DHS Laboratories' physical buildings and facilities house dynamic research, as well as important development, test and evaluation work in support of DHS missions. The branch and its projects also maintain and provide space for research and development (R&D) capabilities that support other agencies that have interrelated homeland security missions. ONL construction investments include future national assets that meet the need for a capability that does not exist, such as the National Bio and Agro-Defense Facility (NBAF). In addition, the branch's upgrade work seeks to extend the life and crucial capabilities within existing DHS Laboratory facilities as efficiently as possible.
- Our Operations Branch provides operational oversight for the five DHS Laboratories to ensure mission needs are met. It fills a vital role by ensuring that each lab operates in a safe and secure manner that is compliant with federal, state, and local regulations. The branch plans and budgets the resources to provide a range of capabilities: physical facilities and support structures, federal staff, management and operations, contractors, equipment, information technology, safety and security, and other lab support needs. The branch is also responsible for ensuring continuity of operations for the laboratories under all circumstances. If there is a disaster, the branch ensures that preparations are in place so that crucial mission work can continue 24 hours a day, seven days a week.

Our Capabilities

We offer the homeland security community opportunities to leverage, transfer, and apply a wealth of expertise that informs policy, improves operations, and advances research needed to keep America safe.

- We address gaps in core DHS mission areas and ensure use of DHS Laboratories to provide the following support:
  - Timely products delivering the knowledge necessary to help plan for and respond to chemical threats
  - Bioforensic operations and biological threat characterization
  - Test and evaluation of tools for first responders
  - Diagnostics and vaccines for foreign animal diseases (FADs)
  - Detection of explosives at transportation hubs
- Our staff builds and maintains strategic partnerships to ensure equal access to capabilities and technologies at the DOE National Laboratories.
- We make prudent use of resources and facilitate maximum use of lab capabilities to minimize waste or redundancy.
- Our team ensures compliance with federal lab utilization policies.
- We ensure relevant, long-term lab capabilities are available either in our own DHS Laboratories or in leveraging DOE National Laboratory network capabilities.
- Our professionals represent the DHS position in interagency efforts to discuss, coordinate, and develop priorities with respect to research, development, and test and evaluation capabilities.
- We engage the DOE National Laboratories and DHS Laboratories in technology assessments, capability road mapping, R&D planning, and technology foraging.
- We act as a force multiplier to use existing lab capabilities to address homeland security challenges.

Our Partnerships

We have a unique and critically important role as one of DHS's only offices responsible for external coordination, facilitation, and stakeholder engagement in support of an array of DHS missions. Our relationships with the DOE National Laboratories and numerous departments and agencies across government help us provide the interagency connective tissue allowing DHS to quickly scale capabilities to achieve mission success. In addition, the DHS Laboratories each have customers, stakeholders, and partners that run the gamut from local, state, and federal agency groups to peer relationships in industry and academia.

Examples of homeland security research conducted through ONL lab coordination and partnership include:

- Critical infrastructure/protection analysis
- Radiological and nuclear countermeasures
- Chemical, biological, and nuclear forensics
- Multi-scale modeling and simulation
- Explosives detection and mitigation
- Test and evaluation for first responder technologies
- FAD research, diagnostics, and training
- Cybersecurity research
- Biodefense countermeasures, bio-detection capability, and preparedness

Our Reach

Through our utilization, construction, and operational functions, America's homeland security community has access to world-leading technological and scientific assets and infrastructure that span from California to New York and various points in between. The DOE National Laboratories contribute a rich arsenal of facilities, experts, and capabilities that actively support the homeland security community. Out of 17 laboratories that make up the DOE National Laboratory network, DHS leverages 13 of them as FFRDCs in support of DHS priorities and homeland security missions. The five DHS Laboratories support core DHS mission needs.

Technology Transfer is a critical strategy in the laboratory complex to transition key information and technologies to the DHS components and Homeland Security Enterprise.

DOE and DHS Laboratory Facilities

DOE National Laboratories Operated as FFRDCs

- Argonne National Laboratory (ANL) — Lemont, IL
- Brookhaven National Laboratory (BNL) — Upton, NY
- Idaho National Laboratory (INL) — Idaho Falls, ID
- Lawrence Berkeley National Laboratory (LBNL) — Berkeley, CA
- Lawrence Livermore National Laboratory (LLNL) — Livermore, CA
- Los Alamos National Laboratory (LANL) — Los Alamos, NM
- National Renewable Energy Laboratory (NREL) — Golden, CO
- Nevada National Security Site (NNSS) — Nye County, NV
- Oak Ridge National Laboratory (ORNL) — Oak Ridge, TN
- Pacific Northwest National Laboratory (PNNL) — Richland, WA
- Sandia National Laboratories(SNL) — Albuquerque, NM (*also w/facilities in Livermore, CA*)
- Savannah River National Laboratory (SRNL) — Aiken, SC
- Y-12 National Security Complex (Y12) — Oak Ridge, TN

DHS Laboratory Complex Facilities

- Chemical Security Analysis Center (CSAC) — Aberdeen Proving Ground, MD
- National Biodefense Analysis and Countermeasures Center (NBACC) — Fort Detrick, MD
- National Urban Security Technology Laboratory (NUSTL) — New York, NY
- Plum Island Animal Disease Center (PIADC) — Orient Point, NY
- Transportation Security Laboratory (TSL) — Atlantic City, NJ

Future DHS Laboratory Complex Facility

- National Bio and Agro-Defense Facility (NBAF) — Manhattan, KS

Our Impact

We Identify Efficiencies in Delivering the Right Lab Capabilities to Meet Mission Requirements

We have unique interdisciplinary knowledge of the DOE National Laboratory capabilities relevant to the homeland security community and effectively manage use of these capabilities in tandem with our own DHS Laboratories to adapt the right technologies to mission requirements and inform investment decisions. Known as "technology foraging," these efforts help maximize DHS's return on investment by making effective use of assets and prior investments to minimize costs while accelerating the use of mission-required technologies.

We Enlist the Right Partners and Pool the Right Knowledge, Science, and Technology to Solve Problems

With ONL's management and oversight, America's laboratories help the homeland security community convert technologies, research, and knowledge to operational status through the development of cooperative research and development agreements (CRADAs), patents, publications, and other means. The DHS laboratories use CRADAs to establish partnerships with industry, academia, and others to transfer technology to the commercial sector for wide use in chemical and biological defense, first responder technologies, and transportation security. For example, the Transportation Security Laboratory (TSL) established more than 30 CRADAs, resulting in the maturation and implementation of emerging explosives detection technologies, including automated threat detection, advanced imaging technology, improved checked baggage and carry-on baggage systems, and bottle screening technology.

We Provide Rapid Response for Emergent Needs

Our networked lab capabilities provide rapid response to members of the homeland security community that require time-sensitive information and immediate support through relevant knowledge, tools, and facilities. For example, the Chemical Security Analysis Center (CSAC) supports dozens of federal agencies and other organizations with 24/7 expert analysis in emergencies or incidents involving chemical threats.

ONL AND THE DHS LABORATORY COMPLEX: PROVIDING INTERNAL FACILITIES AND RESOURCES TO ADDRESS HOMELAND SECURITY VULNERABILITIES

Our five DHS Laboratories provide specialized technical expertise and world-class research facilities to DHS and other partners. These facilities support a diverse portfolio of capabilities to serve all of DHS and the extended homeland security community. More than 700 federal and contract positions support the five laboratories.

Chemical Security Analysis Center

Location: Aberdeen Proving Ground, MD

In 2006, by Presidential Directive, DHS established CSAC to identify and assess America's chemical threats and vulnerabilities and develop the best responses to potential chemical hazards. CSAC supports the homeland security community by providing a crucial knowledge repository of chemical threat information, design and execution of laboratory and field tests, and a science-based threat and risk analysis capability, among other services. CSAC's presence on the Edgewood Area of Aberdeen Proving Ground (APG) allows close collaboration with Army scientists and engineers.

Offering Reachback Capabilities in Response to Investigations and Crises

For inquiries related to chemical threats and chemical hazards, the CSAC offers a 24 hour, seven days a week informational response capability, known as "CSAC Reachback," to federal, state, local, territorial, and first responder agencies. The CSAC Reachback is a key resource for the National Operations Center (NOC). CSAC Reachback typically responds to 70–80 requests per year. Key customers include the Department of Health and Human Services, Environmental Protection Agency (EPA), Federal Bureau of Investigation (FBI), and many other agencies and industry stakeholders.

Did You Know?

In January 2014, approximately 10,000 gallons of 4-methylcyclohexane methanol accidentally leaked into the Elk River, affecting hundreds of thousands of West Virginia residents. As part of the DHS response, CSAC worked with the Federal Emergency Management Agency and other federal, state, and local responders to evaluate and assess the impact.

In April 2013, CSAC assisted with data analysis for the NOC in response to the ammonium nitrate blast at a fertilizer plant in West, Texas. The blast killed 15 people and injured another 226.

Leading the Way in Assessing Toxic Chemical Risks

CSAC executes the Chemical Terrorism Risk Assessment (CTRA) to help the federal government manage its resources and priorities to the appropriate level of risk. CTRA ranks chemicals by risk based on impact of exposure, intelligence information, and modeling techniques. Agencies use the CTRA Desktop Tool to maintain awareness of chemical threats and analyze mitigation and response strategies to protect the public.

Project Jack Rabbit—Helping DHS and its Partners Reduce the Risk of Large-Scale Toxic Inhalation Hazard (TIH) Chemical Releases

Each year, hundreds of millions of tons of chemicals like chlorine and ammonia are transported through America's population centers. Although these chemicals are essential, they are toxic and pose a risk to the public through accidental release or an act of terrorism. To better understand and address this risk, CSAC conducted Project Jack Rabbit in 2010 and initiated the Jack Rabbit II program in 2014.

Jack Rabbit I involved a series of one- to two-ton outdoor chlorine and ammonia release trials involving a team of stakeholders from government, industry, and academia.

Did You Know?

In 2013, CSAC signed S&T's first-ever reimbursable CRADA with the Chlorine Institute, the private-sector trade organization for the chlor-alkali chemical industry. The CRADA enables CSAC to leverage resources and experience from experts in the private sector and allows chemical industry partners to improve hazard modeling, training, and risk reduction to further advance a culture of safety and security.

Jack Rabbit II will continue that effort with release trials of up to 20 tons. These experiments are unprecedented and will fill crucial knowledge and data gaps. Prior to Jack Rabbit I and II, large-scale chlorine releases have never been tested at volumes representative of rail cars, tanker trucks, barges, or bulk storage tanks. This work will improve hazard prediction modeling, emergency planning and response, mitigation strategies, and improves America's resilience against chemical release incidents.

National Biodefense Analysis and Countermeasures Center

Location: Fort Detrick, MD

The National Biodefense Analysis and Countermeasures Center (NBACC) is a one-of-a-kind facility dedicated to defending the nation against biological threats. Its work supports intelligence assessments, preparedness planning, response, emerging threat characterization, and bioforensic analyses. It is the first national laboratory created by DHS and the capabilities within the facility did not exist prior to the Amerithrax attacks of 2001.

Since its inception, NBACC and its staff of more than 150 dedicated employees have filled critical shortfalls in our scientific knowledge of biological agents needed to defend the public from acts of terrorism.

World Class Facilities for Biodefense

NBACC's 160,000 square-foot facility and 51,927 square feet of lab space includes two centers: the National Bioforensic Analysis Center (NBFAC), which conducts technical analyses in support of federal law enforcement investigations, and the National Biological Threat Characterization Center, which conducts experiments and studies to better understand biological vulnerabilities and hazards. Together these centers offer a national resource for understanding the risks posed by malicious use of biological agents and the operational capability to support the investigation, prosecution and prevention of biocrimes and bioterrorism.

Biodefense homeland security missions require special attention to safety, security, and regulatory requirements, and NBACC is committed to maintaining a culture of safety. Its fully accredited, state-of-the-art lab facilities

are at the biosafety levels (BSL) 2, 3, and 4, providing the highest standards of safety and experimental capability available. Its BSL-4 accreditation allows NBACC to perform R&D on pathogens for which no vaccine or treatment exists and makes it one of seven such facilities in the United States.

Providing Efficiencies through Partnerships

NBACC is a partner in the National Interagency Confederation for Biological Research at Fort Detrick. This consortium includes the Centers for Disease Control and Prevention, Food and Drug Administration (FDA), National Cancer Institute, National Institute of Allergy and Infectious Diseases Integrated Research Facility, Naval Medical Research Center Biological Defense Research Directorate, U.S. Army Installation Management Command, U.S. Army Medical Research and Materiel Command, U.S. Army Medical Research Institute of Infectious Diseases, U.S. Department of Agriculture (USDA) Foreign Disease-Weed Science Research Unit. As an interagency partner, NBACC coordinates a range of scientific, technical, operational, and infrastructure-related activities that enhance scientific collaboration and productivity.

In addition, NBACC established a "Work for Others" program that makes the NBACC national security biocontainment capabilities more broadly available to federal agencies.

Addressing Emergent Threats

NBACC collaborates with the Department of Defense (DOD) and National Institutes of Health (NIH) to plan and conduct research to address gaps and needs in biodefense. For example, NBACC worked with other federal agencies to provide characterization and analysis of potentially dangerous pathogens that could pose a threat to the Homeland Security Enterprise.

NBACC also coordinates with other national laboratories to enhance research capabilities, share lessons learned, and provide training more efficiently.

Did You Know?

The NBFAC component of NBACC provides the FBI with bioforensic testing and analysis on suspected biothreat samples, including analyses of ricin envelopes mailed to public officials. NBACC has supported more than 100 federal law enforcement cases.

As a national resource, NBACC offers a 24/7 biodefense capability with the means and infrastructure to conduct sensitive experiments that address operational needs and fundamental knowledge gaps in biodefense.

National Urban Security Technology Laboratory

Location: New York City, NY

The National Urban Security Technology Laboratory (NUSTL) conducts tests, evaluations, and assessments of homeland security technologies and systems both in the lab and in the field for the first responder community. Its reports and other products help first responders acquire and deploy tools to address homeland security threats and events.

Situated in New York City, an area known as a national leader of innovation in emergency response, NUSTL is well positioned by geography and mission to act as a bridge between technology developers and end users. NUSTL relays responder issues and needs to developers while advising end users on the most innovative solutions offered by the technology development community.

Producing Innovations in Radiological Emergency Management

NUSTL created the Radiological Emergency Management System (REMS), an innovative network of gamma radiation detectors that can provide immediate data for response and recovery operations in major cities in the event of a radiological or nuclear incident. REMS sensors help emergency managers understand the threat and deploy first responders as quickly and efficiently as possible. Access to timely, accurate data informs evacuation decisions, saves lives, and can reduce negative economic impacts.

Pictured above is a REMS sensor located on a rooftop in New York City.

Strengthening Security through Partnerships and Information Sharing

In addition to test and evaluation of first responder tools, NUSTL manages and conducts R&D in support of capabilities for radiological/nuclear response and recovery activities. It works with federal partners and first responders to identify needs and invest in R&D to save lives and minimize impacts following a radiological/nuclear event. For example, NUSTL partnered with the Defense Threat Reduction Agency (DTRA) to test the operability of first responder communications equipment following an electromagnetic pulse, which can disrupt electronic devices and halt communications. In addition, NUSTL collaborated with the Environmental Protection Agency to develop waste management and decontamination tools and guidance.

Through its New York Area Science and Technology (NYAST) forum, NUSTL maintains strong relationships with state and local agencies and private sector groups to share advances in science and technology and map out solutions to the most pressing homeland security challenges.

NUSTL also serves as a Technical Agent for the System Assessment and Validation for Emergency Responders (SAVER) Program, which assists emergency responders across the United States with procurement decisions. For the SAVER program, NUSTL conducts objective assessments, validates commercial equipment and systems, and shares findings through reports to the emergency response community.

Did You Know?

NUSTL is responsible for DHS's first-ever patent. Its scientists created the Citizen's Dosimeter, a potentially life-saving portable device that measures an individual's exposure to radiation.

Plum Island Animal Disease Center

Location: Orient Point, NY

Plum Island Animal Disease Center (PIADC) is the only laboratory in the nation that can work on high-consequence, live foot-and-mouth disease (FMD). Since 1954, it has served as the nation's premier defense against accidental or intentional introduction of FADs including FMD. The lab and its staff of nearly 400 employees provide a host of high-impact, indispensable capabilities, including diagnostics, training, bioforensics, and vaccine licensing, among others.

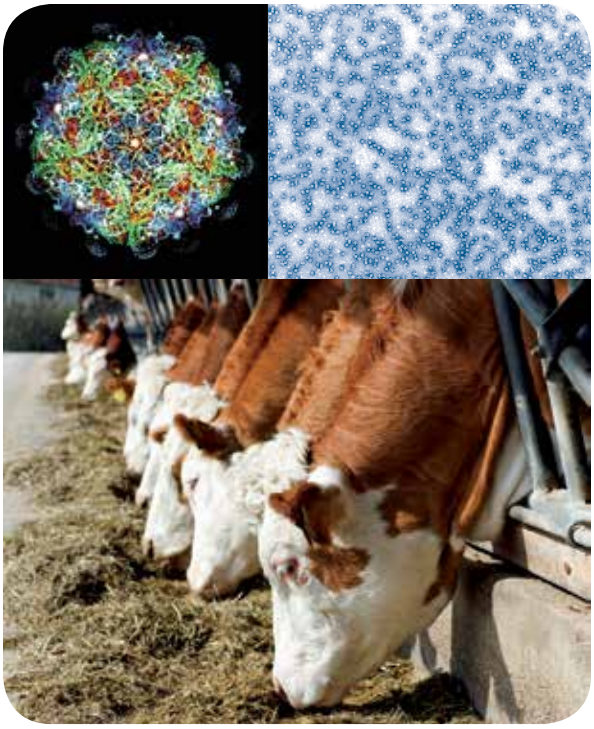
PIADC's Work Protects Our Agricultural and Food Industries

PIADC scientists, the facilities they use, and the work they conduct on FMD is essential to our agricultural and food industries. FMD is a viral infection of cloven-footed domesticated animals, which include cows and other U.S. livestock. Taken together, these industries contribute more than $1.5 trillion to the U.S. economy per year and represent one-sixth of our gross national product. The results of an FMD outbreak would have widespread economic consequences that negatively affect:

- 22 million U.S. jobs
- 2.2 million farms
- 970,000 restaurant food service locations
- 210,000 traditional food stores
- 34,000 food and beverage manufacturing facilities
- 1,800 slaughtering and processing establishments

PIADC's Strong Partnerships Promote Foreign Animal Disease Prevention and Containment

With ONL's stewardship, PIADC provides oversight, technical expertise, coordination, and facilitation for DHS agricultural defense programs with other agencies.



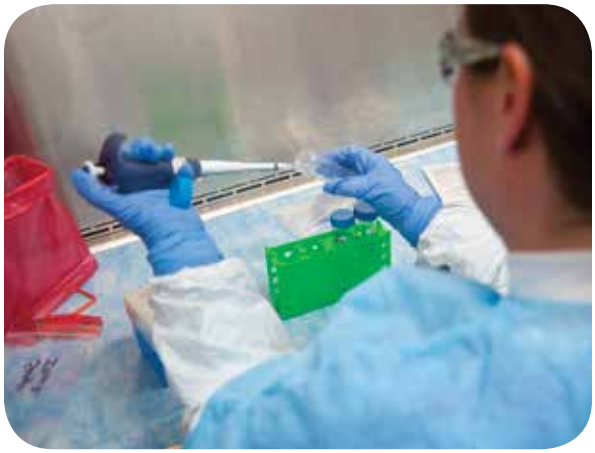
Since 2002, DHS has worked in partnership with the USDA at Plum Island to develop new vaccines and diagnostic tests to respond to and control outbreaks. DHS is responsible for operation of the laboratory, and the DHS PIADC science program partners with USDA Agricultural Research Service (ARS) and USDA Animal and Plant Health Inspection Service (APHIS) in vaccine and diagnostic development.

Did You Know?

In 2012, PIADC scientists developed and licensed the first FMD vaccine that does not contain a live FMD virus. This means that for the first time an FMD vaccine can be manufactured on the U.S. mainland. PIADC's groundbreaking innovation promotes better biosecurity, efficiency, and rapid response capability.

PIADC established 10 CRADAs with industry supporting R&D of new FAD vaccines and diagnostics.

Through its co-located partnership with USDA, PIADC provides a safe, secure, and compliant environment to execute mission-specific objectives. Through PIADC, ARS conducts research and develops means to prevent, control, and recover from outbreaks of FMD and other diseases like African swine fever. APHIS uses PIADC facilities to conduct training for international, federal, and state veterinarians who function as first responders in the event of an outbreak. APHIS provides the nation with diagnostic services for high threat FADs and also serves as a critical resource for surge capabilities by helping maintain the North American Foot-and-Mouth Disease Vaccine Bank for use in an FMD outbreak in the U.S., Mexico, and Canada.



Transportation Security Laboratory

Location: Atlantic City, NJ

TSL helps protect our nation's civilian air transportation systems. By virtue of its accomplished experts, cutting-edge facilities, and important partnerships, TSL offers the homeland security community and transportation security partners the ability to advance detection technology from conception to deployment through applied research, test and evaluation, assessment, certification, and qualification testing.

Special Expertise

TSL's staff of more than 100 employees includes physicists, chemists, engineers, and mathematicians who are leaders in explosives detection and mitigation. These talented technical experts have more than 1,000 years of experience collectively. In 2014, TSL processes were re-accredited for A2LA 17025 and ISO 9001 certifications, thereby continuing to meet the most rigorous and internationally recognized standards.

Unique Facilities and Laboratory Capabilities

TSL's 12-acre secure campus includes specialized explosive storage and handling areas and a multi-laboratory infrastructure designed for applied research, test, and evaluation. Its special blast-resistant laboratories are equipped to evaluate explosives detection equipment and imaging equipment against an extensive library of domestic, foreign, and homemade explosives.

Public-Private Partnerships That Expedite Transportation Security Solutions

TSL has more than 30 CRADAs with industry and academia. Partners work with TSL to complete development and reduce time needed to deliver capabilities to the front line. TSL's Technology Optimization Partnerships (TOPs) process is a public-private enterprise designed to quickly mature and deploy detection technologies. TOPs helps industry understand the detection problem and offers the expertise to assist with technical solutions.

Efficient Certification and Qualification Test Services to Help Industry Usher In Solutions

TSL's Independent Test and Evaluation (IT&E) group provides certification and qualification tests and laboratory assessments that provide DHS components, including the Transportation Security Administration (TSA), with critical information about equipment and its ability to detect explosives. TSL also provides a range of actual explosives to system manufacturers to develop software necessary to locate them within various concealment scenarios.

Did You Know?

If you traveled by air recently, your luggage was screened by X-ray systems that were tested at TSL.

TSL is the only laboratory authorized to provide certification and qualification testing for TSA.

In fiscal year 2013, TSL produced 400 technical reports and 13 patent initiatives.

SPOTLIGHTS

SPOTLIGHT: Leveraging the National Laboratory Network to Secure The Homeland

As emerging threats, natural disasters, and acts of terror occur, ONL is an essential player in helping S&T harness resources, moving from the planning stage to action, and addressing needs with science and technology solutions. ONL's Utilization Branch provides the connective tissue between DHS, DOE, and other government laboratories and sites and helps identify where high-performing research, developmental testing, and science should occur to support the DHS mission. It also identifies research programs at the DOE laboratories that may accelerate delivery of technological solutions and solve immediate problems. By managing partnerships and aligning work across S&T, DHS components, and the DOE laboratories, ONL is adept at leveraging its resources to ensure capabilities are used in the most efficient and effective manner.

ONL Has Created a Trusted and Robust Relationship between DHS and the DOE National Laboratory Network

ONL assists with R&D coordination with DHS components and the DOE labs to address homeland security's difficult, multi-disciplinary, and crosscutting technology challenges. DOE labs have performed research for DHS that explored a wide range of critical areas, including:

- Big data and its impact on the DHS mission space
- Response and recovery from a radiological/nuclear accident or incident
- Forward-looking studies to enable DHS to better understand the future states of technologies
- Impact of severe weather events on the electrical grid and other critical infrastructure
- Cybersecurity and its impact on the Homeland Security Enterprise

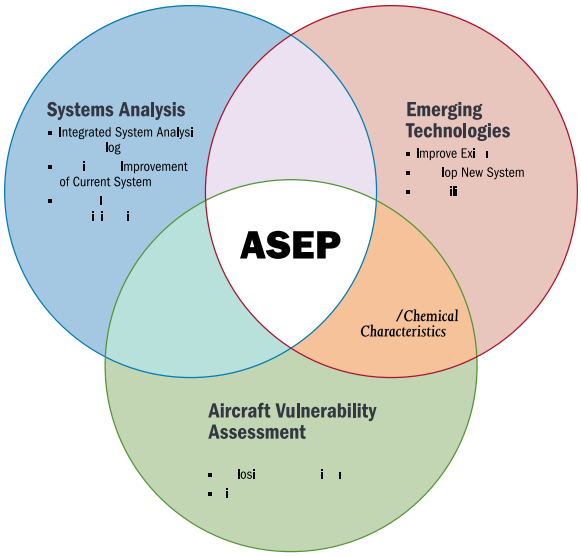
Did You Know?

The DOE National Laboratory network has produced 48 Nobel Prize winners since 1977.

2009 Christmas Day Bomber: Quickly Coordinating Capabilities to Help Components Address Emergent Homeland Security Needs

In response to the attempt by a terrorist to detonate a concealed explosive on a flight near Detroit, Michigan, the federal government needed the means to quickly understand and act upon emergent terrorist threats and tactics like the "underwear bomb."

At the president's swift direction, S&T, through ONL, established the Aviation Security Enhancement Partnership (ASEP), an effort that focused on accelerating technology solutions for aviation security using DHS and DOE lab resources. This partnership was a catalyst for emerging homeland security solutions that we see at airports today like Advanced Imaging Technology, Explosives Trade Detection, Advanced Technology X-ray systems, and Bottled Liquid Scanners. ONL's role in coordinating ASEP was pivotal.



With its institutional expertise and understanding of capabilities across the DOE National Laboratory Network, ONL helped devise three working groups: Systems Analysis, Emerging Technologies, and Aircraft Vulnerability Assessment. It then aligned lab capabilities with needs, developed an action plan, and determined how resources would best accelerate the delivery of solutions to the front line. A key outcome from the emergence of ASEP was TSA's focus on risk-based security, which is now a standard framework used by the agency to make many of its investment decisions.

Mission Executive Council: Partnering to Align Laboratories with America's National and Homeland Security Needs

In July 2010, the agency heads from DOE, DHS, DOD, and the Director of National Intelligence established the Mission Executive Council (MEC), a mission-aligned model for effective interagency coordination.

The MEC arose from a shared recognition that there is necessity in maintaining capabilities critical to the work of agencies that carry out America's national and homeland security missions. Its partnering agencies share a long-term interest in preserving a wide range of science, technology, and engineering capabilities necessary to meet new and diverse national security threats and challenges.

ONL's Utilization Branch offers direct support to the MEC by providing a senior-level forum where DHS leadership can engage DOE leadership and member organizations while fostering a better understanding of DHS's long-term needs.

The MEC's purpose is to serve as a mechanism for the agencies to engage in interagency long-term strategic planning for the capabilities that are unique to the National Laboratories. In addition, the MEC ensures that certain national security priorities can be supported by these unique capabilities in a coordinated, effective, and efficient manner.

"There is established within the Directorate of Science and Technology an Office for National Laboratories, which shall be responsible for coordination and utilization of the Department of Energy national laboratories and sites under this section in a manner to create a networked laboratory system for the purpose of supporting the missions of the Department."

~ Homeland Security Act of 2002

SPOTLIGHT: Upgrading Infrastructure to Remain on the Cutting Edge

ONL manages an aggressive infrastructure upgrade and construction program to satisfy continued and emergent DHS mission needs and to keep pace with anticipated demands for innovation.

New NUSTL Facility Promotes Collaboration and Economic Efficiencies

NUSTL moved to a state-of-the-art facility on October 22, 2012. The facility contains multiple testing, training, and collaboration spaces used to further NUSTL's work in support of emergency responders. Its 75 percent reduction in square footage from 80,000 to 20,000 square feet has the net effect of increasing economic efficiency and improved collaboration. In addition, its updated features—including meeting rooms that are equipped with modern technologies—create an environment that is conducive to better and more efficient teamwork.

TSL: Establishing an Independent Testing and Evaluation Facility for Safer and More Expansive Testing Capabilities

TSL's IT&E Facility provides the ideal space to meet demands born of new and increasingly complex threats and technologies. The building provides for fully isolated and safe IT&E certification capabilities of next-generation detection devices for commercial, military, international, and homemade explosives threats. Continued investment in this modern TSL infrastructure helps ensure that our nation's transportation systems have the ability to quickly develop and test cutting-edge detection technologies.

TSL Explosive Storage Facilities Doubled in Capacity

In 2012, S&T doubled the explosive storage facilities at the TSL. ONL's construction team built eight new explosive storage bunkers large enough to expand TSL's capabilities and provide improved blast protection. Each bunker is 20 feet wide and more than 40 feet long with walls reinforced by one foot of reinforced concrete sunk into foundation and backed with earth. The bunkers provide additional capacity to store 2,400 pounds of explosives.

PIADC's Sustainment Plan Enables Continuity and Keeps Focus On Strategic Goals

The PIADC sustainment plan addresses the highest priority infrastructure requirements needed to ensure that current research on FADs continues uninterrupted, safely, and in compliance with regulatory standards. More broadly, it is meant to ensure that DHS and its partners remain capable of protecting the U.S. food supply and America's public health. ONL continues to support these broad strategic goals by ensuring that PIADC facilities maintain the ability to detect, diagnose, and research FADs; license vaccines and develop open countermeasures; and offer training.

Major PIADC sustainment efforts include a large exit autoclave for sterilization and a solids separator; improved biocontainment airflow monitoring, filtration and control; life safety and critical infrastructure

protection; environmental compliance support systems; and a replacement chilled water system. In addition, in 2014 ONL will begin construction of the replacement Wastewater Thermal Decontamination System, a new BSL-3 enhancement facility capable of decontaminating 65,000 gallons of raw sewage and animal waste per day using extreme heat and pressure for secure disposal.

PIADC's Upgraded Animal Rooms Allow Research on Larger Species

New animal rooms at PIADC were completed in August 2011 and provide important space for research, development, and test and evaluation efforts that were previously non-existent in the PIADC facility. The two newly constructed large animal rooms provide a capability for studies involving more animals.

SPOTLIGHT: National Bio and Agro-Defense Facility

NBAF is a groundbreaking new laboratory designed to provide America's next-generation capabilities that safeguard our agricultural economy, food supply, and public health from the threat of foreign animal, emerging, and zoonotic diseases. NBAF will be located on the campus of Kansas State University in Manhattan, KS. Support for NBAF is the result of an extraordinary federal-state partnership between DHS and the state of Kansas.

In recognizing NBAF's indispensable role in shaping a safe, secure, and prosperous future, officials from the state of Kansas are helping drive its development through a memorandum of understanding that provides 25 percent of NBAF's total funding. With continued congressional support and assistance from the state, NBAF will fill crucial long-term homeland security needs, while providing more than $800 million in economic benefits to the state of Kansas.

Purpose

NBAF will expand upon research capabilities within the DHS Laboratory complex and continue to build and strengthen the DHS and USDA partnership. NBAF will further America's ability to develop vaccines and other countermeasures and train veterinarians in preparedness and response against FADs and agro-terrorism, while greatly enhancing domestic research capabilities. NBAF will ultimately replace the aging PIADC laboratory and all of its essential functions.

Seventy-five percent of emerging infectious diseases are zoonotic, meaning that they have the ability to cause harm by passing from animals to humans. Once completed, NBAF will be the only U.S. facility capable of diagnosing and researching foreign animal, emerging, and zoonotic diseases in large livestock.

Did You Know?

The economic activity associated with NBAF's construction will support nearly $800 million in revenue for Kansas businesses over five years and support more than 1,300 jobs. Once constructed, NBAF will employ more than 400 workers.

Design

Once constructed, NBAF will be the gold standard as a modern, high-containment, large livestock research facility that meets or exceeds all modern biocontainment design principles and standards. NBAF will offer 574,000 square feet of facility space to include biosafety level (BSL) - 2, 3, 3Ag and 4 research space for the development of vaccines, diagnostics, training, and other countermeasures. Approximately 10 percent of its space will be for BSL-4 research.

NBAF will provide the first large livestock Animal BSL-4 laboratory in the United States, which will allow safe, secure, and efficient study of high-consequence zoonotic diseases.

NBAF will include a vaccine development module (e.g., masterseed production) which, along with its lab and animal research facilities and Manhattan's nearby commercial animal pharmaceutical and biopharmaceutical firms, will increase the speed of development and testing for new vaccines and medicines. It will offer the safest, most secure space available to conduct research and provide enhanced diagnostics.

Did You Know?

NBAF will feature a state-of-the-art, current Good Laboratory Practice (GLP) facility that will support DHS and USDA (ARS, APHIS). The GLP will accelerate technology transfer to commercial veterinary biologic manufacturers. In addition, it will support the evolution of existing vaccine and diagnostic programs by providing small-scale production of experimental materials.

Construction

Construction of the NBAF Central Utility Plant (CUP) began in February 2013. The CUP construction is a crucial step forward in demonstrating commitment to the facility and its enhanced capabilities that will enable DHS mission success. Preliminary NBAF stand-up planning has been completed and laboratory construction will commence in 2015. NBAF will be operational by the end of 2022 at which point it will begin taking on primary responsibilities for America's bio and agro-defense.

NBAF Opera li

2013	*Commence CUP Construction*
2014	
2015	*Commence Laboratory Construction*
2016	
2017	
2018	
2019	
2020	*Complete Construction*
2021	*Turn Over Facility to Operations*
2022	*Acquire Accreditations*
2023	*Complete Operational Implementation*

The proposed scope of the NBAF design was carefully analyzed to meet DHS and USDA (ARS, APHIS) program requirements. The final design represents an extensive effort to "right-size" the laboratory, including international consultation with operators of existing Animal BSL-4 laboratories. Extensive design reviews were held to confirm the facility's size and scope, including international peer reviews by top researchers and facility operators to evaluate the overall efficiency, throughput, room sizes, and flexibility to handle the NBAF mission. In addition, all recommendations identified in the facility's risk assessments are part of the NBAF design.

Timely response to an outbreak is crucial. Without the large livestock BSL-4 research capabilities that NBAF will provide, the United States is reliant upon cooperative agreements with foreign partners to conduct research abroad on high-consequence zoonotic and emerging diseases found in large animals. Once in place, NBAF will provide the means to conduct this research safely, securely, and domestically, including appropriate protection measures for biosafety, biosecurity, physical security, personnel reliability, and agent accountability.

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