# CHEMICAL SECURITY ANALYSIS CENTER (CSAC)

**Location:** Aberdeen Proving Ground, MD

**Core Competencies:** Knowledge Management, Design and Execution of Laboratory and Field Tests, Assessment of the Hazard and Risk of Toxic Chemicals, Safer Design Strategies for Chemical Engineering Processes, and 24/7 S&T-Based Reachback

**Accreditations:** ISO 9001 Compliant

The Department of Homeland Security (DHS) established the Chemical Security Analysis Center (CSAC) in 2006 to assess and identify vulnerabilities and respond to potential chemical threats and hazards to the homeland. Located on Aberdeen Proving Ground in Maryland, CSAC supports the Homeland Security Enterprise by providing a robust knowledge repository of chemical threat information, extensive subject matter expertise in science-based threat and risk analysis, and a 24/7 science- and technology-based reachback capability. CSAC maintains core competencies to address the following focus areas:

## Knowledge Management

- Delivered the Interagency Nontraditional Chemical Agents Virtual Library to the White House's Office of Science and Technology Policy.
- Improved the Chemical Agent Reaction Database.
- Enhanced the CSAC website on the Homeland Secure Data Network.
- Published more than 300 reports since 2006.

## Design and Execution of Laboratory and Field Tests

- Developed updated source terms for chlorine and ammonia releases.
- Transitioned results from the Jack Rabbit testing to several training organizations.
- Initiated execution of the Jack Rabbit II series of 5- to 20-ton chlorine release tests.
- Established a Cooperative Research and Development Agreement (CRADA) with the Chlorine Institute for transferring information essential for operations planning and response, garnering two Federal Laboratory Consortium Awards for Technology Transfer.

## Assessment of the Hazard and Risk of Toxic Chemicals

- Published the 2012 Chemical Terrorism Risk Assessment (CTRA); transitioned assessment methodologies to the Department of Defense (DOD) and other federal agencies.
- Provided tailored assessments based on client input using the CTRA Desktop Tool.
- Completed hazard and delivered hazard assessments on Food and Drug Administration and U.S. Department of Agriculture food products.
- Prepared and delivered three reports on emerging chemical threats to the Committee on Homeland and National Security.

## Safer Design Strategies for Chemical Engineering Processes

- Defined Inherently Safer Technology (IST) in cooperation with the Center for Chemical Process Safety and industry experts.
- In cooperation with industry, developed a set of risk-based metrics to evaluate safety and security measures for various chemical processes and the supply chain.

## Support to the Homeland Security Enterprise

- Developed and delivered a process and data to the Federal Emergency Management Agency to support a scenario-based chemical defense strategy.
- Developed and delivered to the DHS Office of Health Affairs a series of medical management guidelines on chemical threat materials.
- Established a joint project with DOD to assess and evaluate emerging threat chemical materials.
- Through the CSAC Reachback, provided responses to more than 500 inquiries from more than 72 organizations.

## Contact

Questions? Email *csacinfo@st.dhs.gov* for more information.

# NATIONAL BIODEFENSE ANALYSIS AND COUNTERMEASURES CENTER (NBACC)


**Location:** National Interagency Biodefense Campus, Fort Detrick, MD

**Core Competencies:** Aerobiology; Biocontainment Operations; Bioforensics; Comparative Medicine; Quality Management; Genomics and Bioinformatics; and Broad Capabilities in Bacteriology, Virology, Toxinology, and Business Operations.

**Accreditations/Registrations:** ISO 17025 Quality (A2LA), CDC/USDA Select Agent for BSL-2, 3, and 4, Association for the Assessment and Accreditation of Animal Care International, Institutional Biosafety Committee, Nuclear Regulatory Commission, Drug Enforcement Administration Controlled Substance, Alcohol and Tobacco Tax and Trade Bureau Industrial Alcohol User Permit

**Key Customers:** Law Enforcement and Interagency Biological Threat Characterization Stakeholders

The National Biodefense Analysis and Countermeasures Center (NBACC) is the first national laboratory created by the Department of Homeland Security. NBACC addresses unmet needs in homeland security and provides a continuously available national security biocontainment laboratory capability for newly identified biological threats. NBACC's mission is to provide the scientific basis for the characterization of biological threats and bioforensic analysis to support attribution of their planned or actual use. NBACC components include the National Bioforensic Analysis Center (NBFAC) and the National Biological Threat Characterization Center (NBTCC).

## NBACC Accomplishments

- Provided safe and compliant operations for more than 50,000 square feet of Bio Safety Level (BSL) 2, 3, and 4 laboratories, including continuous operational support to law enforcement.
- Continuously maintained Centers for Disease Control and Prevention (CDC) and U.S. Department of Agriculture (USDA) Biological Select Agent and Toxin Program (BSAT) compliant BSL-4 laboratory operations, including annual CDC/USDA inspections. In FY 2013, expanded registration with the CDC/USDA for 27,600 square feet of BSL-3 laboratories.
- Achieved a "Superior" Defense Security Service (DSS) rating in FY 2012 and FY 2013.
- Established a "Work for Others" program that makes the NBACC national security biocontainment capabilities more broadly available to federal agencies.
- Recognized for staff volunteerism and the Battelle National Biodefense Institute's philanthropic contributions to regional STEM (Science, Technology, Engineering, and Mathematics) education.

## NBFAC Accomplishments

- Supported more than 45 investigations of potential biological crimes by federal law enforcement and other agencies in FY 2013.
- Activated unique, purpose-built BSL-3 bioforensic laboratories with ISO 17025 accreditation for casework operations in FY 2013.
- Established and maintained ISO 17025 accredited processes and assays that create an operational capability for more than 60 high-priority human, animal, and plant pathogens and toxins.
- Established ISO 17025 validated sequencing in biocontainment laboratories and bioinformatics methods for bioforensic casework that are enabling new types of investigations.
- Developed a new operational capability that supports investigations of genetically modified and *de novo* synthetic agents.

## NBTCC Accomplishments

- Installed and CDC/USDA registered unique national BSL-3 and BSL-4 aerobiology capabilities, which are required to obtain key scientific data that informs biodefense planning and response.
- Provided scientific data addressing 10 specific biological agent knowledge gaps in FY 2013 that improved hazard, risk, and threat assessments in support of biodefense planning and response. Data from threat agents significantly improved the fidelity of hazard and threat/risk assessment modeling of aerosol and other bioterrorism scenarios for bacterial, viral, and toxin threat agents.

## Contact

Questions? Email *questions@nbacc.net* for more information.



Homeland Security
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# NATIONAL BIO AND AGRO-DEFENSE FACILITY (NBAF)

**Location:** Manhattan, Kansas (under construction)

**Core Competencies:** Diagnostics, Training, North American Vaccine Bank, Basic and Applied Research, Vaccines and Agriculture Biological Countermeasures, and Vaccine Licensure

**Key Customers:** U.S. Livestock Producers, National Veterinary Stockpile, National Animal Health Laboratory Network, FBI, USDA ARS and APHIS, Private Industry, and Academia

## Protecting the Nation's Food Supply Against All Threats

The United States needs to be on the front line of livestock animal health research to defend against foreign animal, emerging, and zoonotic diseases. The National Bio and Agro-Defense Facility (NBAF) is envisioned as a state-of-the-art biosafety level (BSL) 3 and 4 facility that will enable the United States to conduct comprehensive research, develop vaccines and anti-virals, and provide enhanced diagnostic capabilities to protect our country from numerous foreign animal and emerging diseases. As a replacement to the aging Plum Island Animal Disease Center (PIADC), NBAF will provide additional capabilities that are not currently available in the United States, including BSL-4 space for livestock and a vaccine development module. The NBAF will be the nation's only large animal BSL-4 facility built to safely handle pathogens that do not currently have treatments or countermeasures.

## Construction

The NBAF will provide safe, secure, and state-of-the-art agriculture biocontainment laboratories that research and develop diagnostic capabilities for foreign animal and zoonotic diseases. The facility will augment the existing bio-defense complex by adding large animal biosafety level 4 (ABSL-4) and vaccine development facilities, which are presently lacking. Both of these capabilities will enhance the related DHS risk-characterization and forensics capacity in order to better meet the mission.

With the award of the construction contract for the Central Utility Plant (CUP) in February 2013, DHS reached an important milestone in the NBAF timeline. Funding for the CUP showcases the collaborative nature of the NBAF as the contract was awarded using both congressional appropriations and gift funding provided by the State of Kansas. The 87,000-square-foot CUP will house the primary heating and cooling systems as well as the emergency generators for the main lab building. DHS is also moving forward with the process to award the main laboratory construction contract in 2015. In fiscal year 2014, $404 million was received for laboratory construction. To help alleviate the federal cost burden, the State of Kansas agreed to commit more than $300 million of gift funding toward the total NBAF construction project. At peak construction, NBAF will employ 1,000 people.

## Design

After a comprehensive three-year federal examination of potential sites that focused on the environmental impacts, threats, and risks of operating the NBAF, the Department of Homeland Security (DHS) selected a site located within the Animal Health Corridor on the campus of Kansas State University. DHS developed an iterative risk assessment process to ensure that the NBAF is safe, secure, and operable over its entire life cycle. Significant design features beyond the industry standard were incorporated into the NBAF design to reduce risk. For example, the biocontainment areas are designed to meet structural and containment building integrity standards similar to those used in the nuclear industry. By adhering to these standards, the final design minimizes the potential for accidental release from the research laboratories.

## Operations Will Begin in 2022

Current operations at PIADC will continue through NBAF construction. DHS is developing a plan to ease the transition from PIADC to NBAF that includes an overlap of operations to ensure there is no interruption of the critical science mission. DHS will not build or operate the NBAF unless it can be done in a safe manner. No select agent permits will be issued by the U.S. Department of Agriculture or the Centers for Disease Control and Prevention until all requirements are met. NBAF will be government owned-government operated with contractor support. When fully operational, NBAF will employ 400 people.

## Contact

Questions? For more information, visit ***http://www.dhs.gov/nbaf*** or email ***NBAFProgramManager@dhs.gov***.



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# NATIONAL URBAN SECURITY TECHNOLOGY LABORATORY (NUSTL)


**Location:** New York City, NY

**Core Competencies:** Test, Evaluation, and Assessments of First Responder Technologies; Technical Advisors to Emergency Responders; Radiological/Nuclear Response and Recovery Research and Development

**Accreditations:** ISO 9001 (in preparation), ISO 14001, ANSI/AIHA Z-1017000 (compliant)

**Key Customers:** Federal, State, and Local First Responders

The National Urban Security Technology Laboratory (NUSTL) is a federal laboratory organized within the US Department of Homeland Security, Science & Technology Directorate, First Responders Group. Building upon our proud history since 1947, the lab currently provides services and products to help First Responders prepare, protect, and respond to homeland security matters.

## Test, Evaluation, and Assessments

NUSTL conducts tests, evaluations, and operational assessments of homeland security technologies for the national first responder community. The NUSTL team provides a full spectrum of services for laboratory and field testing campaigns. Work products inform the national first responder community for technology acquisition, deployment, and sustainment.

- Published dozens of knowledge products for the System Assessment and Validation for Emergency Responders (SAVER) Program since 2008.
- Conducted tests of In-Q-Tel-sponsored emerging technologies with New York City first responder organizations.
- Conducted operational field assessments of rapidly prototyped technologies under the First Responders Technologies program (R-Tech).
- Tested several thousand radiation detectors for the Securing the Cities program since its inception in 2007.

## Technical Advisors to First Responders

The NUSTL team's daily interactions with homeland security operational units position the Lab to act as a bridge between technology developers and end users. NUSTL relays responder issues and needs to developers while advising operational end users on innovative solutions from the technology development community.

- Hosted 32 New York Area Science and Technology forums. Since 2004, more than 1300 members have attended in person and several thousand more viewed webcasts nationwide.
- Designed, developed, tested, and transitioned to operational use the Radiological Emergency Management System (REMS), a radiation sensor network. NUSTL continues to act as a resource for national deployments of REMS.
- Supported training and exercises for more than 1500 state and local first responders by providing licensed radioactive sources and support materials.
- Supported the development of standards for environmental dosimetry (ANSI N13.37), personal radiation detectors (N42.32), emergency dosimeters (N42.49), and neutrons (ISO TC85).
- Received the first patent issued to the Department of Homeland Security: # 7,781,747 for "very thin dosimeter filters and low profile dosimeters."

## Radiological/Nuclear Response and Recovery

NUSTL works with federal interagency partners and first responders to identify needs and invest in impactful R&D to save lives, minimize economic impact, and enhance resiliency following a radiological/nuclear event.

- Partnered with the Defense Threat Reduction Agency to test the operability of first responder communications equipment following electromagnetic pulse impacts.
- Partnered with the Environmental Protection Agency to develop waste management and decontamination tools and guidance.

## Contact

Questions? Email *nustl@dhs.gov* for more information.



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# PLUM ISLAND ANIMAL DISEASE CENTER (PIADC)

**Location:** Orient, NY

**Core Competencies:** Diagnostics, Training, North American Vaccine Bank, Bioforensics, Basic and Applied Research, Vaccines and Biological Countermeasures, and Vaccine Licensure

**Accreditations/Registrations:** USDA APHIS Select Agent Permit, Drug Enforcement Administration Controlled Substance Registration, APHIS lab is a reference lab with the Food and Agriculture Organization and World Organisation for Animal Health for FMD

**Key Customers:** U.S. Livestock Producers, National Veterinary Stockpile, National Animal Health Laboratory Network, FBI, USDA ARS and APHIS, Centers of Excellence, Private Industry, and Academia

Since 1954, the Plum Island Animal Disease Center (PIADC) has served as the front line of the nation's defense against diseases that could devastate markets for livestock, meat, milk, and other animal products. PIADC is the only laboratory in the nation that can conduct initial diagnostic testing for foot-and-mouth disease (FMD). The U.S. Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS) provides this service and develops novel diagnostic tools. In addition, APHIS conducts training for federal and state veterinarians who serve as the first responders in a potential outbreak of a foreign animal disease (FAD). The USDA's Agricultural Research Service (ARS) conducts research on high-consequence FADs at PIADC and develops diagnostic tools, vaccines, and other means for preventing FADs. The Department of Homeland Security's (DHS) Science and Technology Directorate takes vaccines developed by ARS, academia, and industry through the regulatory process to develop and license new vaccines and diagnostics for high-threat FADs.

## DHS PIADC Transboundary Animal Disease Countermeasure Development Branch

In partnership with ARS and industry, PIADC performs advanced development of vaccines and other biological countermeasures needed to effectively respond to an incursion of a FAD. Laboratory diagnostic test development is also conducted in partnership with APHIS. Recent accomplishments include:

- Completed USDA licensing of the first FMD molecular cattle vaccine that can be manufactured in the United States. The vaccine supports USDA APHIS vaccinate-to-live strategy as the absence of specific viral components provides opportunities to develop improved diagnostic tests that differentiate between FMD vaccinated and infected cattle.
- Established a licensable pipeline of molecular vaccine candidates for numerous, additional high-threat FMD virus strains.
- Established a cooperative research and development agreement (CRADA) with a global vaccine manufacturer to improve the FMD molecular vaccine platform for swine.
- Established additional CRADAs with industry partners to support research and development of new countermeasures for other high-consequence FADs.

## USDA Animal and Plant Health Inspection Service

USDA APHIS provides FAD diagnostic services for the nation. Recent accomplishments include:

- Designated as an FMD reference lab by the Food and Agriculture Organization of the United Nations and World Organisation for Animal Health.
- Developed a companion diagnostic test for the new molecular FMD vaccine and began validation.
- Developed microarray technology for pathogen discovery.

## USDA Agricultural Research Service

USDA ARS provides research services on high-consequence FADs. Recent accomplishments include:

- Developed the first molecular vaccine against FMD (Ad5-FMD) capable of fully protecting cattle and swine against FMD.
- Developed a viral strain that allows safer production of the FMD vaccine that is effective and distinguishes between infected and vaccinated animals.
- Developed a method to protect swine against FMD 24 hours post-vaccination.

## Contact

Questions? Email *PIADC@dhs.gov* for more information.



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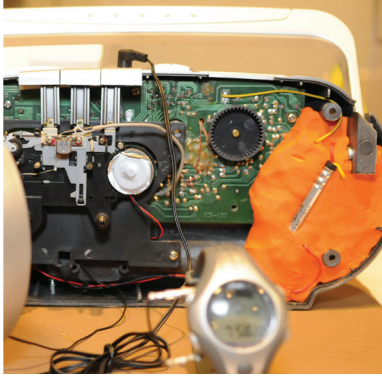
# TRANSPORTATION SECURITY LABORATORY (TSL)



**Location:** Atlantic City, NJ

**Core Competencies:** Detection Science Expertise, Explosives Mitigation/Vulnerability Expertise, Test Articles/Test Phantoms, Test Standards and Methodologies, Small-Scale Safety Testing, Technology Assessment, Readiness Assistance, Certification/Qualification Testing, Special Operations Studies, and Rapid Response

**Accreditations:** Test and Evaluation of Contraband Detection Technologies for DHS; ISO 9001 and 17025 Accredited

**Key Customers:** DHS Science and Technology Directorate's Explosives Division, TSA, DoD

The Transportation Security Laboratory (TSL) is a national asset that supports the maturation of, evaluates, and certifies emerging explosives detection technologies. TSL helps the detection equipment industry meet performance requirements established by the Department of Homeland Security (DHS) and other customers. TSL also directly supports DHS acquisition through testing and evaluation. TSL addresses the following core competencies:

## Explosives Detection Equipment Certification, Qualification, and Assessment Testing

- Conducts certification and qualification tests supporting the Transportation Security Administration's (TSA) acquisition of explosive detection systems for checkpoint, checked luggage, and cargo screening.
- Conducts special studies of identified explosive detection equipment to identify and correct detection vulnerabilities.
- Designs and executes laboratory test and evaluation protocols for emerging detection technologies.
- Develops test protocols and procedures for new TSA standards for checkpoint, checked baggage, and cargo detection technologies.
- Designs safety protocols for handling novel explosives needed to characterize detection capabilities.
- Designs and delivers test articles (explosive simulants, phantoms, and standards) to DHS, other government agencies, and industry.

## Industry Partnerships

- Establishes cooperative research and development partnerships with industry to help mature and implement emerging explosives detection technologies, including automated threat detection, an enhanced advanced imaging technology, enhanced checked baggage and carry-on baggage explosive detection systems, and a new bottle screening technology for liquid explosives.

## Next Generation Explosive Detection or Mitigation Technologies

- Determines aircraft vulnerabilities through live-fire range testing and develops and tests mitigation strategies.
- Creates databases of explosive signatures for industry and government use.
- Conducts specialized training on handling explosives.

## Information and Innovation Products

TSL produces technical reports, presentations, external publications, and patents covering scientific and technical aspects of explosives and their detection. These products cover analytical laboratory methods and test and evaluation protocols relevant to explosives detection, novel analytical instrumentation, and new explosive simulants. Recent patents include:

- Inert and Non-Toxic Explosive Simulants and Method of Production (Patent 8563316)
- Ion Mobility Spectrometer to Mass Spectrometer Interface (Patent 8536518)

## Contact

Questions? Email *tslinfo@dhs.gov* for more information.