



2011

ANNUAL REVIEW

COMBATING TERRORISM
TECHNICAL SUPPORT OFFICE

PREFACE



DoD photo by Mass Communication Specialist 2nd Class Casey H. Kyhl, U.S. Navy

2011 has been a monumental year in the combating terrorism community. The capture and death of Osama bin Laden in May marked the end of a decade-long chapter in the search for justice for all who lost their lives on September 11, 2001. The raid on the bin Laden compound in Pakistan highlighted the vigilance, tenacity, and cooperation of America's Navy SEALs and special operations forces—groups who have historically preferred to remain under the radar—whom the Combating Terrorism Technical Support Office (CTTSO) supports daily by providing capabilities to meet their operational requirements.

This year also marked the 10th anniversary of that fateful day in September of 2001. The fact that the U.S. is still fighting overseas conflicts and that more than 6,200 soldiers, sailors, airmen, and Marines have lost their lives in the line of duty since September 11, 2001 serve as constant reminders of why the CTTSO exists. The CTTSO's mission is to identify and prioritize the needs of the interagency community charged with combating terrorism. The CTTSO delivers capabilities to those on the front lines through rapid research, development, test, evaluation, and operational support.

As the nation faces severe budget constraints, the CTTSO has the distinct advantage of efficiency. With an interagency and international scope, the CTTSO has been able to open lines of communication and collaboration. Currently more than 100 government agencies and five international partners participate in the combating terrorism realm, working directly with the CTTSO. This is achieved through requirements vetting and results in the sharing of technical expertise, experience, and resources. This efficient cooperation and collaboration also eliminates duplication, thereby saving time, resources, and money. As a rapid prototyping research and development organization, the CTTSO understands the imperative nature of ensuring that end users have the technologies and capabilities they need when they need them. In addition, the CTTSO's global audience continues to increase due, in part, to the success of the Global Security Challenge. The Global Security Challenge runs annual international business plan competitions to find and select the most promising security technology startups in the world.

PREFACE



DoD photo by Staff Sgt. Renae Saylock, U.S. Air Force

This annual review book will highlight a few of the new technologies and resources that may improve the effectiveness of military and civilian security forces, law enforcement officials, bomb squads, first responders, and a host of other individuals who have a single-minded purpose and defined mission to defeat terrorists. It will also highlight those agencies that, by providing their people and their support, help to ensure that CTTSO continues to remain on the cutting edge, providing both materiel and nonmateriel solutions to those who need it most. The projects included in this book are only some of CTTSO's success stories—successes garnered in the constant effort to be prepared in the combating terrorism domain.

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U.S. Air Force photo by Master Sgt. Michael O'Connor

Combating Terrorism Technical Support Office



COMBATING TERRORISM TECHNICAL SUPPORT OFFICE

OVERVIEW

Identify requirements to combat terrorism and provide solutions to warfighters, first responders, and other frontline users as rapidly as possible.



The Combating Terrorism Technical Support Office (CTTSO) is charged with providing a forum for interagency and international users to discuss mission requirements to combat terrorism, prioritize those requirements, fund and manage solutions, and deliver capabilities.

The CTTSO accomplishes these objectives through rapid prototyping of novel solutions developed and field-tested before the traditional acquisition systems are fully engaged. This low-risk approach encourages interdepartmental and interagency collaboration, thereby reducing duplication, eliminating capability gaps, and stretching development dollars. This unique "left of POM" process for rapidly delivering capabilities allows the Department of Defense and interagency acquisition systems and Programs of Record to identify successful capabilities and incorporate them into budget cycles without the risk of long-term development efforts.



COMBATING TERRORISM TECHNICAL SUPPORT OFFICE

ORGANIZATION

The Assistant Secretary of Defense for Special Operations/Low-Intensity Conflict (ASD (SO/LIC)) established CTTSO in 1999 to consolidate its research and development programs previously administered by the Office of the Assistant Secretary of Defense (Command, Control, Communications and Intelligence). The research and development effort that supports the interagency Technical Support Working Group (TSWG) was the first program to transition to CTTSO. The Explosive Ordnance Disposal/Low-Intensity Conflict (EOD/LIC) Program, which develops advanced technologies for Joint Service EOD and Special Operations Forces (SOF) missions, transitioned in 2001. In 2007, the Irregular Warfare Support (IWS) Program was initiated to satisfy a growing need to improve the capacity of the United States to counter insurgencies and fight an irregular war.

INTERNATIONAL PROGRAM

Most terrorist acts are not solely planned and executed in one country. To defeat an international threat, CTTSO has since 1993 pursued international cooperation, where appropriate, to accomplish its mission.

CTTSO cooperates with governmental organizations in Australia, Canada, Israel, Singapore, and the United Kingdom, all of which have the ability, like CTTSO, to reach to the whole of government including military, security services, and first responder organizations. These agreements allow projects that go beyond data exchanges to cooperative development, ensuring a broadly-scoped program with worldwide impact. The results of this cooperation are not only high-quality products and increased communication with key global partners, but also the creation of a global antiterrorist environment.





U.S. Army photo by Spc. Tia Sokimson

Technical Support Working Group



TECHNICAL SUPPORT WORKING GROUP

HISTORY AND MISSION

In April 1982, the National Security Decision Directive 30 assigned responsibility for the development of an overall U.S. policy on terrorism to the Interdepartmental Group on Terrorism (IG/T), chaired by the Department of State (DOS). TSWG was an original subgroup of the IG/T, which later became the Interagency Working Group on Counterterrorism (IWG/CT). In its February 1986 report, a cabinet level Task Force on Counterterrorism—led by then Vice-President Bush—cited TSWG as assuring “the development of appropriate counterterrorism technological efforts.”

Today, TSWG still performs that counterterrorism technology development function as a stand-alone interagency working group. TSWG’s mission is to identify and prioritize the needs of the national interagency community through research and development programs for combating terrorism requirements. TSWG delivers capabilities to those on the front lines through rapid research and development, test and evaluation, while providing operational support. TSWG incorporates available expertise and experience from government, commercial, private, and academic sources throughout the United States and the world.

TSWG initiates efforts to influence longer-term research and development initiatives; and, reflecting the shift to a more offensive strategy, balance its technology and capability development efforts among the four pillars of combating terrorism: antiterrorism, counterterrorism, intelligence support, and consequence management.

ORGANIZATION AND STRUCTURE

TSWG operates under the policy oversight of the Department of State’s Coordinator for Counterterrorism and the management and technical oversight of the Department of Defense Assistant Secretary of Defense for Special Operations and Low-Intensity Conflict. While TSWG’s core funds are derived principally from CTTSO and DOS, other departments and agencies contribute additional funds and provide personnel to act as project managers and technical advisors. TSWG has successfully transitioned capabilities to the Departments of Agriculture, Defense, Homeland Security, Justice, State, and Treasury; the Public Health Service; and many other departments and agencies. Additionally, TSWG has transitioned many systems to state and local law enforcement. TSWG membership includes representatives from more than 100 government organizations. Participation is open not only to federal departments and agencies, but also to first responders and appropriate representatives from state and local governments and international agencies. These departments and agencies work together by participating in one or



DoD photo by Petty Officer 3rd Class Trevor Welsh, U.S. Navy



U.S. Navy photo by Mass Communication Specialist 2nd Gary Granger Jr.

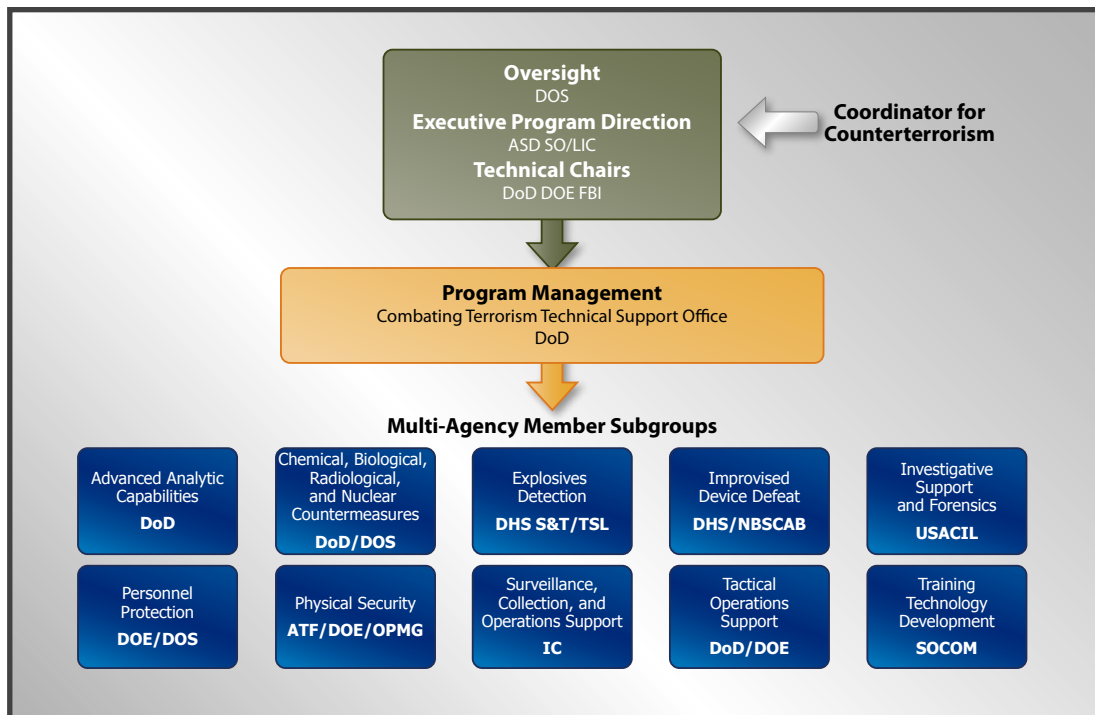


U.S. Army Photo by Sgt. Gustavo Olgiasi

TECHNICAL SUPPORT WORKING GROUP

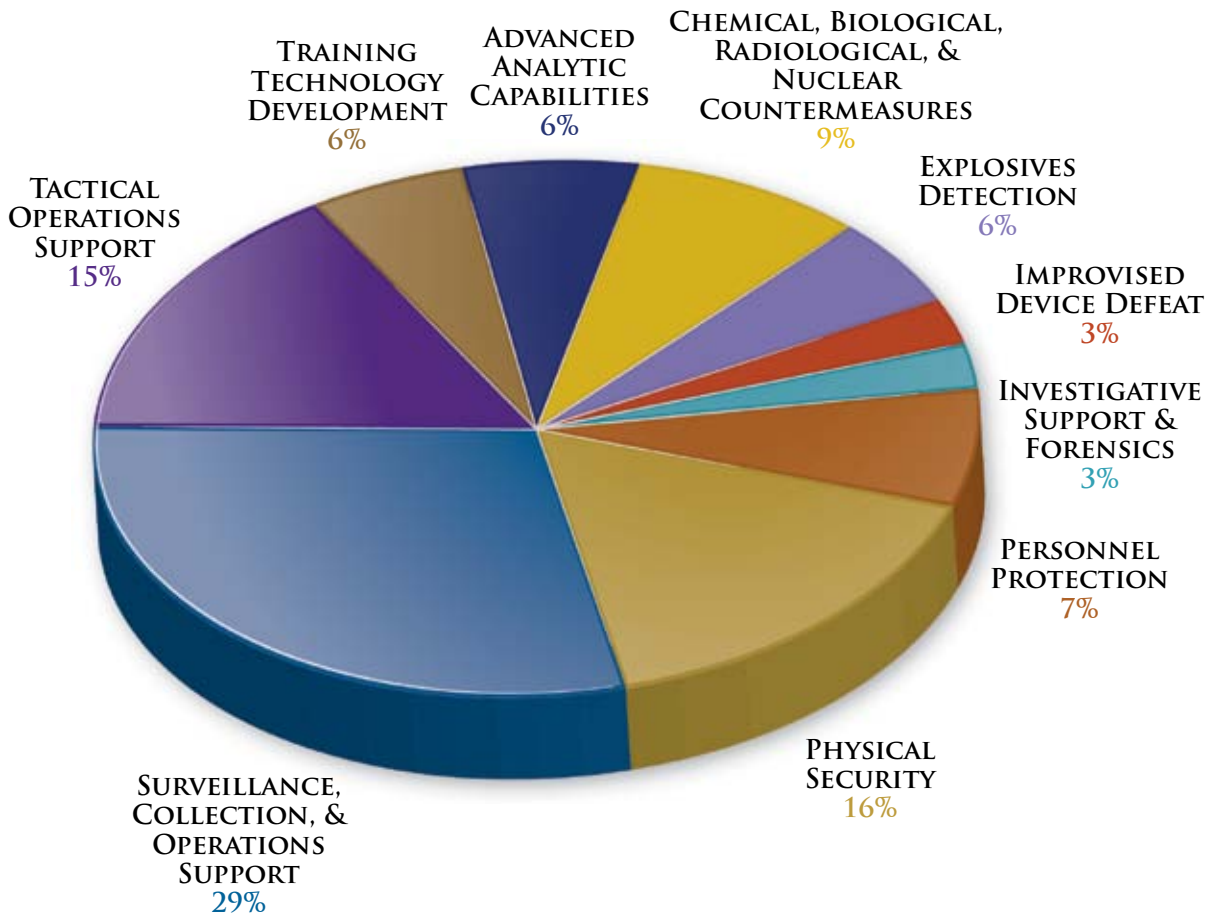
more subgroups. A comprehensive listing of member organizations is provided in the appendix.

TSWG's subgroups are chaired by senior representatives from federal agencies with special expertise in those functional areas. Chairmanship of ten subgroups is shared as indicated in the organizational chart below.



TECHNICAL SUPPORT WORKING GROUP

TSWG FY 2011 PROJECT FUNDING (\$123 MILLION)





U.S. Army photo by Sgt. 1st Class Mark Burrell

Technical Support Working Group Subgroups





Advanced Analytic Capabilities



ADVANCED ANALYTIC CAPABILITIES

MISSION

Identify, prioritize, and execute research and development projects that satisfy interagency requirements to improve sense making, decision making, and data management for counterterrorism, counterinsurgency, stabilization/reconstruction missions, and cyber defense. Focus on the development and integration of analytic tools and associated processes at the tactical level and its operational level interface.

FOCUS AREAS

Integrated Analytic Platforms

Develop and deploy robust integrated platforms to enhance analysis of diverse and disparate data sources to support decision making and planning. These platforms shall enable a variety of analytic tools and methods to be readily interoperable with each other and with supporting data sources. Integrate analytic tools into existing military operational platforms, both forward deployed and reach back capabilities, to facilitate the appropriate interaction, exploration and visualization of key elements. Develop infrastructure to facilitate secure collaboration and fusion among and between analysts and forward deployed operators in real time.

Decision, Planning, and Analytical Tools

Develop tools and models that provide analytic rigor to the military and interagency planning and decision making process for counterinsurgency and counterterrorism operations and campaigns. This includes decision support tools that will enable operators and planners at the operational and tactical levels to better understand the operational environment, evaluate first and higher order effects of alternate courses of action, and enable near real-time decisions within the context of the mission.

Cyber Defense Applications

Support sustained operations through development and fielding of enhanced layered defensive capabilities by anticipating and avoiding threats through understanding the cyber situation, anticipating adversarial actions, assessing potential impacts, and by implementing defensive methodologies.

SELECTED COMPLETED PROJECTS

TYTON

TYTON is a Human Social Cultural Behavior (HSCB) supported toolset designed to help analysts address operational questions by exploring large, disparate datasets and discovering non-obvious relationships within them. It is comprised of modular configurable tools that address operational questions faced by fusion cell analysts. Originally these tools were developed as a disparate set of tools developed ad hoc by



ADVANCED ANALYTIC CAPABILITIES

an innovative fusion cell supporting U.S. Special Operations Command (SOCOM) but were not readily usable by other fusion cells and analysts. This project refined the tools so that they were user-friendly, data agnostic, and accredited. TYTON has more than 1,000 registered users in more than 27 agencies. An ongoing interest in expanding the accessibility, use, and application of TYTON exists.

SELECTED CURRENT PROJECTS

Virtual Oversight Console and Response System

mPedigree Network of Accra, Ghana, was selected as the winner in the start-up category in the 2010 Global Security Challenge. The innovative company has pioneered a security system for detecting and defeating criminals or terrorists from penetrating the legitimate supply chain to substitute counterfeit items of commerce such as spare parts, software, or medicines. The system is elegantly suited to austere and low-resource environments requiring only available basic mobile phones capable of SMS text messaging.

The mPedigree Goldkeys® technology is currently providing pharmaceutical companies in Africa with cloud computing based tools, developed jointly with Hewlett Packard, to mark each package of medicine with a unique code and hide it from plain view with a scratch-off strip. Consumers reveal the code by removing the strip and then text message it to a universal shortcode in a growing number of African countries including Ghana, Nigeria, Kenya, Tanzania, and Uganda. Efforts are also underway to make the service available in India and other Asian countries. The text message is free, and phones, even those with no airtime credit, can be shared amongst pharmacists and patients within the community. Consumers receive a response on their phone within an average of 20 seconds that confirms the originality of the pharmaceutical and provides essential information about the drug such as its true expiration date and batch number.

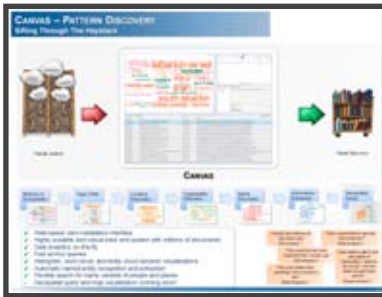
The TSWG project develops network monitoring tools to support the growing number of telecom partners to ensure that mPedigree Network has the capabilities to maximize the benefits to promote positive public health outcomes and address other supply chain security challenges.

Canvas

Canvas is a high throughput, dynamic visualization tool that analysts will use to filter millions of messages on the fly to identify unexpected relationships. Canvas allows the analysts to add and remove concepts (entities or context) from the visualization. Canvas uses data discovery and advanced visualization to suggest non-obvious relationships among large, complex, multi-intelligence source data sets and allows insightful context configurations to be shared and re-used, creating domain specific filters and theme discovery by analyzing and visualizing large amounts of



ADVANCED ANALYTIC CAPABILITIES



text. Canvas is built on a cluster of computers working together to solve large problems just like Google, Amazon, and Yahoo. Users interact with it through a Web browser.

After the first spiral of development in collaboration with a fusion cell supporting SOCOM, several agencies requested additional refinements including the addition of a geospatial capability. AAC has initiated work on adding the geospatial capability, and other groups are focused on improving the ability of Canvas to use unstructured and structured data sets.

Modeling Information Propagation

Military Information Support Operations (MISO) practitioners require the ability to understand how information moves through a population to a specific target audience, as well as the possible range of effects on their attitudes, beliefs, and actions. MIMEO aids planning and analysis in influence operations through the application of advanced modeling techniques and technologies. In the first year, work focused on identification of advantageous social science theories and design and development of techniques that allowed naïve operators to apply them in influence operations planning. The visualization developed for MIMEO was also incorporated into Susceptibility and Vulnerability Analysis Tool (SAVANT), a MISO tool that is being trained to all MISO users and being incorporated into a program of record. These improvements to MIMEO are assisting in an active transition pathway to SAVANT. A more rigorous modeling effort is underway to attempt to develop detailed models and techniques that can be applied to assist with analysis. The developer is also working with the TRADOC Analysis Center to develop mechanisms, scenarios, and tools that allow them to include influence operations in their Irregular Warfare Tactical Wargame (IW TWG). These will be subjected to full-scope trial and study in the FY11 iteration of the IWTWG with the goal of complete integration in FY12.

Integrated Fusion and Analysis Platform

U.S. analysts in Afghanistan lacked analytic tools to properly support analysis of massive amounts of data to provide their commanders with a comprehensive understanding of the highly complex and dynamic counterinsurgency environment within which they operate. Key pieces of critical information were lost in the reams of data and omitted from assessments, resulting in a lack of full understanding of the operational environment and enemy.

Palantir is the commercially developed software technology that was selected and is currently used by major financial institutions, industry, and several government agencies for a variety of applications. Palantir combines several analytical functions (data-mining/research, link-analysis, geospatial and temporal context) into one platform. It does this with a user interface that is intuitive, easy to learn, and easy to use, even by inexperienced operators in austere environments. CTSO

ADVANCED ANALYTIC CAPABILITES

worked with several organizations to deploy a system in theatre that incorporated disconnected laptops at the lowest tactical level, regional nodes, and reach back for training and support in the U.S. while allowing data to be transferred to all parties in a collaborative environment. A ruggedized expeditionary version was also field tested. USMC and SOF users report significant time savings in their analytical workflows due to Palantir. The CTTSO is also supporting the National Assessment Group, which is conducting an ongoing independent capability assessment of the technology.



CONTACT INFORMATION

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ADVANCED ANALYTIC CAPABILITIES



Chemical, Biological, Radiological, and Nuclear Countermeasures



CHEMICAL, BIOLOGICAL, RADIOLOGICAL, AND NUCLEAR COUNTERMEASURES

MISSION

Identify, prioritize, and execute research and development projects that satisfy Department of Defense, interagency, state, and local user requirements to counter the terrorist employment of chemical, biological, radiological, and nuclear materials.

The Chemical, Biological, Radiological, and Nuclear Countermeasures (CBRNC) Subgroup identifies and prioritizes multi-agency user requirements and competitively seeks technological solutions for countering the terrorist employment of CBRN materials. Through its participation in the InterAgency Board for Equipment Standardization and Interoperability and in coordination with the Department of Homeland Security, the National Institutes of Justice, the Environmental Protection Agency, and other Department of Defense components, the CBRNC Subgroup integrates technology requirements from the fire, hazardous materials, law enforcement, and emergency medical services communities into its process.

FOCUS AREAS

The CBRNC focus areas reflect the prioritized requirements of the CBRN incident prevention and response community. During FY 2011, these focus areas were:

CBRN Attribution

Develop tools to determine the origin of a piece of CBRN evidence to a high degree of scientific certainty to the exclusion of all other sources. Evaluate methods for the improvised production of CBRN threats. Provide information resources and decision support tools to assist with the evaluation and attribution of CBRN evidence.

Consequence Management

Advance equipment to counter the release of CBRN materials, to include short- and long-term decontamination and restoration.

Detection

Improve the sampling, detection, and analysis of CBRN threats in air, water, food, soil, and on surfaces. Develop new and innovative solutions to increase sensitivity and specificity, decrease response time, reduce false positives, harden detectors, decrease overall cost, and increase ease of use for CBRN sensor technologies. Detection efforts are coupled with the development of novel sampling and analysis methods.

Information Resources

Integrate shared information management tools to provide on-scene situational awareness. Facilitate the integration of diverse emergency and consequence management elements from federal, state, and local agencies. Develop tools for efficient modeling of CBRN material behavior

CHEMICAL, BIOLOGICAL, RADIOLOGICAL, AND NUCLEAR COUNTERMEASURES

in indoor and outdoor environments. Expand and enhance decision support and emergency response tools to assist on-scene commanders with informed decision making to enable optimization of workloads. Study lethal dose and agent behavior in diverse food matrices for high-consequence agents. Develop tools for efficient modeling of foreign animal disease and zoonotic outbreaks.

Protection

Operationally enhance individual and collective protection performance while reducing cost. Develop and enhance personal protective equipment, clothing ensembles, and respiratory protection systems. Develop decision support tools to allow operators to make protective equipment decisions based on field-generated physiological data. Develop architectural threat assessment tools for CBRN protection for building engineers and architects. Develop and evaluate advanced filter materials. Develop communications tools for disaster situations. Develop tools to enable sheltering-in-place and evacuation.

SELECTED COMPLETED PROJECTS

HME Precursor Wet Chemistry Identification

Improvised labs may produce a variety of different end products from drugs to explosives. The identification of precursor materials can distinguish unlabeled and potentially toxic or dangerous compounds for disposal or evidence collection. Current wet chemistry kits are labor intensive and complex in their use. CET, LLC developed a simple, compact wet chemistry kit to identify classes of compounds that may be found in improvised laboratories. The steps for sampling to detection are being minimized to improve the ease of use for general purpose forces as well as allies. The kit will provide improved detection times and accuracy as opposed to available colorimetric systems. Prototype kits have been delivered and will undergo test and evaluation at the Navy Explosives Ordnance Disposal Technology Division prior to operational testing.



Best Practices Guide for Mail Screening and Handling

Government mail center managers face a wide range of mail-borne threats on a daily basis. As such, they needed a comprehensive and concise "Best Practices" manual. The manual developed will help agencies choose and implement the right technology and screening processes necessary to protect their facilities and their mail center personnel. Pitney Bowes Government Solutions and its teaming partner, Clovis Point Solutions, LLC led an effort to develop the Best Practices Guide based on an analysis of the existing literature on mail screening and handling, interviews with key government and industry experts, and onsite audits/examinations of existing mail screening facilities. The Best Practices Guide includes chapters that examine risks in government mail streams; technologies, facilities, and processes to combat risks; training requirements for mail center personnel; and emergency response procedures. The guide also



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includes copies of key regulatory requirements, a risk matrix to help identify the appropriate handling and screening approach for a given location, and a series of short case studies to help mail center managers better understand the approaches being illustrated throughout the guide. The guidebook received the Department of Homeland Security's Interagency Security Committee's seal of approval and is available for purchase through the Government Printing Office.



Ultra Low Profile Escape Mask

The Institute for Applied Science developed a working prototype Ultra Low Profile Escape Respirator that can easily fit inside a jacket breast pocket or handbag or be worn inconspicuously on a belt. In its packaging, the Ultra Low Profile Escape Respirator (ULP Hood or Mask) can be easily and inconspicuously carried on the person to be readily available for escape from a hostile environment in an emergency situation. The ULP Hood is intended for use by the general adult working population (one-size-fits-all/no fit testing) to provide protection from CBRN materials identified as inhalation hazards in the event of fire or terrorist emergencies. The device has been designed to meet European certification requirements for Respiratory Protective Devices for Self-Rescue and U.S. NIOSH CBRN air purifying escape respiratory protection requirements for TSWG specified toxic agents.

The ULP Hood is an individual protection device intended to provide respiratory and ocular protection in the event of an overt chemical or biological attack or other emergencies. The mask is for short duration use to escape from an area of known or suspected contamination. The mask is designed to provide protection for a general population of adults who may wear eyeglasses, have beards, long hair, or other characteristics that may preclude use of military style tight-fitting masks. The escape mask is vacuum packaged for storage until time of use with explicit and easy to understand instructions. Donning time is less than 30 seconds. A low cost training version of the mask with distinct markings that states that it provides no protection can also be provided to familiarize the wearers with the donning procedures.



HVAC Carbon Filter Test Kit

ASZM-TEDA-Carbon filters are widely used in building HVAC systems, including in many government buildings. These filters are expensive, and managing building operations requires an assessment of both filter performance and remaining life before costly replacement filters will be needed. Ensuring appropriate protection of building occupants requires filter testing that can in itself be expensive and time consuming. CET, LLC developed a rapid test system for determining remaining filter life. The use of a bypass filter with standard carbon filter beds allows for representative samples to be analyzed without interaction with the main filter system. The bypass filters can be inserted directly into the filter test kit and analyzed for both physical and chemical adsorption properties of the carbon to assess remaining life.

CHEMICAL, BIOLOGICAL, RADIOLOGICAL, AND NUCLEAR COUNTERMEASURES

Multipurpose Threat Glove

To protect public safety officers during routine tasks, Warwick Mills, Inc. designed a multipurpose glove that protects against cuts, punctures, and pathogen threats. The gloves are slip-resistant but are thin and pliable enough to retain manual dexterity. They resist degradation over time and remain operational in extreme temperatures, humidity, salinity, and UV conditions. The gloves are also machine-washable and can be decontaminated on site and reused. A chlorine-based treatment provides the ability to kill pathogens in the glove. This capability is easily recharged by the user with a chlorine wash as part of routine care and maintenance actions. The gloves are compatible with existing commercial and military-issued duty uniforms.



SELECTED CURRENT PROJECTS

Person Portable Gas Chromatograph–Mass Spectrometer

Civil and Department of Defense first responders may choose from a wide array of relatively simple technologies to detect the presence of chemicals. However, most current technologies are not capable of accurate identification in a complex environment or cannot accurately measure airborne chemical concentrations for initial risk assessment. Gas chromatography-mass spectrometry has long been a gold standard for analysis of unknowns, but field-portable gas chromatograph-mass spectrometer (GC-MS) instruments have lacked in detection capability and easy operability for technician level users. Smiths Detection and Torion Technologies have developed a person-portable GC-MS with 20 percent reduced size over currently fielded systems, lower power consumption, and extended battery life. A companion handheld air sampler for quantitative sampling and analysis in field operation environments is in development. The total analysis time is less than four minutes for qualitative screening, and the combined sampling and analysis time for quantitative air sampling at the single digit part-per-billion level is expected to be ten minutes.



Portable Orthogonal Detection Device for Toxic Industrial Chemicals

Detection and identification of chemical threats is a continuing problem for military, security, and emergency responder personnel. No single detection technology has proven capable of reliably detecting all threats. Some detection schemes are very sensitive but have little or no selectivity and are prone to false alarms. Other schemes are very selective but require high concentrations of the analyte to give a reliable analysis. In an effort to streamline operations and reduce overall cost, teams require fewer detectors to meet the varied detection needs. The orthogonal detector must have the capability to provide a secondary confirmation for chemical identification based upon an orthogonal detection technique. This capability will greatly reduce the false positives found in field operations.

CHEMICAL, BIOLOGICAL, RADIOLOGICAL, AND NUCLEAR COUNTERMEASURES



For gases and vapors, the portable, handheld Orthogonal TIC Detector (OTD) system will combine photoionization detection and electrochemical detection with the optical engine based on Ahura Scientific's gas-phase Fourier-transform infrared spectrometer TruDefender FTG. The system will also include sensors for lower explosive limit and oxygen. Software on OTD will use data from all of the detectors to set calibrations and to validate the analysis. A separate detector for solids and liquids—the portable, handheld Dual Wavelength Raman system—will include the 785-nanometer Raman optical engine based on Ahura Scientific's FirstDefender RM and a new, longer-wavelength (greater than 1,000 nanometers) Raman optical engine for more effective analysis of fluorescent materials.

Onboard chemometrics will process the output of the sensor array in conjunction with the vibrational spectrum, providing detection, identification, and quantification of hundreds or thousands of chemical vapors. The utility of the portable orthogonal detectors will be greatly enhanced with the addition of wireless communication and GPS location.

Noise Cancelling SCBA

Current self-contained breathing apparatus (SCBA) systems are hampered by poor intelligibility of the speech signal. This limitation in communications is a significant safety hazard for first responders and military personnel operating in environments where SCBA use is necessary. Sound Innovations is developing a wireless earpiece capable of providing in-ear voice pickup and communication delivery and the associated printed circuit board (PCB) for incorporation into the communication systems of SCBA manufacturers. The PCB shall supplement the existing SCBA microphone signal with the in-ear microphone signal to provide the highest-intelligibility signal possible.

Personal Hydration Desalination Water Filter

The need for processing brackish and saltwater into potable water has been a long standing challenge for military forces. For emergency survival needs, the challenges of desalination are further compounded by factors like speed, power, weight, and volume. Technologies that utilize electrical and mechanical pumps are not ideal for many operational environments, while other chemical pumps are slow and inefficient. Cascade Designs is developing a gravity filtration system for desalination that will provide enough water for emergency survival in an operational environment. The water filter will render saline water safe for human consumption in accordance with Environmental Protection Agency and Department of Defense drinking water standards. The filter will be small, lightweight, quiet, and require no power or pumping action while providing enough water rapidly for 24 hours of emergency operations.

CHEMICAL, BIOLOGICAL, RADIOLOGICAL, AND NUCLEAR COUNTERMEASURES

Next Generation CB Garment

Due to the current operating environment, the need exists for a personal protective ensemble providing reduced thermal burden at the weight of current CB protective ensembles that will enable the users to more effectively conduct missions while continuing to maintain percutaneous protection against chemical warfare agents and toxic industrial chemicals (TICs) in traditional and catastrophic environments. The new garments are necessary to maximize operational performance, individual protective capability, and effectiveness by minimizing the effects of physiological stressors associated with sustained operations with strenuous physical activity while wearing protective garments. Associated increased mobility, increased environmental contaminant performance, and enhanced individual endurance is facilitated by reduced garment weight, bulk, and thermal burden.

W. L. Gore and Associates, in partnership with Lion Apparel, is developing a garment that will provide National Fire Protection Association (NFPA) 1994, Class 3 protection while providing a reduction in thermal burden similar to that provided by a standard station/combat uniform. The garment is capable of being worn unobtrusively. The garment will provide extended mission tailored percutaneous protection from exposure to the harmful effects of all traditional CB warfare agents and the TICs listed in NFPA 1994 and will be capable of integrating with a variety of protective gloves, overboots, Self-Contained Breathing Apparatus/Powered Air Purifying Respirators and the M53/FM53 masks to ensure whole-body protection. The garment design does not interfere with the performance of routine and emergency mission duties. The material solution is capable of operating in temperature and humidity extremes and will be capable of withstanding salt spray, rain, sand, dust, sweat, oil, and other contaminants.

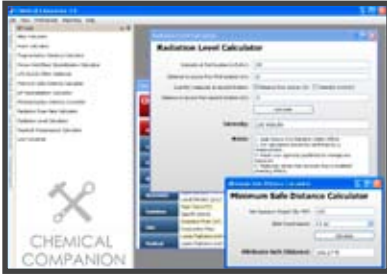


SELECTED PROJECT UPDATES

Chemical Companion Decision Support System

On June 27, 2011, the CBRNC Subgroup and the Georgia Tech Research Institute released version 3.0 of the Chemical Companion Decision Support System (CCDSS) software. The program is developed in partnership with the Marine Corps Systems Command and the Department of the Prime Minister and Cabinet in Australia. This resultant product is available at no cost to local, state, and federal response elements within the United States and partner countries and is currently in use by more than 800 departments or agencies. Version 3.0 of the CCDSS includes data on more than 2,000 chemical threats including physical properties, exposure standards, emergency medical protocols, emergency action guidelines, and personal protection equipment. The interactive tools added in version 3.0 include a radiation dose rate calculator, a radiation level calculator, a pH neutralization calculator, a known acid/base

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neutralization calculator, unit convertors, a photoionization detector response calculator, a firefighting foam calculator, and a blast calculator. The blast calculator also includes a minimum safe distance calculator, a fragmentation calculator, and a residual overpressure calculator. The system also allows chemical searches based upon observable symptoms, observable characteristics, respirator cartridge appearance, and the use of specific personal protective equipment.

The modules incorporated within the tool are vetted during biannual user meetings within the United States and Australia. The CCDSS program runs on a spiral development cycle and incorporates data gathered from a variety of other CTTSO programs. The system is classified as For Official Use Only and is available at www.chemicalcompanion.org. Version 4.0 is slated for release in December 2011 and will incorporate new tools for evidence prioritization and IED characterization.

CB Tactical Boot

The CBRNC Subgroup, working with North Carolina State University, Falcon Footwear, Globe Firefighting, and W. L. Gore & Associates, Inc. recently completed the development and certification of an enhanced performance tactical boot with integrated chemical and biological protection. The boot was developed in partnership with the United States Marine Corps Systems Command. The resultant product is the only certified leather CBRN boot in the world. The CB Terrorism Footwear Element (Class 2) was certified by the Safety Equipment Institute on June 1, 2011 in accordance with the requirements of NFPA 1994 (2007 Ed.) Standard on Protective Ensembles for First Responders to CBRN Terrorism Incidents. The project team is evaluating the longevity of the new boot design to provide users with a realistic timeline for replacement. The fully deconable boot was designed to enhance user comfort and tactical response capabilities in a CBRN environment. The boot will be commercially available from Globe Firefighting and Falcon Footwear.



CONTACT INFORMATION

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Explosives Detection



EXPLOSIVES DETECTION

MISSION

Identify, prioritize, and execute research and development projects that satisfy interagency requirements for existing and emerging technology in explosives detection and diagnostics. Emphasis is placed on a long-term, sustained approach leading to new and enhanced technology for detection and identification of improvised explosive devices, including vehicle-borne devices.

FOCUS AREAS

The Explosives Detection (ED) Subgroup focus areas reflect the prioritized requirements of a broad range of interagency customers, including those responsible for incident response, physical security, and forensic analysis. During FY 2011, these focus areas were:

Chemical and Physical Characterization

Produce and analyze chemical and physical scientific information to expand the fundamental understanding of threats. Investigate and identify unique physical and chemical characteristics to enable detection of homemade, military, and commercial explosive capabilities and limitations of sensor technologies. The information provided will allow better focus on the selection of new technology and the optimization of existing technology for explosive detector development. This will deliver new or improved explosive detection capabilities to current and future programs within the explosives detection community.

Enabling Technology Development

Develop enabling technology to detect energetic materials and explosive precursors. Advance technologies that address capability gaps for the detection and diagnosis of person- and/or vehicle-borne improvised explosive devices (PBIED/VBIED). Areas of concern are detection rate, variability of content, safety, and impact on stream of commerce.

Bulk and Trace Explosive Detection Performance Development

Develop new capabilities and improve existing systems for quick improvements in the detection and identification of explosive threats. Improve the detection rate and accuracy of commercial and near-commercial detection systems.

Test and Evaluation

Conduct rigorous independent assessments to confirm the detection capability and performance of commercial and prototype systems. Evaluate the performance of new systems to assure that the needs of the warfighter are met.

EXPLOSIVES DETECTION

SELECTED COMPLETED PROJECTS

Rapiscan Ruggedized Detection Portal

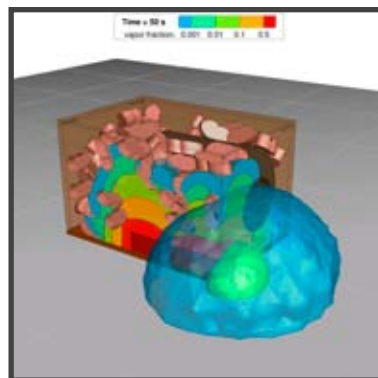
The challenge in detecting explosive devices hidden on a person is the ability to detect and differentiate organic and inorganic threats. Rapiscan Systems has developed and marketed a backscatter X-ray imaging system—the Secure 1000® Personnel Screening System—for detection of explosives, guns, knives, and other organic and metallic threats that may be hidden on a person's body. Backscatter X-ray imaging is a well-established technique for the non-intrusive inspection of vehicles and personnel. The Secure 1000® technology was adapted to produce a rugged, modular system for the detection of concealed explosives that is easily transportable and operable day and night, indoors and outdoors, and in all types of weather conditions. Enhancements were also made to the detection software to provide improved automated detection capabilities and to increase ease of detection by security personnel.



SELECTED CURRENT PROJECTS

Characterization of Flow Dynamics of Vapor in Cargo

Although canines are considered highly effective detection tools, many poorly understood factors remain in the effective use of canines for cargo screening. These include the identification of the actual chemicals that drive canine response as well as an understanding of the transport of vapors from typical cargo types to a point outside of the cargo container or palette. This project characterizes the chemical signatures and flow dynamics of vapor emanating from cargo including experimental measurement and modeling for cargos in various form factors. Analyses also include compositional and reference chemical signatures of military grade and homemade explosives, additives, and trace signatures to the extent of what can be detected with respect to both explosives and benign materials in cargo.

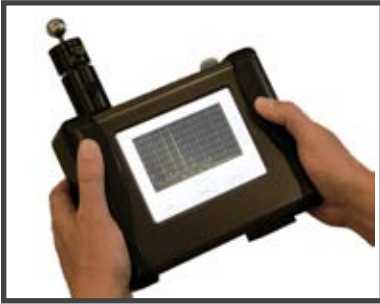


Multi-Barrel Colorimetric Fertilizer Identifier

The use of agricultural fertilizers as precursors to improvised explosives is of great concern to the U.S. military in Afghanistan or in the current theatre of operations. Most common fertilizers contain nitrogen, either in the form of ammonium nitrate or urea nitrate. Visually discerning an unknown white powder, such as ammonium or urea nitrate, is difficult or often impossible without expensive, bulky, laboratory grade equipment. A need exists for a simple, robust field test that provides the layman with a high degree of accuracy and low false positives to distinguish between these components. This multi-barrel kit will be an easily deployable and disposable tester that will allow troops in the field to rapidly identify fertilizers and categorize the fertilizers as to their possible use in making homemade explosives.



EXPLOSIVES DETECTION



Mini 1029 Raman Spectrometer

Delta Nu, with assistance from a range of organizations across industry and government and building on previous collaborations between the CTTSO and the United Kingdom, was tasked to construct and optimize a next generation mini-handheld Raman material identification instrument. This spectrometer utilizes a 1029 nanometer laser, which results in fewer fluorescence issues compared to the commonly used industry standard wavelengths such as 785 nanometers. Enhanced sensitivity and extended battery life due to advanced sensor technology have been included in the system. A prototype system will be available for operational assessments upon completion.



Improved 250 GHz Camera Technology

ThruVision Systems has commercially marketed a 250GHz camera designed to identify concealed contraband on the body by anomaly detection. This project significantly improved upon their current technology by better understanding the parameters and constraints that govern system performance and also by developing the technologies that underpin many of the key system components. The resulting prototype will be a tripod mounted system capable of discreet deployment in a fixed position. A real-time image is available to the operator in both the visible and THz region (250 GHz) of the electromagnetic spectrum.

CONTACT INFORMATION

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CTTSO photo by Dr. Edwin A. Bundy

Improvised Device Defeat



IMPROVISED DEVICE DEFEAT

MISSION

Identify, prioritize, and execute projects that satisfy mission critical needs and address interagency requirements for advanced technologies to safely and effectively defeat improvised terrorist devices.

The Improved Device Defeat (IDD) Subgroup delivers advanced technologies, tools, and information to increase the operational capabilities of the U.S. military explosive ordnance disposal (EOD) community and federal, state, and local bomb squads to defeat and neutralize terrorist devices. In collaboration with military, federal, state, and local agencies, the IDD Subgroup identifies and prioritizes multi-agency user requirements through joint working groups and thorough validation processes.

FOCUS AREAS

The IDD Subgroup focus areas reflect the joint priorities of military and civilian responders. During FY 2011, these focus areas were:

Device Defeat

Develop advanced technologies to defeat the broad spectrum of improvised terrorist devices to include improvised explosive devices (IEDs), vehicle-borne IEDs, person-borne IEDs, and enhanced hazard devices containing chemical, biological, or radiological materials. Develop innovative, cost-effective disruption and precision render safe solutions that increase standoff distance, reduce collateral damage, and decrease risk to the improvised device defeat operator. Improve neutralization techniques for both sensitive and insensitive explosives and enhanced payloads such as flammable liquids and gases.

Identification and Diagnostics

Advance the capability of improvised device defeat operators to interrogate unknown or suspect items and packages. Develop technologies to locate and identify improvised devices and enhanced fillers, and diagnose key fuzing and firing components. Develop tools to assist improvised device defeat operators in the identification of U.S. and non-U.S. ordnance and firing systems incorporated into or modified for use in improvised devices.

Emerging Threats

Advance production of effective countermeasures to neutralize or defeat radio-controlled IEDs and provide safe environments for improvised device defeat operators. Develop, characterize, and test technology solutions to effectively render safe improvised devices using novel fuzing systems that incorporate such items as electronic, sensor, microcontroller, or mechatronic¹ components.

1-Mechatronics adds intelligence to a mechanical design or replaces a mechanical design with an intelligent electronic solution. An example of a mechatronic component is the digital thermostat, which has replaced the much more inefficient mechanical thermostat. Digital thermostats are more accurate and are typically programmable, allowing for increased efficiency.

IMPROVISED DEVICE DEFEAT

Remote Procedures

Develop advanced application systems to remotely access, diagnose, and defeat improvised devices. Advance development of manufacturer- and model-independent products and robotics with plug and play interface. Develop open architecture, navigation, communication, and operator controls for robotic platforms, tools, and sensors.

Tool Characterization and Information Resources

Improve performance evaluation methodologies, test procedures, and tool characterization models for improvised device defeat technologies. Conduct ongoing evaluation and improvement of tools, methods, and protocols for confirming the accuracy of detection equipment, reliability of diagnostic tools, and completeness of neutralization and render safe techniques. Advance training concepts and information delivery systems that promote the tactical and operational response readiness required to effectively, safely, and efficiently counter improvised devices and emerging terrorist threats.

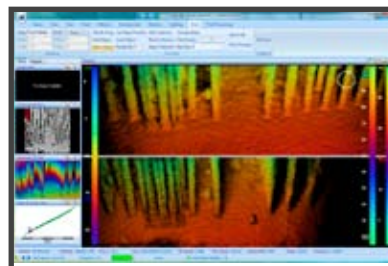
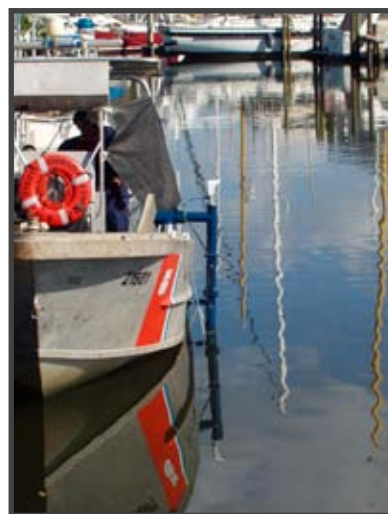
Maritime Security

Develop technologies to protect ships, boats, docking facilities, offshore platforms, shoreside loading facilities, power plants, bridges, and marine cables and pipelines from any form of terrorist attack, including waterborne and underwater IEDs. Develop and test technologies to include manned or unmanned long- and short-range sensors for detection and tracking; physical barriers and stopping devices; unmanned surface, underwater, and air vehicles; weapons; armor; life support; diving and underwater systems; and mammal systems.

SELECTED COMPLETED PROJECTS

Advanced Underwater Inspection System

The U.S. Coast Guard has the requirement to rapidly conduct daytime or nighttime searches for threats and parasitic attachments below the surface in low-visibility underwater conditions. The pole-mounted 3-D Underwater Imaging System (UIS) carries a 16,000 beam sonar head and provides a high-resolution 3-D underwater imaging capability for small boats traveling at 3 to 5 knots. UIS provides a detailed mosaic of underwater structures, anchoring systems, ship hulls, obstructions, and objects that may contain explosives or other threatening materials. Using Automatic Change Detection software, the UIS can cover 18,000 to 30,000 linear feet of bulkhead per hour and can log each inspection sweep for subsequent review and comparison. These systems provide a rapid underwater search capability that can be used for emergency response, such as natural disasters or terrorist threats, as well as for routine imaging of the 22,000 marine structures, which must be periodically inspected by the U.S. Coast Guard. The UIS is commercially available from Coda Octopus USA.



IMPROVISED DEVICE DEFEAT

Advanced Telescoping Manipulation System

The Advanced Telescoping Manipulation System (ATMS) was developed in 2010 for use in situations where robotic platforms could not be deployed and the EOD technician had to don a bomb suit and manually investigate the suspected improvised explosive device (IED). The requirement from theatre wanted the ATMS to allow the technician between 10 and 12 feet of safe separation distance away to interrogate a suspicious package and to be able to place a counter charge next to the IED. The ATMS is currently being evaluated by Headquarters Air Combat Command/A7XE, Langley Air Force Base, VA, and the Marine Detachment at Naval School Explosive Ordnance Disposal Technology Division, Indian Head, MD.



Carbon 10 Disruptor Evaluation

Military EOD technicians are often being utilized in foot-borne operations vice vehicle-borne operations where mobility is reduced due to the various types of terrain encountered. Since foot-borne operations require the EOD operator to physically carry his/her equipment, any reduction in size or weight (without a reduction in capability) of the equipment is very much desired. The Improvised Device Defeat (IDD) Subgroup has evaluated the Carbon 10 Disruptor and obtained Weapons Systems Explosive Safety Review Board Approval and Category 1 Approval for Explosive Ordnance Disposal Use through the Naval Explosive Ordnance Disposal Technology Division, Indian Head, MD. The Carbon 10 Disruptor is comprised of a 10-inch titanium barrel wrapped in carbon fibers and uses a standard T3 shock tube breech. This disruptor is significantly lighter at one and one half pounds and is physically smaller than the currently used Percussion Actuated Non-electric disruptor, the primary IED render safe tool. The Carbon 10 Disruptor will lighten the operator's load and enhance his capability in dismounted and air insertion operations.



Advanced X-ray Imaging Single-Sided System

The Department of Homeland Security and the National Institutes of Justice developed a capability that removes the Bomb Technician from harm's way while conducting X-ray diagnostics of suspect vehicle-borne improvised explosive devices. The Advanced X-Ray Imaging Single-Sided System (AXISS) is a non-invasive backscatter X-ray imaging system that can be deployed to the site of a suspected VBIED or suspicious package and used when only one side of the item is accessible to the bomb technician, security guard, or other force protection professional. The system can be manually or robotically employed to interrogate suspect packages. This allows the operator to view the X-ray images as they are displayed on the operator control unit of the robotic platform from the safe area at a safe distance from the potentially hazardous device. The X-ray pictures captured through this technology can then be used to assist bomb technicians identifying hazard areas and formulating a render safe procedure for disruption of the suspect device.

IMPROVISED DEVICE DEFEAT

Camera Blinder

The Camera Blinder system is capable of camera blinding or camera disabling for the use in standoff tactical situations where the presence of home security surveillance cameras present an unacceptable risk to tactical team members trying to breach a residence. The temporary blinding aspect of this system focuses a scanning beam over the surveillance camera iris, basically overloading the photo cathodes or photodiodes arrayed as pixels. The beam sweep will be set such that the camera will be re-blinded before it has a chance to recover from the first sweep. AMP Research teamed up with the Collier County Sheriff's Department Bomb Squad in Florida to test and evaluate this system throughout its development. This system has also been field evaluated by the Houston Police Department Bomb Squad.



SELECTED CURRENT PROJECTS

Advanced Diver Data Display Systems

The overall objectives of this effort are to leverage assets and capabilities to research and development efforts of the United States and the United Kingdom in the area of data display technologies for military divers and to provide for the manufacture and fielding of final production versions of such systems for both U.S. and UK military personnel. First, a summary transition status report will be developed on the current U.S.-developed diver mask-mounted display (MMD) system demonstrated and evaluated during U.S. and UK baseline technology assessments. This MMD technology transition meets a requirement for a portable, high-data content (sonar, video), standard interface data display for joint military divers. Next, a prototype Combat Diver Navigation Mask (CDNM) will be developed for joint service in-water testing and evaluation. This prototype CDNM mask will provide the diver's depth, time, and compass heading. Finally, a conceptual prototype full facemask data display system will be developed. This conceptual prototype should demonstrate simulated interface to a mixed-gas rebreather underwater breathing apparatus for joint service military dive missions.



Agile Wireless Ethernet

Nomadio's Agile Wireless Ethernet (AWE) radios use technology that provides long range, high bandwidth connections for delivering high speed audio, video, and general connectivity on the move where other radios cannot operate: urban environments through walls, vehicles, and elevators; desert scenarios over long distances; and jungle environments through dense foliage. Nomadio's sophisticated radio systems use the best and latest unique orthogonal frequency-division multiplexing mesh hardware and advanced networking software to provide unrivaled performance.

The Agile AWE is a lightweight, frequency agile system with support for two simultaneous two-by-two multiple-input multiple-output (MIMO)

IMPROVISED DEVICE DEFEAT



radios, mesh routing, and a pair of ethernet interfaces. Both radios output one-quarter watt per MIMO channel. MIMO is the best way to deliver range at lower power. The Agile AWE at one quarter watt and two-by-two MIMO can achieve greater range than single-input single-output one watt radios.

Characterization of Disruption Tools

VBIEDs have proven to be devastating terrorist tools in many regions of the world. Because of this, effective and efficient mitigation of a discovered intact vehicle containing a VBIED is a prime concern for bomb squads. Deployment of access and disablement tools that are either improperly undercharged or overcharged against a particular VBIED target array, or that have inappropriate functional characteristics for a particular target array can compound the situational hazards realized by the bomb technician. The High Energy Access and Disablement Device (HEADD) was characterized by Battelle Memorial Institute to be fed into the Tool Characterization Guide to be distributed to bomb squads across the country to assist in selecting the appropriate disruptor for the incident that they may be facing. The HEADD charge was designed to be used against IEDs in a large vehicle such as a panel van, a moving van, or a tractor trailer.



CONTACT INFORMATION

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Investigative Support and Forensics



INVESTIGATIVE SUPPORT AND FORENSICS

MISSION

Identify, prioritize, and execute research and development projects that satisfy interagency requirements for criminal investigation, law enforcement, and forensic technology applications in terrorism related cases.

FOCUS AREAS

The ISF Subgroup focus areas reflect the prioritized requirements of the military and civilian law enforcement communities. During FY 2011, these focus areas were:

Crime Scene Response

Improve the quality of recognition, documentation, collection, and preservation of evidence as well as the safety of first responders at a scene. Train first responders and forensic examiners and improve their capabilities to process and record terrorist incident scenes for future prosecution. Develop advanced technologies for the analysis of handwriting, verification of documents and forgeries, and document origin.

Electronic Evidence

Develop computer forensic hardware, software, decryption tools, and digital methods to investigate terrorism. Identify computer systems and media used by terrorists and extract the maximum amount of evidence from them. Develop advanced methods to extract and enhance audio recordings and video images from surveillance sources. Improve techniques for the analysis of electronic devices to obtain the most forensic information.

Forensic Biology and Chemistry

Develop analytical methods for biological evidence found at terrorist scenes to make identifications and extract the maximum information such as origin or age. Enhance the DNA and other person-specific identifiers to track, identify, or profile persons or other biological material. Use stable isotope ratios to determine the geographic origin of organic material. Improve chemical techniques for analyzing evidence and identifying materials used in explosive devices.

Fingerprint, Impression, and Trace Evidence

Improve and automate latent print and related biometric techniques used in terrorism cases. Create better visualization and development of fingerprint evidence, and support better understanding of the molecular content of print evidence as well as the scientific validation of fingerprint examinations. Develop and enhance methods for the recovery, comparison, analysis, and interpretation of small, often microscopic, fragments of materials that transfer between people, places, and objects during terrorist incidents. Improve methods to identify, collect, and

INVESTIGATIVE SUPPORT AND FORENSICS

analyze fibers, paint, glass, hair, soil, gunshot residue, and other trace evidence items. Enhance forensic capabilities to examine any impression evidence such as firearms comparisons, tool marks, and physical matches.

Surveillance and Information Gathering

Produce new advanced surveillance and tracking techniques for law enforcement. Improve voice identification and speaker recognition capabilities. Develop better credibility assessments, interviewing techniques, and related technologies. Improve information gathering and analysis techniques through technology, social interaction methods, and training.

SELECTED COMPLETED PROJECTS

Remote Viewer for Bullet Comparison

Analysis by forensic firearms examiners may critically affect criminal and terrorist cases domestically and on the battlefield. The need for firearms examinations is increasing. Yet, the number of firearms examiners remains limited, and they are located at forensic laboratories far from the crime scene or combat zone. Quantum Signal, LLC of Saline, MI, has developed a solution that remotely extends the range of the forensic firearms examiners. A motorized platform containing high quality optics and a comparison microscope allows an on-site person to mount bullets, shell cases, and other evidence. The device contains a communications system that permits a remotely located examiner to adjust and manipulate the evidence. All of the typically adjustable features of the microscope, such as zoom, focus, and lighting, are controlled through this interface. The examiner can completely analyze the markings and striations and perform a full examination. The persons at the remote site can rapidly receive the results of the examination. The new equipment enables a single firearms examiner to analyze evidence efficiently at a host of distant different locations, thereby saving critical time and resources. Additional information is available at <http://www.quantumsignal.com>.



Advanced Log Collector

Despite persistent and conscientious computer security efforts, terrorists still find ways to gain unauthorized access to computers and to steal sensitive information. Collecting data from computers to determine who, how, when, and what was accessed becomes critical and normally requires highly trained investigators or forensic scientists. In this project, ID Scientific of Las Vegas, NV, created a system to make the extraction and analysis of the data in these cases quicker, easier, and more complete than ever before. This new advanced computer forensic system can rapidly download stored data and RAM, determine the programs and running processes that were being used, identify passwords, and collect other data pertinent to the incident. Most significantly, the new system eliminates the need to have physical access to the targeted computer because it can remotely perform its capabilities and evidence collection



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via the Internet or a local area network. The advanced log collector can target any Windows, Mac, or Linux-based computer and is minimally invasive. Modules within the software thoroughly analyze the extracted raw data and transform it into easy-to-read reports. The software program is commercially available from the developer.

Trace Evidence from Blast Scenes – Best Practices

During investigations of terrorist-caused explosions, proper collection and processing of the trace evidence at the blast scene is critical to forensically developing the maximum information from the site. In addition to possibly identifying the responsible terrorists, the trace evidence can also characterize the type of explosive device and the materials used. Each scene presents its own challenges, and investigators have many factors to consider. Having access to the latest available information, research, and a well organized best practices guide is invaluable to those responsible for processing the blast scene. Analytic Services, Inc. (ANSER) researched and published a comprehensive reference that describes the best practices for the identification, collection, and preservation of trace evidence at blast scenes. The reference includes an explanation of the forensic examinations and tests that are available for the different types of evidence. This reference was used to produce a condensed ruggedized guide for trace evidence best practices that fits in the cargo pockets of military uniforms and is easily carried to blast scenes.



Improvised Explosive Device Defeat Tools Forensic Study

The first and primary concern of bomb technicians when encountering an improvised explosive device is to perform render safe procedures. However, these actions affect the forensic evidence that is present on the IEDs. For a long time, the effects of these procedures on IEDs were not fully known. Battelle Memorial Institute of Columbus, OH, conducted a statistically well-designed study to determine what exploitable evidence remains after the use of render safe tools on an explosive device. The research produced a report that allows bomb technicians to make informed decisions about what procedures and tools may be best to reduce the negative effects on evidence. Additionally, the final report provides what information and materials are required when submitting evidence to a forensic laboratory for examinations.



DNA Evidence Recovery from IEDs

Improvised explosive devices are often the weapon of choice for terrorists and continue to be responsible for many casualties. Getting the most evidence from post-blast debris is a difficult task. DNA evidence that often survives the blast provides great potential to identify those responsible for its manufacture and detonation. The Forensic Biology Laboratory of Michigan State University researched and analyzed the most effective methods to collect and analyze post-blast evidence for DNA analysis. Some of the key results were that swabbing may be



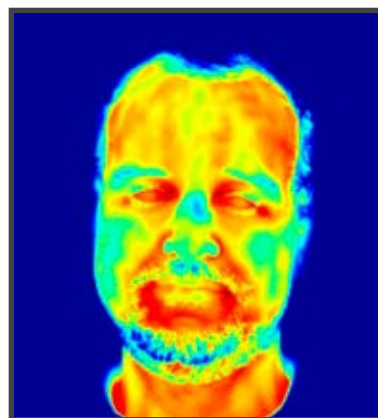
INVESTIGATIVE SUPPORT AND FORENSICS

the preferred method for DNA isolation; a standard organic extraction is effective for DNA purification; cyanoacrylate fuming for fingerprints does not hinder DNA analysis; and this type of fuming may have an advantageous effect on DNA recovery. Other significant determinations included that useful DNA profiles can be obtained from IEDs even if not cleaned in advance and that mitochondrial DNA analysis can often provide useful information when short tandem repeats testing fails.

SELECTED CURRENT PROJECTS

Advanced Remote Automated Physiological Analysis by Thermal Imaging

Information gathering efforts require better methods to determine the credibility and truthfulness of persons being interviewed. The University of Illinois-Chicago Brain-Body Center is developing a thermal imaging analysis system that will more quickly and accurately make credibility assessments. The system uses an infrared camera to measure the heat radiating from the interviewee's face. These readings can determine the traditional polygraph measurements of pulse, breathing, and skin conductance. Additionally, the system can determine change in the blood flow around the eyes, which is another measurement useful in determining physiological and psychological stress. The camera system can track the head movements to obtain more consistent results. Software integrates all of the readings, which are further analyzed to provide an overall assessment. Since the measurements can be taken from a distance, the system may be used in overt and covert modes.

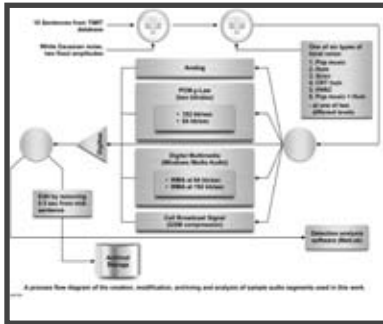


Digital Video Player Library Link

With digital video cameras being frequently used for surveillance and security purposes, recordings related to terrorist and criminal activities are frequently collected as evidence. The lack of standardization and the wide number of proprietary formats creates a severe challenge when they are enhanced or forensically examined. The examiner may spend much effort and time to gather technical data about the specific equipment that was used. Signalscape, Inc. of Cary, NC, is setting up a video library link on an FBI Web site to overcome these difficulties. The Web site will be available to law enforcement and combating terrorism agencies. The site will include information about the software required to play back the recorded evidence along with technical data about the equipment. Images of players and their components will be available. The databases will be easily searchable and will include links to the manufacturers. The library link will include a searchable database that can connect video file extensions to their specific players. The library link will direct investigators to a manufacturer Web site to download the appropriate software or will link them to an archive where the software could be downloaded. The library will also include manufacturer points of contact, making it possible for investigators to connect directly with the manufacturers when necessary.

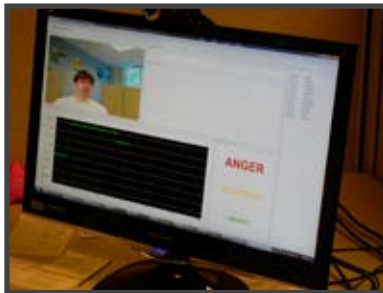


INVESTIGATIVE SUPPORT AND FORENSICS



Validating Phase Discontinuity as Authentication Indicator

During counterterrorism and criminal investigations, forensic examiners must often determine if audio tracks in digital recordings have been tampered with or altered. As the terrorists and criminals have gained more expertise in this area, better and more sophisticated technology is needed to identify alterations. Southwest Research Institute of San Antonio, TX, is developing a new forensic technique to better verify tampering or altering in audio recordings by examining phase discontinuity of various signals within the recordings. Many different tones and signals may be present on a recording. When altering and tampering occurs, some of these likely will show phase discontinuity. Likewise, when the recording has many signals that all show continuity, no tampering has likely occurred. This method can not only show if altering of the recording has occurred, but it can also show the specific location of the tampering. Additionally, a corpus of recordings will be produced that includes multiple variables such as sources and levels of usable tones, noises, distortions, and confounding factors. The final product will include the best ways to apply the techniques in forensic examinations.



Automated Facial Expression Recognition System Next Generation

The automated facial expression recognition system (AFERS), previously developed in a CTTSO project, helps determine credibility by the analysis of facial micro-expressions. These expressions are of less than a tenth of a second in duration and not usually observed, nor are people aware that they make them. The expressions, which reveal seven different emotions that have been found to be consistent in all cultures, can be used to determine credibility. This project being performed by Platinum Solutions of Reston, VA, is advancing the technology level to make an operational system with more capabilities than the previous version. In addition to video recording the face and audio during an interview to identify the micro-expressions, the next generation version will provide a number of new capabilities. One capability will be a speech-to-text feature that will distinguish between the interviewer and the interviewee as well as fully synchronize the text with the audio. Another new capability will be a searchable database of the interview recordings that will be part of an overall case management system. This version will operate much faster and be ruggedized, compact, and weigh less than ten pounds including the case.

Scientific Review of Friction Ridge Examination Protocols and Procedures

Fingerprint examinations still result in more successful identifications of criminals and terrorists than any other forensic method. However, the methods and protocols for fingerprint analysis and examinations have been less scrutinized for scientific validity than DNA procedures.

INVESTIGATIVE SUPPORT AND FORENSICS

This project, performed by Cognitive Consultants International Ltd. of Southampton, United Kingdom, is examining the fingerprinting procedures presently being used by forensic laboratories to determine their efficiency and scientific validity. The effect of biases is also being critically analyzed. The research will develop standardized guidelines to promote consistent implementation of industry-accepted scientific standards for the examination processes. These will be tested and revised and disseminated through the forensic community.

CONTACT INFORMATION

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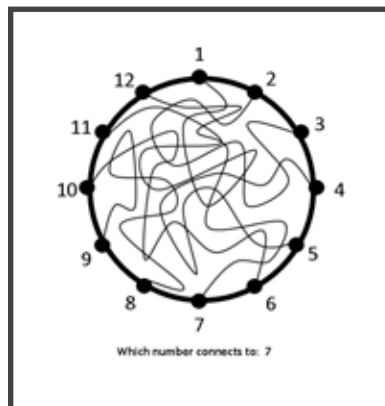




Photo by Sgt. 1st Class Vaughn R. Larson, Wisconsin National Guard

Personnel Protection



PERSONNEL PROTECTION

MISSION

Identify, prioritize, and execute research and development projects that satisfy interagency requirements to provide advanced tools, techniques, and guidelines that enhance personnel security.

The Personnel Protection Subgroup develops new equipment, reference tools, and standards to improve the protection of high-risk personnel (HRP). Projects focus on putting innovative tools such as automated information management systems, communication devices, mobile surveillance systems, as well as personnel and vehicle protection equipment in the hands of those tasked with the safety of HRP. The subgroup delivers new technologies to military, federal, state, and local law enforcement protection details.

FOCUS AREAS

The Personnel Protection Subgroup focus areas reflect the prioritized requirements of the personnel protection community. During FY 2011 these focus areas were:

Communications Surveillance and Reconnaissance

Develop technology that provides military and law enforcement personnel with a greater capability of covertly communicating and collecting surveillance data to identify and mitigate terrorist threats against personnel. Provide personnel with tools to tag, track, and locate mission critical personnel. Develop technology that enhances situational awareness of mission operations.

Individual Protection and Survivability

Enhance the protection of personnel during blast and ballistic events. Develop technology that increases the performance of body armor by reducing weight and optimizing material performance. Develop test devices and procedures that provide more biofidelic responses during blast and ballistic testing events in order to mitigate the probability of personnel injury. Quantify the effects of conventional and enhanced blast damage mechanisms to the human body.

Information Resources

Develop reference materials, information management systems, and analytical tools to improve mission preparation, facilitate decision making, and advance incident response capabilities. Enhance software tools to more efficiently exploit intelligence and surveillance data. Generate tools that will augment the detection of networks, relationship resolution, and tracking of terrorists through large amounts of data.

Mobile Security

Enhance personnel protection during vehicular, marine, and air transportation. Develop techniques to increase protection against blast

PERSONNEL PROTECTION

and ballistic threats during transit. Conduct performance evaluations and studies to assess the protection capabilities of transport mechanisms and generate solutions to optimize protection.

SELECTED COMPLETED PROJECTS

Wide Area Video Exploitation Library

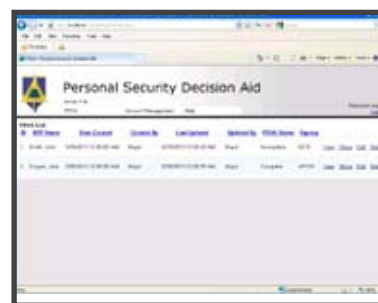
Wide area persistent surveillance sensors used to gather information yield large amounts of data, leading to major analyst productivity bottlenecks. The volume and complexity of this data presents a significant challenge for human analysts to manage large datasets, integrate data from multiple sources, identify activity of interest, isolate it from background activity, and derive useful intelligence in a timely manner. Advanced algorithms and tools are required to automate or semi-automate the labor-intensive aspects of the information extraction process. The Wide Area Video Exploitation Library (WAVELib) developed by BAE Systems is a set of advanced video exploitation algorithms that provides reliable event detection, vehicle tracking, and precision video geolocation to enhance intelligence analyst productivity. Developed in C++, WAVELib is capable of running on Windows and Linux operating systems and was designed in an open manner to allow for rapid integration with existing exploitation tools. The WAVELib single target tracker function has been integrated into the Constant Hawk and Multi-Aperture Sparse Imager Video System versions of APIX, and the shapefile refinement tool has also been integrated into APIX for Constant Hawk. WAVELib is undergoing accreditation with the National Geospatial Intelligence Agency and the U.S. Army National Ground Intelligence Center for use in their operational analyst cells.



pp

Personal Security Decision Aid

A Protective Service Detail's (PSD) mission is to protect, deter, defend, and evacuate their high risk personnel (HRP). To ensure that the proper size and scope of an HRP's protective detail is implemented, PSDs conduct a Personal Security Vulnerability Assessment (PSVA) for the HRP. To assist in the PSVA, Analytic Services, Inc., (ANSER) developed the Personnel Security Decision Aid (PSDA) to support PSDs in completing these vulnerability assessments. The PSDA is a secure Web-based application that provides interactive, fillable online templates based on the standardized procedures and guidelines currently used by Department of Defense PSDs for assessing an HRP's security posture. These templates focus on various aspects of the operational security planning and preparation, which allows the user to enter data regarding the HRP, to obtain and evaluate security threat information for the areas they will be visiting, and to gather other pertinent information. The tool provides an interactive workflow wizard that guides the user through the various steps in the assessment process. Upon completion of the assessment, the user can print a uniformed report detailing all information that was entered for approval. When viewed in its aggregate, the report will enable



PERSONNEL PROTECTION

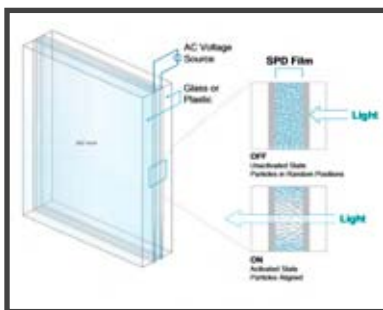
protection providers to make risk-based decisions about HRP protection missions and the security measures to execute. The PSDA also allows the user to enter debriefing information about a completed operation including lessons learned. All assessments are saved in the application's searchable database. To ensure information security, all data contained in the PSDA is protected through tiered information access security controls.



Mass Alert Emergency Mobile Reporting System

Following the shootings at Virginia Tech (VT) and Fort Hood, the need for an effective emergency alerting system was brought to the forefront. The Mass Alert Emergency Mobile Reporting System developed by White Canvas Group, LLC, is a unique bidirectional crisis communication platform that allows real-time, actionable information exchange between a pre-established command and control authority and a population of mobile users. The incident management platform allows the authority to send pictures and text via e-mail, SMS, or social networking sites, to compute geographic positions, to translate between languages, and to manage communications through geo-fencing. The mobile application, in turn, allows users to send and receive text, pictures, and geo-positional data via a low-bandwidth, low-power application with an uncomplicated interface. U.S. Customs and Border Protection is one of the first adopters of this technology, currently deploying systems at monitoring stations on the Arizona border. The system has also been demonstrated to other anticipated users within the Department of Homeland Security, the Department of Defense, state and local law enforcement agencies, and universities such as VT.

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Smart Shade

Very Important Persons (VIPs) can be easily located, identified, and spied upon during transportation in armored passenger vehicles (APVs). Once located, adversaries can focus a technical or tactical attack with increased accuracy and efficiency. Smart Shade, developed by GKN Aerospace, is a dimmable window technology that enables rapid darkening of APV windows to conceal the identity and location of VIPs. Smart Shade uses a Suspended Particle Device (SPD) Smart Film technology licensed by Research Frontiers, Inc. The SPD system is based on microscopic, rod-like particles suspended in a polymer emulsion and then applied as a modular film between traditional ballistic glass laminations. Applied voltage aligns the particles, permitting light to pass through, making the window clear. Removing that electrical current allows the particles to return to a random state, making the window dark. The technology operates on nominal 12 VDC vehicle power, can be produced in curved automotive window shapes, and can be applied to any ballistic test requirement and military requirements.

PERSONNEL PROTECTION

VIP Protective Services Portal Next Generation and Training Aid

The VIP Protective Services Portal, developed by Platinum Solutions, Inc., is a Web-based application currently deployed on the Federal Bureau of Investigation's Law Enforcement Online Web site. The portal is used by protective service details during their operational planning and guides agents through the pre-advance, advance, operation, and post-mission phases. The application offers templates and best practices for developing operations plans that detail critical information regarding airports, hotels, event sites, motorcade routes, and other aspects. Since the initial deployment in 2009, enhancements have been made that increase the tool's value and operability during the planning process. These enhancements included pre-population of common information such as major metropolitan and state police agency information, trauma 1 hospitals, and major airports. Another enhancement has been the bolstering of multi-agency coordination through the ability to assign agents from outside collaborating agencies on an operation. The enhanced portal provides the ability to better organize and assess operational details as well as provides consistency across the protective services community. A mock-up of the online version of the VIP Portal has been developed as a training tool and included as part of initial/refresher training courses at federal law enforcement training facilities. This training aid will replicate the exact appearance and workflow and contain the same pre-populated data as the online version to better prepare agents in performing their duties when they are assigned to their detail.

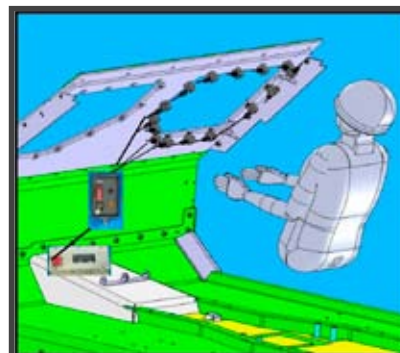


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SELECTED CURRENT PROJECTS

Emergency Egress System for Tactical Wheeled Vehicles

A gap currently exists in determining the specific safety threats of armored tactical wheeled vehicles being overturned, submerged, or collided with another vehicle in which the primary exits become inoperable. Recent in-theatre casualties resulting from situations in which crew members were not able to safely and quickly exit their vehicles have highlighted the need for a capability that fills this gap. Due to the materials and designs used in the construction of Armored Tactical Wheeled Vehicles that present a unique challenge to the crew's safe egress during emergency situations, the Emergency Egress System (EES) is being developed by Plasan North America. The EES incorporates a pyrotechnically activated windshield removal device that allows for egress of the vehicle crew members without causing injury of any kind to those inside or outside of the vehicle before, during, or after operation. The system will be operable from inside the vehicle with minimal physical exertion as well as from outside the vehicle by trained personnel. The system will be modular in design and will be adaptable to all currently U.S.-fielded armored tactical wheeled vehicles. Upon completion of the development, the vehicle-integrated EES will be demonstrated in an operationally realistic environment.



PERSONNEL PROTECTION



Multi-Threat Concealable Body Armor

The threats faced by federal law enforcement officers are varied and include both ballistic attacks as well as stabbing attacks from cutting and puncturing weapons. Many of these officers rely on their protective equipment being undetectable to potential armed attackers. Present multi-threat body armor systems have failed to achieve the requisite level of concealability. Therefore, a truly concealable multi-threat body armor system that provides not only ballistic protection but also knife and spike protection needs to be developed. To fulfill this requirement, multiple competitive contracts have been awarded to Armor Designs Inc., ArmorWorks, Neptunic Technologies Inc., and Safariland LLC for the design and development of a Multi-Threat Concealable Body Armor (MTCBA) system. The MTCBA will meet the performance standards for NIJ Level II ballistic protection and NIJ Level I Spike and P1 Knife protection while not compromising wearability, comfort, or maintainability. The four separate development efforts will progress concurrently, culminating in a combined competitive test and evaluation period. The end objective is the identification of a single superior design for certification, production, and fielding to those officers.



AgileGuard

The U.S. military is currently using various ground sensors in theatre to detect specific threat activity and has a requirement for onboard aircraft recording of data related to this threat activity, in particular the point of origin for hostile firings. Agile Defense is developing AgileGuard, a high-speed datalink to provide critical warfighter information to aircraft for tactical aircrew display and onboard data recording. This effort leverages the datalink Agile Defense developed under the Airspace MANPADS Protection System (AMPS) contract to broadcast ground-based launch detections to surrounding aircraft and to automatically launch onboard countermeasures if an aircraft is within the threat cone. Agile Defense collaborated with the Night Vision and Electronic Sensors Division (NVESD) and Georgia Tech Research Institute (GTRI) to demonstrate the AgileGuard datalink capability during the Tactical Network Testbed (TNT) experiment at Camp Roberts, California, in August 2011. The AgileGuard system is comprised of a small ground station (laptop and radio) and an air subsystem. The AgileGuard ground station is integrated with the NVESD Cerberus system to receive cursor-on-target (CoT) messages indicating the location of friendly or hostile forces and threat type. The ground station automatically transmits the CoT message in real time to the AgileGuard air subsystem, which sends data to the GTRI defensive system data recorder (DSDR). To demonstrate the ground-to-air datalink, the air subsystem and DSDR were elevated up to 500 feet above ground level via an aerostat. Agile Defense and GTRI also successfully demonstrated how the CoT information could be displayed on existing aircraft displays including the AAR-47 missile warning system and APR-39 radar warning,

PERSONNEL PROTECTION

as well as a sample map-based kneeboard display. Following analysis of the TNT experiment data, AgileGuard will be integrated with selected aircraft and additional ground sensors.

Alternative Fuel Vehicle Assessment

As the movement to become more eco-friendly grows, cabinet members of the U.S. government are looking at ways they can be more compliant. As part of that effort, these government officials have expressed great interest in using domestic Alternative Fuel Vehicles in their security motor pools. To do so without compromising the vehicle performance and safety they have with the currently used gasoline engine vehicles, the Alternative Fuel Vehicles must undergo extensive emergency response maneuver testing to evaluate the capabilities and limitations in escape, evade, emergency response, and pursuit situations. The George Washington University–National Crash Analysis Center will test the Alternative Fuel Vehicles in various protective detail driving maneuvers such as rapid accelerations and deceleration, sustained high speeds, idling for long periods, tactical movement such as push throughs, ramming, jarring and precision immobilization technique maneuvers. Power consumption in long moving and static states will also be evaluated. This testing will include four sedans and four sport utility vehicles. Agencies will be better able to determine the extent to which Alternative Fuel Vehicles can be used in their motor pools once the results of the testing are completed.



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PERSONNEL PROTECTION

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Physical Security



PHYSICAL SECURITY

MISSION

Identify, prioritize, and execute research and development projects that satisfy interagency requirements for physical security support to protect forces, equipment, and facilities against terrorist attacks.

FOCUS AREAS

The PS Subgroup focus areas reflect the prioritized requirements of the physical protection community. During FY 2011, these focus areas were:

Blast Effects and Mitigation

Test and evaluate infrastructure components and systems to investigate and characterize potential damage in order to identify mitigation strategies to protect against current and evolving threats. Components include but are not limited to: fortifications, buildings, bridges, tunnels, and structural members. Develop test protocols to ensure repeatable and consistent results where components and threats require evaluation under unique circumstances. Testing emphasis is on explosives (including homemade explosives) and debris and shrapnel effects. Events may also include gunfire, mortars, and rockets. Mitigation strategies may include hardened infrastructure, improved design standards, retrofit techniques, and new design criteria.

Emerging Explosive Threats

Develop projects to satisfy interagency and international requirements that address the adaptive threat associated with emerging explosives. Emphasize characterization of explosives and novel delivery techniques to combat their use in terrorist activities.

Vulnerability Identification

Develop predictive analysis software and decision aids to identify vulnerabilities and/or determine preventive courses of action. Emphasize pre- and post-event planning and assessment of emerging threats.

Screening, Surveillance, and Detection

Develop technologies and techniques to survey and analyze facilities; improve situational awareness; detect, identify, and locate advancing threats; control access to critical assets; and neutralize confirmed threats. Emphasize automatic alerting, expeditionary kits, and exportable variants.

Integrated Solutions

Integrate technologies into force protection solution packages that will improve the effectiveness of security systems, reduce manning requirements, and offer increased affordability and survivability of operators and responders.

PHYSICAL SECURITY

Working Groups

The Physical Security Subgroup has regularly scheduled working group meetings that bring together scientists, researchers, intelligence officers, operators, and academia from the interagency and international communities to collaborate on efforts, to identify capability gaps, and to build a collective path forward. The following five areas have active working groups: Counter-Tunnel Operations, Homemade Explosives, Vehicle Barriers, Video Analytics, and Waterside Security.

SELECTED COMPLETED PROJECTS

Surveillance and Reconnaissance Platform

The Surveillance and Reconnaissance Platform (SRP) suite of equipment provides enhanced area surveillance and an augmented reaction capability for a small, far-forward deployed operational element in an unconventional warfare/counterinsurgency environment. The SRP suite consists of five primary capabilities: a stationary imager node; a rucksack deployable surveillance system; a motorized mast surveillance system; an all terrain vehicle mounted surveillance system; and a command and control (C2) node. Each system is viewable at the site of deployment via a tethered handheld monitor. In addition, all systems feed wirelessly into the C2 node via a Web browser to be viewed simultaneously on a single ruggedized laptop. Imagery from all system components is also viewable on ruggedized tablets for dismounted personnel. All system cameras can likewise be manipulated at the C2 node or from the tablets. The systems were designed to be easy to install and operate and require minimal logistics support. All systems were designed to utilize local indigenous power sources when available.



PS

Enhanced, Man-Portable Ground Penetrating Radar

Traditional and existing man-portable ground penetrating radar (GPR) systems have limitations in the depth of penetration. The reflections from the first interface are the predominant factor in limiting standard GPR ability to see targets closer to the surface. The enhanced, man-portable ground penetration radar or "Deep Look Radar" (DLR) utilizes a method to null first interface reflections, thus allowing for a greater depth of penetration. Standard GPR systems are also typically very wideband and of higher frequency. The DLR applies modulation techniques and processing algorithms to allow for lower frequency operation in narrower bandwidths. This overcomes the limitation of standard GPR application in layered earth situations where rates of attenuation and dispersion are critical factors for accurate signal demodulation and depth of penetration issues. The DLR has been proven to detect targets down to approximately 10 feet below the surface. The system is extremely easy to maneuver and handle. The total weight of the system is approximately 30 pounds, which is made possible through the DLR's single antenna design.



PHYSICAL SECURITY



Ammonium Nitrate Detonability Review and Assessment Project

As part of its ongoing security strategy, the Transportation Security Administration, Freight Rail Security Division, identified the security of ammonium nitrate (AN), transported in bulk, as a potential vulnerability in the freight rail network. An analysis was conducted on AN in transportation configurations by rail and by highway motor vehicles to see if it can be weaponized to cause a large-scale full or partial detonation with catastrophic damage in a densely populated area. This investigation consisted of an analysis of existing literature published by members of the explosives industry, the fertilizer industry, U.S. government agencies, and interested international governmental agencies. The project brought together subject matter experts from government and industry to determine the detonation characteristics of AN and to facilitate broad consensus among stakeholders, especially in regard to literature discrepancies. A gap analysis was also conducted. It addressed missing data points that are not present in current literature with respect to the detonability of bulk AN in transport. This effort addressed ammonium nitrate prill exclusively and did not include ammonium nitrate and fuel oil (ANFO) mixtures or other ammonium nitrate products that have been modified to increase detonability.



Pipeline Blast Mitigation Technologies

As a critical part of the nation's infrastructure, damage to pipelines could have a great impact on the U.S. economy and environment. This effort identified existing research and technology specifically for blast protection of pipelines, identified and evaluated the vulnerability of pipeline systems and infrastructure, and identified and evaluated generic blast-mitigation technologies that may be applied to the specific case of pipeline protection. Blast mitigation products were evaluated with numerical modeling methods to estimate their capacity for reducing vulnerabilities of pipeline components. The modeling data was verified through explosive testing on pipeline components with and without blast-mitigation retrofits. The results of this testing were used to define the types of pipeline components, the explosive threats, and the most promising blast-mitigation technologies. The study findings were shared with the Department of Homeland Security and, at their request, these findings were combined into a book that is available for purchase via the Government Printing Office.



Portable Seismic Acoustic Sensor Kit

Smuggling operations are increasingly using tunnels to avoid interdiction on both the northern and southern borders of the United States, and tunnels are being used internationally both against foreign partners and in U.S. theatres of operation. Denying the use of adversarial tunnels and the terrorist use of the subterranean environment has become a strategic necessity. The Portable Seismic Acoustic Sensor Kit (PSASK) was developed to address those needs. The PSASK is a seismic-acoustic sensor

PHYSICAL SECURITY

system that enables operators to detect and locate tunnel operations. This system is portable for use in remote locations and does not require external power for forward deployment. The system alerts the operator to tunneling operations by sensing, identifying, and reporting on foot traffic, digging with hand tools, or digging with power tools and is able to eliminate background noise and clutter in a signal-rich environment in both urban and rural settings. The sensors communicate wirelessly with the monitoring station and require a minimum user interface until an alert is received. The PSASK system not only detects tunnel activity below the surface, but also can be programmed to detect and report on ground level foot and vehicle traffic. A spiral development effort will focus on enhancing the ability to detect helicopters, airplanes, and ultra lights while in flight.



SELECTED CURRENT PROJECTS

Light-Based Sensor for Perimeter Protection

Units operating in hostile environments require perimeter protection against intrusions when setting up temporary or permanent encampments. The CTSO is working with its partners in the Israeli Ministry of Defense to leverage a promising Israeli-developed technology. The Light-Based Sensor for Perimeter Protection (“Lightsaber”) is a lightweight, mobile perimeter intruder detection system, based on a unique, electro-optic scanning detector. The sensors are deployed along the perimeter of the encampment being secured. As soon as an intrusion is detected, an alarm and a high-quality color image of the crossing object are transmitted to the control station. The system can distinguish between different objects based on their contours and can send alerts based on user-specific requirements. Lightsaber is a stand-alone system operating through wireless communication and a self-powered energy source. The system also operates during the day and night, in dense fog, rain, and in other severe weather conditions.



Homemade Explosives (HME) Desensitization Program

Various desensitization techniques are currently employed by personnel who encounter suspected homemade explosives (HME). In a majority of cases, such techniques have not been characterized to accurately determine effectiveness. The HME Desensitization Program will develop and execute a test program that provides end users with a knowledge base to enhance, validate, and document current procedures used to desensitize HME. The data generated through this effort will be used to develop guidebooks that provide the procedures, results of the research with regard to safe handling and sampling, safe transportation, burning of HME, low-order detonation of HME, and disposal of HME. The test program will also determine the best currently available desensitizing agent for each HME investigated. Testing of the efficacy of desensitization techniques will include the use of traditional small scale safety testing with rigorous data analysis (standard deviation calculations, etc.),



PHYSICAL SECURITY

detailed thermal and chemical compatibility studies, and large scale (one pound and above) trials. The information will be disseminated via periodic reports and a reference guide.



Portable and Persistent Video Surveillance System

Current remote video surveillance systems (e.g., “pole cameras”) used by field personnel require electrical and communications infrastructure support in the immediate vicinity. Other existing stand-alone systems (i.e., not connected to electrical and communications infrastructure) operate for only a limited period of time, do not provide real-time information, and require recovery of the system to play back video recordings. Additionally, existing systems frequently preclude the ability to record and archive critical information in an easily searchable manner, such as searching for specific license plate numbers on vehicles captured in the images. Mobile “plate readers” are currently utilized by police departments in vehicle-mounted applications to locate stolen vehicles but are not being utilized in fixed and clandestine surveillance applications. The Portable and Persistent Video Surveillance System is being developed to meet these needs in a single, stand-alone, small system that will integrate commercial-off-the shelf (COTS) components such as long-range vehicle sensing (pyroelectric) and lowlight imaging optics, wireless communication hardware, and solar-energy-harvesting capabilities. Based on optimal integration of these components, the system offers covert all-weather persistent day/night surveillance with an off-angle long range license plate reading capability with remote control operator user interface.



Enhanced Remotely Operated Underwater Vehicle

Securing ports and harbors remains a key mission in defending against terrorist acts. The U.S. Coast Guard (USCG) requires the capability to conduct timely and effective hull searches/inspections of vessels, piers, the seafloor and/or anomalous events (parasitic attachments, drifting or moored mines, and improvised explosive devices). The Coast Guard currently maintains Remotely Operated Vehicle (ROV) systems devoted to the port security mission. Current system performance is limited in certain capacities. This project aims to enhance the USCG’s current ROV systems with an improved sonar, manipulator, image enhancement system, hull crawler, and an improved non-acoustic navigation system. These upgraded ROVs will provide better search capabilities in all water clarities and in very strong currents, keeping divers out of dangerous waters while searching for hazardous devices.

PHYSICAL SECURITY

High-Voltage Power Transformer Ballistic Shield

High-voltage power transformers are critical to the U.S. electrical infrastructure. These units are located in various electrical distribution yards across the country. Transformers may stand alone or in a row of up to four units, depending upon the site. This project will provide a modular ballistic shield to protect the transformers. The shield design can be extended to protect multiple sides of a single transformer or multiple adjacent transformers. The shield and support structure will be removable even if the design requires installation of a permanent base, e.g., concrete foundation. Due to the need for air flow around the transformers for cooling, the ballistic shield will allow air to pass through it without giving line-of-sight to the transformer. Installation of the shields will take no more than two to three individuals equipped with hand tools and a small forklift or bucket lift.



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PHYSICAL SECURITY

PS



Surveillance, Collection, and Operations Support



SURVEILLANCE, COLLECTION, AND OPERATIONS SUPPORT

MISSION

Identify, prioritize, and execute research and development projects that satisfy interagency requirements supporting information gathering and special operations directed against terrorist activities.

The Surveillance, Collection, and Operations Support (SCOS) Subgroup identifies high-priority user requirements and special technology initiatives focused primarily on countering terrorism through offensive operations. SCOS research and development projects enhance U.S. capabilities to conduct retaliatory or preemptive operations and to reduce the capabilities and support available to terrorists.

FOCUS AREAS

The SCOS Subgroup focus areas reflect the prioritized requirements of the Intelligence Community. During FY 2011, these focus areas were:

Traditional Surveillance

Improve the quality of intelligence collection. Develop and advance capabilities for the collection and enhancement of video, imagery, and audio surveillance.

Analytical Surveillance

Improve the means to detect terrorists by developing automated tools for terrorist identification using biometrics, pattern recognition, voice and speaker recognition, and database technologies.

Surveillance and Reconnaissance

Develop and improve the ability to locate, identify, and track terrorists and terrorist activities. Support programs and initiatives critical to intelligence operations such as tagging, tracking, and locating; special sensors; and covert communications.

Information Operations Support

Develop and improve tools to degrade, disrupt, deny, or destroy both analog and digital adversary information and information systems. Emphasize initiatives critical to tactical intelligence and military direct action operations, such as to intercept, identify, and locate electronic emissions for the purpose of immediate threat reduction and targeting.

Human Language Technologies

Develop tools to assist deployed forces in foreign language and cultural knowledge and awareness. Research automated translation capabilities to aid human translators; rapid creation of translation capability for additional languages; rapid customization of new subject domains; and language learning at various levels of proficiency from beginner to advanced in preparation for operational assignment or continuing

SURVEILLANCE, COLLECTION, AND OPERATIONS SUPPORT

education. Develop new approaches for exploitation of speech in foreign languages with specific improvement in searching, filtering, organizing, and navigating multilingual mixed-media data.

PROGRAM HIGHLIGHTS

SCOS projects are classified or highly sensitive. Program requirements, the success of projects, and specific capabilities cannot be discussed in an unclassified document.

CONTACT INFORMATION

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Tactical Operations Support



TACTICAL OPERATIONS SUPPORT

MISSION

Identify, prioritize, and execute research and development projects that enhance the capabilities of DoD and interagency special operations tactical teams engaged in finding, fixing and finishing terrorists. This includes the development of capabilities for state and local law enforcement agencies to combat domestic terrorism.

The Tactical Operations Support (TOS) Subgroup provides technology solutions to assist direct action operational personnel in a variety of tactical missions and environments. Most often these solutions are in the form of rapidly prototyped and specialized equipment. Each material solution is specifically designed to provide enhanced mission effectiveness while assisting operational personnel in maintaining situational awareness.

FOCUS AREAS

The TOS Subgroup focus areas reflect the prioritized requirements of offensive counterterrorism forces. During FY 2011, these focus areas were:

Tactical Communications Systems

Develop flexible and enhanced communications capabilities specifically designed for tactical forces. Emphasize reducing the size of equipment, while improving operator mobility and efficiency. Consider durability, concealment, innovative power sources, range, reception, battery life, ease of use, and low probability of detection/interception. Develop assured tactical communications connectivity in challenging environments such as buildings, caves, tunnels, below deck, or underground bunkers.

Information, Surveillance, and Target Acquisition and Reconnaissance Systems

Develop technologies to assist tactical teams in conducting intelligence, surveillance, target acquisition, and reconnaissance missions. Develop systems that enhance the visual perception or other imaging capabilities of tactical operators in all conditions and environments. Develop independent, vehicular, or weapon-mounted systems for enhanced aiming, target designation, illumination, range detection, or surveillance.

Offensive Systems

Develop equipment and capabilities that enhance the effectiveness of small offensive tactical teams engaged in specialized operations. Develop specialized weapons, munitions, detonators, distraction/diversion devices, and other unique tactical equipment. Develop systems to support sniper and countersniper operations. Develop man-portable sensor systems to enhance operator security during tactical missions.

TACTICAL OPERATIONS SUPPORT

Specialized Access Systems

Develop technologies that assist tactical assault forces in gaining rapid access to objectives, improve evaluation of tactical options, and support efficiency and stealth of operations. Develop enhanced manual and dynamic breaching technologies for tactical assault teams. Develop clandestine defeat or override devices for building and vehicle entry points.

Survivability Systems

Develop clothing, individual equipment, mobility platform enhancements, and man-portable systems that provide protection from or identification of ballistic, fragmentation, explosive, and thermal threats during the conduct of tactical missions.

Unconventional Warfare

Develop innovative solutions for small specialized tactical operations teams conducting a broad spectrum of military and paramilitary operations including counterinsurgency and foreign internal defense missions through, with, or by host nation indigenous forces building partner capacity to support U.S. objectives.

SELECTED COMPLETED PROJECTS

Platform Interchangeable Gear Modules and Internal Frame Load Bearing System

Anyone who has ever worn body armor for more than just a few minutes knows of the requirement for lighter armor solutions. However, due to an increased threat of fragmentation and large caliber projectiles, very little has been accomplished in the realm of weight savings in the development of armor solutions for soldiers. The Platform Interchangeable Gear (PIG) Modules and Internal Frame Load Bearing System approach the issue by reducing weight in the carrier solutions where possible, but most of all by redistributing most of the weight from the shoulders of a soldier to his hips. This shift in weight creates a perceived weight reduction and increased range of motion and endurance by the end user. The PIG Modules allow mission essential items to be easily donned and doffed through the use of a new and novel quick release system that is pneumatically controlled rather than manually laced through the armor carrier while the Internal Frame Load Bearing System also has a built-in harness for medical evacuation and rescue scenarios.



TOS

SELECTED CURRENT PROJECTS

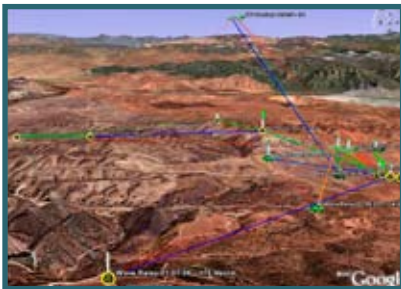
Ultra Mobile Tactical Computer

As computing components become smaller and less expensive, the commercial market has been moving more and more toward mobile computing platforms such as tablet computers and smart phones. In the same vein, government end users have been trying to keep up with



TACTICAL OPERATIONS SUPPORT

the pace of commercial technology and the ubiquity of small, wireless personal computing devices. As the government pushes toward more mobile computing platforms, a gap exists between larger and more rugged laptops and small yet powerful computing devices that can be easily carried, easily manipulated, can run complex command and control software solutions, and are rugged enough for tactical use. The Ultra Mobile Tactical Computer (UMTC) provides a hybrid approach to this problem by affording end users with a full and familiar computing environment capable of running the latest desktop operating systems and software suites, is small enough to be worn by the soldier in a convenient manner, and is inexpensive enough that the devices are easily replaced if broken. In addition, the UMTC has several standard interface ports that create a flexible computing platform for various mission requirements.



Next Generation Tactical Mesh Network

The rapid progression of commercial hardware and software technologies in the areas of secure mobile communication have led to capabilities previously unavailable to U.S. Special Operations Forces (SOF) working in austere environments. With the National Security Agency's designation of the publically available Suite B algorithms as acceptable encryption for some types of perishable data transmission and the proliferation of advanced mobile applications providing many of the key functions needed for tactical situational awareness, the Next Generation-Tactical Mesh Network (NG-TacMN) project will deliver to U.S. SOF an integrated, scalable solution with superior bandwidth at the small unit level in a manner that maximizes reliability in dynamic situations. TSWG is working with various elements of the U.S. departments of Defense, Homeland Security, and Justice to ensure that NG-TacMN can work across multiple interagency organizations.



Situational Awareness for Intelligent Robotic Employment

To date, small tactical robotic systems have only been used with a relatively small number of U.S. Armed Forces and in very specific applications in most instances (e.g., explosive ordnance disposal). A fundamental issue keeping robots from being more widely used at the small tactical unit level is the significant amount of input the robot operator must provide to accomplish the intended mission. This is primarily due to the lack of situational awareness, which forces the robot operator to try to understand where the robot is and what it is doing via fixed, low-resolution onboard camera systems that do not provide any spatial information. The Situational Awareness for Intelligent Robotic Employment (SAFIRE) is a very small, lightweight, and power advanced image processing sensor that is able to quickly and intuitively show the robot operator what the distance is from the robot to various obstacles and objects of interest around the robot. Furthermore, all of this situational awareness information is processed onboard the SAFIRE, enabling semi-autonomous functions such as the robot travelling along several waypoints while it avoids obstacles as well as a return home

TACTICAL OPERATIONS SUPPORT

function, all with one command from the robot operator. In this way, the robot no longer requires the operator's undivided attention and now serves as a force-multiplier for collecting information and performing operations in areas that are unsafe or difficult for humans or military working dogs. The SAFIRE is compliant with the Joint Architecture for Unmanned Systems standards and is one pound, making it available for installation on any tactical robot available in the market today.

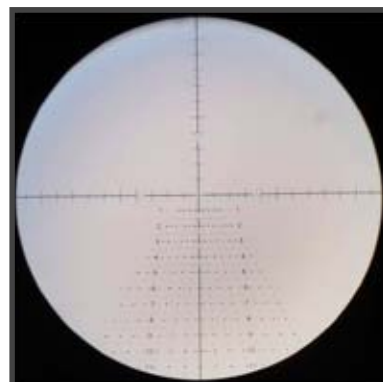
Enhanced Collapsible-Wing Micro Tactical Unmanned Aerial System

Given the remote and difficult terrain U.S. interagency SOF are working both inside the United States and overseas, it is increasingly important to have intelligence, surveillance, and reconnaissance (ISR) systems that are packable and operable by one person at the small unit level. Furthermore, these systems must work both day and night, survive harsh environmental conditions, and operate continuously for several hours to support mission requirements. The Enhanced Collapsible-Wing Micro Tactical Unmanned Aerial System (ECWMTUAS), known by the system name "Arrow-Lite," provides SOF with an aerial ISR capability that can be launched within seconds of orienting the transport canister in a safe direction, comes with both day and night mechanically-stabilized payloads, has a Suite B-encrypted mobile ad hoc network data-link that allows the Arrow-Lite to also serve as a tactical communications relay, can fly at dash speeds greater than 50 knots, and weighs less than five pounds.



SOF Marksmanship Advancement

Numerous advances have been made in long-range shooting technologies in the past few years that can change the way SOF train and fight on today's battlefield. The SOF Marksmanship Advancement program takes a holistic look at currently available technologies, developing technologies, and training methods to create a new and novel equipment and training package for SOF snipers and long-range shooters. TOS has partnered with the Joint Readiness Training Center Special Operations Training Detachment to provide these leading-edge sniper and spotter capabilities with the highest caliber training available in an effort to shape future requirements and technology development with an emphasis on evolutionary and low-cost solutions to complex long-range shooting problems.



Sniper Status System

A requirement exists for a simple and affordable Sniper Status System. The commercial market and government solutions offer complex and very capable and impressive C4ISR systems; however, these "all-in-one" capabilities often require extra radios, are difficult to set up, and create distractions for snipers and special reconnaissance teams. As integral members of any assault force, snipers need to be able to easily and effectively communicate their ability to take a shot on a target back to the ground commander with low latency and high reliability.



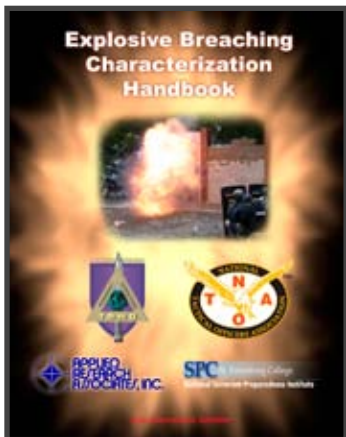
TACTICAL OPERATIONS SUPPORT

The Sniper Status System will provide an easy-to-use and unobtrusive means for communicating a sniper's go/no-go shot status utilizing the sniper's organic tactical radio solution and without requiring the shooter to remove focus from the target and task at hand. The ground force commander will then be able to make critical decisions based on the status of his sniper teams, which are displayed on a small computing platform along with the geolocation of each team.



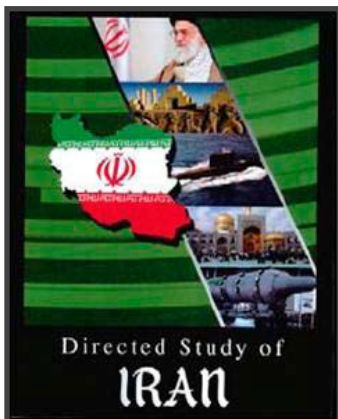
Enhanced Mortar Targeting System-Mobile

Force protection is a constantly changing requirement for U.S. Armed Forces conducting operations in Afghanistan as the enemy adapts their tactics, techniques, and procedures. Whether it is tower-based camera systems, unattended ground sensors, or the ground-mounted Enhanced Mortar Targeting System (EMTAS), the static nature of many of the force protection measures being employed make them vulnerable to this hostile adaptation. Therefore, TSWG is pursuing two EMTAS-Mobile variants that will allow U.S. Armed Forces to fire U.S. standard 81-millimeter mortar rounds from a light commercial vehicle and 120-millimeter/81-millimeter mortar rounds from a light tactical vehicle. These EMTAS-Mobile systems will keep the 360-degree, rapid precision target engagement capability of the current ground-mounted EMTAS, while adding the ability to pursue and engage the enemy wherever they are located. Additionally, future integration with various force protection systems (e.g., unmanned aerial vehicles, lightweight counter-mortar radar) are being explored further to increase the EMTAS-Mobile's lethality while reducing the risk of fratricide, civilian casualties, and structural damage to local buildings.



Maritime Breaching Handbook

As a continuation of prior work in providing a functional handbook for explosive breachers, TOS is developing a Maritime Breaching Handbook to aid tactical teams with breaching in the unique maritime environment. The Maritime Breaching Handbook will give the end user a comprehensive guide to attacking and defeating targets on ships. In addition to providing specific data related to attack methods, the handbook will cover the inherent dangers and considerations found in maritime environments.



Directed Studies

To combat terrorism effectively, operators and technology developers need to be aware of any emerging threats as well as understand complex global dynamics and how they impact tactical operations. This program is an effort to develop and deliver in-depth analysis of the activities and motives of individual countries, organizations, or threat subjects. Subjects include: objectives, alliances, structure, history and activities of the subject country, organization, or threat.

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Training Technology Development



TRAINING TECHNOLOGY DEVELOPMENT

MISSION

Identify, prioritize, and execute projects that satisfy interagency requirements for the development and delivery of combating terrorism related education, training, and mission performance support products and technologies.

FOCUS AREAS

The TTD Subgroup focus areas reflect the prioritized requirements of the military and civilian combating terrorism communities. During FY 2011, these focus areas were:

Models, Simulations, and Games

Develop interactive models, simulations, and games (MS&G), including, but not limited to: tabletop simulations, field exercise simulations, immersive virtual-learning environments, hands-on virtual reality, simulation models, and PC-based three-dimensional and isometric simulations and games. Develop crowd models, adversarial behavior models, network-based simulations, and mini-simulations on specific combating terrorism related tasks. Incorporate beneficial game characteristics through the full range of game genres (i.e., strategy, first person tactical, massively multiplayer online game, role-playing, etc.). Develop tools, technologies, and techniques for improving MS&G design, development, and validation.

Advanced Training and Education

Develop programs of instruction, training packages, and computer- and classroom-based terrorism training courses. Develop the advanced tools, techniques, and guidelines required to analyze needs, develop solutions, and evaluate results. Analyze performance needs to identify applicable solutions. Integrate delivery technologies with combating terrorism training materials to increase the quality, effectiveness, and accessibility of training.

Training and Information Aids and Devices

Develop job aids, performance improvement solutions, and training devices to support mission performance and to increase mission readiness. Support new areas in the combating terrorism domain. Provide training simulants as aids in training exercises.

Delivery Architectures

Develop new, advance emerging, and enhance existing training to combating terrorism personnel. Emphasize ubiquitous and distributed computing to provide the basis for information and training technology interoperability and the standards needed to provide distributed, on demand, and customized training consistent with future computing infrastructure. Emphasize proven methods of effective and individualized instruction and electronic performance support.

TRAINING TECHNOLOGY DEVELOPMENT

SELECTED COMPLETED PROJECTS

Culture and Irregular Conflict Course

Trends in the global operational environment demand new skills for assessing the motivations leading to violent confrontation. Soldiers and civilians possessing an understanding of cultural variations can influence operational outcomes through the selective implementation of irregular tactics, techniques, and procedures. In cooperation with the JFK Special Warfare Center and School (JFKSWCS), Norwich University Applied Research Institutes developed a computer-based undergraduate level course to help the warfighter meet the challenges of persistent irregular conflict. The course was informed by the academic disciplines of sociology, anthropology, communications, and psychology and how these disciplines can be applied by personnel in various regions of the world to help achieve mission success. The goal is to enable military and government civilian personnel to understand ethnic, religious, and cultural rivalries resulting in the ability to predict, influence, and moderate the evolutionary path in which violent conflicts develop. Verifiable student improvements in cross-cultural competence are anticipated in areas including: cultural factors, sociocultural awareness, social capital, social networks, values, decision-making styles, interpersonal skills, and personality factors. The course meets American Council on Education standards and became an integral part of USAJFKSWCS Directorate of Regional Studies and Education curriculum in the fall of 2011.



Incidental Fire Support Training for Observers

The Incidental Fire Support Training Package provides the Marines with a capability to request indirect fire support and close air support when separated from a platoon or company and without a formal school-trained fire supporter. The Penro Group developed the training that includes lessons on types of terminal attack control, self and target location, call for fire, close air support, talk-on techniques, and battle damage assessment. The training package contains instructor presentations and notes, student materials, video demonstrations, quick reference cards, and a commander briefing on the capabilities this training provides. The package incorporates practical exercises and sustainment training utilizing the current Marine Corps Deployable Virtual Training Environment laptop simulation system. This training is available through each of the schoolhouses and the Training and Education Command.



Mobile Learning for the Military: An Assessment and Implementation Plan

The use of mobile technologies for training and performance support is increasingly being adopted across the military. The Center for Innovative Technology conducted the mobile learning needs assessment across ten Department of Defense organizations and created a plan for implementation of mobile learning for USMC's Training and Education Command and the Army's Training and Doctrine Command. The

TRAINING TECHNOLOGY DEVELOPMENT



assessment included all branches of the military, with the ultimate goal of shaping and developing new learning technologies and best practices for use in training and performance support to combat terrorism. The assessment identified viable training initiatives, current and emerging mobile learning technologies, solutions, capabilities, best practices, and lessons learned for use within the military. The Implementation Plan outlines the technical architecture and operational support required to sustain a long-term mobile learning program. Electronic versions of TTD's Military Mobile Learning Assessment and Implementation Plan are currently available to military, federal, state, and local government, international, and industry users by contacting the TTD Subgroup at ttdsubgroup@tswg.gov.

SELECTED CURRENT PROJECTS

Elevating Ocular Tactical Reaction System



Soldiers are required to operate in urban environments with a significant number of visual cues requiring their attention. Situational awareness, decision making, and reaction speed are critical for engaging and eliminating threats. Conflict Kinetics developed the Elevating Ocular Tactical Reaction System that enables soldiers to process more information at a faster pace to keep forward momentum in assault-type missions. The laser-based performance simulation covers a 220-degree field of vision that allows trainees to visually acquire more than 1,500 targets and fire more than 500 virtual rounds in a single training session. The system consists of a five-screen, laser-based performance simulation and a computer-based eye tracking and target recognition system. The system is currently being used to train special operations assaulters. During a two-week pilot course with special operations forces, quantifiable increases were evident in the speed, accuracy, and number of targets engaged.

Counter Tunnel Investigation Training



The transnational threat of cross-border tunnels and subterranean passages is a growing concern for law enforcement. These tunnels are being used to smuggle special interest aliens, narcotics, and/or weapons of mass destruction into the United States. Carley Corporation is designing and developing a blended learning course that includes computer-based and instructor-led training as well as job aids concerning cross-border tunnel investigations. This 20-hour course will include topics such as investigative methods, site exploitation, tunnel rescue, local tunnel perspectives, report writing, community outreach, and collaboration with partner agencies and cross-border authorities. The computer-based training will be hosted on the Department of Homeland Security's Virtual University, and the instructor materials and job aids will be available through the Government Printing Office in the spring of 2012.

TRAINING TECHNOLOGY DEVELOPMENT

Tactical Driving Simulator

When providing transportation and movement protection to high-profile government officials (i.e., VIPs) within the United States and abroad, protective detail personnel must be prepared to effectively and efficiently respond to threats upon the VIP. In collaboration with the Pentagon Force Protection Agency, the U.S. Secret Service, and the U.S. Department of State, Quantum Signal is developing a PC-based Tactical Driving Simulation that will help train and evaluate, within a virtual environment, the skills necessary for transporting VIPs and responding to threats. The simulation will provide a range of programmable scenarios that require situational awareness, decision making, and action including: principles of route planning and analysis, evasive driving skills, force-on-force counter ambush tactics, vehicle dynamics during crash avoidance, and defensive driving techniques when in hostile situations. The Tactical Driving Simulation project will be completed in December 2011.



Shot Indicating Resetting Trigger (SIRT) Training Rifle and Pistols

Firearm skills—including the motor skills involved with draw, grip, stance, site presentation, trigger take-up, and final site confirmation—need to be honed at regular intervals. Next Level Training is currently developing the M-4 rifle, M-9 Beretta Brigadier, and Glock 19 laser based dry-fire training tools, which include shot indicating lasers and a resetting trigger. The training aid will look and feel like the real weapon and will include a weighted inert magazine. The SIRTs will allow for effective off-range practice of trained firearms skills to improve trigger control and shooting proficiency while reducing training time and costs of ammunition. The SIRT training rifle and pistols will be available on the GSA Schedule in the spring of 2012, and Next Level Training has the Glock 17/22 available for purchase.



CONTACT INFORMATION

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TRAINING TECHNOLOGY DEVELOPMENT



U.S. Army photo by Sgt. Joseph Watson

Explosive Ordnance Disposal/ Low-Intensity Conflict

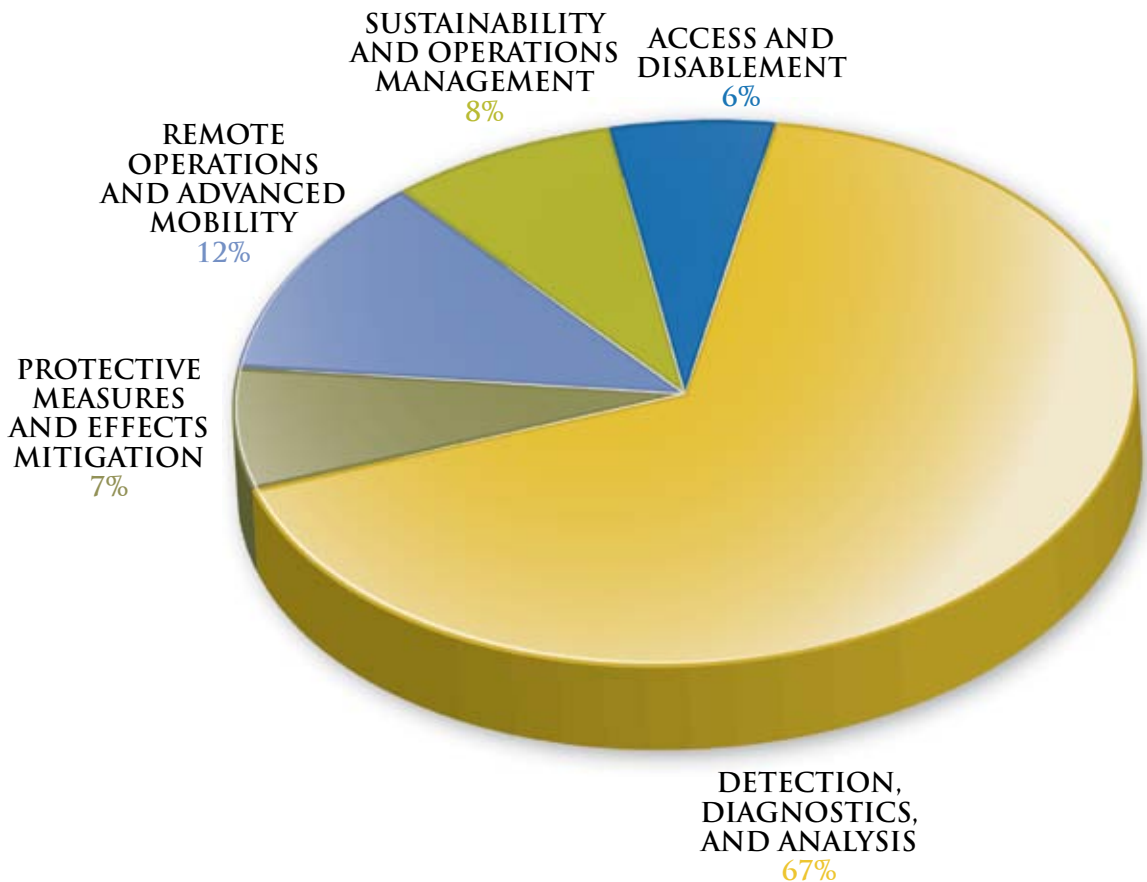


EXPLOSIVE ORDNANCE DISPOSAL/ LOW-INTENSITY CONFLICT

MISSION AND ORGANIZATION

The Explosive Ordnance Disposal/Low-Intensity Conflict (EOD/LIC) Program provides explosive ordnance disposal technicians and special operations forces operators with the advanced technologies and mission-focused solutions required to address current and emerging threats presented by unconventional and asymmetric warfare.

EOD/LIC FY 2011 FUNDING BY FOCUS AREA (\$12 MILLION)



EXPLOSIVE ORDNANCE DISPOSAL/ LOW-INTENSITY CONFLICT

FOCUS AREAS

Remote Operations and Advanced Mobility

Develop capabilities to remotely approach, enter, and conduct reconnaissance operations in hazard areas and danger zones. Enhance mobility-related technologies and equipment to facilitate safely approaching, operating in, and withdrawing from hazardous environments. Develop systems and technologies to gather and store operational information for transmission to operational personnel and unit commanders. Improve technologies for the relocation of unexploded ordnance, hazardous materials, and improvised devices.

Access and Disablement

Develop tools to quickly and efficiently breach or gain access to structures, barriers, vehicles, and containers. Develop chemical, mechanical, electrical, and explosively actuated systems for the neutralization and disruption of unexploded ordnance and improvised devices. Improve technologies for rendering fuzing and firing systems inoperable.

Detection, Diagnostics, and Analysis

Develop tools to locate and verify the presence of improvised devices, unexploded ordnance, booby traps, and other threats. Develop technologies to determine the specific type, condition, and characteristics of unexploded ordnance and improvised device components and the specific hazards associated with each. Improve methods to analyze and evaluate improvised device construction.

Protective Measures and Effects Mitigation

Advance the development of personnel protection systems for operations in enhanced environments. Develop novel and improved solutions to protect personnel and property from blast, fragmentation, and ballistic hazards.

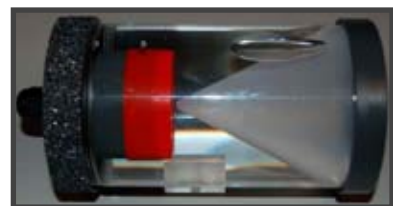
Sustainability and Operations Management

Develop tools and equipment to enhance situational awareness and operational capability during incident response or direct action operations. Develop human performance improvement tools that foster the advancement of knowledge related to unexploded ordnance, improvised devices, and enhanced hazard environments. Develop tools and training for conducting novel and advanced missions related to improvised devices and hazardous environments.

SELECTED COMPLETED PROJECTS

Concealed Device Disruption - Closer

Explosive Ordnance Disposal (EOD) technicians require the capability to unearth buried or concealed IEDs to further exploit and render safe these devices. Los Alamos National Laboratory in New Mexico developed



EXPLOSIVE ORDNANCE DISPOSAL/ LOW-INTENSITY CONFLICT

the Closer, a conical water-jet charge designed to use approximately 110 grams of Composition C4 high explosive stamped from an M112 Demolition Block. The explosive is contained within a cylinder that is surrounded by water. A conical cavity is maintained in the water using a thin-walled plastic cone. Upon detonation of the explosive, the water is propelled into the conical cavity, thus producing a high-velocity water jet in the opposite direction as the tip of the cone (much like a typical shaped charge). The water jet is capable of penetrating an inch of steel. The EOD/LIC program funded a low rate initial production of the Closer to support operational trials, and 4,900 Closers were provided to Task Force Paladin and the U.S. Marines for use in Afghanistan. Feedback from the evaluation by deployed forces will allow for the development of more effective employment procedures against buried or concealed IEDs.



EOD Homemade Explosives Kit

Homemade explosives (HME) use by enemy forces has increased to the point that HMEs now pose a significant threat to military forces worldwide. As such, EOD technicians have a critical requirement for a field expedient capability to detect and identify HMEs. The EOD/LIC Program investigated commercially available individual systems that could be packaged as a kit and meet the needs of EOD operators. Phase I of the EOD HME kit was comprised of the Thermo Scientific (formerly Ahura Scientific) FirstDefender handheld chemical identifier, the Smiths Detection HazMatID solid and liquid chemical identifier, and the American Innovations xD2i wet chemistry kit. The Naval EOD Technology Division developed a system-of-systems training course and manual that allows the operator to select the device best suited for the suspected threat. Nineteen kits were provided to EOD units deployed in various theatres of operation. Phase II of the effort looks at systems that provide the capability in a smaller form factor. The Phase II kit is comprised of the Thermo Scientific FirstDefender and TruDefender and the ChemSpectra Mini XD2. Twelve Phase II kits have been provided to military units all over the world. The EOD HME kit's collection of systems transitioned to a program of record through PMS-EOD under the Weapons of Mass Destruction Kit.



Defense Against Terrorist Tactics

The Unmanned Surface Vehicle (USV) Defense Against Terrorist Tactics (DAT) collaborative project with the Republic of Singapore Ministry of Defence, U.S. Naval Undersea Warfare Center, and U.S. Naval Surface Warfare Center-Crane, developed a capability to perform a small missile attack against shoreline and marine targets from a remotely operated craft. The missile launcher was designed to hold two wire-guided missiles and is light enough to be carried on a 12-meter unmanned surface vehicle. The goal of the effort was to demonstrate and evaluate the performance of a precision engagement module (PEM) fired in structured operational scenarios from a USV using a captured (in-tube)



EXPLOSIVE ORDNANCE DISPOSAL/ LOW-INTENSITY CONFLICT

training missile. The USV PEM demonstrated successful target acquisition and target lock-on in sea-state 1 conditions.

In addition to EOD/LIC, sponsors included the Singapore Ministry of Defence, United States Department of Defense Coalition Warfare Program, Office of Naval Research Global TechSolutions, and the Navy International Programs Office.

SELECTED CURRENT PROJECTS

MK16 MOD 1 Underwater Breathing Apparatus Integrated Data Display Mask

The U.S. Navy has a technical and operational requirement for an integrated data display capability for the MK 16 MOD 1 UBA diver to read and monitor vital equipment status information (primary and secondary display) without work stoppage and regardless of underwater environment visibility. The project will be accomplished in a 24-month period of performance over successive fiscal years. Phase 1 will encompass basic requirements development: building human factors conceptual prototypes for end user evaluation; and conducting initial technical assessments of the MK16 signals, sensors, electronics, and software. Phase 2 will incorporate the end user test results and requirements; develop a final advanced prototype design for use with the KM48 MOD 1 Full Face Mask; identify low magnetic component design and magnetic testing requirements; and design an interface for the MK16 MOD 1 UBA electronics assembly and software interface.



Electronic Warfare Grenade

Current electronic countermeasures (ECM) systems, or jammers, are either vehicle-mounted or man-portable backpack systems. One of their uses is to help counter the threat of radio-controlled improvised explosive devices (RCIEDs). Military and law enforcement tactical forces have a requirement for a miniaturized, 'toss-forward,' counter-RCIED jamming device to defeat IED receivers within close proximity during urban and indoor scenarios and Explosive Ordnance Disposal (EOD) operations. The Electronic Warfare Grenade (EWG) is a portable, battery-powered active jamming device capable of defeating multiple threats within a confined space by tossing one or more of the softball-sized devices into the space, similar to standard grenades. It can also be hand-emplaced or robot-emplaced proximate to a known or suspected threat. Battery replacement can be quickly and easily accomplished in the field and will not require special tools. The EWG operates on up to five frequency bands within a frequency range of 25 MHz to 2.5 GHz. The EWG will undergo operational testing and evaluation in FY12.



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Photo courtesy of International Security Assistance Forces Headquarters, Deputy Chief of Staff, Stability Operations

Irregular Warfare Support

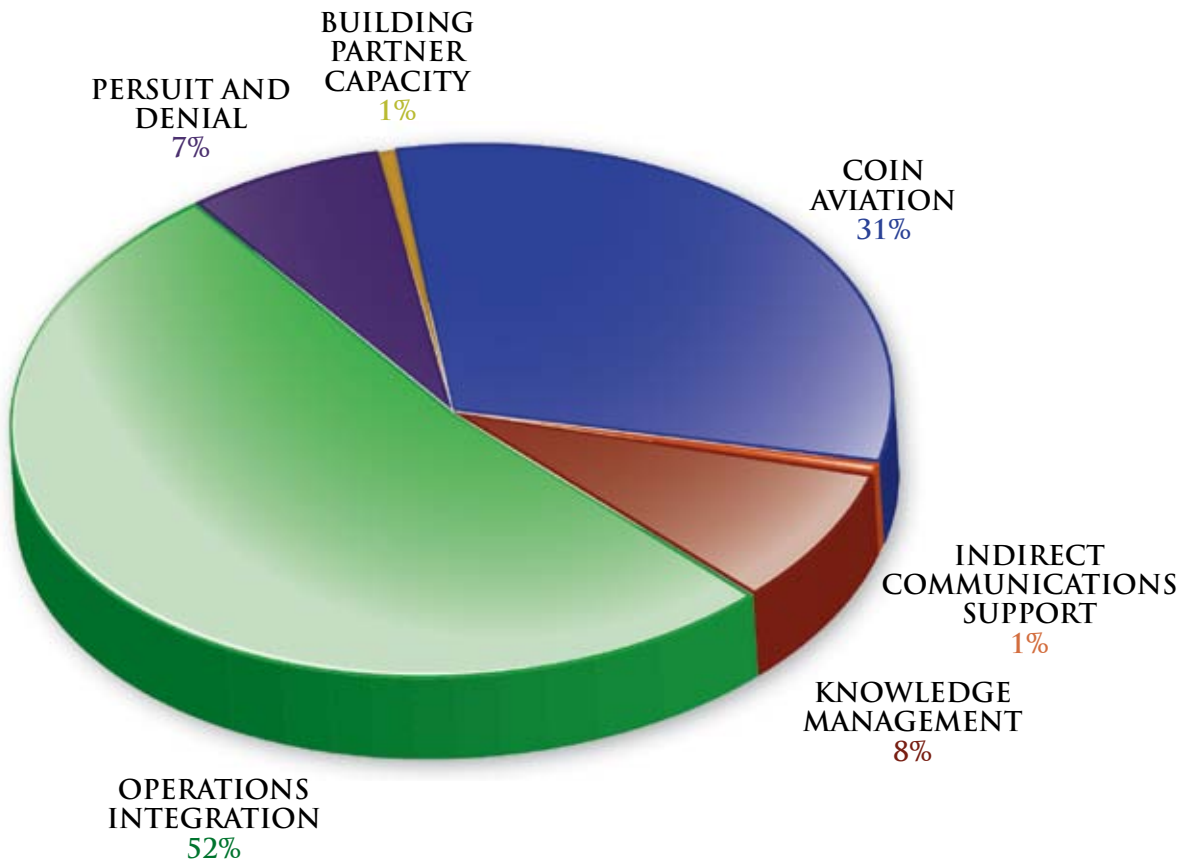


IRREGULAR WARFARE SUPPORT

MISSION

Develop adaptive and agile ways and means to support irregular warfare in the current and evolving strategic environments. Identify materiel and non-materiel solutions via operational analysis, concept development, field experimentation, and spiral delivery capabilities to defeat the motivations, sanctuaries, and enterprises of targeted state and non-state actors.

IWS FY 2011 FUNDING BY FOCUS AREA (\$76 MILLION)



IRREGULAR WARFARE SUPPORT

FOCUS AREAS

IWS develops interagency capabilities and capacities for information age irregular warfare. During FY 2011, focus areas were:

Battlespace Awareness

Conduct research, operational analyses, capability design, and implementation support to enable forces to understand dispositions and intentions as well as characteristics and conditions of the threat and operational environment that bear on national, coalition, interagency, and military decision making.

Building Partner Capacity

Conduct research, operational analysis, capability design, and implementation support in order to enable the Department of Defense to assist, train, advise, and influence foreign partners, foreign competitors, adversary leaders, military like forces, and relevant populations by developing and presenting information and conducting shaping activities to affect their perceptions, will, behavior, and/or capabilities. This includes research and development that supports the conduct of communication, shaping missions, and activities, but does not include kinetic operations or maneuver of forces for the purpose of influence.

Indirect Communications Support

Conduct research, operational analysis, capability design, and implementation support within the scope of traditional military information operations to enhance and improve client organization efforts to erode adversaries' power, influence, and will through proactive and responsive informational, psychological, and other irregular operations. IWS seeks to increase the efficacy of military information operations while decreasing the likelihood of direct action environments.

Knowledge Management

Conduct research, operational analysis, capability design, and spiral experimentation support to increase U.S. and appropriate partners' understanding of hostile forces, current and evolving tactical and operational environments, and opportunities for successful irregular warfare operations.

Mission Rehearsal and Exercise

Conduct research, operational analysis, capability design, and implementation support to increase U.S. and coalition partners' proficiency in and capacity to wage irregular warfare on targeted state and non-state actors. IWS seeks to further the art and science of irregular warfare operations and their understanding in the appropriate agencies, forces, and bodies of government.

IRREGULAR WARFARE SUPPORT

Operations Integration

Conduct research, operational analysis, capability design, and implementation support to synchronize interagency irregular warfare efforts. IWS refines current capabilities and develops those capabilities necessary for friendly forces to prevent and prevail in future conflicts.

Pursuit and Denial

Conduct research, operational analysis, capability design, and implementation support to enable client organizations to better apply indirect and asymmetric force to identify, disrupt, deny, exploit, manipulate, and destroy hostile organizations and their supporting enterprises.

Remote Area Aviation Capabilities

Conduct research, analysis, design, and operational experimentation to identify solutions for remote area air mobility and sustainment capabilities to support small SOF and GPF units conducting distributed operations in remote and austere environments. Develop and refine future remote area air capabilities and sustainment to determine effective strategies for evolving missions.

PROGRAM HIGHLIGHTS

ARCHER

In response to General Stanley McChrystal's (then Commander, International Security Assistance Force [COMISAF]) August 4, 2009 Memorandum requesting the creation of a Counterinsurgency Advisory and Assistance Team (CAAT) to help inculcate his Counterinsurgency (COIN) Guidance throughout the force, the Irregular Warfare Support Program, with support from Special Operations/Low Intensity Conflict (SOLIC), stood up Project ARCHER. Project ARCHER was a 24-month prototype effort to provide tailored counterinsurgency capabilities to COMISAF and Commander, U.S. Forces Afghanistan (COMUSFOR-A). Over its two-year life span, Project ARCHER primarily, but not exclusively via the CAAT, identified, created, and promulgated effective tactics, techniques, and procedures (TTP) for coalition forces throughout the Afghanistan theatre of operations; discovered and recommended solutions for capability gaps; and helped shape doctrine through its key role in developing the Department of Defense COIN Qualification Standards. The hundreds of tactical and operational reports produced over the life of the program will serve as a useful repository of knowledge that can continue to be tapped for operations in Afghanistan as well as for irregular warfare activities in future conflicts or contexts. The value of Project ARCHER and the CAAT has been consistently endorsed by COMISAF/COMUSFOR-A and was successfully transitioned to USFOR-A in September 2011.



Photo courtesy of International Security Assistance Forces Headquarters, Deputy Chief of Staff, Stability Operations



Photo courtesy of a member of the Counterinsurgency Advisory and Assistance Team

IRREGULAR WARFARE SUPPORT

CROWDED HOUSE

CROWDED HOUSE was a project delivering a tailored community engagement methodology in support of Combined Forces Special Operations Component Command–Afghanistan (CFSOCC-A) mission requirements. Stabilization efforts to build from a community engagement methodology have been utilized by development professionals in more than a dozen countries, particularly in hot zones such as Iraq, Afghanistan, and Pakistan.

Guiding principles of this methodology include: (1) Communities best determine their own needs; (2) Community action empowers individuals; (3) Small projects have great impact; (4) Common efforts mitigate conflict; (5) Expatriate footprint is best invisible. Stabilization efforts that focus on a “bottom up”, village level approach, are more likely to achieve community buy-in and lay the necessary groundwork for transition to longer-term development.

Local Afghan staff and Afghan non-governmental organizations were hired and trained to conduct local needs assessments to establish baseline data, objectives, and engagement approaches. Thereafter, local staff assigned as community mobilizers engaged the respective village or community leadership to introduce the stabilization initiative. Initial quick impact projects focused on four essential community needs, including basic community infrastructure, income and employment generation, civil society, and local security. In return, the community leadership appointed a Community Development Council as its representative to select, supervise, monitor, and accept all project activities and collect a village-provided percentage of project costs in cash or in-kind, such as labor or human capital. All assistance, including economic incentive awards to individuals and cooperatives were distributed on a grant basis.

From initial engagement of the community leadership, community mobilizers completed at least one project in each village within 90 days. This requirement is central to winning the confidence of the community and creating buy-in.

As part of the project implementation, specific high risk villages in designated rural districts were selected on a “clustered” basis, meaning that as success at the individual village level takes hold, villages that are geographically contiguous will share the costs of mutually beneficial projects and cooperate on local security. Clustering has the effect of “oil-spotting” positive economic, political, and security effects.

The CROWDED HOUSE project was conducted with support from the Joint Improvised Explosive Device Defeat Organization (JIEDDO) and complemented the Village Stability Platform, Afghan Local Police initiatives, and provided direct operational support to DoD COIN operations.



Photo courtesy of Creative Associates International



Photo courtesy of Creative Associates International



Photo courtesy of Creative Associates International

IRREGULAR WARFARE SUPPORT

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U.S. Army photo by Sgt. Dennis W. Jackson

Outreach



TECHNOLOGY TRANSITION

The TSWG charter identifies technology transition assistance throughout the development cycle as essential to supporting national combating terrorism objectives. The CTTSO has formalized the technology transition process into every aspect of its R&D programs. The CTTSO requires that every proposal received address technology transition as a principal task and that each new project include a technology transition plan. A dedicated technology transition manager works with CTTSO developers to prepare the plans and to address the issues associated with a successful transition to production, such as:

- Exploration of all applications and markets for the technology;
- Understanding and managing intellectual property (patents, trademarks, copyrights, trade secrets, and licensing; to include data and software rights and options);
- Market evaluations for military, federal, state, local, and commercial users;
- Environmental, safety, and health issues;
- Liability risk reduction and consideration of SAFETY Act Applications;
- Security and Export Control provisions;
- Regulatory restrictions to include electronic emissions, environmental, safety, health, transportation, and others;
- Test and evaluation planning and independent operational testing by users;
- Transition to production, including partnering, investment capital, licensing, and finding markets and distributors; and
- Operational suitability and operational support planning.

A number of technology transition tools and methodologies are used to assist the developer with resolving issues and reaching user markets, such as:

- Commercialization assessments and transition plan formats;
- Publication of handbooks and special primers;
- Non-disclosure agreements;
- Provisional patents versus full patents;
- Liability risk reduction techniques;
- Tailored license application forms and licensee/partner selection board assistance;
- Technical data and software package rights and management techniques;
- Federal Business Opportunity announcements;
- Licenses and Cooperative Research and Development Agreements (CRADAs);
- Cooperative Agreements
- Implications of the Buy American Act on production;

TECHNOLOGY TRANSITION

- Export Control processing assistance;
- Technology briefs, articles, and outreach plans to reach large user groups;
- Interface with professional associations, user publications, and other media to provide product visibility; and
- Assistance with linkages to DHS Federal Grant funding for responder related technology.

The keys to accelerating the complicated approach of moving many prototypes to production includes having a disciplined process, available assistance, and teamwork among the project manager, technology transition manager, and the developer. Additional information is available at the Technology Transition section of the CTTSO Web site, <http://www.cttso.gov>.

INTERAGENCY AND INTERNATIONAL COLLABORATION

Throughout the year, the CTTSO participated in a number of interagency and international meetings and conferences. These include but are not limited to the following:

Advance Planning Briefing for Industry

On January 25, 2011, the Advance Planning Briefing for Industry (APBI), sponsored by the CTTSO, provided representatives of industry, government, entrepreneurs, and associated developers with a preview of the requirements identified in the annual CTTSO Broad Agency Announcement. This year approximately 550 registrants attended the APBI, which was held in the Ronald Reagan Building and International Trade Center in Washington, D.C. The CTTSO and EOD/LIC program representatives presented 45 requirements published in March 2011.

Homemade Explosives International Workshop

More than 150 participants attended the Homemade Explosives (HME) International Workshop, hosted by the Physical Security Subgroup, on February 1-4, 2011. The meeting opened with recent events and threat perspectives from the Intelligence Community and operators.

Participants came from multiple agencies within the United States, the United Kingdom, Canada, Israel, Australia, Singapore, and the Netherlands. Discussions included ongoing projects and current scientific research conducted to support understanding of HME and aide in the development of necessary tools to defeat the threat. The meeting included three days of afternoon break-out sessions on topics such as explosive equivalence, HME requirements, HME outreach programs, ongoing round robin efforts, classification of HME materials and training, forensics, and more. This conference builds consensus and connects the needs of the Intelligence Community with military and interagency operators, while providing researchers with a greater understanding in order to create solutions to bridge operational gaps. It provides a venue where international partners can collaborate on these solutions and share life-saving information.

Current membership consists of almost 600 individuals from six countries and includes federal, state, and local bomb technicians and explosive ordnance disposal technicians, national laboratories, and U.S. federal departments including the Department of Homeland Security, the Department of Justice, and the Department of Transportation.

Ammunition Initiatives Meeting

The Tactical Operations Support (TOS) Subgroup hosted the Ammunition Initiatives III Meeting (AIM III) in McLean, VA, on March 16-17, 2011. The AIM conference is the only known world forum devoted to small

INTERAGENCY AND INTERNATIONAL COLLABORATION

caliber ammunition initiatives. The conference has grown from a one-day event with 25 attendees, 15 agencies, and no vendors in 2009 to a two-day event with more than 100 registered individuals, more than 40 government organizations, eight commercial vendors, and 19 papers presented in 2011. New in 2011 was the addition of a Warfighter Panel, which was moderated/chaired by U.S. Army Special Forces Command (Airborne), and included members of the Canadian special operations forces (SOF) community, the U.S. Army Asymmetric Warfare Group, the UK Ministry of Defence, and the Australian Special Operations Command. The Warfighter Panel discussed the Precision Sniper Rifle requirements, capability gaps within the international/interagency community, and attempted to polarize areas of commonality in terminal performance and maximum effective range of the primary individual weapon on the modern battlefield.



Irregular Warfare in the 21st Century Symposium

On March 30-31, 2011, the Office of the Assistant Secretary of Defense for Special Operations/Low Intensity Conflict (OASD SO/LIC) hosted a two-day symposium in Washington, D.C., on Irregular Warfare in the 21st Century. The purpose of this symposium was to bring together senior military and civilian officials to discuss critical issues surrounding the implementation of Secretary of Defense Gates' directive to institutionalize Irregular Warfare (IW) in the Department of Defense. With participation from across the DoD, the symposium enabled decision makers to share insights into the current state of IW in the Armed Services, which lays the groundwork to discuss oversight mechanisms to further increase DoD's capacity and capability to conduct IW. The symposium also allowed for robust discussion with other practitioners and members of the academic community on the history of IW and the role it plays in current and future conflicts.

Force Protection Equipment Demonstration

The Technical Support Working Group participated in the eighth Force Protection Equipment Demonstration (FPED VIII) from May 17-19, 2011 at the Stafford Regional Airport in Stafford, VA. The FPED event is co-sponsored by the Department of Defense's Physical Security Equipment Action Group, the Department of Energy, and TSWG. FPED brings together federal research organizations and more than 500 commercial sector manufacturers to display and demonstrate advanced technologies in force protection and physical security equipment. Decision makers and end users from federal, state, and local levels attend the FPED to witness the equipment demonstrations, receive project briefings, and provide feedback through interactive discussions with technical representatives. This year TSWG presented equipment and technologies from all of its subgroups

INTERAGENCY AND INTERNATIONAL COLLABORATION

Quadrilateral Countering Violent Extremism – Radicalization R&D Conference

The Irregular Warfare Support Program hosted a Quadrilateral Countering Violent Extremism – Radicalization R&D Conference June 22-24, 2011 in Seacaucus, NJ. Attendees were international partners and representatives from U.S. agencies who are funding and conducting research in this area. This conference served to discuss current trends, to review current research, to discuss relevant gaps, to understand each country's requirements, to discuss possible areas of collaboration, and to build an international community of interest.

Homemade Explosives Working Group

The Physical Security Subgroup hosted the Domestic Homemade Explosives (HME) Working Group, which was attended by 110 participants, on August 30-31, 2011. Participants came from multiple agencies including the Department of State, the Department of Homeland Security, the Bureau of Alcohol, Tobacco, Firearms and Explosives, the Federal Bureau of Investigation, the Joint Improvised Device Defeat Organization, the U.S. Army Corps of Engineers, the Intelligence Community, service members, local law enforcement groups, and many more. The meeting included two days of sessions on topics such as explosive equivalence, HME requirements, HME training, HME forensic tools, transportation issues, and more. This conference builds consensus and connects the needs of the Intelligence Community with military and interagency operators, while providing researchers with a greater understanding in order to create solutions to bridge operational gaps. It provides a venue where domestic partners can collaborate on these solutions and share life-saving information. Current membership consists of more than 500 individuals from federal, state, and local operational personnel, national laboratories, and U.S. federal departments including the Department of Defense, the Department of Homeland Security, the Department of Justice, and the Department of Transportation..



CTTSO Special Operations Forces (SOF) Review

The CTTSO held its annual Combat Support to Special Operations Forces (SOF) Review on October 13-14, 2011 in McLean, VA. More than 50 U.S. government agencies and international SOF partners participated. The SOF Review included project briefings on more than 80 CTTSO projects that have recently completed or are underway to support SOF elements. In addition to the CTTSO presentations, the SOF Review included briefings from U.S. Army Special Forces Command, U.S. Army 75th Ranger Regiment, U.S. Naval Special Warfare Command, U.S. Army Rapid Equipping Force, U.S. Army Asymmetric Warfare Group, U.S. Border Patrol Tactical Unit, and the FBI Hostage Rescue Team.

BAA INFORMATION DELIVERY SYSTEM (BIDS)

The Broad Agency Announcement (BAA) Information Delivery System, better known as BIDS, works to support the CTTSO mission through the electronic publication of its annual BAAs. BAAs are the solicitation method of choice to bring the most urgent combating terrorism requirements forward for publication. CTTSO staff monitors BAA package instruction in light of submitter responses and feedback, and CTTSO implements improvements as needed each year to clarify the submission process.

To ensure the widest possible distribution to potential submitters, BAAs can be downloaded at the BIDS Web site (<http://www.bids.cttso.gov>) and are also advertised at the Federal Business Opportunities Web site (<http://www.fedbizopps.gov>). In addition to conventional government solicitation notices, the BIDS Web site provides a BIDS Advisory and Announcement area that posts BAA news, coming events, and partnering agency solicitations. In addition to the advisory, the RSS (really simple syndication) news feed allows interested users to receive real-time broadcast information at a local computer when connected to the Internet.



BIDS is a rich source of submitter information, providing small business outreach, online training, and guidance for offerers proposing the use of human subjects in research. Overall BAA statistics are posted once the BAA closes.

BIDS not only functions as a response collection system, but also provides for submission evaluation and submitter notification. Submitter data is fully protected in a 128-bit encrypted environment. Evaluators must comply with source selection data handling requirements and accept a nondisclosure agreement to access BIDS. In addition to the nondisclosure, evaluators must also certify that there is no conflict of interest before access is granted to any submissions. The evaluation process is monitored for timely notice to submitters with the typical response via an automated e-notice complete within 90 days.

BIDS continues to serve as a leading solicitation process model for other federal programs by providing a streamlined electronic solution to receive proposals, providing access for subject matter expert evaluation, processing submissions through the approving authority, notifying the submitter of status, and maintaining a record of solicitation results.

CTTSO PORTAL WEB SITE — WWW.CTTSO.GOV

The CTTSO portal Web page (www.cttso.gov) works to centralize comprehensive program resources while maintaining the individual technical expertise of each sector.

Featured program elements to date include the Technical Support Working Group, the Explosive Ordnance Disposal/Low-Intensity Conflict, and the Irregular Warfare Support program. Each program maintains its own Web site and is easily accessed through the portal. The TSWG site also includes a focus on the transition of products available to end users.

Portal visitors can freely navigate several information pages to learn about the CTTSO or review business opportunities for product commercialization. Helping small businesses and nontraditional defense contractors to find opportunities and do business with the government is one of several information focuses. A Technology Transition page is provided for CTTSO contract awardees to help in the transition to production or commercialization of products. Links to BIDS and other government sites are also available. The Contract Award page details information on current performers, recent contract awards, and BAA statistical data.

CTTSO Forums, an access-controlled site for data sharing among mission area participants, is linked from the portal.



U.S. Army photo by Staff Sgt. Shawn Morris

Appendix



2011 MEMBERSHIP

Environmental Protection Agency

- National Enforcement Investigations Center

Federal Reserve Board

Intelligence Community

InterAgency Board

National Aeronautics and Space Administration

National Bomb Squad Commanders Advisory Board

National Tactical Officers Association

National Transportation Safety Board

Office of the Director of National Intelligence

State and Local Agencies:

- Arlington County (VA) Fire Department
- Bloomington, Minnesota Police Department (Central region)
- DC Metropolitan Police
- Fairfax County (VA) Fire and Rescue Department
- Fairfax County (VA) Police Department
- Fire Department, City of New York
- Georgia Bureau of Investigation (Southern region)
- Houston, Texas Police Department (Western region)
- Jacksonville Port Authority
- Los Angeles County Sheriff's Department
- Lynchburg Sheriff's Office
- Maryland State Police
- Michigan State Police
- Montgomery County Department of Police
- Morris County Sheriff's Office (Eastern region)
- New York City Office of Chief Medical Examiner
- New York City Police Department
- Pentagon Force Protection Agency Bomb Squad (VA)
- Pinellas County Sheriff's Office
- Port Authority of New York & New Jersey
- Protective Services Police Department
- Seattle (WA) Fire Department
- U.S. Capitol Police
- Virginia State Police

U.S. Department of Agriculture

- Animal and Plant Health Inspection Service
- Food Safety and Inspection Service

2011 MEMBERSHIP

- Forest Service

U.S. Department of Commerce

- National Institute of Standards and Technology
- Office of Law Enforcement Standards

U.S. Department of Defense

- Armed Forces Institute of Pathology
- Assistant to the Secretary of Defense for Nuclear and Chemical and Biological Defense; Acquisition, Technology and Logistics
- Counterintelligence Field Activity
- Defense Academy for Credibility Assessment
- Defense Advanced Research Projects Agency
- Defense Computer Forensics Laboratory
- Defense Criminal Investigative Service
- Defense Finance and Accounting Service
- Defense Intelligence Agency
- Defense Threat Reduction Agency
- Explosives Safety Board
- Joint Chiefs of Staff
- Joint Improvised Explosive Device Defeat Organization
- Joint Personnel Recovery Agency
- Joint Program Executive Office for Chemical and Biological Defense
- Joint Task Force North (NORTHCOM)
- Joint Warfare Analysis Center (JFCOM)
- Lawrence Livermore National Laboratory
- National Security Agency
- National Geospatial-Intelligence Agency
- National Nuclear Security Administration
- National Reconnaissance Office
- Nuclear Regulatory Commission
- Office of Naval Research
- Office of the Provost Marshal General
- Office of the Undersecretary of Defense for Personnel and Readiness
- Pentagon Force Protection Agency
- Physical Security Equipment Action Group
- Rapid Reaction Technology Office
- Special Operations Command
- Unified Combatant Commands
- U.S. Air Force Air Combat Command
- U.S. Air Force Office of Special Investigations
- U.S. Air Force Research Laboratory
- U.S. Air Force Special Operations School
- U.S. Army
- U.S. Army 20th Support Command – Chemical, Biological, Radiological, Nuclear, and high yield Explosives (CBRNE)
- U.S. Army 22nd Chemical Battalion
- U.S. Army 52nd Ordnance Group

2011 MEMBERSHIP

- U.S. Army Armaments Research, Development and Engineering Center
- U.S. Army Asymmetric Warfare Group
- U.S. Army Chemical School
- U.S. Army Chemical School, Maneuver Support Center
- U.S. Army Communications-Electronics Research, Development and Engineering Center
- U.S. Army Corps of Engineers
- U.S. Army Criminal Investigation Command
- U.S. Army Criminal Investigation Laboratory
- U.S. Army Edgewood Chemical Biological Center
- U.S. Army Explosive Ordnance Disposal Technical Detachment
- U.S. Army Intelligence and Security Command
- U.S. Army John F. Kennedy Special Warfare Center and School
- U.S. Army Joint Trauma Analysis and Prevention of Injury in Combat
- U.S. Army Maneuver and Support Center
- U.S. Army Medical Department
- U.S. Army Medical Research and Materiel Command
- U.S. Army Military Police School
- U.S. Army National Ground Intelligence Center
- U.S. Army National Guard Bureau
- U.S. Army Office of the Provost Marshal General
- U.S. Army Product Manager-Force Protection Systems
- U.S. Army Product Manager-Guardian
- U.S. Army Program Executive Office Soldier Protective Equipment
- U.S. Army Rapid Equipping Force
- U.S. Army Research, Development, and Engineering Command
- U.S. Army Research Laboratory
- U.S. Army Research Lab Simulation and Training Technology Center
- U.S. Army Soldier Systems Center (Natick)
- U.S. Army Special Forces Command
- U.S. Army Special Operations Command
- U.S. Army Tank Automotive Research, Development and Engineering Center
- U.S. Army Training and Doctrine Command
- U.S. Army War College
- U.S. Joint Forces Staff College
- U.S. Marine Corps
- U.S. Marine Corps Central Command
- U.S. Marine Corps Chemical, Biological Incident Response Force
- U.S. Marine Corps Criminal Investigation Division
- U.S. Marine Corps Explosive Ordnance Disposal Detachment
- U.S. Marine Corps Forces-Pacific
- U.S. Marine Corps Special Operations Command
- U.S. Marine Corps Systems Command
- U.S. Marine Corps Training and Education Command
- U.S. Marine Corps Warfighting Laboratory
- U.S. Naval Criminal Investigative Service
- U.S. Naval Facilities Engineering Command
- U.S. Naval Facilities Engineering Service Center

2011 MEMBERSHIP

- U.S. Naval Special Warfare Command
- U.S. Navy
- U.S. Navy Bureau of Medicine
- U.S. Navy Chief of Naval Operations
- U.S. Navy Commander Navy Installations Command
- U.S. Navy Criminal Investigative Service
- U.S. Navy Expeditionary Combat Command
- U.S. Navy Explosive Ordnance Disposal Detachment 63
- U.S. Navy Explosive Ordnance Disposal Fleet Liaison Office
- U.S. Navy Explosive Ordnance Disposal Technology Division
- U.S. Navy Naval Air Systems Command
- U.S. Navy Naval Air Warfare Center
- U.S. Navy Naval Criminal Investigative Service
- U.S. Navy Naval Forces Central Command
- U.S. Navy Naval Research Laboratory
- U.S. Navy Naval Surface Warfare Center
- U.S. Navy Office of Naval Research
- U.S. Navy Program Executive Office Ships
- U.S. Navy Sea Systems Command
- U.S. Navy Strategic Systems Programs
- U.S. Navy Surface Warfare Center
- U.S. Special Operations Command

U.S. Department of Energy

- National Nuclear Security Administration
- Office of Health, Safety and Security

U.S. Department of Health and Human Services

- Centers for Disease Control and Prevention
- Food and Drug Administration
- National Institute for Occupational Safety and Health

U.S. Department of Homeland Security

- Border and Transportation Security Directorate
- Federal Air Marshal Service
- Federal Emergency Management Agency
- Federal Law Enforcement Training Center
- Federal Protective Service
- Forensic Document Laboratory
- Homeland Security Advanced Research Project Agency
- Immigration and Customs Enforcement
- Information Analysis and Infrastructure Protection Directorate
- Office for Domestic Preparedness
- Office of Bombing Prevention
- Science and Technology Directorate
- Transportation Security Administration
- Transportation Security Laboratory
- Urban Search and Rescue

2011 MEMBERSHIP

- U.S. Border Patrol
- U.S. Coast Guard
- U.S. Customs and Border Protection
- Border Patrol Tactical Unit
- U.S. Secret Service
- U.S. Secret Service, Special Services Division, Technical Security Division

U.S. Department of the Interior

- Bureau of Reclamation

U.S. Department of Justice

- Ballistic Research Facility
- Bureau of Alcohol, Tobacco, Firearms and Explosives
- Special Response Team
- Drug Enforcement Administration
- Federal Bureau of Investigation
- Hostage Rescue Team
- Federal Bureau of Prisons
- National Center for Forensic Science
- National Forensic Science Technology Center
- National Institute of Justice
- U.S. Marshals Service

U.S. Department of State

- Bureau of Diplomatic Security
- Bureau of Overseas Buildings Operations
- Office of the Coordinator for Counterterrorism

U.S. Department of Transportation

- Federal Aviation Administration
- Research and Innovative Technology Administration (Volpe Center)

U.S. Department of the Treasury

- Internal Revenue Service
- Office of the Inspector General

U.S. Department of Veterans Affairs

U.S. Postal Inspection Service

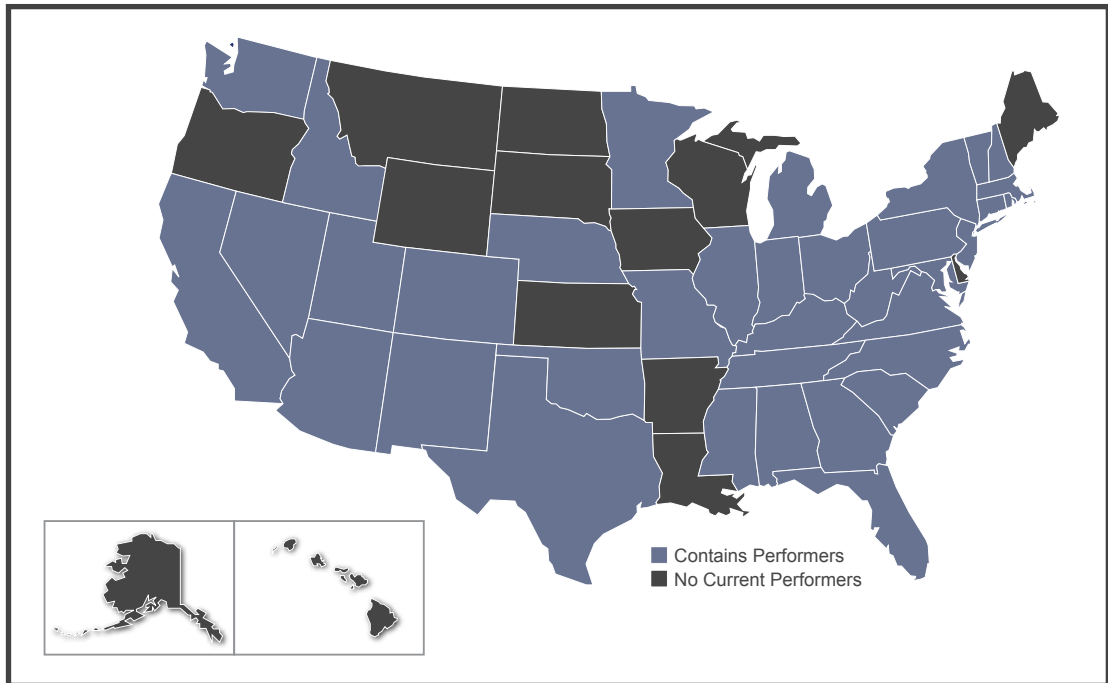
U.S. Senate Sergeant at Arms

U.S. Supreme Court Police

White House

- Homeland Security Council
- Office of Science and Technology Policy

2011 PERFORMERS



Alabama

U.S. Army Space and Missile Defense Command, Huntsville

Arizona

Armor Designs, Phoenix
Armorworks, Chandler
University of Arizona, Tucson

California

Aerovironment, Simi Valley
Altobridge Corporation, San Jose
Cantimer, Menlo Park
GKN Aerospace Transparency, Garden Grove
Intelligent Optical Systems, Inc., Torrance
Naval Facilities Engineering Service Center, Port Hueneme
Naval Health Research Center, San Diego
Neptunic Technologies, San Diego
Pacific Science and Engineering Group, Inc., San Diego
Palantir Technologies Inc., Palo Alto
Physical Optics Corporation, Torrance
QPC Fiber Optic, Inc., San Clemente
Rapisan, Hawthorne
Rapisan Systems Neutronics and Advanced Technologies, Sunnyvale
Raymat Materials, Inc., Fremont
Safariland, Ontario

2011 PERFORMERS

Science Applications International Corporation, San Diego
Science Applications International Corporation, Vista
Smiths Detection, Pasadena
System Technology, Inc., Hawthorne
Tactical Survey Group, San Bernardino
University of California, San Diego
Visualyze Technologies, Inc., Santa Monica
Western Psychological Services, Torrance

Colorado

Applied Research Associates, Inc., Littleton
APTEK, Colorado Springs
NEK Advanced Securities Group, Inc., Colorado Springs
Rocky Mountain Scientific Laboratories, Highlands Ranch
SET Corporation, an SAIC Company, Greenwood Village
Stratom, Inc., Boulder

Connecticut

Nextgen Fiber Optics, LLC, Dayville
Summa Design, LLC, Montrose
United Technologies Research Center, Hartford

District of Columbia

Bureau of Alcohol, Tobacco, Firearms and Explosives
Defense Intelligence Agency
Defense Threat Reduction Agency
Department of Homeland Security
Government Printing Office
Naval Research Laboratory
Naval Sea Systems Command
Orbis Operations
Pentagon Force Protection Agency
U.S. Park Police

Florida

Air Force Civil Engineer Support Agency, Tyndall Air Force Base
Air Force Research Laboratory, Tyndall Air Force Base
AMP Research, Inc., Naples
Carley Corporation, Orlando
CTC Tampa Bay Inc., Largo
Dreifus Associates Ltd., Inc., Maitland
Engineering and Computer Simulations, Inc., Orlando
Field Forensics, Largo
Florida State University, Panama City
Naval Surface Warfare Center, Panama City
Perception IR Manufacturing, LLC, Palm Harbor
Quantum Technology Sciences, Inc., Cocoa Beach

2011 PERFORMERS

U.S. Army Research Laboratory Simulation and Training Technology Center, Orlando
U.S. Special Operations Command, Tampa
Vcom3D, Inc., Orlando

Georgia

Georgia Tech Research Institute, Atlanta
Squires-Fulcher LLC, Locust Grove

Idaho

Idaho National Laboratory, Idaho Falls

Illinois

Argonne National Laboratory, Argonne
Brain-Body Center, University of Illinois at Chicago
Illinois Fire Service Institute, University of Illinois, Champaign

Indiana

Conflict Kinetics, Merrillville
Indiana University Purdue University Indianapolis, Indianapolis
Lafayette Instrument Company, Lafayette
Naval Surface Warfare Center, Crane
Raytheon Technical Services, Indianapolis

Kentucky

Ideal Products, Inc., Lexington
L-Tech Enterprises, Inc., Eubank

Maine

Falcon Performance Footwear, Auburn

Maryland

Army Aberdeen Test Center, Aberdeen Proving Ground
Army Medical Research and Materiel Command, Fort Detrick
Army Research Laboratory, Aberdeen Proving Ground
Ballard Power Systems, College Park
Edgewood Chemical Biological Center, Aberdeen Proving Ground
Edgewood Chemical Biological Center, Edgewood
HazTrain, White Plains
Impact Computing Corporation, Silver Spring
Intelligent Automation, Inc., Rockville
Naval Explosive Ordnance Disposal Technology Division, Indian Head
Naval Surface Warfare Center, Indian Head
Pitney Bowes Government Solutions, Inc., Latham
Regal Decisions Systems, Belcamp
SimQuest, Silver Spring
TRX Systems, Inc., Greenbelt
U.S. Army Public Health Command, Aberdeen

2011 PERFORMERS

U.S. Army Test and Evaluation Center, Aberdeen
Vehicle Systems Integration, LLC, College Park
W.L. Gore, Elkton
Zephyr Technology Corporation, Annapolis

Massachusetts

American Science and Engineering, Inc., Ballerica
Artisent, Inc., Boston
BAE Systems, Burlington
Black I Robotics
Charles River Analytics, Inc., Cambridge
Excellims Corporation, Maynard
Foster-Miller, Inc.
QinetiQ – North America, Inc., Waltham
Raytheon BBN, Cambridge
Reveal Imaging Technologies, Bedford
Thermo Fisher Scientific, Inc., Wilmington
U.S. Department of Transportation Volpe Center, Cambridge

Michigan

Avon Protection Systems, Inc., Cadillac
Baker Enterprises, Alpena
General Motors LLC, Detroit
Michigan State University, East Lansing
Quantum Signal, LLC, Ann Arbor
Wayne State University, Detroit

Minnesota

Agile Defense, LLC, St. Paul
University of Minnesota, Minneapolis

Mississippi

U.S. Army Engineer Research and Development Center, Vicksburg

Missouri

Clean Earth Technologies, LLC, Earth City
Clean Earth Technologies, St. Louis
Essex PB&R Corporation, St. Louis
Midwest Research Institute, Kansas City
Washington University in St. Louis, St. Louis

Nebraska

U.S. Army Corps of Engineers Protective Design Center, Omaha

Nevada

Global Specialized Medicine, Reno
HBM, Inc., Las Vegas
ID Scientific, Las Vegas

2011 PERFORMERS

National Nuclear Security Administration, Las Vegas
Prototype, Las Vegas
Remote Sensing Laboratory, Las Vegas

New Hampshire

Elbit Systems of America, Merrimack
Globe Manufacturing Company, Pittsfield
Sig Sauer, Inc., Exeter
U.S. Army Cold Regions Research and Engineering Lab, Hanover
Warwick Mills, Inc., New Ipswich

New Jersey

Armament Research, Development and Engineering Center, Picatinny Arsenal
Lockheed Martin Advanced Technology Laboratories, Cherry Hill
Picatinny Arsenal, Picatinny
Structured Materials Industries, Piscataway

New Mexico

Applied Research Associates, Inc., Albuquerque
Energetic Materials Research and Testing Center, Socorro
National Assessment Group, Albuquerque
National Assessment Group, Kirtland Air Force Base
Sandia National Laboratories, Albuquerque
Stolar Research Corporation, Raton

New York

GE Global Research, Niskayuna
Kitware, Inc., Clifton Park
New York City Police Department, New York
Persistent Systems, LLC, New York
Skidmore College, Saratoga Springs
Vuzix Corporation, Rochester

North Carolina

Archangel Armor, Fayetteville
Chemring Group, Charlotte
Logos Technologies, Inc., Raleigh
North Carolina State University, Textile Protection and Comfort Center, Raleigh
Signalscape, Inc.
XinRay Systems, Research Triangle Park

Ohio

Battelle Memorial Institute, Columbus
Lion Apparel, Dayton
Multiple Intelligences Research and Consulting, Inc., Kent
Plug Power, Sidney

2011 PERFORMERS

Oklahoma

ICx Nomadics, Inc., Stillwater
Southwest Research Institute, Midwest City
Tactical Electronics, LLC, Broken Arrow

Pennsylvania

Drexel University Data Fusion Laboratory, Philadelphia
DRS Laurel Technologies, Johnstown
Dynamic Defense Materials, Boothwyn
Foreign Policy Research Institute, Philadelphia
NIOSH NPPTL, Pittsburgh
Nuvision Engineering, Pittsburgh
Ordnance Holdings, Inc., Drexel Hill
Pennsylvania State University, University Park
Pennsylvania State University/Applied Research Laboratory, University Park
RE2 Inc., Pittsburgh
VideoRay, Phoenixville

Rhode Island

Naval Undersea Warfare Center, Newport

South Carolina

Advanced Mission Systems, Ft. Mill
Time Cuffs, LLC, North Charleston

Tennessee

Northrop Grumman Remotec, Clinton
Universal Strategy Group, Inc., Mt. Pleasant

Texas

21st Century Technologies, Austin
Accuracy 1st, Inc., Arthur City
Applied Research Associates, Inc., San Antonio
G2 Associates, Heath
International Personnel Protection, Inc., Austin
OSS Law Enforcement Advisors, Spring
Protection Engineering Consultants, LLC, Spring Branch
Southwest Foundation for Biomedical Research, San Antonio
Southwest Research Institute, San Antonio
University of Houston, Houston
U.S. Army Institute of Surgical Research, Fort Sam Houston

Utah

Coda Octopus USA, Salt Lake City
Torion Technologies, Inc., American Fork

Vermont

Norwich University Applied Research Institutes, Northfield

2011 PERFORMERS

Plasan North America, Bennington
Sound Innovations, Inc., White River Junction

Virginia

Analytic Services, Inc., Alexandria
Ashlar International, LLC, Ashburn
AT-Solutions, Inc., Fredericksburg
Avir, LLC, Charlottesville
Battelle Memorial Institute, Arlington
Blackbird Technologies, Herndon
The Bode Technology Group, Springfield
Booz Allen Hamilton, Arlington
Center for Innovative Technology, Herndon
Federal Bureau of Investigation, Quantico
Gatekeeper Security, Inc., Reston
GeoEye, McLean
George Mason University, Fairfax
Hazard Management Solutions, Inc., Arlington
Institute for Applied Science, Reston
Jorge Scientific Corporation, Arlington
ManTech International Corporation, Chantilly
National Crash Analysis Center of George Washington University, Ashburn
Naval Surface Warfare Center Carderock Combatant Craft Division, Little Creek
Naval Surface Warfare Center, Dahlgren
Night Vision and Electronic Sensors Directorate, Ft. Belvoir
Northrop Grumman Training Solutions Sector, Herndon
The Penro Group, Alexandria
Platinum Solutions, Inc., Reston
S4 Tech, Reston
System Planning Corporation, Arlington
Trident Systems, Inc., Fairfax
U.S. Army Night Vision and Electronic Sensors Directorate, Fort Belvoir
White Canvas Group, LLC, Arlington

Washington

The Boeing Company, Seattle
Cascade Designs, Inc., Seattle
Cling Cal Corp., Deming
Creative Machining Co., Sedro Woolley
Isotron Corporation, Seattle
NextLevel Training, LLC., Ferndale
Pacific Northwest National Laboratory, Richland
Pioneer Consulting, Ferndale
Sound Metrics Corporation, Lake Forest Park
Stark Aerospace, Redmond

West Virginia

STS International, Berkeley Springs
West Virginia High Technology Consortium Foundation, Fairmont

2011 PERFORMERS

INTERNATIONAL

Australia

Bond University, Gold Coast, Queensland
Defence Science and Technology Organisation, Fishermans Bend, Melbourne
Department of the Prime Minister and Cabinet, Canberra
Emergency Management Australia, Canberra
Flinders University, Adelaide
iWebGate Pty Ltd, Perth
Prime Minister and Cabinet, Canberra
Queensland Fire and Emergency Services, Brisbane
Queensland University of Technology, Brisbane
University of Adelaide, Adelaide

Canada

Allen-Vanguard Protective Technologies, Ltd., Ottawa, Ontario
Ballard Power Systems, Burnaby, British Columbia
Biokinetics and Associates, Ltd
Canadian Commercial Corporation, Ottawa, Ontario
Defence Research and Development Canada, Suffield
Defence Research and Development Canada, Valcartier, Quebec
Oculus, Toronto, ON
Optosecurity, Inc., Quebec City, Quebec

Ghana

mPedigree Network Ltd., Accra

Israel

Adaptive Imaging Technologies, Yokneam Illit
C4, Ramat Hasharon
Controp Precision Technologies, Hod Hasharon
Elbit Systems, Haifa
Elbit Land/Platforms, Yokne'am
Electro-Optics Industries, Ltd., Rehovat
The Hebrew University of Jerusalem, Jerusalem
Israel Defense Forces, Combat Engineering Corps
Israel Defense Forces, Home Front Command
Israel Ministry of Defense, Tel Aviv
Israeli National Police, Jerusalem
Israeli Security Agency
Motorola Israel Ltd, Tel Aviv
National Nuclear Research Center, Negev
Rafael Armament Development Authority, Ltd., Haifa
Soltam Systems, Ltd., Yokne'am
Soreq, Tel Aviv

2011 PERFORMERS

Singapore

Envisage Reality
Ministry of Defense, Singapore
Singapore Defence Science and Technology Agency

United Kingdom

Buckler Davies Consultancy Limited, Swindon
Centre for Protection of National Infrastructure, London
Cognitive Consultants International, Ltd., Southampton
Counter Terrorism Science and Technology Centre, Salisbury
Defence Science and Technology Laboratory, Fort Halstead, Kent
Defence Science and Technology Laboratories, Porton Down
Hazard Management Solutions, Inc., Farington, Oxfordshire
Home Office Scientific Development Branch, London
MBDA, Bristol
Ministry of Defence, London
University of Portsmouth, Portsmouth

GLOSSARY OF ACRONYMS

A

AAC	Advanced Analytic Capabilities
AFERS	Automated Facial Expression Recognition System
AMPS	Airspace MANPADS Protection System
AN	Ammonium Nitrate
ANFO	Ammonium Nitrate and Fuel Oil
APV	Armored Passenger Vehicle
ASD	Assistant Secretary of Defense
ASD (SO/LIC)	Assistant Secretary of Defense for Special Operations/Low-Intensity Conflict
ATMS	Advanced Telescoping Manipulation System
AWE	Assured Wireless Ethernet
AXISS	Advanced X-ray Imaging Single Sided System

B

BAA	Broad Agency Announcement
BIDS	BAA Information Delivery System

C

C2	Command and Control
CAAT	Counterinsurgency Advisory and Assistance Team
CB	Chemical and/or Biological
CBR	Chemical, Biological, and Radiological
CBRN	Chemical, Biological, Radiological, and Nuclear
CBRNC	Chemical, Biological, Radiological, and Nuclear Countermeasures
CBRNE	Chemical, Biological, Radiological, Nuclear, and High-Yield Explosives
CbT	Combating Terrorism
CCDSS	Chemical Companion Decision Support System
CDMN	Combat Diver Navigation Mask
COIN	Counter Insurgency
COMUSFOR-A	Commander, U.S. Forces - Afghanistan
CoT	Cursor-on-Target
COTS	Commercial Off-the-Shelf
CTTSO	Combating Terrorism Technical Support Office

D

DATT	Defense Against Terrorist Tactics
DHS	Department of Homeland Security
DNA	Deoxyribonucleic Acid

DoD Department of Defense
DSDR Defensive System Data Recorder
DWR Dual Wavelength Raman

E

ECM Electronic Countermeasures
ECWMTUAS Enhanced Collapsible Wing Micro Tactical Unmanned Aerial System
ED Explosives Detection
EES Emergency Egress System
EMTAS Enhanced Mortar Targeting System
EOD Explosive Ordnance Disposal
EOD/LIC Explosive Ordnance Disposal/Low-Intensity Conflict
EWG Electronic Warfare Grenade

F

FY Fiscal Year

G

GC/MS Gas Chromatograph/Mass Spectrometer
GPO Government Printing Office
GPR Ground Penetrating Radar
GPS Global Positioning System
GTRI Georgia Tech Research Institute

H

HAZMAT Hazardous Material
HEADD High Energy Access and Disablement Device
HME Homemade Explosives
HN Host Nation
HRP High-Risk Personnel
HSCB Human Social, Cultural, and Behavior
HVAC Heating, Ventilation, and Air Conditioning

I

IDD Improvised Device Defeat
IED Improvised Explosive Device
ISC Interagency Security Committee
ISF Investigative Support and Forensics
ISR Intelligence, Surveillance, and Reconnaissance

IWS Irregular Warfare Support
IW TWG Irregular Warfare Tactical Wargame

J

JFKSWCS John F. Kennedy Special Warfare Center and School

M

MANPADS Man-Portable Air Defense Systems
MIMEO Modeling Information Propagation Through Memetic Evolution
MIMO Multiple Input, Multiple Output
MISO Military Information Support Operations
MMD Mask-mounted Display
MTCBA Multi-Threat Concealable Body Armor

N

NFPA National Fire Protection Association
NG-TacMN Next Generation Tactical Mesh Network
NIJ National Institutes of Justice
NIOSH National Institute for Occupational Safety and Health
NIST National Institute of Standards and Technology
NRO National Reconnaissance Office
NSA National Security Agency
NVESD Night Vision and Electronic Sensors Division

O

OTD Orthogonal TIC Detector

P

PBIED Person-Borne Improvised Explosive Device
PCB Printed Circuit Board
PEM Precision Engagement Module
PIG Platform Interchangeable Gear
PIT Precision Immobilization Technique
PPE Personal Protective Equipment
PS Physical Security
PSASK Portable Seismic Acoustic Sensor Kit
PSD Protective Service Detail
PSDA Personal Security Decision Aid
PSVA Personal Security Vulnerability Assessment

R

R&D	Research and Development
RAM	Random-Access Memory
RC	Regional Command
RCIED	Radio-controlled Improvised Explosive Device
ROV	Remotely Operated Vehicle

S

S/CT	Department of State Office of the Coordinator for Counterterrorism
SAFIRE	Situational Awareness for Intelligent Robotic Employment
SAVANT	Susceptibility and Vulnerability Analysis Tool
SCBA	Self-Contained Breathing Apparatus
SCOS	Surveillance, Collection, and Operations Support
SIRT	Shot Indicating Resetting Trigger
SMS	Short Message Service
SOCOM	United States Special Operations Command
SOF	Special Operations Forces
SO/LIC	Special Operations/Low-Intensity Conflict
SPD	Suspended Particle Device
SRP	Surveillance and Reconnaissance Platform

T

TIC	Toxic Industrial Chemical
TNT	Tactical Network Testbed
TOS	Tactical Operations Support
TSA	Transportation Security Administration
TSWG	Technical Support Working Group
TTD	Training Technology Development
TTP	Tactics, Techniques, and Procedures

U

UAS	Unmanned Aerial Systems
UIS	Underwater Imaging System
ULP	Ultra Low Profile
USCG	United States Coast Guard
USMC	United States Marine Corps
UMTC	Ultra Mobile Tactical Computer
USV	Unmanned Surface Vehicle
UV	Ultraviolet

V

VBIED	Vehicle-Borne Improvised Explosive Device
VIP	Very Important Person
VT	Virginia Tech

W

WAVELib	Wide Area Video Exploitation Library
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