Results of Fiscal Year 2013 Research and Development

Fiscal Year 2014 Report to Congress

May 16, 2014

Homeland Security

Science and Technology Directorate

Message from the Under Secretary for Science and Technology

I am pleased to submit the following report, "Results of Fiscal Year 2013 Research and Development," which has been prepared by the Science and Technology Directorate (S&T).

This report was prepared pursuant to language in the Senate Report 113-77 accompanying H.R. 2217, enacted as Division *Department of Homeland Security Appropriations Act* of the Consolidated Appropriations Act, 2014 (Pub.L. No. 113-76).

Pursuant to language in the Senate Report, this report is being provided to the following Members of Congress:

The Honorable John R. Carter
Chairman, House Appropriations Subcommittee on Homeland Security

The Honorable David E. Price
Ranking Member, House Appropriations Subcommittee on Homeland Security

The Honorable Mary L. Landrieu
Chairman, Senate Appropriations Subcommittee on Homeland Security

The Honorable Dan Coats
Ranking Member, Senate Appropriations Subcommittee on Homeland Security

Inquiries related to this report may be directed to me at (202) 254-6033 or to the Department's Acting Chief Financial Officer.

Sincerely,
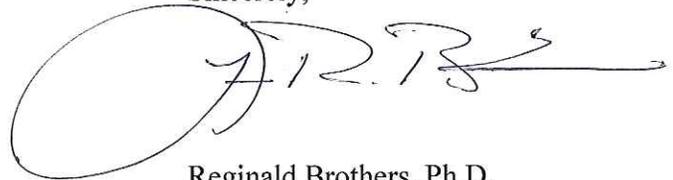
Reginald Brothers, Ph.D.
Under Secretary for Science and Technology
Department of Homeland Security

Results of Fiscal Year 2013 Research and Development

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I.   Legislative Requirement

This report was prepared pursuant to language in the Senate Report 113-77 accompanying H.R. 2217, enacted as Division *Department of Homeland Security Appropriations Act of the Consolidated Appropriations Act, 2014* (Pub.L. No.113-76).

The Senate Report states:

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REPORTING REQUIRMENTS

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S&T is directed to continue to provide the following:

  --a report on results of its research and development for the prior fiscal year.

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II. FY 2013 Research & Development Results of the Science and Technology Directorate

This report was prepared pursuant to language in the Senate Report 113-77 accompanying the Fiscal Year (FY) 2014 *Department of Homeland Security Appropriations Act* (P.L. 113-76), to provide information concerning the results of Research and Development for the Department of Homeland Security's (DHS) Science and Technology Directorate (S&T) that occurred in the prior fiscal year.

S&T's support to the Department and Homeland Security Enterprise focuses not just on delivery of individual technologies but on development of broader operational capabilities. Our efforts are guided by strong partnerships with end users and operators in developing scientifically-informed, analytically-based operational capabilities across four different types of activities: new technological capabilities and knowledge products, process enhancements and efficiencies, acquisition support and operational analysis, and understanding of homeland security risks and opportunities.

The following are the results for FY 2013 organized by S&T budget thrust areas:

III. APEX

Project: Science and Technology Operational Research Enhancement Program
End User: United States Secret Service (USSS)
Result:
Delivered ION II (Knowledge Product) – ION II assessed the impact of threats identified in ION I. In 2011, Project ION I evaluated the detection capabilities of current x-ray technologies against threats that pose a danger to homeland security. Project Ion I revealed explosive threats that are difficult to detect with today's state-of-the-art X-ray screening systems.

Delivered operational baseline modeling of the USSS travel scenario that has over 1,000+ operational nodes, characterized as the intersection of process, persons and/or technologies, several alternative operational scenarios, supporting documentation for operating and maintaining the model, and training to the transition partners. This allowed the USSS to assess changes to operational processes as well as varying threat levels with respect to these changes.

Delivered two SNOOPY systems – a light weight anomaly detection tool that allows for greater sensor range and penetration, supports real-time viewing of images, and provides a library of common threat items for reference. The project also added simulated structures to an existing test facility to simulate threats for use in future projects and for end user operational threat analysis. SNOOPY was delivered in March 2013 and the end-user stated that it is used in current operations.

Delivered 10 ARMOR wall kits designed to meet and exceed USSS portability, ballistic, and weight requirements. It is designed as a system of panels arranged for blast mitigation that can be used singularly or inter-connected to adapt to the configurations of changing public

environments including erecting a four-sided room made of ballistic shielding. In certain situations, it can be used in place of heavier, more expensive and fragile shielding, enabling protection in more locations and scenarios. The project executed, from contract award to delivery, in 10 months.

Delivered six Universal Night Sights – a high-resolution, clip-on night vision weapon sight that mounts on an existing scope, adding combined night vision and thermal viewing capabilities to counter sniper team rifles without the need to recalibrate the weapon. The project executed, from contract award to delivery, in 12 months.

Delivered 13 LOOXCIE systems – an easily deployable video surveillance system that is less expensive and more advanced than legacy systems. Legacy unit costs are $30,000 per kit. A LOOXCIE kit is about $10,000. It is a user-friendly, light weight, hand-carried, secure, self-contained, wireless video "kit" developed with the USSS mission in mind. S&T modified LOOXCIE, Inc.'s commercially available camera system to meet USSS's range, environment, and wireless security requirements. The project executed in 12 months, leveraging $900,000 of Intelligence Community funding.

Delivered Modular Vehicle Power Amplifier that provides four times greater coverage than current system capabilities, allows operators to be selective in operation, and reduced operations and maintenance costs.

IV. Border Security

Project: Decision Support System for Water Infrastructure Security (DSS-WISE)
End Users: Dam and transportation owners and operators, United States Coast Guard (USCG), National Protection and Programs Directorate (NPPD), U.S. Navy, port owners, and chemical sectors will benefit from the data generated
Result: Delivered the DSS-WISE Modeling & Simulation tool. NPPD Infrastructure Protection Division's Dam Sector is currently using DSS-WISE to model and simulate dam/levee breach floods, fluvial floods, storm/tidal surges, landslide waves, and the consequences on the surrounding infrastructure.

Project: Port and Coastal Surveillance Improvement
End Users: USCG, Customs and Border Protection (CBP)
Result: Increased the availability of actionable maritime law enforcement information to CBP, USCG and other federal, state, local, and international law enforcement agencies that will improve their interdiction rate. The resulting capability has been installed/piloted at CBP's Air Marine Operations Center (AMOC) located at March Air Reserve Base in Riverside, California, since December 2012 and USCG is looking to integrate it into their West Coast operations in FY 2014.

Project: Smart Chart/Automated Identification System (AIS) Class E
End User: Public (Primarily, the recreational boating community)
Result: Smart Chart AIS is a reference implementation app for smart phones that is available for free on Android (over 19,500 downloads). Roll-out of the free app for the iOS operating system

is anticipated in the 3rd quarter, FY14. The app allows the boating public to self-identify over the cellular network to the USCG and other boaters improving situational awareness. Additional features include Augmented Reality (the graphical overlay of information such as nautical markers on a live display screen), access to NOAA charts online, live weather radar, access to the user-maintained cruising database Active Captain, and chat with other Smart Chart AIS users. This app increases safety for the recreational boater while also improving situational awareness of the USCG, CBP, and other DHS, federal, state, tribal, and local law enforcement elements.

Project: Safe Quick Undercarriage Immobilization Device (SQUID)
End Users: CBP, law enforcement, first responders
Result: Developed the prototype and user requirements for the SQUID program that resulted in successful Small Business Innovation Research transition of two commercially available, remotely operated vehicle immobilization devices: Nighthawk® and Pit-BUL®. Nighthawk® is a remote controlled spike strip disguised as a small suitcase, while the Pit-Ballistic Undercarriage Lanyard, or PitBUL®, can be placed near the gate of a facility for automatic deployment if crossed. Forty-eight Nighthawk® and five Pit-BUL® devices were procured by CBP increasing the safety of border agents and first responders by placing them at a safe distance away from the path of a vehicle being disabled.

V. Chemical, Biological and Explosive Defense

Project: Bioassays
End Users: DHS Office of Health Affairs (OHA); Department of Defense (DoD), Department of Health and Human Services (HHS), United States Postal Service , Department of Justice (DOJ)
Result: Delivered two Public Health Actionable Assays for rapid ricin and *Francisella tularensis* detection and characterization assays to the Centers for Disease Control and Prevention (CDC) Laboratory Response Network. Delivered two First Responder Actionable Assays, one for rapid abrin toxin detection, and one for rapid ricin detection to S&T's First Responder Group (FRG) and the System Assessment and Validation for Emergency Responders Program.

Project: Integrated Chemical Biological Radiological Nuclear (CBRN) Terrorism Risk Assessment
End Users: HHS, DHS NPPD, DHS OHA, Transportation Security Agency (TSA), DHS Office of Intelligence and Analysis (I&A), DoD, Department of Agriculture (USDA), Office of the Director of National Intelligence, the Federal Emergency Management Agency (FEMA), Federal Bureau of Investigation (FBI), CDC
Result: Delivered the Integrated CBRN Terrorism Risk Assessment (ITRA) to the Interagency, which drives medical countermeasure development and the $2 billion national strategic stockpile maintained by HHS. DHS also used the results of the ITRA program to conduct an assessment of the terrorism risk from chemical, biological, radiological, and explosive agents to the mail as applied to the Consolidated Remote Delivery Site mail screening facility.

Project: Canine Explosive Detection
End Users: TSA, Federal Protective Service (FPS), First Responders

Result: Transitioned Home Made Explosive (HME) training aids for Explosive Detection Dogs (EDD) to TSA and the greater Homeland Security Enterprise. These training aids, having undergone extensive laboratory analysis and performance assessments with EDD teams (federal, state, local, and commercial security organizations), are proving to be highly effective. The aids are safe, reliable, inexpensive, and have a long shelf-life, thereby enabling the EDD handlers to expose their canines to HME odors on a regular basis.

Project: Next Generation Passenger Check Point
End Users: TSA
Result: Delivered the Digital Imaging and Communications in Security (DICOS) Standard to provide common data formats for TSA screening equipment. DICOS enables security screening components (software, detection algorithms) and systems (hardware) to have standard interfaces for images and data. This allows TSA and other screening system users to quickly plug in more effective or updated software and algorithms in response to new threats. This supports TSA's need to standardize equipment interfaces and file formats across proprietary vendor systems. The modularization and standardization of transportation security equipment will allow third party developers to participate in the enhancement of security capabilities and reduce overall operating and maintenance costs for TSA. Covered equipment includes checked and carry-on X-ray systems, personnel screening systems, and trace detection systems. Two versions of DICOS were written and approved by a consortium of the National Electrical Manufacturers Association, Battelle, TSA equipment vendors and subject matter experts. The DICOS standard can be used as the basis for TSA's common element architecture initiatives including, in the short term, a common user interface that can be applied to all similar screening equipment. Future TSA acquisitions will include the DICOS standard image format as a requirement.

Project: Predictive Screening
End Users: TSA, CBP
Result: Transitioned software supporting a real-time information sharing and data recording capability for TSA Behavior Detection Officers (BDO). Presently, TSA BDOs manually record observed suspicious passenger behavior and at the end of their shift transfer the information to the Screening Passenger by Observation Technique (SPOT) Referral Report and other select reporting data bases. This administrative recording and transcription process takes 20 to 30 minutes per BDO per day and increases the opportunity for data entry errors. S&T's transitioned software provides BDO the ability to directly enter data into a secure application on their phone (Government Provided Equipment) at the time of observation. This capability eliminates the requirement for multiple manual data transcriptions and reduces the time required for administrative record keeping, and improves data integrity. TSA estimates that the real-time Risk Information Sharing Environment (RrISE) will save approximately 20 to 30 minutes per BDO per day. When fully deployed, this estimated cost off-set is projected to be from 112 to 168 full-time equivalents per year.

VI. Counter Terrorist

Project: Home Made Explosive Characterization
End Users: TSA, FPS, USSS
Result: Provided TSA with X-ray signature data to assist TSA in setting requirements for their current acquisition of airport screening technologies. The delivery of five new HME detection windows for checked baggage screening was the culmination of two years of HME characterization, development of safety and synthesis protocols, and substantial vendor data collection and algorithm development efforts by industry. S&T's Explosives Division worked with TSA to implement the new detection windows and has continued efforts to add additional detection windows that will be delivered in FY 2014.

Project: Actionable Indicators and Countermeasures
End User: United States Citizenship and Immigration Services (USCIS), Office of the Counterterrorism Coordinator, I&A, DHS Office of Policy (PLCY), state, and local law enforcement, DHS Office of Civil Rights and Civil Liberties
Result: Resilient Systems Division's Actionable Indicators and Countermeasures Project is developing what will be the most comprehensive and accessible open source database on Terrorism and Extremist Violence in the United States (TEVUS). This effort, which is integrating and expanding four existing databases, will include data on more than 2,800 terrorist incidents, 3,000 precursor activities, 1,000 perpetrators, and 3,000 extremist crimes. End users will access TEVUS data through an easy-to-use portal that includes graphing, mapping, and analysis functions, allowing them to conduct more sophisticated, accurate, and efficient analyses of trends in extremist violence. They will be able to search information by locations, events, and perpetrators, as well as a range of other attributes. In November 2013, the preliminary TEVUS portal was demonstrated to a group of end users to solicit input on how best to shape it to address their needs.

Project: Risk Prediction
End User: CBP
Result: Delivered the Automated Threat Detection Software to the CBP National Targeting Center. This software provides near real-time analysis of CBP's Automated Targeting System to identify potential threats across 20 attributes. The previous CBP process to adjudicate potential threats required analysts to manually select and search data sets for each high risk traveler identified by the CBP Automated Targeting System. This process exceeded one hour per high risk passenger, but S&T's software cuts time requirements approximately ten-fold through automated identification, consolidation, and alert of potential threat indicators to CBP analysts. The S&T transitioned software also provides CBP the added capability of automatically identifying "known" and "covert" co-travelers of potential threats. CBP is funding the integration of the S&T transitioned software into their Unified Passenger suite of tools.

Project: Biometric Detector
End Users: CBP, USCIS
Result: Delivered the ten-print slap-capture fingerprint sensor and related data sharing tools, test programs, and quality metrics. Cross Match Technologies, Inc., the vendor of the Guardian ten-print device, recently reported that more than 50,000 units are in use worldwide in embassies,

air/land/sea ports of entry, and DHS immigration application support centers and detention facilities, as well as military and law enforcement facilities.

Project: Searchable Toner and Printing Ink Library (STPIL)
End User: ICE Homeland Security Investigations Forensic Laboratory
Result: Delivered an electronic library of most commercially available ink/toner mass spectra, along with specially designed searching/matching software to identify suspected documents. STPIL was developed in partnership with S&T, Ames Laboratory, and the National Institute of Justice. STPIL will assist law enforcement officers in rapidly identifying suspected fraudulent documents and linking these items with comparable documents that are associated with other criminal incidents, locations, materials, or individuals. STPIL is able to decrease investigative and analytical time from days down to minutes.

Project: Hard Drive Unlocking Device
End User: USSS Criminal Investigative Division
Result: Shipped three Hard Drive Unlocking Devices to each of the three USSS forensic laboratories in Washington D.C., Los Angeles, California, and Tulsa, Oklahoma. The device assists the investigators in unlocking hard drives seized by law enforcement agencies. Instead of trying to guess the passwords that lock hard drives, direct connections to hard drive ports enable law enforcement agencies to manipulate hard drives and unlock them. The device uses two methods to unlock hard drives, both of which allow access the hard drive and bypass the password locking mechanism.

VII. Cyber Security/Information Analytics

Project: Experimental Research Testbed (a.k.a. the DETER Testbed)
End Users: Cybersecurity research community, academia, college and university classes (education tool), international partners
Result: The Experimental Research Testbed Project, also known as the DETER testbed, focuses on providing cybersecurity researchers the ability to run experiments on a secure "virtual Internet." The testbed's self-contained environments allow researchers to safely test advanced defense mechanisms against "live" threats without endangering other research or the larger Internet.   S&T Cyber Security Division provided the open source software that was developed to power DETER to the Canadian government to stand up their own testbed. This testbed can be seamlessly interconnected with DETER to allow for joint research and experimentation, making it easier to tackle global scale challenges.

Project: Research Data Repository (a.k.a. the Protected Repository for the Defense of Infrastructure Against Cyber Threats [PREDICT])
End Users: Cybersecurity research community (national and international), academia
Result: Added 17 new partners from academia, 21 from commercial, three foreign, eight government, and the non-profit organizations to PREDICT. This lays the groundwork for expanding the variety of datasets in the repository. Work was also initiated on implementing virtual data enclaves to provide access to select datasets in an audited environment.

Project: Cyber Security Assessment and Evaluation
End Users: Government and industry Chief Information Officers and Chief Information Security Officers, critical infrastructure owners/operators
Result: Developed and provided Suricata, a leading intrusion detection system, freely available as open source software. Unlike other intrusion detection protection system solutions, it was designed from the ground up to support modern multicore processors, allowing it to keep pace with ever increasing network traffic. S&T initiated Suricata using $1.2 million of S&T funding, and it has received over $9 million in partnering company funds and resources.

Project: Cyber Security Forensics
End Users: Federal, state, and local law enforcement agencies
Result: Delivered Blackthorn3 Global Positioning System Forensic Analysis Tool. The Cyber Security Forensics project funded development by Berla Corporation of the hardware and software for a single platform, manufacturer-agnostic GPS forensics tool, Blackthorn3, to automate the collection of evidence from GPS devices. The software acquires all or selected data from GPS devices including routes, waypoints, tracklogs, trackpoints, address books, and favorite locations. The ruggedized toolkit gives operators the capability to quickly acquire data and make tactical decisions based on actionable intelligence while still in the field. The S&T-funded enhancements for this tool include the following: 1) double the number of GPS brands that can be analyzed from three to six, incorporating all major devices; 2) reduced the time required to manually pull information from a device from several hours to under five minutes; and 3) provided the only field solution currently available. Blackthorn3 was integrated and issued as part of the Immigration and Customs Enforcement (ICE) Homeland Security Investigations and USSS basic mobile device programs and Mobile Device Forensics classes at the National Computer Forensics Institute. The Blackthorn3 hardware kits developed by S&T are currently being piloted by USCG for mobile use aboard vessels.

Project: Secure Protocol
End Users: All network connected entities, Government, industry, the public
Result: Transitioned the Domain Name System Security (DNSSEC), which develops secure protocols for the cyber components that make up the Internet, specifically the Internet's Domain Name System (DNS) and routing infrastructure. DNSSEC ensures that users reach correct and valid Internet sites. DNSSEC is now a requirement for all new top level domains (TLDs) and is being monitored through the government .gov space as well as the private sector .com space through internet society and other partners. As of the end of FY 2013, 85 percent of U.S. Government websites were DNSSEC enabled. Additionally, many top-level domains (including, .com, .org, .us, and .uk) have adopted the DNSSEC protocol, over 100 country code TLDs are signed and Google Public Domain Name System fully supports DNSSEC validation.

Project: Secure Protocols
End Users: Internet Registrars; Internet users
Result: Led the development of the Resource Public Key Infrastructure (RPKI) suite of standards in the Internet Engineering Task Force. RPKI provides cryptographic proof that you are authorized to use Internet routing addresses, thereby helping to prevent hijacking websites by simply reusing its unique routing number. The suite of standards was finalized in 2012 and the five Internet Registrars completed deployment of the underlying infrastructure in 2013.

VIII. First Responder/Disaster Resilience

Project: Foreign Animal Diseases Vaccine and Diagnostics
End Users: USDA
Result: Delivered a patent for the first successful Foot and Mouth Disease (FMD) vaccine technology in more than 50 years, and the first licensed FMD vaccine approved for manufacture in the United States. The vaccine represents significant progress in the control of FMD, as it can be produced in FMD-free countries without risk of releasing the virus, and common diagnostic tests can be used to distinguish vaccinated animals from those infected with the disease. It is expected that a total of 18 vaccines for different strains of FMD will be produced by 2021, ensuring protection against the highest-risk serotypes and subtypes of the FMD virus.

Project: National Bioforensic Analysis Center (NBFAC) Operations
End Users: FBI, USSS
Result: Provided unique 24/7 capabilities to rapidly identify and characterize biological agents in evidentiary samples as well as to rapidly support federal law enforcement traditional forensic analysis simultaneously within biocontainment. NBFAC's rapid analysis techniques and ability to support traditional forensics within biocontainment have significantly reduced the time required to complete analysis, often within days as compared to the weeks to months required during the Amerithrax case. In 2013, these capabilities were used to support the ricin mailings incident analysis.

Project: Chemical Forensics
End Users: FBI, Environmental Protection Agency (EPA)
Result: Developed a set of standards consisting of a core set of surface and chemical mixtures for evaluating different chemical sampling approaches and techniques. The product, in the form of a kit, is now making sampling standards available to requesting researchers for the cost of production. Delivered Field Vacuum Extractor (FVE) developed by the Idaho National Laboratory to increase the efficiency of collecting vaporous chemical samples from porous surfaces. The FBI will be a principal user due to its primary jurisdiction in the investigation of terrorist and weapons of mass destruction incidents. The device will also be used by the EPA. The FVE is compatible with a person-portable Gas Chromatography/Mass Spectroscopy that is also marketed by Torion Technologies, Inc.

Project: Blast/Projectile – Protective Measures and Design Tool
End Users: Transportation Agencies
Result: Evaluated protective panels for their ability to protect the interior walls of subway tunnels against an improvised explosive device attack. The panels met performance criteria in full-scale tests, and are now being installed in the Port Authority of New York and New Jersey's Trans-Hudson subway system. Panel installation is complete in one tunnel, and has begun in a second tunnel.

Project: Radiological Nuclear Response and Recovery
End Users: First responders
Result: Provided scientific expertise and services to the New York Police Department in support of their implementation of Radiological Emergency Management System (REMS). When fully

deployed, REMS will provide a single picture of the threat at the time of weakest coordination, in the moments immediately following the incident, enabling city commanders to deploy resources in the most efficient manner and make informed decisions to help minimize radiation exposure to emergency responders and the public.

Project: First Responder Technologies - Finding Individuals for Disaster and Emergency Response (FINDER)
End Users: USCG, USSS, ICE, CBP, DHS Office of Biometric Identity Management, and law enforcement, fire, emergency and medical services (EMS), and other emergency response agencies nationwide
Result: In earthquakes, building collapses and other situations where victims might be buried in rubble piles or large fields of debris, the ability to detect and locate survivors quickly is crucial. FINDER uses low-power microwave radar to detect the small movements of breathing and heartbeats through several meters of debris. In June 2013, S&T's FRG and its project partners from the National Aeronautics and Space Administration's (NASA) Jet Propulsion Laboratory (JPL) demonstrated FINDER at the Virginia Task Force 1 International Urban Search and Rescue disaster training center in Lorton, Virginia. FINDER uses NASA technology that explores other planets and locates spacecraft. JPL scientists realized that this same radar technology could be used on our planet for rescue operations and approached DHS to begin discussions on how this new technology could be used in the civilian emergency response world. NASA JPL is building FINDER tools and S&T is placing them in the field with state and local search and rescue teams for training and evaluation. Eight companies have expressed interest to license FINDER and have signed Non-Disclosure Agreements with NASA JPL to begin the process.

Project: First Responder Technologies – Virtual Training
End Users: USCG, USSS, ICE, CBP, DHS Office of Biometric Identity Management, and law enforcement, fire, emergency and medical services (EMS), and other emergency response agencies nationwide
Result: S&T conducted operational field assessments of virtual training simulations in 2013 in coordination with first responder agencies in Sacramento, California. Virtual Training is a customizable, multi-player, cross-discipline online training game for first responders that is scalable and can be tailored for any jurisdiction to help them respond to day-to-day incidents and large-scale emergencies. An active shooter gaming scenario is expected to be available to agencies nationwide in 2014.

Project: First Responder Technologies – Mobile Biometrics
End Users: USCG, USSS, ICE, CBP, DHS Office of Biometric Identity Management, and law enforcement, fire, emergency and medical services (EMS), and other emergency response agencies nationwide
Result: S&T, working with federal, state, local, and tribal agents and first responders as well as DoD, DOJ, and the Intelligence Community, developed critical upgrades for mobile biometric devices and additional uses of mobile biometric devices in the field. Various state and local agencies are piloting mobile devices in the field that help identify individuals who lack proper identification, capture latent prints at active crime scenes, and provide database matches back to

the agents in near real-time. Other partners include USCG, FPS, CBP, ICE, USSS, and DHS Office of Biometric Identity Management (OBIM), formerly US-VISIT.

Project: TechSolutions – Wildland Firefighter Advanced Personal Protection System (APPS)
End Users: Law enforcement, fire, EMS, and other emergency response agencies nationwide
Result: S&T initiated "wear trials" of APPS with over 1,000 wildland firefighters from the California Department of Forestry and Fire Protection, the United States Forest Service, and county/local California fire departments, including San Bernardino County Fire Department, Los Angeles County Fire Department, Orange County Fire Department, and San Diego County Fire Department. APPS is a certified garment system that features lighter, more flexible, and more breathable materials, which reduce heat stress while increasing radiant thermal protection and improving garment form, fit, and function. The new gear, which includes jacket, shirt, pants, underwear, and socks, leverages DoD warfighter technologies. Additional wear testing of prototype garments will be conducted during the 2014 wildland fire season, and it is anticipated that certified garments will be available for purchase in FY 2015.

Project: TechSolutions – Heads-Up Display for Temperature Monitor
End Users: Law enforcement, fire, EMS, and other emergency response agencies nationwide
Result: S&T conducted a user operational evaluation of the Heads-Up Display for Temperature Monitor with the New York City Fire Department at the New York City Fire Academy in 2013. High temperatures in fire response situations pose a significant danger to firefighters, and this danger is heightened due to the reduced ability of firefighters to sense heat through their equipment. The Heads-Up Display for Temperature Monitor monitors the internal and external temperatures both inside and outside a responder Level-A hazmat suit and provides a warning when unacceptable temperatures are reached.

Project: Internet Protocol Communications Test and Evaluation
End Users: Law enforcement, fire, EMS, and other emergency response agencies nationwide, equipment manufacturers
Result: Sponsored a simulation exercise during the "Cruise Nite Kearney" event in Central Nebraska to test the Hybrid Public Safety Microphone and provide user feedback. Participating agencies include the Buffalo County Police Department and the Nebraska State Police. The Hybrid Public Safety Microphone, also known as the Turtle Mike, is a Voice over Internet Protocol (VoIP) bridging solution that enhances legacy radio system capabilities by allowing communication over commercial broadband networks for improved interoperability. The Turtle Mike solution can be added to any existing land mobile radio system, providing access to cellular networks, which can prove beneficial to off-load voice communication traffic. This can provide an affordable option for first responders because it does not require costly replacement of existing communication equipment and infrastructure.

Project: Virtual USA® (vUSA)
End Users: States in the Southeast (11 states), Pacific Northwest (four states) and the Central U.S. Earthquake Consortium (8 states), and law enforcement, fire, EMS, and other emergency response agencies and emergency operations centers nationwide
Result: Deployed the Virtual USA® (vUSA) Library and Next Generation Incident Command System (NICS) information sharing capabilities that are key components of the vUSA Program

to first responders in California, the National Capital Region (NCR), and elsewhere to provide situational awareness, collaboration and decision support during critical incidents. S&T integrated the vUSA Library within the NCR's Geospatial Data Exchange as an initial operational capability. It was used to coordinate information sharing across federal, state, and local first responders during the Presidential Inauguration in Washington, D.C. Esri, a leading geospatial software provider to government agencies, integrated the vUSA Library and Library Widget capabilities into their ArcGis Online cloud-based product. The NICS instance that was deployed in California with the California Department of Forestry and Fire Protection has been used during numerous incidents including the August 2013 "Rim" fire in Yosemite, California.

Project: Process Control Systems (PCS) Security – Linking the Oil and Gas Industry to Improve Cybersecurity (LOGIIC)
End Users: Oil and Gas Industry, Process Control System Operators, Critical Infrastructure owners
Result: Completed the Factory Acceptance Testing/Site Acceptance Testing (FAT/SAT) project. This project addressed concerns with Basic PCSs being delivered to Asset Owners without proper Cyber-Security Testing. The final report addressed best standards for acceptance testing based on external standards, previous LOGIIC findings and current LOGIIC member company specifications for acceptance testing. LOGIIC also completed a study on the security of wireless devices within the control systems environment. The study took into account security and security operability in terms of availability, integrity, and confidentiality. This report discusses the assessment attributes, findings, and considerations for using wireless in process control environments. The final report can be found at https://logiic.automationfederation.org.

Project: Standard Unified Modeling Mapping Integrated Toolkit (SUMMIT)
End Users: State and local emergency responders, first responders, emergency preparedness exercise community
Result: Transitioned the SUMMIT reporting capability to the FEMA operational environment at the National Exercise Division. SUMMIT is a software platform and toolkit that enables the emergency management community to access previously stove-piped models in a single integrated suite of modeling tools and reusable data sources for more effective and efficient planning, exercise, and operational response. The SUMMIT program provides non-technical personnel a suite of usable best-in-class modeling and simulation tools and underlying data and enhances the ability of the emergency management community to apply science-based tools to their activities. SUMMIT decreases the time and cost needed to train for, analyze, and respond to real or potential incidents, while increasing preparedness. SUMMIT is available to federal, state, and local agencies at no cost and has been used during various exercises and operational planning efforts including National Level Event (NLE) 11, NLE12, FEMA Region 2 Blue Surge 2013 Exercise, and Anaheim/Santa Ana Urban Area Threat and Hazard Identification and Risk Assessment planning process. SUMMIT has also been adopted by Sweden's Civil Contingencies Agency for regional exercises.

IX. Acquisition and Operations Support

Project: DHS Big Data Requirements
End Users: DHS S&T, DHS components
Result: Completed a survey of 10 operational DHS components that identified 43 big data needs. The resulting list of requirements was the foundation of the Department's approach to broader implementation of data analytics including expansion of S&T's Border Enforcement Analytics Program with ICE into an Apex project.

Project: Explosive Countermeasures Standards
End Users: TSA, FPS, CBP **Result:** Completed international X-ray standards development on whole-body imaging technical performance and air cargo inspection. This project develops new types of standard test materials for practical applications and sampling test methods for swipe, stand-off, and vapor-base explosive trace detection instruments. Efforts are directed toward developing new sampling technologies for mass spectrometric based technologies that are under development. It also develops and provides metrology, standardized test materials, and protocols required to render canine detection of explosives a more exact science as well as x-ray inspection systems.

Project: Responder & Resiliency Standards
End Users: First responders
Result: Completed standard performance specifications for multimodal biometric sensors. Finalized National Fire Protection Association standards for fire and arson resistance. This project works to improve the safety of first responders through the development of test methods for respiratory protection, building infrastructure disaster resilience, and response robot capabilities. It also focuses on identifying generic user requirement for potential DHS iris based solutions as well as web service biometric devices.

Project: Test and Evaluation Infrastructure Development
End Users: DHS program and test managers, DoD
Result: Completed development of the Test and Evaluation Knowledge Management System (TEKMS). The Test and Evaluation Knowledge Management System (TEKMS) is a relational data repository developed to catalogue the various T&E resources available for use by DHS. Development of the stand-alone TEKMS catalogue has been completed with population of the initial validated T&E activities' data. Integrated DoD infrastructure and capabilities available for DHS use into TEKMS.

Project: Test and Policy Analysis and Development
End Users: DHS program and test managers, DoD
Result: Completed development of the Level III Test and Evaluation course. DHS has developed professional training and certifications for various acquisition professions to include T&E. As the T&E experts for DHS, the Office of Test and Evaluation participation in the development of the level I, II, and III courses was critical. Level I and II courses have previously been designed, piloted, and instituted in the available DHS training curriculum. The level III Test and Evaluation course has been designed, piloted, and instituted in the DHS

training curriculum and provides DHS the ability to certify T&E professionals at all levels with DHS specific T&E courses.

Project: Supporting Anti-terrorism by Fostering Effective Technologies (SAFETY) Act
End Users: Private sector companies that develop anti-terrorism technologies or implement anti-terrorism practices and procedures
Result: Designated 60 technologies as qualified anti-terrorism technologies, with aggregate project annual technology revenue totaling $1.2 billion, which supports more than 50,000 private sector jobs.

Project: International Cooperative Programs
End Users: U.S. Homeland Security Enterprise and international stakeholders in the civil/public safety and security community, the Netherlands
Result: Coordinated and facilitated negotiations and the execution of a new bilateral agreement with the Netherlands allowing new government to government cooperation in cyber security and explosives detection. This agreement also provides a mechanism to conduct potential future cooperative activities relating to chemical, biological and nuclear/radiological security; innovative transportation security screening technology; protection of critical infrastructure; crisis response, consequence management and mitigation; and other terrorism- and homeland security- related activities.

Project: System Assessment and Validation for Emergency Responders (SAVER)
End User: First responders, law enforcement
Result: Delivered 116 documents that guide first responder and law enforcement agency investment in new equipment. These documents include 11 Assessment Reports, 15 Market Survey Reports, nine Focus Group Reports, 18 TechNotes, 29 Highlights, 13 Summaries, and 21 other reports. such as the 2013 SAVER Year in Review, Fall 2013 SAVER Newsletter, Innovative Uses of Social Media in Emergency Management, Data Fusion Considerations and Guidelines, and Body Worn Camera Systems for Tactical Operations Technical Report.

Project: Rio Grande Valley Systems Analysis Project
End Users: CBP
Result: Collaborated with CBP agents at the Rio Grande Valley Sector McAllen Station (MCS) detention center to identify 22 gaps and limitations in technology, training, and organizational processes. The resulting process improvements resulted in a total of 2,000 agent hours saved in January 2013.

X. Laboratory Facilities

Project: Office of National Labs
End Users: DHS S&T, DHS components, USDA, FBI
Result:

National Bio and Agro Defense Facility (NBAF): Began construction of the central utility plant (CUP) to provide utilities needed for the NBAF laboratory operations. The CUP construction will be 98% complete by the end of FY 2015. In FY 2015, the S&T Directorate

will award the construction of the NBAF main laboratory. The additional $300.000 million will provide funding for the construction of the NBAF main laboratory facility as well as construction administration activities, site security, and procurement support. Once this award is made, the construction contractor will mobilize to the site and begin laboratory construction activities.

Plum Island Animal Disease Center (PIADC): Completed design of the replacement for the aging PIADC waste water thermal decontamination system. Infrastructure Upgrades ensure that S&T Directorate Laboratories do not reach a point where obsolete or insufficient infrastructure prohibits continued R&D operations. The highest priority for lab facility upgrades is the Plum Island Animal Disease Center (PIADC), to ensure that there is operational continuity until NBAF comes on line.

National Biodefense Analysis and Countermeasures Center (NBACC): Completed CDC registrations for all space and re-aligned laboratory activities between Bio Safety Level (BSL) 3 and BSL-4 to fully optimize operations and capabilities. NBACC supported over 45 federal law enforcement investigations and seven threat gap assessments in fully CDC-registered and accredited BSL-2, -3 and -4 laboratories. NBACC also assisted the Kingdom of Saudi Arabia by facilitating the importation and analysis of ungulate samples (consisting of sera, saliva, throat swabs, rectal swabs, and nasal swabs), as part of a collaboration with Dr. Ian Lipkin of Columbia University, to identify the host reservoir and possible source of the Middle East respiratory syndrome coronavirus (MERS-CoV) infection. As part of this collaborative effort, USDA's Animal and Plant Health Inspection Service laboratories at PIADC screened the samples for Foot and Mouth Disease virus and NBACC supported the molecular and serological analyses of these samples for MERs-CoV with collaborators from Columbia University.

Chemical Security Analysis Center (CSAC): Developed and transitioned the Chemical Terrorism Risk Assessment (CTRA) desktop tool for U.S. Government use and provided the capability for the chemical industry to assess consequences and risk associated with an intentional or accidental chemical release. The tool will permit users to conduct "what if" assessments and to analyze the reduction in risk associated with different mitigation steps.

National Urban Security Technology Laboratory (NUSTL): Published a Radiological Emergency Management System (REMS) Lessons Learned and Guidance document. Drawing on the New York Police Department's experience with REMS, the document provides recommendations for implementing and operating the post-event detection network. NUSTL conducted assessments of and published 20 guidance documents on detection equipment (radiation, explosives, biological agents), first responder safety equipment (radiation mitigation blankets, personal cooling systems), computer modeling tools (atmospheric plumes, vehicular escape routes), and other technologies.

Transportation Security Laboratory (TSL): Provided certification testing of over 100 explosive detection systems platforms on behalf of TSA and industry using its unique dual ISO 9001 and ISO 17025 accredited operational capabilities. Additionally TSL provided developmental assistance and technical feedback to three Bottled Liquid Screening (BLS) vendors with systems in various states of system maturity and helped them collect detection data on explosive threats with which to refine their algorithms. TSL also conducted four qualification

tests on BLSs for TSA. Due to TSL's developmental support, the qualification of one BLS system enabled TSA to acquire and deploy nearly 400 systems in FY 2013. TSL provided developmental assistance and technical feedback to three manufacturers of Advanced Imaging Technology (AIT). These systems were accepted into AIT-2 tier 2 qualification testing performed by TSL at the request of TSA, supporting the TSA Checkpoint Technology Division acquisition programs in the Office of Security Capabilities. .

XI. University Programs

Project: University Programs Summer Research Team Program
End Users: Minority Serving Institutions (MSI)
Result: Completed a 10-week Summer Research Team Program for MSIs that provides experience for teams consisting of a faculty member and up to two students, to perform research at a DHS University Center that aligns with the DHS mission.

Project: Centers of Excellence (COE)
End Users: S&T Divisions, DHS components, and federal, state, and local government agencies
Result: In 2013, COEs have repeatedly proven to be a valuable asset to the DHS mission. COEs delivered many operational products to solve complex, high-priority problems.

Project: Video Analytic Surveillance Transition Project (VAST)
COE: Center for Awareness and Location of Explosives-Related Threats (ALERT)
Lead University: Northeastern University
End Users: TSA, Cleveland Hopkins International Airport
Result: In 2013 ALERT's Video Analytic Surveillance Transition Project (VAST) initiated state-of- the-art video analytics tests at Cleveland Hopkins International Airport to address two existing airport security concerns: (1) in-the-exit security breaches (a person attempts to enter the secure side of the terminal area through the exit lane), and (2) tag-and track capabilities (monitoring the path of a suspicious person in real-time to interdiction). The in-the-exit project demonstrated success in solving the in-the-exit problem, resulting in 100 percent probability of detection and 0.07 percent probability of false alarms, and is being expanded to surface rail and other airports (e.g., Boston).

Project: Advanced Circulation (ADCIRC)
COE: Coastal Hazards Center (CHC)
Lead University: University of North Carolina at Chapel Hill
End Users: USCG, FEMA, National Weather Service forecast offices, National Hurricane Center, National Oceanic and Atmospheric Administration (NOAA), U.S. Army Corps of Engineers, and the North Carolina Division of Emergency Management
Result: In 2013, CHC's ADCIRC (Advanced Circulation) Storm Surge/Flood Model results helped guide storm preparedness and response for USCG, FEMA, and other end users. During the hurricane season, CHC's model results can be viewed at http://nc-cera.renci.org/cgi-cera-nc/cera-nc.cgi. The International Data Corporation awarded the High Performance Computing Innovation Excellence Award to CHC for ADCIRC, recognizing it as a noteworthy achievement by users of High Performance Computing technologies.

Project: Assistant for Randomized Monitoring Over Routes (ARMOR) Technologies
COE: Center for Risk and Economic Analysis of Terrorism Events (CREATE)
Lead University: University of Southern California
End Users: USCG, TSA, Federal Air Marshall Services
Result: In 2013, CREATE established a private, spin-off company, Armorway, to continue to transition the highly successful ARMOR technologies. To establish the company, Armorway acquired commercial licenses to the ARMOR technology from the University of Southern California. The company is in the process of developing commercial extensions of the basic research software, and is developing client relationships with existing users of the software, such as the Los Angeles World Airports police at Los Angeles International Airport. The version of ARMOR developed for the USCG Port Resilience Operational Tactical Enforcement to Combat Terrorism (PROTECT) saves resources and increases productivity for USCG patrols. PROTECT was delivered to USCG, which modeled the ports of Los Angeles and Long Beach. PROTECT was accredited by USCG as an asset scheduling tool for single boats in 2013 and is now a USCG program of record.

Project: "The Impact on the U.S. Economy of Changes in Wait Times at Ports of Entry"
COE: Center for Risk and Economic Analysis of Terrorism Events (CREATE)
Lead University: University of Southern California
End Users: CBP
Result: In April 2013, CREATE completed a study titled "The Impact on the U.S. Economy of Changes in Wait Times at Ports of Entry." In joint testimony before the House Appropriations Subcommittee on Homeland Security on April 17, 2013, CBP officials stated that this CREATE study "found that an increase or decrease in staffing at ports has an impact on wait times and, therefore, on the U.S. economy." The Fiscal 2014 Homeland Security Senate Appropriations Committee report cited this study in appropriating funds to CBP to increase the number of CBP Officers: "Initial estimates indicate that for every 1,000 additional CBP Officers, the United States can anticipate a $2,000,000,000 increase in Gross Domestic Product. Based on the continued growth in trade and travel volume, the CBP Officer need is considerably higher." CBP provided funding to CREATE for a follow-on study, which extends the analysis to examine more aspects of wait times at more airports, including the extent to which reduced wait times not only benefit the people already traveling but also encourage more people to visit the United States.

Project: Coast Guard Search and Rescue Visual Analytics (cgSARVA)
COE: Center for Visualization and Data Analytics (CVADA)
Lead University: Purdue University
End Users: USCG
Result: USCG, in collaboration with CVADA co-lead at Purdue University, completed the verification, validation, and accreditation process for the USCG cgSARVA tool. This marks the first time that a COE-developed tool has been accredited for USCG-wide use. The formal signing was completed at USCG Headquarters by Rear Admiral Lee on April 22, 2013. USCG used cgSARVA during Superstorm Sandy to determine how to reallocate resources in light of damage caused to USCG stations in New Jersey and to prioritize the rebuilding of 14 damaged or destroyed stations.

Project: Gang Graffiti Recognition and Analysis (GARI)
COE: Center for Visualization and Data Analytics (CVADA)
Lead University: Purdue University
End Users: Indiana Department of Public Safety Division of Homeland Security, Indianapolis Metropolitan Police Department, Indiana Gang Network, Indiana Intelligence Fusion Center, Cook County Sheriff's Department, and other police departments
Result: CVADA's GARI system is proving useful to an increasing number of law enforcement officials. GARI enables law enforcement to track graffiti and interpret gang communications. In 2013, GARI was installed on servers at the Indiana Intelligence Fusion Center in Indianapolis, and at the Cook County Sheriff's Department in Chicago. A long term plan for maintenance and support for these sites is being developed.

Project: Boat Allocation Module (BAM)
COE: Center for Visualization and Data Analytics (CVADA)
Lead University: Rutgers University
End Users: USCG
Result: The BAM project created a mathematical model that produces optimal assignments of boats or resources across the USCG boat stations to meet or almost meet station mission hour requirements. The project formalized two objectives: (a) efficiently meet the required mission hours and station requirements while staying within a given budget, and (b) minimize the budget while satisfying all of the station and mission requirements. USCG estimates savings of about $120 million over 20 years by using BAM, developed by CVADA co-lead at Rutgers University and delivered to USCG in 2013.

Project: Stadium Security Tools
COE: Center for Visualization and Data Analytics (CVADA)
Lead University: Rutgers University
End Users: National Football League (NFL) MetLife Stadium
Result: On December 20, 2013, MetLife Stadium, site of the 2014 Super Bowl, became the first NFL Stadium to be granted SAFETY Act Designation and Certification. The CVADA co-lead at Rutgers University contributed to this success by providing simulation and screening tools that helped MetLife make on-scene decisions. CVADA demonstrated this tool for NFL Security and is adapting the tool for the Barclays Center, home of the Brooklyn Nets professional basketball team. CVADA-Rutgers also produced a best practices manual for stadium security operations. CVADA is also in discussions with Major League Baseball on using this tool. This accomplishment will lead to other NFL stadiums duplicating this methodology and will have a lasting effect on how NFL stadium security managers think about screening over 17 million patrons per season.

Project: Stevens Passive Acoustic Detection System (SPADES)
COE: Center for Maritime, Island and Remote and Extreme Environment Security (MIREES)
Lead University: Stevens Institute of Technology
End Users: Sonardyne Inc.
Result: MIREES co-lead at Stevens Institute of Technology and Sonardyne Inc., a subsidiary of Sonardyne International Ltd., a British manufacturer of subsea navigation and security technologies, executed a licensing agreement for intellectual property of the MIREES

SPADES. This portable, near shore and harbor surveillance system uses sound processing to detect, track, and classify vessels, swimmers, and divers to protect naval ships, ports, waterways, and high-value maritime assets from potential threats posed by divers or small vessels.

Project: Sensor Data
COE: Center for Maritime, Island and Remote and Extreme Environment Security (MIREES)
Lead University: Stevens Institute of Technology
End Users: NOAA
Result: Stevens Institute of Technology collaborated with NOAA, which used MIREES data to help monitor critical waterway activities in the New York Harbor. The data was collected by MIREES's new ocean current meter that provided enhanced real-time information to mariners traveling halfway between the Verrazano Narrows Bridge and Manhattan, the primary navigation route into New York and New Jersey ports. NOAA used the sensor data in its Physical Oceanographic Real-Time System (PORTS®) system, which delivers real-time environmental observations, forecasts, and other geospatial information to mariners in 21 major U.S. harbors. MIREES is a partner in the NOAA-led U.S. Integrated Ocean Observing System (IOOS®).

Project: Botulism Subject Matter Expertise
COE: National Center for Food Protection and Defense (NCFPD)
Lead University: University of Minnesota
End Users: New Zealand industry partner
Result: In August 2013, an NCFPD industry partner headquartered in New Zealand experienced a major market disruption in the form of potential botulism contamination of New Zealand milk products. Dairy product exports represent a large portion of New Zealand's gross domestic product, and any disruption has the potential to cause significant economic damage to the industry and economy. NCFPD's principal botulinum researcher, a global expert on botulinum neurotoxin, traveled to New Zealand and gave technical advice and interpreted laboratory results. This COE technical support allowed New Zealand to continue exporting milk. The professional networks created and supported by NCFPD provide strategic advantages for industry and federal partners when faced with public and private sector challenges.

Project: EMCAPS 2.0 (Electronic Mass Casualty Assessment and Planning Scenarios)
COE: National Center for the Study of Preparedness and Catastrophic Event Response (PACER)
Lead University: Johns Hopkins University
End Users: First responders, emergency planners, emergency rooms, and other disaster response agencies
Result: In 2013, PACER released EMCAPS 2.0, a web-based software tool that estimates the number and type of casualties that could result from 11 different disasters, including an improvised explosive device, food contamination, toxic gas release, and pandemic. This tool is available at www.pacerapps.org. Users must register and set up an account profile before gaining access to the application.

Project: Surge App
COE: National Center for the Study of Preparedness and Catastrophic Event Response (PACER)
Lead University: Johns Hopkins University

End Users: Emergency planners, medical centers, emergency rooms, and other disaster response agencies

Result: Surge helps medical facilities determine their facility's surge capacity and the impact of various surge responses. The Surge app simulates bed needs, the efficient movement of patients to open beds, discharge planning, and other steps to increase bed capacity for disaster patients. This tool is available at www.pacerapps.org. Users must register and set up an account profile before gaining access to the application.

Project: FluCast App
COE: National Center for the Study of Preparedness and Catastrophic Event Response (PACER)
Lead University: Johns Hopkins University
End Users: Hospital emergency departments, infectious disease experts, and health departments
Result: FluCast helps hospital emergency departments, infectious disease experts, and health departments estimate the number of flu patients a specific hospital is likely to see in a given week based on the hospital's historical data and data collected by Google Flu Trends. FluCast gives advanced warning of potential flu case loads, enabling hospitals and medical institutions to prepare. This tool is available at www.pacerapps.org. Users must register and set up an account profile before gaining access to the application.

Project: Transnational Illicit Trafficking (TransIT)
COE: National Consortium for the Study of Terrorism and Responses to Terrorism (START)
Lead University: University of Maryland
End Users: DHS Domestic Nuclear Detection Office
Result: START delivered the TransIT geospatial tool to the Domestic Nuclear Detection Office. TransIT marries the latest geospatial analysis techniques with data on adversary behavior in order to identify trafficking "chokepoints" where enforcement and detection resources can be most productive. This tool has been applied to modeling potential illicit movement of radiological/nuclear materials by transnational criminal organizations working on behalf of terrorists into the United States through Central America and the Caribbean Basin. START is now developing the tool for broader utility for potential customers (e.g., CBP, TSA, USCG, ICE, I&A) to consider both other geographical locations and contraband.

Project: AgConnect
COE: National Center for Zoonotic and Animal Disease Defense (ZADD)
Lead University: Texas A&M University
End Users: USDA Center for Epidemiology and Animal Health, USDA State Animal Health Officials, agricultural producers
Result: In 2013, five major agricultural producers partnered with ZADD co-lead Texas A&M University to pilot a system of IT applications called AgConnect. The partnership is a novel public-private arrangement to develop, test, and diffuse technologies that protect livestock and poultry production in emergencies. ZADD's AgConnect suite of web-based and mobile IT applications provide critical real-time information to all components within the agricultural community, from producers to federal agencies.

Project: Centers of Excellence Education of the Next Generation of Homeland Security Professionals

End Users: S&T Divisions, DHS components, and federal, state, and local government agencies
Result: S&T's Office of University Programs (OUP) is dedicated to training homeland security professionals in scientific analytical methods to increase the effectiveness of counterterrorism, security, and emergency operations. OUP works with COEs to build a robust homeland security science and engineering workforce and provide professional development opportunities for current homeland security professionals. Seventy-two percent of COE Career Development graduates have obtained work in the homeland security community. OUP also provided access to service academy students (cadets and midshipmen), while offering these students valuable experience in homeland security missions. The COEs also developed programs and curricula accessible to homeland security professionals. In 2013, COEs reached an additional 7,100 students, including over 1,000 current homeland security professionals. The COEs also began to place faculty at DHS for one to two month periods to both learn DHS problems and operations and provide seminars and training in analytical approaches to DHS staff.

Project: Centers of Excellence DHS Summer Internships
End Users: S&T Divisions, DHS components, and federal, state, and local government agencies
Result: The 2013 DHS OUP Homeland Security Science and Engineering Summer Internship program placed 55 student interns at the following hosting sites: Argonne National Laboratory, Engineer Research & Development Center, Homeland Security Studies and Analysis Institute, Idaho National Laboratory, Los Alamos National Laboratory, Lawrence Berkeley National Laboratory, Lawrence Livermore National Laboratory, National Institute of Standards and Technology, Oak Ridge National Laboratory, Pacific Northwest National Laboratory, and Sandia National Laboratories.