

Question#:	1
Topic:	evaluation
Hearing:	Behavioral Science and Security: Evaluating TSA's SPOT (Screening of Passengers by Observational Techniques) Program
Primary:	The Honorable Paul Broun M.D.
Committee:	SCIENCE (HOUSE)

Question: Does S&T's evaluation seek to validate the underlying behavioral indicators that form the basis of the SPOT program?

Response: The scope of the study was to conduct an operational examination of the existing indicators contained within the Screening Passengers by Observational Techniques (SPOT) Referral Report. The results of the study provide evidence to support the criterion-related validity (classification accuracy) of the SPOT Referral Report. In a comparison of Operational SPOT and random screening selection outcomes, the classification accuracy for Operational SPOT was significantly more accurate in identifying high-risk travelers as defined by possession of serious prohibited and illegal items (weapons, fraudulent documents, etc.) and law enforcement arrests. This finding was based upon a comparison of Operational SPOT and random screening at 43 airports for a period of nine months and included over 23,000 Operational SPOT screenings and 70,000 random screenings.

Question#:	2
Topic:	study
Hearing:	Behavioral Science and Security: Evaluating TSA's SPOT (Screening of Passengers by Observational Techniques) Program
Primary:	The Honorable Paul Broun M.D.
Committee:	SCIENCE (HOUSE)

Question: For the purpose of the S&T study, you describe ‘high risk travelers’ as “those passengers in possession of serious prohibited and/or illegal items or individuals engaging in conduct leading to an arrest.”

Why is ‘terrorism’ not included in the definition of high risk travelers?

Response: The number of terrorists identified as traveling through airports is too infrequent to support the inclusion of terrorists as high-risk passengers in an empirical comparative analysis of screening methodologies. In keeping with the best practice of developing proxy measures, the Science and Technology Directorate’s study defined high risk travelers using behaviors common to both terrorists and criminals, such as attempting to conceal identity and smuggling of potentially dangerous materials.

Question: Has the definition of high risk travelers changed from when SPOT was first implemented? If so, how?

Response: The definition has not changed.

Question#:	3
Topic:	training
Hearing:	Behavioral Science and Security: Evaluating TSA's SPOT (Screening of Passengers by Observational Techniques) Program
Primary:	The Honorable Paul Broun M.D.
Committee:	SCIENCE (HOUSE)

Question: At a recent Oversight and Government Reform hearing, TSA stated that it was introducing training for screeners to put travelers at ease while going through screening.

What impact would this, and other countermeasures employed by travelers such as training to hide indicators, or anti-anxiety drugs, have on a BDO's ability to identify an individual intending to cause harm?

Response: Screening of Passengers by Observation Techniques (SPOT) indicators are based on the involuntary physical and physiological behaviors that occur when a person has a fear of discovery. Research supports that these behaviors are difficult to countermeasure. First, involuntary behaviors originate in an area of the brain that individuals do not have control over. People cannot stop these behaviors from occurring; rather they must try to mask or suppress them once they are triggered. Second, nonverbal behavior is more complex and more difficult to control than verbal communication because there are many areas of nonverbal behavior an individual needs to control, such as facial expression, posture, etc. Third, deception is a cognitively demanding state, and this makes body movements even more difficult to control, because people have lower cognitive capacity when they are trying to lie.

Research has not yet examined how medication, surgery, disguise, or drugs affect human behavior in these situations, and this research is needed by the scientific community. Even though medication or drugs may suppress some behaviors and body movements, they may produce other signals to suggest that the person has taken this medication.

Question#:	4
Topic:	BDOs
Hearing:	Behavioral Science and Security: Evaluating TSA's SPOT (Screening of Passengers by Observational Techniques) Program
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Committee:	SCIENCE (HOUSE)

Question: How does TSA ensure that BDOs are using indicators to screen passengers rather than something more troublesome like profiling or racial bias?

Response: Behavior Detection Officers (BDO) and candidates are trained to identify behaviors, and work to resolve any suspicions based on the training protocols. The BDO training distinguishes between subjective profiling and proven scientific methods. They are specifically trained not to consider ethnicity or race—and or other traits that are not associated with behavior. Additionally, BDOs work in teams which aids in integrity. Furthermore, the program office regularly performs Standardization Visits with refresher training. Finally, the Screening of Passengers by Observation Techniques (SPOT) Transportation Security Managers, who are the first line supervisors to the BDOs, are required to spend time on the floor monitoring the BDOs to ensure they are applying the behaviors in accordance with the SPOT standard operating procedures.

Question#:	5
Topic:	SPOT
Hearing:	Behavioral Science and Security: Evaluating TSA's SPOT (Screening of Passengers by Observational Techniques) Program
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Question: On what basis was the SPOT checklist of indicators selected?

Response: The behavioral indicators incorporated within Screening of Passengers by Observation Techniques (SPOT) are based on both law enforcement experience and the most recent scientific findings.

Additionally, the work of Dr. David Givens, Director of the Center for Nonverbal Studies, was utilized in selecting the SPOT behaviors. Dr. Givens is recognized as an expert in nonverbal behavior. Behaviors outlined in his *Nonverbal Dictionary* were selected based on their relationship to stress, fear, and deception cues associated with the fear of discovery and integrated into the SPOT program.

Question: Why doesn't the S&T study evaluate the validity of the indicator list? Do you believe this would be helpful?

Response: The Science and Technology Directorate's (S&T) study did directly evaluate the indicator list as executed through the existing Screening Passengers by Observational Techniques (SPOT) Standard Operating Procedure (SOP).

Question#:	6
Topic:	GAO report
Hearing:	Behavioral Science and Security: Evaluating TSA's SPOT (Screening of Passengers by Observational Techniques) Program
Primary:	The Honorable Paul Broun M.D.
Committee:	SCIENCE (HOUSE)

Question: According to the GAO report, S&T officials “agreed that SPOT was deployed before its scientific underpinnings were fully validated.” (p. 15). Additionally, in discussing the S&T study, the GAO report states, “S&T’s current research plan is not designed to fully validate whether behavior detection and appearances can be effectively used to reliably identify individuals in an airport terminal environment who pose a risk to the aviation system.” (p. 20). Additionally, in the first paragraph of Dr. Maria Hartwig’s written testimony, she says, “In brief, the accumulated body of scientific work on behavioral cues to deception does not provide support for the premise of the SPOT program. The empirical support for the underpinnings of the program is weak at best, and the program suffers from theoretical flaws.”

Prior to implementing SPOT, why did TSA not validated the science behind the program?

Response: Prior to the Transportation Security Administration’s Screening of Passengers by Observation Techniques (SPOT) program, no behavior-based program had ever been rigorously scientifically validated. The program was established on widely accepted principles supported by leading experts in the field of behavioral science and law enforcement.

Question: Why did the S&T validation study not validate “whether behavior detection and appearances can be effectively used to reliably identify individuals in an airport terminal environment who pose a risk to the aviation system?”

Response: The Science and Technology Directorate (S&T) sponsored study did directly examine the extent to which “behavior detection and appearances,” as represented in the existing Screening Passengers by Observational Techniques (SPOT) indicators, can be effectively used to identify high-risk travelers, which is an examination of classification accuracy (criterion-related validity). Results of the study found support for criterion-related validity; that is, there is evidence that the SPOT indicators are accurate in identifying outcomes and is significantly more accurate in doing so than random screening.

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Question: How do you respond to Dr. Hartwig's comment?

Response: During the recent testimony, Dr. Rubin responded to a similar question by stating that the published research literature on the link between behavioral, physiological, and verbal cues to deception and general suspicious behaviors is mixed, rather than non-supportive as represented by Dr. Hartwig. The Science and Technology Directorate (S&T) agrees with Dr. Rubin's assessment.

Question#:	7
Topic:	originated
Hearing:	Behavioral Science and Security: Evaluating TSA's SPOT (Screening of Passengers by Observational Techniques) Program
Primary:	The Honorable Paul Broun M.D.
Committee:	SCIENCE (HOUSE)

Question: Who originated the SPOT program, was it Carl Maccario, as Dr. Ekman states in his written testimony, or was it Lieutenant DiDomenica, who says his PASS program was the basis for SPOT?

Response: After the terrorist attacks of 9/11, behavior recognition and analysis concepts were adapted and modified by the Massachusetts State Police (MSP) Troop F (Lieutenant DiDomenica) assigned to Boston Logan International Airport (BOS). Their program was modified to meet the legal, social, political, financial, and resource limitations of the United States and was merged with drug interdiction techniques used by United States law enforcement. MSP named this program Behavior Assessment Screening System and trained all law enforcement officers assigned to BOS in its use as an enhanced security measure to the newly instituted security checkpoint screening system of the Transportation Security Administration (TSA).

The Screening of Passengers by Observation Techniques (SPOT) program was developed by TSA (Carl Maccario), with assistance from MSP, to meet TSA-specific security and public service needs, with particular emphasis on the protection of individual civil rights, privacy, and to mitigate possible complaints of racial profiling.

Question: What role did the Israeli model play?

Response: The SPOT subject matter expert was initially trained in Israeli Behavior Pattern Recognition (BPR). Many of the BPR concepts are contained in SPOT such as informally interacting with passengers who are in line at the security checkpoint queue.

Question: What aspects of the Israeli model are based on behavioral science?

Response: TSA defers to the Government of Israel to respond as appropriate, as they are the subject matter experts on their security model.

Question#:	8
Topic:	experiments
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Question: Dr. Ekman distinguishes his experiments from those of his critics by emphasizing that his focus is on “high stake lies, in which the person lying has a lot to gain or lose by success or failure.” He specifically addresses the work conducted by Dr. Hartwig, stating, “She has dealt with low-not-high-stake lies which have little relevance to my work or to the situation faced in SPOT.” Conversely, Dr. Hartwig states, “Neither the research in general nor specific results on high-stake lies support the assumption that liars leak cues to stress and emotion, which can be used for the purposes of lie detection.”

Given these opposing views, what is your assessment?

Response: As Dr. Rubin stated during his testimony, the published research literature is mixed on the topic of behavioral, physiological, and verbal cues to deception and general suspicious behaviors. Ideally, one might expect greater consensus and support from the academic research base prior to fielding a screening program; however, academic research alone is insufficient. Once a screening program is fielded, regardless of how supportive the academic research base may be, prudent research requires the conduct of operational experiments to validate the effectiveness of the screening program and if effective, to then conduct additional research to optimize its effectiveness. The reality is that behavior-based screening is currently used operationally by DHS, the U.S. Department of Defense, the U.S. intelligence community, law enforcement, and by numerous other countries. Increased focus should be applied to conducting field research on these programs.

Question#:	9
Topic:	research
Hearing:	Behavioral Science and Security: Evaluating TSA's SPOT (Screening of Passengers by Observational Techniques) Program
Primary:	The Honorable Donna F. Edwards
Committee:	SCIENCE (HOUSE)

Question: Please indicate each and every research effort that the DHS Science & Technology Directorate (S&T) is conducting on behalf of the Transportation Security Administration (TSA). This should include all efforts the S&T Directorate is taking on behalf of TSA and not simply be limited to work that S&T is performing regarding the TSA SPOT program.

Please include in this list the following information:

The name of the TSA effort DHS S&T is supporting.

The purpose of the S&T research or task.

The amount of financial reimbursement S&T is receiving from TSA for each effort.

Response: The Science and Technology Directorate (S&T) partners with the Transportation Security Administration (TSA) on several research and development tasks. Below are the projects and associated funding from FY 2010 reimbursed by TSA: *(NOTE: * indicates projects are funded by TSA and do not appear in S&T budget documents)*

Project Name: Secure Carton

Financial Reimbursement from TSA: N/A

Description: Develop (at the request of TSA and DHS Policy) a shipping carton embedded with security sensors that detects tampering or opening of the carton once closed. It is scalable and applicable across various shipping modalities, including maritime and air cargo, and can communicate a tamper event of the internal cargo to a radio frequency identification reader, when interrogated. The interaction with TSA has been to keep them informed of the project. S&T intends to test the product for inclusion on the TSA qualified products list. Secure Carton is a Phase-III Small Business Innovation Research (SBIR) – Phases I & II were funded by S&T SBIR Program and Phase III was funded with S&T Borders and Maritime Security Division FY09/10 project funds.

Project Name: Secure Wrap

Financial Reimbursement from TSA: N/A

Description: Secure Wrap is being developed for TSA and DHS Policy. It is a flexible wrapping material that provides a visible indication of tamper evidence and can be deployed with little to no change to current supply chain logistics and processes. The

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interaction with TSA has been to keep them informed of the project. S&T intends to test the product for inclusion on the TSA qualified products list. Secure Wrap is a Phase-II SBIR with all funding provided by DHS S&T SBIR Program.

Project Name: Autonomous Rapid Facility Chemical Agent Monitor Project

Financial Reimbursement from TSA: N/A

Description: Develop a low-cost, fully autonomous, chemical vapor monitor that is intended to “detect-to-warn” of the presence of up to 17 chemical warfare agents and high-priority toxic industrial chemicals within a single device at both immediately dangerous to life and health and permissible exposure limit concentrations. The monitor will be able to operate continuously in closed or partially enclosed facility 24hrs/day, 365 days/yr.

Project Name: Chemical Security Analysis Center (CSAC) Project

Financial Reimbursement from TSA: N/A

Description: Develop and sustains expert reach-back capabilities to provide rapid support in domestic emergencies. The CSAC serves as the Nation’s first centralized repository of chemical threat information (hazard and characterization data) for analysis of the Nation’s vulnerabilities to chemical agent attacks. To ensure a cohesive effort to evaluate threats and countermeasures, CSAC conducts key analytical assessments, such as material threat assessments (MTAs), hazard assessments, and the Chemical Terrorism Risk Assessment (CTRA). The DHS Office of Infrastructure Protection, Office of Health Affairs, TSA, and Intelligence & Analysis are the primary DHS customers for CSAC products. CSAC provides completed MTAs to Health and Human Services to fulfill BioShield requirements.

Project Name: Model Large-Scale Toxic Chem Transport Release Project

Financial Reimbursement from TSA: \$800,000

Description: Focus on developing an improved understanding of large-scale releases of toxic inhalation hazards. Aspects of the project include improved modeling, first responder procedures, and industrial safety in addition to the development of enhanced mitigation strategies.

Project Name: Canine Detection R&D Project (FY10)

Financial Reimbursement from TSA: N/A

Description: Assess the performance of TSA certified explosive detection canine teams when screening air cargo. This effort is in support of the TSA National Explosives Detection Canine Team Program (NEDCTP) effort to independently test performance measures in operational environments in order to make decisions on concepts of

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operations. Independent experts collect and present the data from canine operational assessments and make recommendations on canine training or deployment to optimize canine explosives detection.

Project Name: Homemade Explosives (HMEs) Stand Alone Detection Project (FY10)

Financial Reimbursement from TSA: N/A

Description: Identify, evaluate, and improve HME detection technologies and screening methods through the collection and analysis of detection data and images from a wide variety of commercial off-the-shelf (COTS) explosive detection systems (EDS), computed tomography, and x-ray diffraction equipment. This helps TSA determine how to improve screening system performance through hardware and software (image processing) upgrades. In addition, this project evaluates COTS explosives detection equipment in laboratory settings to determine detection limits, false-alarm rates, and documents unique homemade explosive (HME) properties for detection exploitation.

Project Name: Air Cargo Project (FY10/FY11)

Financial Reimbursement from TSA: FY 10 \$1.1 million

Description: Identify and develop next generation screening systems to mitigate the threat of explosives placed in air cargo containers. Activities include developing technologies to enable more effective and efficient air cargo screening (including break-bulk, palletized, and containerized configurations screening) with reduced operational costs and false-alarm rates.

Project Name: Algorithm and Analysis of Raw Images (FY10/FY11)

Financial Reimbursement from TSA: N/A

Description: Develop a non-proprietary database of explosive-detection images which will be provided to all detection-program participants. Collect and consolidate images, including those of novel explosives, from commercial vendors and coordinates the purchase of additional images and data from computed tomography, explosive detection systems, trace, emerging devices and other technologies. The evaluation of these images will help determine the causes of false alarms over many types of scanning systems.

Project Name: Automated Carry-On Detection (FY10/FY11)

Financial Reimbursement from TSA: N/A

Description: Develop advanced capabilities to detect explosives and concealed weapons in carry-on luggage. This project also will introduce new standalone or adjunct imaging technologies, such as computed tomography, to continue the improvement of checkpoint detection performance and the detection of novel explosives.

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Project Name: Automated Threat Recognition (FY10/FY11)

Financial Reimbursement from TSA: N/A

Description: Develop and evaluate automated target recognition algorithms for advanced imaging technology in a test bed with the goal to automatically and reliably detect threats on passengers, eliminating the need for human interpretation in order to improve detection and false alarm performance and reduce privacy concerns. The December 25, 2009 incident clearly shows the importance of detecting threats hidden on passengers' bodies. This research will guide further enhancements necessary to reach full-scale development and deployment.

Project Name: Detection Technology and Material Science (FY10/FY11)

Financial Reimbursement from TSA: N/A

Description: Evaluate advanced detection algorithms, improves explosives detection and develops and tests advanced materials for trace sample collection.

Project Name: Explosives Trace Detection (FY10/FY11)

Financial Reimbursement from TSA: N/A

Description: Develop advanced capabilities to detect explosives (including homemade explosives) through improved trace sampling and detection technologies. Develops trace detection standard materials that can be used as field performance standards for deployed trace detection systems. Characterizes trace explosives chemical and physical signature properties to inform advanced trace detector system design.

Project Name: Checked Baggage (FY10/FY11)

Financial Reimbursement from TSA: FY 10 \$5.5 million

Description: Drive commercial development of next-generation systems that will substantially improve performance and affordability of checked baggage screening. Commercial development is driven when the test results referred to below are incorporated into TSA's increased performance requirements for screening systems. Vendors must then meet these requirements for consideration during TSA acquisition. Test and evaluation of these systems will focus on probability of detection, number of false alarms, and throughput. The project also measures affordability of these systems by evaluating initial purchasing cost, operating costs, maintainability, and other elements of the full life-cycle costs.

Project Name: Mass Transit (formerly Suicide Bomber) (FY10/FY11)

Financial Reimbursement from TSA: N/A

Description: Identify the infrastructure characteristics and security concept of operations for surface transportation systems in order to drive a security technology development

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strategy designed to combat the explosive threat within the operational requirements of the transportation systems. Assessments will be conducted at transit authorities to frame the technology development solution space. Currently fielded technologies will be evaluated for potential enhancement.

Project Name: Next Generation Passenger Checkpoint (FY10/FY11)

Financial Reimbursement from TSA: FY 10 \$2.1 million

Description: Develop the next-generation detection system architecture to screen passengers for explosives at aviation checkpoints. This project also investigates new emerging liquid- and gel-based explosive threats and includes them in a comprehensive detection system.

Project Name: Predictive Screening Project

Financial Reimbursement from TSA: N/A

Description: Derive the observable behavioral indicators and develops technologies to automatically identify, alert authorities to, and track suspicious behaviors that precede suicide bombing attacks. The Science and Technology Directorate will test technologies at ports-of-entry, transit portals, and special events.

Project Name: Aircraft Vulnerability Tests (FY10/FY11)

Financial Reimbursement from TSA: FY10 \$6.6 million

Description: Assess the vulnerability of narrow- and wide-body aircraft passenger cabins and cargo holds to explosives. These vulnerability assessments will analyze blast/damage effects of explosives and determine the minimum threat mass required to cause catastrophic damage to various aircraft types. The assessments will also identify the detection limits for bulk screening systems. Develop and assess hardened unit load devices (HULDs) for blast mitigation in air cargo. These HULD development efforts will provide reduced weight air cargo containers for blast protection while minimizing impact on commerce.

Project Name: Homemade Explosives (HME) Characterization (FY10/FY11)

Financial Reimbursement from TSA: N/A

Description: Determine the impact, friction, and electrostatic-discharge sensitivities of HME threats. This data facilitates the safe handling and storage of HME materials during research and development activities. Technology efforts to identify, evaluate, and improve HME detection technologies and screening methods through the collection of raw data and images from a wide variety of commercial off-the-shelf (COTS) explosive detection systems (EDS), computed tomography, and x-ray diffraction equipment are also conducted. This helps TSA determine how to improve EDS performance through

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hardware and software (image processing) upgrades. In addition, this project evaluates COTS equipment in laboratories to determine detection limits, false-alarm rates, and documents unique HME properties for detection exploitation.

Project Name: Facility Restoration Demonstration Project

Financial Reimbursement from TSA: N/A

Description: Develop a systems approach to response and recovery of critical transportation facilities following a chemical agent release. This project develops remediation guidance, efficient pre-planning tools, identifies decontamination methods, identifies sampling methods, and develops decision analysis tools.

Project Name: Operational Tools for Response and Restoration Project

Financial Reimbursement from TSA: N/A

Description: Develop a suite of state-of-the-science indoor-outdoor predictive tools to characterize the extent and degree of biological contamination, incorporating the best-available deposition, degradation, and surface viability data. This project will provide validated interagency sampling plans and improved statistical sampling design to support characterization and decontamination planning.

Project Name: Bridge Vulnerability Project

Financial Reimbursement from TSA: None

Description: Develop an understanding of the vulnerabilities of different types of bridges to terrorist threats. This project will evaluate vintage bridge components to improve understanding of explosives effects and to refine blast modeling tools. The approach is unique in that it examines actual bridge sections exposed to wear or aging instead of fabricated specimens. As a result, it will provide more accurate vulnerability information for aging bridges and allow for refinement of existing numerical models that predict failure of bridge components. The project is using the Golden Gate Bridge, Crown Point Bridge (New York State - Lake Champlain), and Manhattan Bridge (New York City East River), and the Fort Steuben Bridge (Ohio) for homeland security research on potential effects of an improvised explosive device (IED) attack and other plausible threats against a bridge. These efforts are in partnership with the Maine Department of Transportation (DOT), NY DOT, NYC DOT, Ohio DOT, Golden Gate Bridge Authority, and the Federal Highway Administration.

Project Name: Blast/Projectile – Protective Measures and Design Tools

Financial Reimbursement from TSA: None

Description: Identify and evaluate protective measures and design guidance for protecting the Nation’s most critical infrastructure assets. The project considers novel

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materials, design procedures, and innovative construction methods to aid in constructing or retrofitting infrastructure. This will numerically analyze protective designs against blast and projectile threats and conduct physical demonstrations to assess effectiveness.

Project Name: Advanced Incident Management Enterprise System (AIMES)

Financial Reimbursement from TSA: None

Description: Develop the next-generation incident-management enterprise system and builds upon the Unified Incident Command and Decision Support architecture and Training, Exercise & Lessons Learned framework. This will integrate all elements of the incident management enterprise to provide a secure, scalable, interoperable, and unified situational awareness to the responder community.

Project Name: Rapid Mitigation and Recovery Project

Financial Reimbursement from TSA: None

Description: Investigate, assess, and develop candidate technologies and methodologies that will reduce or eliminate the release of toxic inhalation hazard (TIH) from the two threat scenarios of interest (.50 caliber AP and small IED). Assess potential TIH mitigation technologies, to include development of interface documentation to ensure that identified technologies can be integrated into any existing and or future rail car design efforts. Mitigation technologies and approaches to be assessed include: Self-sealing Technologies and Blast and Fragment Penetration Resistant Materials.

Project Name: Blast Projectile-Advanced Materials Design

Financial Reimbursement from TSA: None

Description: Assess the risk to a tunnel or mass transit station due to a terrorist attack that has the potential of causing catastrophic losses (fatalities, injuries, damage, and business interruption). Information from Integrated Rapid Visual Screening Tool (IRVS) can be used to support higher level assessments and mitigation options by experts. In coordination with TSA, IRVS for Mass Transit Stations and Tunnels were tested in various cities: Boston (Boston Massachusetts Bay Transportation Authority (MBTA), Cleveland, St. Louis, and others. TSA will use the tool to enhance risk assessments of transportation hubs around the country. In addition to TSA, potential users include Office of Infrastructure Protection, Federal Emergency Management Agency, Commercial and Government Facilities, State and local governments, code officials, associations of engineers and architects, the design and construction industry.

Project Name: Community Based CIP Institute

Financial Reimbursement from TSA: FY11 \$1million

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Description: The shipment of hazardous materials provides a significant target for terrorists. The ability to track hazardous materials (HAZMAT) shipments on a real-time basis is essential for providing an early warning of an impending terrorist threat. The University of Kentucky (UK) will design and organize a functional prototype of a HAZMAT truck tracking center. This project supports a Transportation Security Administration (TSA) program that tracks motor carrier shipments of security-sensitive materials. Collaborating with UK on the project are Morehead State University, Coldstream Digital and General Dynamics Advanced Information Systems. The prototype software is integrated with “smart truck” technology and will contain operational components that will integrate reporting and shipping information with a real-time tracking and situation display capability.

Project Name: Suspicious Activity Reporting Project

Financial Reimbursement from TSA: None

Description: S&T is developing an enhanced analytical tool prototype for the Federal Air Marshal Service (FAMS), Investigations Division. This application, now named iConnex, is a suite of analytical tools that allows investigators to search, find, explore, link, visualize and understand relationships within Suspicious Activity Reports and other law enforcement data sets. The iConnex application is under development using predominantly open-source technologies. The application’s architecture targets the technical needs of the law enforcement community by being able to work with an array of structured and unstructured data. The system is designed to be user friendly, and does not require extensive training or support to reach operational capabilities. Once completed, iConnex will be made available to any DHS component or law enforcement agency as a cost-free Government Open Source solution.

Project Name: Law Enforcement Data Fusion

Financial Reimbursement from TSA: None

Description: The Science and Technology is working with Federal Air Marshal Service (FAMS), Investigations Division to develop a geospatial predictive analytics product that will detect, forecast, and disrupt future terrorist attacks and criminal activity – leveraging predictive analytic algorithms and software developed for the Department of Defense community that successfully ‘forecast’ improvised explosive device locations in Iraq and Afghanistan. This capability will provide FAMS with actionable guidance on the most effective location and allocation of agents to place on high risk flights as well as providing them with increased knowledge of the tactics and procedures of the adversary. This effort utilizes a cloud-computing environment in which national data (Homeland Security Infrastructure Protection Gold, among others) are being brought together and analyzed to support the FAMS mission to discern threats and forecast the location of

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attacks. As this technology matures at FAMS, the final product will be made available to any DHS component or law enforcement agency as a cost-free Government Open Source solution.

Project Name: Cross-Cultural Validation of Screening of Passengers by Observation Techniques (SPOT)

Financial Reimbursement from TSA: N/A

Description: Provide empirical validation of existing behavioral indicators employed by DHS' operational components to screen passengers at air, land, and maritime ports, including those indicators contained within TSA's SPOT. This effort complements the automated prototype work and supports development of an enhanced capability to detect behavioral indicators of hostile intent at a distance. The project will integrate these validated behavioral indicators into the screening concept of operations through each component's existing training programs.

Project Name: Future Attribute Screening Technologies Mobile Module (FAST M2)

Financial Reimbursement from TSA: N/A

Description: Develop a prototype screening facility containing a suite of real-time, non-invasive sensor technologies to detect behavior indicative of malintent (the intent or desire to cause harm) rapidly, reliably, and remotely. The system will measure both physiological and behavioral signals to make probabilistic assessments of malintent based on sensor outputs and advanced fusion algorithms. Federal, state, and local authorities may use the fully developed FAST system in primary screening environments to increase the accuracy and validity of people screening at special events, airports, and other secure areas. FAST will measure indicators using culturally independent and non-invasive sensors. FAST will use an ongoing, independent peer review process to ensure objectivity and thoroughness in addressing all aspects of the program.

Project Name: Hostile Intent Detection – Automated Prototype

Financial Reimbursement from TSA: N/A

Description: Develop real-time, non-invasive, and culturally independent, hostile-intent detection video extraction algorithms to identify unknown or potential terrorists through an interactive process.

Project Name: Human Systems Research

Financial Reimbursement from TSA: FY10 \$1.7 million

Description: Examine ways to maximize human performance across DHS end-user tasks and activities. Activities under this project include research on exceptionally

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performing (EP) screeners, development of a human factors research roadmap, a study of airport dynamics and the development of a cognitive assessment tool.

***Project Name:** Aviation Security Enhancement Partnership (ASEP) Evaluating TSA's Comprehensive Airport Security Strategy

Financial Reimbursement from TSA: FY10 \$1 million

Description: The project will deliver an evidence-based assessment and a research design for a comprehensive evaluation of the efficacy of the Transportation Security Administration's Playbook to ensure that it has the intended prevention and deterrent effects in and around U.S. airports.

***Project Name:** Intelligent Closed Circuit Television (iCCTV) Project

Financial Reimbursement from TSA: FY10 \$400,000

Description: Design and construct a data video collection, storage, and distribution capability to support off-line behavioral analysis. The resulting analysis will support an inter- and intra-reliability assessment of the SPOT indicators.

***Project Name:** Behavior Detection Officer (BDO) Selection Instrument Validation Project

Financial Reimbursement from TSA: FY09 \$1.25 million (still being completed)

Description: Design and validate a personnel selection instrument to support the hiring of TSA BDO.