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FY 2005 ANNUAL REPORT

ACQUISITION AND TECHNOLOGY DIVISION

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14. ABSTRACT
This report summarizes projects carried out during Fiscal Year 2005 by the U.S. Army Environmental Center's Acquisition and Technology Division. The report describes each project's participants, results, requirements, milestones and products. The Acquisition and Technology Division provides support to Headquarters, Department of the Army (HQDA), Major Army Commands (MACOMS), Installation Management Agency (IMA), and the installations on the implementation and maintenance of environmental initiatives; provide technical expertise and guidance on regulatory issues; ensure all weapons systems programs comply with Environmental, Safety, and Occupational Health Requirements; and conduct demonstrations of new and innovative environmental technologies and transfer successful technologies to the field.

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APPENDICES

Introduction

This report describes current projects at the U.S. Army Environmental Center's (USAEC) Acquisition and Technology Division (ATD) during fiscal year (FY) 2005. These summaries will help readers better understand the division's efforts and capabilities. Technology is a major weapon in the Army's efforts both to defend the nation and to sustain its environment. Through the programs described in this report, USAEC gives the Army access to the most effective and affordable environmental tools available.

ATD focuses on conservation, compliance, and cleanup technologies and assists the Army in determining environmental impacts for weapon acquisitions, bolstering the USAEC commitment to saving money and quickly putting innovative ideas to work for its Army and Defense Department customers.

To contact the Acquisition and Technology Division about any of the projects or information included in this report e-mail the Technology Transfer Hotline at T2hotline@aec.apgea.army.mil.

ACQUISITION BRANCH

The Acquisition Branch has included weapon systems fact sheets, which provide a brief explanation and report on each weapon system under review. The fact sheets include the following information:

I. System Description

II. System Data

III. Upcoming Major System Reviews

IV. Current Status/Issues

V. USAEC Role

VI. Joint Requirements

VII. Weapon Systems Points of Contact

TECHNOLOGY BRANCH

The Technology Branch project descriptions serve to provide a brief summary of the content, purpose, and accomplishments of each of the many projects completed or worked on in FY05. The project descriptions include the following information:

Purpose — What problem does the project address?

Benefits — How does the project help its users?

Technology Users — Who will benefit from the project?

DESCRIPTION — Why was this technology developed? How does it work? What results have been achieved so far?

LIMITATIONS — What might affect use of this technology?

ACCOMPLISHMENTS AND RESULTS — What additional requirements are anticipated?

FOLLOW-ON PROGRAM REQUIREMENTS — What additional related efforts are planned?

PROGRAM PARTNERS — What organizations are participating in the project?
(Appendix B contains a consolidated list of partners.)

PUBLICATIONS — What publications relate to the project?

Section headings that do not apply to the project are omitted.

ACQUISITION BRANCH

ACQUISITION BRANCH OVERVIEW

The Acquisition Branch supports the Deputy Assistant Secretary of the Army for Environment, Safety, and Occupational Health (DASA (ESOH)) and the Assistant Chief of Staff for Installation Management (ACSIM) by ensuring that installation environmental issues are considered in the development of new Army weapon systems. In addition, the Branch compiles information on potential weapon system impacts on installations, materiel fielding schedules, and materiel fielding locations to support Army installations as new equipment is fielded. Specific actions executed include:

- Provide an Environmental Quality Impact Assessment (EQIA) for Acquisition Category (ACAT) I and II Weapon System programs (also known as an ASARC notebook) for the DASA (ESOH) prior to all Army Systems Acquisition Review Council (ASARC) and Cost Review Board (CRB) meetings.
- Review acquisition capabilities documents to ensure Environmental Quality requirements are included.
- Support the Deputy Assistant Secretary of the Army for Cost and Economics (DASA – CE) to review Program Office estimates for environmental quality life cycle costs.
- Collect data to define weapons system fielding impacts.
- Maintain membership on Program Managers' Integrated Product Teams.
- Coordinate activities with the Army Materiel Command/Assistant Secretary of the Army for Acquisition, Logistics and Technology's Environmental Support Office.

ACQUISITION BRANCH

WEAPON SYSTEMS UNDER EVALUATION FOR ASA(I&E)/ DASA(ESHOH)

PEO Ammunition

Excalibur XM982

I. System Description

The Excalibur, XM982, is a family of precision, 155 mm modular projectiles that incorporates three unique payloads. The unitary warhead will be used against various personnel, equipment, and building targets in urban or complex terrain. A sensor fused munition (SFM) variant will be used to engage self-propelled artillery and armored targets. The dual-purpose improved conventional munitions (DPICM) variant will be used against personnel, materiel, light armored targets, and other area targets. Excalibur permits our 155 mm artillery systems to regain range overmatch while precisely engaging targets at ranges up to 50 km. Excalibur is a force multiplier that increases lethality while reducing the logistical burden for legacy, interim, and objective forces.

An internal Global Positioning System (GPS) updates the inertial navigation system, providing precision guidance and improved accuracy. The GPS features a selective-availability, anti-spoofing module and an anti-jam system. Excalibur is effective in all weather and terrain. It contains a fusing system that is set by either an enhanced portable inductive artillery fuse setter or Crusader's inductive automated fuse setter. The target, platform location, and GPS-specific data are inductively entered into the projectile's mission computer, located in the nose of the projectile. Upon firing, Excalibur will determine its up-reference using inertial sensors. A trajectory correction to optimize range takes place midway between apogee and the target. Upon arrival, the trajectory is optimized for the Unitary, SFM, or DPICM payload variants.

II. System Data

- PEO: Ammunition
- PM: Combat Ammunition Systems-Indirect Fire
- Acquisition Category: IC
- Current Phase: System Demonstration
- System lead: Army

III. Upcoming Major System Reviews

- CRB March 2007
- ASARC March 2007

IV. Current Status/Issues

The Environmental Life Cycle Cost Estimate was drafted in July 2002 and incorporated into the Program Office Estimate. The Excaliber Program Baseline was not approved in March 2004, however, as a result of two

issues. The first issue involved a question as to the general requirement for the Excaliber. As a result, the Joint Requirements Oversight Council is reviewing that concern. The second issue involved the legal authority for the early purchase of Excalibur rounds prior to Milestone C. A memo was prepared on this subject for ultimate review by the Under Secretary of Defense.

V. USAEC Role

Member of the Excalibur Cost Review Board and Safety Assessment Working Group (IPT)

VI. Weapon System Point of Contact

Picatinny Arsenal, NJ, (973) 724-3534, (732) 532-4740

USAEC: (410) 436-6848

PEO Ammunition

Precision Guided Mortar Munition (PGMM)

I. System Description

The 120 mm Precision Guided Mortar Munition (PGMM) fully supports the Army Vision as it provides organized precision strike capability to the maneuver commander. The ability to hit point targets is especially valuable in urban environments and low intensity conflicts, avoiding collateral damage and reducing the potential for civilian casualties. PGMM increase the number of stowed kills and reduces the overall logistics burden (a critical goal for early entry forces).

II. System Data

- PEO: Ammunition
- PM: Mortar Systems
- Acquisition Category: ACAT II
- Current Phase: SD&D
- System lead: Army

III. Upcoming Major System Reviews

- Milestone C in 4thQ FY08

IV. Current Status/Issues

Awarded ATK the PGMM SD&D contract in December 2004 after a nine month protest resolution process. Program is progressing through SD&D with a goal of reaching Milestone C decision in late FY08.

V. USAEC Role

USAEC has reviewed and provided comments on the ORD; Programmatic Environmental, Safety and Health Evaluation; and the Lifecycle Environmental Assessment. USAEC also is Member of the Environmental Integrated Process Team and Cost Integrated Process Team. USAEC assisted in development of the Test and Evaluation Master Plan.

VI. Weapon System Point of Contact

Picatinny Arsenal, NJ, 973-724-7520

USAEC: (410) 436-6848

PEO Aviation

Apache Helicopter

I. System Description

The AH-64A and AH-64D Apache are the Army's main attack helicopters, designed primarily to destroy heavy armor. They are dual-engine single-rotor craft with infrared and video piloting, automated target acquisition and classification, a 30 mm chain gun, Hellfire laser-guided missiles, and 2.75 inch rockets. The "A" models have been in production since 1983 with more than 800 craft in service. Since the late 1990s, about 500 of the "A" models are being upgraded to the "D" model, with better avionics and instrumentation in the cockpit. Half of the new "D" models, in addition, will have the new Longbow millimeter wave fire control radar mounted on the rotor mast, capable of better terrain mapping, target detection, and targeting of the new radio frequency guided Longbow Hellfire missile.

II. System Data

- PEO: Aviation
- PM: Apache, with separate PMs for Longbow Apache, Apache Block III Modernization, Fire Control Radar, and Modernized Target Acquisition Sight
- Acquisition Category: ACAT ID
- Current Phase: III for Longbow (deployed, in operations and support phase, and in production), and pre-MS B for Block III modernization
- System lead: Army

III. Upcoming Major System Reviews

- None for Longbow, but MS B (April 2006) and C (late 2nd quarter FY09) is expected for the modernized Apache.

IV. Current Status/Issues

Apache completed the first multiyear Longbow upgrade contract earlier in 2002 and started into the second multiyear contract, intended to provide ~500 Longbow upgrades. In 2000 there was evidently a cost increase and the program was rebaselined. As part of this effort, USAEC developed the Environmental Quality Life Cycle Cost Estimate. In 2002, the program was being recapitalized, including adding new components on the "D" models, but also including new components on the existing "A" models that had not been scheduled to be converted to "D"s. Among these components were better night vision equipment and additional fuel capacity. These upgrades may have been driven by a GAO report in March 2001 analyzing lessons learned from the Kosovo campaign, where some Apaches were lost. A new baseline cost for this recapitalization was floated early in 2002, though it appears not to have been validated through the U.S. Army Cost

and Economic Analysis Center Cost Review Board process. It is planned to continue to use Apache in the Objective force in 2010-2030; to accomplish that, another upgrade to produce the so-called "Modernized Apache" is expected in 2005-2008. This will upgrade the entire fleet to digital capability, assure it can fire the Joint Common Missile, and add a more powerful and efficient engine currently in development. In mid-2004, Modernized Apache underwent scrutiny by DoD Acquisition, Logistics and Technology.

V. USAEC Role

Member of the Cost IPT and member of ASARC IIPTs. Reviewer of PESHE and NEPA documentation.

VI. Weapon System Point of Contact

PM Apache: DSN: 897-4200, COMM: (256) 313-4200, Fax: (256) 313-4147

USAEC: (410) 436-6840

PEO Aviation

Armed Reconnaissance Helicopter (ARH)

I. System Description

The ARH was started in 2004, a product of the cancellation of the Comanche Reconnaissance Attack Helicopter. ARH is designed to fill the light-armed reconnaissance role being left vacant by the planned elimination of Kiowa Warrior (OH-58C) in the next few years. ARH is expected to be a commercial-off-the-shelf aircraft (COTS), without "bells and whistles," in order to speed up the acquisition process. The aircraft should be able to carry machine guns and/or missiles, but not in the quantity that Apache can. Non-developmental items (NDI) will be integrated into the COTS aircraft. The integration of NDI into the COTS aircraft has necessitated that the system enter the acquisition process at Milestone B.

II. System Data

- PEO: Aviation, Huntsville, AL
- PM: Armed Reconnaissance
- Acquisition Category: ACAT ID
- Current Phase: System Development and Demonstration.
- System lead: Army

III. Current Status/Issues

Current Status is that the Milestone B Defense Acquisition Board recommended the Milestone B decision be to continue system development and demonstration. The Defense Acquisition Executive made this decision in the Acquisition Decision Memorandum signed July 26, 2005. The contract has been awarded and the system IPTs are being set up.

IV. USAEC Role

Validator of cost estimate, PESHE, and NEPA documents for ASA(I&E), member of IIPT and CRBWG.

V. Joint Requirements

Use of communication systems that are interoperable between the DoD services.

VI. Weapon System Point of Contact

USAEC: (410) 436-6840

PEO Aviation

Black Hawk Helicopter

I. System Description

Black Hawk is the Army's standard utility helicopter, providing light cargo transport, troop transport, and some attack functions. A benchmark of Black Hawk's capability is being able to transport a complete 11-man squad with all associated equipment, or a 105 mm howitzer with full crew and 30 rounds of ammunition. Black Hawk is the successor to the UH-1 (Huey) of Vietnam fame. It has two engines, single rotor, and can carry either 50 caliber or 7.62 mm machine guns out the side doors. It started production in 1978 as the "A" model, received an engine upgrade in 1989 in the follow-on "D" models, and both the "A" and "D" models are to receive cockpit instrumentation/digital communication, airframe, rotor, and transmission upgrades as part of a recapitalization program that entered development after a late 2000 DAB. Portions of the Black Hawk fleet are nearing the end of their 30-year life, and the recapitalization is intended to keep Black Hawk usable as the primary utility helicopter in the Objective Force. Black Hawks were also produced in other configurations for Special Forces, medical evacuation, and Navy sealift.

II. System Data

- PEO: Aviation
- PM: UH-60 Modernization
- Acquisition Category: ACAT ID (DoD Oversight)
- Current Phase: O&S for the fleet, and development for the modernization/recapitalization effort
- System lead: Army

III. Upcoming Major System Reviews

- Upgrade IPR Nov 05
- Full-rate production review: FY07

IV. Current Status/Issues

Milestone C DAB approved for low rate initial production (LRIP) 15 Mar 2005. The DAE sent the approving ADM 31 March 2005. Although the DAE approved LRIP, several of the technologies needed to meet the requirements were not ready. The DAE approved the addition of the technologies when they become available but requires DAB IPR approval. We are now in that phase.

V. USAEC Role

Validator of cost estimate, PESHE, and NEPA documents for ASA(I&E), member of IIPT and CRBWG.

VI. Joint Requirements

Use of communication systems that are interoperable between the DoD services.

VII. Weapon System Point of Contact

PM UH-60 Modernization: DSN: 645-6545, COMM: (256) 955-6545, Fax: (256) 955-6702

USAEC POC: (410) 436-6840

PEO Aviation

CH-47F Chinook Helicopter

I. System Description

The CH-47F/Improved Cargo Helicopter (ICH) is a remanufactured version (i.e., version F) of the CH-47D Chinook cargo helicopter, and will use the new more powerful, efficient, and digitally controlled T55-GA-714A engines. The ICH program is intended to restore CH-47D airframes to their original condition and extend the aircraft's life expectancy another 20 years (total life of 70 years) until the 2030-2035 timeframe. The program will remanufacture ~400 CH-47D aircraft, reduce the aircraft's vibration, thereby reducing Operations and Support costs, and allow the aircraft to operate on the digitized battlefield by incorporating a 1553 data bus. The ICH will also acquire the capability to carry 16,000 pounds of external/internal cargo for a 50 NM combat radius at 4000 feet pressure altitude and 95 degrees Fahrenheit. In addition, the following improvements will be incorporated into the aircraft:

- Fuselage stiffening and active systems for vibration reduction (this is expected to lead to improved reliability and therefore reduced operating and support costs).
- Integrated cockpit
- Digital architecture for FORCE XXI compatibility.

Previous major system reviews are:

- Cost Review Board:
  CRB: Nov 2004
- ASARC/IPRs:
  FRP: Nov 2004

II. System Data

- PEO: Aviation
- PM: Cargo Helicopters with CH-47F Product Manager
- Acquisition Category: ACAT IC
- Current Phase: LRIP
- System lead: Army

III. Upcoming Major System Reviews

- CRB: None
- ASARC/IPRs

IV. Current Status/Issues

The system has entered full rate production.

V. USAEC Role

USAEC prepared and submitted the Environmental Quality Life Cycle Cost Estimate to the CRBWG and the Environmental Quality Impact Assessment to the ODASA(ESOH). USAEC attended the CRBWG and ASARC IIPT meetings.

VI. Joint Requirements

Ability to communicate with joint assets.

VII. Weapon System Point of Contact

PMO: PM Environmental POC, (618) 234-3400

USAEC: (410) 436-6840

PEO Aviation

Light Utility Helicopter

I. System Description

The Light Utility Helicopter (LUH) was a new start in 2004, funded with resources recovered from the cancellation of the Comanche Recon Attack Helicopter. The LUH is designed to fill an Army National Guard homeland security/defense (HS/HD) mission within CONUS, including Domestic Support, Humanitarian Assistance, Disaster Relief, Civil Disturbance Operations, Support for Incidents Involving WMD, Civil Law Enforcement Support, Counterterrorism/Counter Narcotics Assistance, and Test Activity Support. The current fleet of UH-1 Huey helicopters are nearing the end of useful life and will not be available; the UH-60 Black Hawks are too few to take on the expanded homeland security role, and also are larger and more costly than the Army needs for HD/HS. The LUH program is expected to be satisfied with an off-the-shelf aircraft, which should speed up the acquisition process. The LUH is expected to enter the acquisition process at Milestone C. Approximately 300 aircraft are needed.

II. System Data

- PEO: Aviation, Huntsville, AL
- PM: Utility Helicopters
- Acquisition Category: Prospective ACAT II
- Current Phase: Pre-MS C
- System lead: Army

III. Upcoming Major System Reviews

- CRB: April 2006
- ASARC, MS C: June 2006

IV. Current Status/Issues

Acquisition Strategy IIPT meetings and Cost WIPT meetings. The PMO is currently working the procurement process. A possible issue is whether the fielding of these aircraft will be expanded beyond current rotary wing fielding sites; such expanded fielding may generate issues about noise and wind that need to be addressed in an Environmental Assessment.

V. USAEC Role

Reviewer of PESHE and NEPA documentation, and validator of environmental quality costs.

VI. Joint Requirements

None, other than ability to communicate with joint assets.

VII. Weapon System Point of Contact

USAEC: (410) 436-6840

PEO Chemical and Biological Defense

Millimeter Wave

I. System Description

The Millimeter Wave (MMW) Module, mounted on the M56 Large Area Smoke Generator System (SGS), is designed to provide the user with a capability to deliver large area obscurant screens from either a stationary or mobile mode of operation, to defeat radar operating in the gigahertz (GHz) frequency range. The system can also produce obscurant to defeat threat systems operating in the visible and infrared region of the electro-magnetic spectrum. Carbon fiber material has proved to be a highly effective MMW obscurant and has demonstrated the capability to absorb radar waves and defeat radar through continuous dissemination by the MMW module. The M56 SGS is equipped with a turbine engine that provides electrical power and pneumatics to each module to disseminate obscurant into the atmosphere. Carbon fiber is disseminated from eight individual canisters, each containing 30 pounds of material, through the fluidizer and out of the ejector. The M56 SGS is capable of producing 30 continuous minutes of MMW obscurant to screen radar on the battlefield. The MMW Module is mounted on the passenger side rear fender of a M1113 High Mobility Multi-Purpose Wheeled Vehicle (HMMWV) and is capable of disseminating obscurant material at a maximum rate of 8 pounds per minute while in stationary or mobile modes.

II. System Data

- PEO: Joint Program Executive Office – Chemical and Biological Defense
- JPM: NBC Contamination Avoidance
- Acquisition Category: III
- Current Phase: System Development & Demonstration
- System lead: Army

III. Upcoming Major System Reviews

- Milestone C, April 2006

IV. Current Status/Issues

The Millimeter Wave module has completed testing at several sites and is scheduled to go to Milestone C in FY06. A Programmatic Environmental Assessment is being written. Toxicological studies are being performed on select species, to include birds, to determine if there is any potential for impact to threatened and endangered species.

V. USAEC Role

Assisting in review of PESHE and Programmatic NEPA document, as well as participating in the Test IPT.

VI. Weapon System Point of Contact

JPM NBC Contamination Avoidance: (410) 436-2566

USAEC: (410) 436-6865

PEO Command, Control and Communications – Tactical (C3T)

Force XXI Battle Command Brigade and Below (FBCB2)

I. System Description

FBCB2 is a computer-based system installed in individual tactical vehicles and platforms for use by vehicle and small-unit commanders. It provides graphical displays showing friendly units, enemy units, control symbols, and targets of interest on a digital map background. FBCB2 lets the solider know where they are, where the friendly forces are, where the known enemy is, and where threats or obstacles are. It also provides the capability to display the commander's operational orders. FBCB2 acts as a digital, battle command information system that provides integrated, on-the-move, timely, and relevant information to tactical combat, combat support, and combat service support leaders and soldiers. It allows warfighters to pass orders and graphics and to visualize the commander's intent and scheme of maneuver, as well as providing them near-real time situational awareness information and a Common Operating Picture of the battlefield. FBCB2 interoperates with and complements the Army Battle Command Systems (ABCS) deployed at brigade and battalion.

II. System Data

- PEO: C3T
- PM: FBCB2
- Acquisition Category: 1C
- Current Phase: Production and Deployment
- System lead: Army

III. Upcoming Major System Reviews

- none

IV. Current Status/Issues

In Production and Deployment phase

V. USAEC Role

General oversight of program and review of acquisition documents.

VI. Weapon System Point of Contact

PM: (732) 427-3237

USAEC: (410) 436-6849

PEO Command, Control and Communications – Tactical (C3T)

Global Command and Control System – Army (GCCS-A)

I. System Description

The Global Command and Control System-Army (GCCS-A) is the Army's Strategic and Theater Command and Control (C2) System. It provides readiness, planning, mobilization, and deployment capability information for strategic commanders. For theater commanders, GCCS-A provides Common Operational Picture (COP) and associated friendly and enemy status information, force employment planning and execution tools (receipt of forces, staging, intra-theater planning, readiness, force tracking, onward movement, and execution status), and overall interoperability with Joint, Coalition, and the tactical Army Battle Command Systems (ABCS). GCCS-A is an integral part of a coordinated Department of Defense (DoD) and Joint Technical Architecture – Army, providing information support to all levels of military command across a Common Operating Environment (COE). GCCS-A provides automated command and control tools for Army Strategic and Theater Commanders to enhance warfighter capabilities throughout the spectrum of conflict during joint and combined operations in support of the National Command Authority.

II. System Data

- PEO: C3T
- PM: GCCS-A
- Acquisition Category: 1AC
- Current Phase: Production and Deployment
- System lead: Army

III. Upcoming Major System Reviews

- Software upgrade (JC2 Block 1) Milestone B 2Q FY07

IV. Current Status/Issues

In Production and Deployment phase

V. USAEC Role

General oversight of program and review of acquisition documents.

VI. Weapon System Point of Contact

PM: (732) 532-4041

USAEC: (410) 436-6849

PEO Command, Control and Communications – Tactical (C3T)

Joint Tactical Radio System (JRTS) Cluster 1

I. System Description

The Joint Tactical Radio System (JTRS) program supports acquisition and fielding of Software Defined Radios (SDR) that provide interoperable communications through an internationally endorsed open Software Communications Architecture (SCA). JTRS will replace older, hardware intensive radios with SDR in which software applications provide waveform generation and processing, encryption, signal processing, and other major communications functions. The Joint Tactical Radio System is a family of radios that are modular, multi-band, multi-mode networked communication systems. Modular design of software and hardware will facilitate upgrades and replacement of functional components. JTRS capabilities will be developed and fielded in an evolutionary manner, to provide increasing capabilities as technology development and funding permits. Cluster 1 supports requirements from the Army Aviation Rotary Wing, Air Force Tactical Control Party (TACP), and Army and USMC Ground Vehicular platforms.

II. System Data

- PEO: C3T
- PM: JTRS
- Acquisition Category: 1D
- Current Phase: System Development and Demonstration
- System lead: Army

III. Upcoming Major System Reviews

- Milestone C 2Q FY08

IV. Current Status/Issues

- In System Development and Demonstration phase
- Program is being rebaselined in view of questions about whether system requirements are achievable.

V. USAEC Role

General oversight of program and review of acquisition documents.

VI. Weapon System Point of Contact

PM: (732) 532-4740

USAEC: (410) 436-6849

PEO Command, Control and Communications – Tactical (C3T)

Joint Tactical Radio System (JRTS) Cluster 5

I. System Description

The Joint Tactical Radio System (JTRS) program supports acquisition and fielding of Software Defined Radios (SDR) that provide interoperable communications through an internationally endorsed open Software Communications Architecture (SCA). JTRS will replace older, hardware intensive radios with SDR in which software applications provide waveform generation and processing, encryption, signal processing, and other major communications functions. The Joint Tactical Radio System is a family of radios that are modular, multi-band, multi-mode networked communication systems. Modular design of software and hardware will facilitate upgrades and replacement of functional components. JTRS capabilities will be developed and fielded in an evolutionary manner, to provide increasing capabilities as technology development and funding permits. Cluster 5 satisfies requirements for handheld, manpack, and embedded applications.

II. System Data

- PEO: C3T
- PM: Joint Tactical Radio System Embedded/Handheld/Manpack (JTRS E/H/M)
- Acquisition Category: 1C
- Current Phase: System Development and Demonstration
- System lead: Army

III. Upcoming Major System Reviews

- Milestone C 4Q FY08

IV. Current Status/Issues

In System Development and Demonstration phase

V. USAEC Role

General oversight of program and review of acquisition documents.

VI. Weapon System Point of Contact

PM: (732) 532-4740

USAEC: (410) 436-6849

PEO Command, Control and Communications – Tactical (C3T)

Maneuver Control System (MCS)

I. System Description

The Maneuver Control System (MCS) provides an automated, on-line, near-real-time capability for planning, coordinating, and controlling tactical operations. MCS automates the creation and distribution of the common tactical picture of the battlefield for the Army Battle Command System. The MCS integrates information from other battlefield functional area command and control systems to provide timely, accurate status information and situational awareness. The main function of MCS is to distribute tactical reports and orders and allow commanders to receive, analyze, and transmit critical battlefield information. MCS is a network of computer workstations that manages information on the planning, execution, and monitoring of military operations at the Unit of Employment level and below. The MCS role in communicating battle plans, orders, and enemy and friendly situation reports makes it a key component of the Army's ongoing efforts to digitize the battlefield.

II. System Data

- PEO: C3T
- PM: MCS
- Acquisition Category: 1AC
- Current Phase: Full Rate Production
- System lead: Army

III. Upcoming Major System Reviews

- Complete fielding 4Q FY09

IV. Current Status/Issues

In Full Rate Production

V. USAEC Role

General oversight of program and review of acquisition documents

VI. Weapon System Point of Contact

PM: (732) 532-4041

USAEC: (410) 436-6849

PEO Command, Control and Communications – Tactical (C3T)

Warfighter Information Network – Tactical (WIN-T)

I. System Description

The Warfighter Information Network-Tactical (WIN-T) will be the high-speed, high-capacity backbone communications network for the Objective Force. WIN-T is composed of network infrastructure, services, and interfaces that provide voice, video, multimedia, and data communications throughout the battlespace. WIN-T will be modular, scalable, and capable of adapting to changes in task organization. At the Unit of Action (UA) level, WIN-T will provide required reach, reachback, and network services, and interface with the Joint Tactical Radio System (JTRS). At the Unit of Employment (UE) level, WIN-T will provide the link to adjacent UE, subordinate UA, supporting base, Joint, Allied and Coalition forces.

II. System Data

- PEO: C3T
- PM: WIN-T
- Acquisition Category: 1D
- Current Phase: System Development and Demonstration
- System lead: Army

III. Upcoming Major System Reviews

- Milestone C 3Q FY06

IV. Current Status/Issues

In System Development and Demonstration phase

V. USAEC Role

General oversight of program and review of acquisition documents.

VI. Weapon System Point of Contact

PM: (732) 532-4740

USAEC: (410) 436-6849

PEO Enterprise Information Systems (EIS)

Distributed Learning System

I. System Description

Distributed Learning System (DLS) uses Commercial Off The Shelf (COTS) components to the maximum extent possible to create a network of Digital Training Facilities (DTF) at active Army installations and U.S. Army Reserve training centers. DLS facilitates the training process by shifting from a dependence on synchronous, instructor-centered instruction in centralized, fixed classrooms to a more asynchronous, student-centered learning delivered at the students' locations. DLS achieves this by providing the enabling technology for remote instruction, bridging the geographic separation between the instructor and students through the electronic transmission, storage, and presentation of training materials. Distributed Learning (DL) is a training and educational approach that integrates information technology, connectivity, course content, and human resources into a standardized holistic training system. With this approach, learning becomes student-centered, collaborative, customized, and productive. DLS uses an evolutionary acquisition strategy and a spiral development approach. Each block is a separate stand-alone increment that is not dependent upon subsequent blocks to meet its operational objectives. DLS blocks are economically and programmatically separable segments that have military use, even if no additional blocks are acquired.

II. System Data

- PEO: Enterprise Information Systems
- PM: DLS
- Acquisition Category: 1AC
- Current Phase: Production and Deployment
- System lead: Army

III. Upcoming Major System Reviews

- Increment 4 Milestone C 3Q FY07

IV. Current Status/Issues

In Production and Deployment phase

V. USAEC Role

General oversight of program and review of acquisition documents

VI. Weapon System Point of Contact

PM: (757) 369-2900

USAEC: (410) 436-6849

PEO Enterprise Information Systems (EIS)

General Fund Enterprise Business System (GFEBS)

I. System Description

GFEBS is the U.S. Army's proposed core financial management capability for administering its general fund to improve performance, standardize processes, ensure that it can meet future needs, and provide Army decision makers with relevant, timely, and reliable information. GFEBS will be a commercial off-the-shelf (COTS) enterprise resource planning (ERP) system. The Army seeks a COTS solution that is certified by the Joint Financial Management Improvement Program (JFMIP) and that meets the requirements of the Federal Financial Management Improvement Act of 1996 (FFMIA) and the Guide to Federal Requirements for Financial Management Systems. The Army will select a systems integrator (SI) that proposes the COTS GFEBS solution that best meets the Army's requirements. The Army expects the SI to develop and implement that solution Army-wide. GFEBS development and implementation will include setup, user training, change management, and system operations and maintenance. The system will be phased in over approximately 5 years. As GFEBS is implemented, it will replace the Standard Finance Systems (STANFINS); Standard Operations and Maintenance, Army R&D System (SOMARDS); and Defense Joint Accounting System (DJAS).

II. System Data

- PEO: Enterprise Information Systems
- PM: None designated
- Acquisition Category: 1AM
- Current Phase: Technology Development
- System lead: Army

III. Upcoming Major System Reviews

- Milestone B 1Q FY07

IV. Current Status/Issues

In Technology Development phase

V. USAEC Role

General oversight of program and review of acquisition documents

VI. Weapon System Point of Contact

PM: POC not designated

USAEC: (410) 436-6849

PEO Enterprise Information Systems (EIS)

Global Combat Support System – Army (GCSS-A)

I. System Description

Global Combat Support System – Army (GCSS-A) is the Army's portion of an integrated multi-service Global Combat Support System (GCSS). GCSS-A will combine the functions of legacy logistics systems into a single system. GCSS-A will support Army logistics for supply, maintenance, transportation, property accountability, and ammunition. GCSS-A will, over time, replace or interface with all existing automated combat support systems (CSS). The new system will also encompass personnel, financial, medical, and other non-logistics CSS functions. GCSS-Army will consist of a series of functional modules such as Supply, Property, Maintenance, and Management. Each module will run at any level of organization where the Army performs that function.

II. System Data

- PEO: Enterprise Information Systems
- PM: GCSS-A
- Acquisition Category: ACAT 1AC
- Technology Development: System Development and Demonstration
- System lead: Army

III. Upcoming Major System Reviews

- Milestone B 1Q FY06

IV. Current Status/Issues

In Technology Development phase

V. USAEC Role

General oversight of program and review of acquisition documents

VI. Weapon System Point of Contact

PM: (804) 734-7665

USAEC: (410) 436-6849

PEO Enterprise Information Systems (EIS)

Transportation Coordinators – Automated Information for Movement Management II (TC-AIM II)

I. System Description

Transportation Coordinator – Automated Information for Movement Management (TC-AIM) is a joint service system to support movement management of personnel, equipment, and supplies from home station to the conflict and back. TC-AIM Block 1 (TC-AIM I) is the current fielded system. TC-AIM I is based on a client server architecture and uses Commercial Off-The-Shelf (COTS) servers, workstations, laptops, and Automatic Identification Technology equipment. TC-AIM Block 2 (TC-AIM II) is being fielded. TC-AIM II will be based on a Web-based architecture. TC-AIM II will also add an enterprise management system and the ability to host multiple related logistics applications on the same platform. TC-AIM assists in the identification of unit personnel and equipment necessary to support combatant commander requirements and the production of documentation required for movement. TC-AIM passes movement requirements to the appropriate organizations to order strategic transportation and supports commanders with in-transit visibility of assets. TC-AIM also supports day-to-day traffic management functions at installation level and in-theater distribution and transportation movement control.

II. System Data

- PEO: Enterprise Information Systems
- PM: Transportation Information Systems (TIS)
- Acquisition Category: 1AM
- Current Phase: Production and Deployment
- System lead: Army

III. Upcoming Major System Reviews

- Block 3 Milestone C 3Q FY06
- Block 4 Milestone B 2Q FY06

IV. Current Status/Issues

In Production and Deployment

V. USAEC Role

General oversight of program and review of acquisition documents.

VI. Weapon System Point of Contact

PM: (703) 752-0775

USAEC: (410) 436-6849

PEO Ground Combat Systems

Stryker Brigade Combat Team

I. System Description

The Stryker fulfills an immediate requirement in the Army's current transformation process to equip a strategically deployable (C-17/C-5) and operationally deployable (C-130) brigade capable of rapid movement anywhere on the globe in a combat-ready configuration. The armored wheeled vehicle is designed to enable the Stryker Brigade Combat Team (SBCT) to maneuver more easily in close and urban terrain while providing protection in open terrain. Stryker comprises two variants – the Infantry Carrier Vehicle (ICV) and the Mobile Gun System (MGS). The ICV has eight additional configurations: Reconnaissance Vehicle (RV), Mortar Carrier (MC), Commanders Vehicle (CV), Fire Support Vehicle (FSV), Engineer Squad Vehicle (ESV), Medical Evacuation Vehicle (MEV), Anti-tank Guided Missile Vehicle (ATGM), and NBC Reconnaissance Vehicle (NBCRV). Eight configurations are in production now, the first systems having been delivered in February 2002. The MGS and NBCRV are in development and will be delivered beginning in 2005. Performance highlights include C-130 transportability; internetted C4ISR capability; integral all-around 14.5 mm armor protection and 152 mm artillery airburst protection (upgradeable to Rocket Propelled Grenade (RPG) protection with add-on armor); self-deployment and self-recovery capability; reduced vehicle acoustic signature; ability to carry a nine-man infantry or engineer squad; and bunker and wall breaching capability. These highlights provide a force that will move rapidly as a cohesive combined arms combat team, a capability not currently in the Army inventory. Three block improvements are planned for the Stryker. A crew-installable add-on armor kit that provides 360-degree RPG-7 protection, an internal recoil-mounted 120 mm mortar system, and embedded training that will be provided beginning with the third SBCT.

II. System Data

- PEO: Ground Combat Systems
- PM: Stryker Brigade Combat Team
- Acquisition Category: 1D
- Current Phase: Full Production (ICV, Commander's Vehicle [CV], Reconnaissance Vehicle [RV], Fire Support Vehicle [FSV], Engineer Squad Vehicle [ESV], Medical Evaluation Vehicle [MEV], Anti-Tank Guided Missile [ATGM]) – Initial Production (NBC Reconnaissance Vehicle, Main Gun System)
- System lead: Army

III. Upcoming Major System Reviews

- MS III for MGS – 2QFY07
- MS III for NBCRV – 4QFY07

IV. Current Status/Issues

The program is in Full Production of the ICV, Commander's Vehicle (CV), Reconnaissance Vehicle (RV), Fire Support Vehicle (FSV), Engineer Squad Vehicle (ESV), Medical Evaluation Vehicle (MEV), Anti-Tank Guided Missile (ATGM). Three SBCTs have been fielded with these Stryker variants: the 3rd SBCT/2nd Infantry Division (ID) stationed at Fort Lewis; the 1st SBCT/25th ID at Fort Lewis; and; the 172nd SBCT stationed in Alaska. Four additional SBCTs are planned: an additional SBCT at Fort Lewis; one in Hawaii; one with the Pennsylvania Army National Guard; and SBCT in Europe. Stryker vehicles are one of the first Army weapons systems using a two-level maintenance approach. Stryker vehicles are continually being improved and upgraded based on lessons learned from Operation Iraqi Freedom.

The PM, SBCT manages environmental issues through the program's Environmental Management Team (EMT). The EMT is supporting continuing fielding of the SBCTs, as well as collecting environmental lessons learned on the system.

V. USAEC Role

Participate as a member on Stryker Environmental Management Team by reviewing or commenting on Programmatic Environmental Assessments, Programmatic Environment, Safety, and Occupational Health Evaluation, Stryker Environmental Management System, and in ESOH Risk Identification/Management process.

VI. Weapon System Point of Contact

Technical Director: (586) 753-2000

Department of Army System Coordinator: (703) 607-7154

USAEC: (410) 436-6869

PEO Intelligence and Electronic Warfare Sensors (EIW&S)

Advanced Threat Infrared Countermeasures/ Common Missile Warning System (ATIRCM/CMWS)

I. System Description

The ATIRCM/CMWS consists of three basic components: (1) a missile detector, (2) infrared and laser jammers to deflect missiles, and (3) a flare and chaff release unit to deflect missiles. The missile detector (which can issue a warning signal) may be used alone, or with either or both of the units which can deflect the missiles. The system functions automatically, detecting a missile, passing the information to the controller for the infrared and laser jammers, which track the missile and steer the infrared and laser on a narrow beam to the missile; if these measures do not deflect the missile, then the expendables (i.e., chaff and flares) are automatically engaged. ATIRCM/CMWS was initially a joint program with Air Force and Navy, but they both dropped out of the program. The system is scheduled to be installed on Army aircraft.

II. System Data

- PEO: Intelligence and Electronic Warfare Sensors
- PM: Aviation Electronics Systems
- Acquisition Category: ACAT IC
- Current Phase: LRIP (limited rate production for CMWS only)
- System lead: Army

III. Upcoming Major System Reviews

- ASARC and CRB: February 2006 (may be moved up to November 05) CMWS Full Rate Production decision
- ASARC and CRB: Fall 2006 ATIRCM Full Rate Production decision

IV. Current Status/Issues

This program's concept initiation was in 1991, and development started in 1995. It was a joint program until the late 1990s. With the withdrawal of Navy and Air Force, the planned buy quantity dropped from ~3000 to ~1000 units, and the unit cost increased. This triggered a Nunn-McCurdy breach, and CEAC developed an Army Cost Position in 2000 to support a new Acquisition Program Baseline. It was approved and the program continued. In 2001, FY03-07 funding was zeroed out for all except development, but with aircraft losses occurring in OIF/OEF, funding was restored in 2003, and the program is on the fast-track now. The missile detection subsystem (CMWS) was more effective than the missile deflection (ATIRCM) portions, and was put into LRIP separately in February 2002 to fill a rush need of Special Operations Command. Hence, CMWS and

ATIRCM are now progressing through separate milestones.

V. USAEC Role

Member of the Cost IPT and attendee for ASA(I&E) at ASARC IIPTs. Validator of EQ costs, PESHE, and NEPA documents for ASA(I&E). Prepared Draft ASARC Notebook and Draft Environmental Quality Life-Cycle Cost Estimate.

VI. Weapon System Point of Contact

PM Aviation Electronic Systems: DSN: 897-4101, COMM: (256) 313-4101, Fax: (256) 313-0106.

USAEC: (410) 436-6825

PEO Intelligence and Electronic Warfare Sensors (EIW&S)

Aerial Common Sensor (ACS)

I. System Description

The Aerial Common Sensor (ACS) is the Army's next generation airborne intelligence, surveillance, and reconnaissance (ISR) system. ACS will provide the ground commander with timely and precise information about the enemy's location on the battlefield. ACS is composed of an airborne platform (fixed wing aircraft) with multiple, controllable sensors. The Aerial Common Sensor (ACS) airborne system contains sensors that provide SIGINT (Signals Intelligence), IMINT (Imagery Intelligence), and MASINT (Measurements and Signals Intelligence) information. ACS can operate in different modes and is connected to the Global Information Grid (GIG) and the national ISR infrastructure. It is rapidly self-deployable and able to arrive in theater ahead of the Army's main force and ready to operate. It has a relatively small forward footprint and provides highly accurate intelligence information on a continuous and real time basis. The aircraft will employ a robust suite of communications equipment for rapid dissemination of collected intelligence information. ACS replaces the current Corps and EAC Airborne Reconnaissance Low (ARL) and Guardrail Common Sensor (GRCS) airborne ISR systems. The major benefit of ACS over other surveillance systems is the use of multiple sensors and the fusion of the multi-sensor information into a single, coherent picture of the enemy on the battlefield. The key to using this capability is to be able to "cross-cue" information received from one sensor with other sensors within the system in order to improve the chances of locating enemy targets and provide a precision location. Cross-cueing of sensors within the same platform is expected to greatly reduce the response time especially for time-critical targets. This multi-sensor collaboration is one of the biggest challenges of the ACS Program.

II. System Data

- PEO: Intelligence and Electronic Warfare Sensors
- PM: ACS
- Acquisition Category: ACAT 1D
- Current Phase: System Development and Demonstration
- System lead: Army

III. Upcoming Major System Reviews

- Milestone C 4Q FY08

IV. Current Status/Issues

- In System Development and Demonstration phase
- Program under review due to need to reexamine airframe selected for the system

V. USAEC Role

General oversight of program and review of acquisition documents

VI. Weapon System Point of Contact

PM: (732) 427-1802

USAEC: (410) 436-6849

PEO Intelligence and Electronic Warfare Sensors (EIW&S)

Distributed Common Ground Station – Army (DCGS-A)

I. System Description

The Distributed Common Ground System – Army (DCGS-A) is part of the DoD Distributed Common Ground/Surface System (DCGS) Family of Systems (FoS). DCGS-A is an integrated intelligence, surveillance, and reconnaissance (ISR) ground processing system whose core functions are receipt and processing of ISR sensor data; control of selected sensor systems; intelligence synchronization; ISR planning; reconnaissance and surveillance (R&S) integration; fusion of sensor information; and direction and distribution/dissemination of sensor information. The DCGS-A will be the Army's primary ISR tasking, collection, analysis, fusion exploitation, and dissemination (TPED/TPPU) system. It will consolidate and replace the ISR processing capabilities currently provided by the All Source Analysis System (ASAS), the CI/HUMINT Information Management System (CHIMS), the Tactical Exploitation System (TES) Family of Systems, the Guardrail Information Node (GRIFN), the Guardrail Common Sensor (GRCS) Integrated Processing Facility (IPF), the Prophet Control, and the JSTARS Common Ground Station (CGS). The DCGS-A is a distributed "system-of-systems" interconnected via networks. This distributed system-of-systems capability provides commanders, decision makers, and analysts with real or near-real-time ISR data and information at all echelons. Sensors are connected to the DCGS-A via sensor data links and communications systems. DCGS-A will process both MI and non-MI sensor data. The ISR domains that are covered by the sensors are: IMINT (Imagery Intelligence), MASINT (Measurement and Signature Intelligence), SIGINT (Signal Intelligence), and HUMINT (Human Intelligence). The DCGS-A consists of fixed, mobile, and embedded configurations interconnected via the GIG, WIN-T, and JTRS and other networks, such that data and information is automatically shared between their respective users and distributed databases.

II. System Data

- PEO: Intelligence and Electronic Warfare Sensors
- PM: DCGS-A
- Acquisition Category: Pre-MDAP
- Current Phase: Concept and Technology Development
- System lead: Army

III. Upcoming Major System Reviews

- Milestone B 2Q FY06

IV. Current Status/Issues

In Concept and Technology Development phase

V. USAEC Role

General oversight of program and review of acquisition documents

VI. Weapon System Point of Contact

PM: (732) 427-5165

USAEC: (410) 436-6849

PEO Missiles and Space

Advanced Precision Kill Weapon System (APKWSII)

I. System Description

The APKWSII will provide a low-cost precision-attack capability, as a complement to the current unguided rockets, anti-tank missiles, and cannon on current and planned helicopters, to destroy targets not suited for heavier anti-tank weapons or outside the range of helicopter cannon. The APKWSII will be a mid-air to long-range weapon that will increase stowed kills, and provide point target accuracy, reducing collateral damage. The APKWSII will be used as a direct-attack weapon during all attack and reconnaissance mission, to destroy light armor, vehicles, structures, bunkers, light shipping, air defense, military operations in urban terrain (MOUT) targets, and exposed enemy personnel. It will be capable of being used as an indirect fire weapon when coordinated with a remote designated laser.

As a direct fire weapon, the APKWSII will provide close support of ground forces conducting fires that extend the tactical reach of those maneuver forces. High precision and reduced collateral damage make the APKWSII particularly suitable for operations in built-up and populated areas. As an indirect fire weapon designated by a remote ground laser, the system will serve as an additional weapon capability for designation-capable units.

The APKWSII will be compatible with existing laser designator systems on the AH-64A/D and OH-58D Kiowa Warrior helicopters as well as the RAH-66 Comanche.

II. System Data

- PEO: Missiles and Space
- Project Office: Joint Attack Munition Systems (JAMS)
- Acquisition Category: II
- Current Phase: Preliminary PDR Design Review
- System lead: Army

III. Upcoming Major System Reviews

- Cost Review Board: January 2006
- IPR: January 2006

IV. Current Status/Issues

- Draft PESHE Oct FY05
- Draft CARD Oct FY05

V. USAEC Role

Member of the R&R, Cost and T&E IPT, attending meetings and reviewing documents and providing comments, notebooks, etc.

VI. Weapon System Point of Contact

PM: (256) 876-1141

USAEC: (410) 436-6842

PEO Missiles and Space

Combined Aggregate Program (CAP)

I. System Description

The Combined Aggregate Program (CAP) consists of the Phased Array Tracking to Intercept of Target (PATRIOT), the PATRIOT Advanced Capability-3 (PAC-3) missile, and the Medium Extended Air Defense System (MEADS) programs. The PATRIOT and PAC-3 systems currently provide lower tier air and missile defense to protect maneuver forces and other critical forward-deployed assets throughout all phases of tactical operations. The MEADS will enhance this concept with improved technology and transportability. The system will interoperate with the air, space, and missile defense (ASMD) system of systems (SoS). It will be interoperable with other airborne, ground-based, and sea-based sensors and have improved seeker/sensor components. The MEADS will provide air and missile defense of vital corps and division assets associated with Army and Marine Corps maneuver forces. MEADS will provide forces with defense against multiple and simultaneous attacks by tactical ballistic missiles, stressing cruise missiles, and other air-breathing threats. MEADS will have a netted distributed architecture with modular components to increase survivability and flexibility of employment in a number of operational configurations. The CAP increments will maintain the current PATRIOT capability to protect the forces during the incremental transformation to MEADS. Given these characteristics, the system can rapidly respond to a variety of crisis situations and satisfy the needs of the Joint Combatant Commanders (COCOM).

II. System Data

- PEO: Missiles and Space
- PM: Lower Tier Air Missile Defense Project Office; MEADS National Product Office; PAC-3 Product Office
- Acquisition Category: ID
- Current Phase: MEADS: Design and Development
PAC-3: Engineering and Manufacturing Development
- System lead: Army

III. Upcoming Major System Reviews

- CARD/ICARD: TBD
- POE/CCA: TBD
- ACP: TBD
- Cost Review Board: TBD

- ASARC: TBD
- DAB: TBD

IV. Current Status/Issues

Fielding of the basic PATRIOT system to U.S. Forces is complete. The system is deployed in the Continental Unites States, Europe, Korea, and Southwest Asia. The PAC-3 missile has completed the flight test phase of engineering and manufacturing development. Additional flight testing was initiated in second quarter of FY04 and is ongoing. The PAC-3 system has entered a series of low-rate initial productions. MEADS received MS B approval in July 2004. The CAP Program will probably be rebaselined in the near future. No issues are currently pending.

V. USAEC Role

USAEC performs independent Environmental Quality Impact Analyses and cost analyses for the Deputy Assistant Secretary of the Army (Installations and Environment) to ensure Army weapon systems programs meet requisite environmental criteria prior to milestone reviews.

VI. Weapon System Point of Contact

PATRIOT/PAC-3: 256-955-5117 (DSN 645)

MEADS: 256-313-8256 (DSN 897)

USAEC: 410-436-6853 (DSN 584)

PEO Missiles and Space

Guided Multiple Launch Rocket System (GMLRS)

I. System Description

The Guided Multiple Launch Rocket System (GMLRS) supports Army transformation as a Legacy-to-Objective Force precision-guided munition with increased overmatch capabilities and reduced logistics throughput over current freeflight rockets. GMLRS will be employed with the M270A1 upgraded Multiple Launch Rocket System (MLRS) tracked launcher and the High Mobility Artillery Rocket System (HIMARS) wheeled launchers. GMLRS is an international cooperative development program with the United Kingdom, Germany, France, and Italy.

GMLRS munitions have greater accuracy with a resulting higher probability of kill, smaller logistics footprint, minimized collateral injury, and minimized damage to unintended or non-military targets. The Guided Multiple Launch Rocket System (GMLRS) consists of two variants of rockets fired from the M270A1 or High Mobility Artillery Rocket System (HIMARS) launchers. The GMRLS Dual-Purpose Improved Conventional Munition (DPICM) variant carries 404 bomblets, while the GMRLS Unitary rocket will have a single, 200-pound class, high-explosive, Unitary warhead. Both variants use an inertial measurement unit guidance system that is aided by the Global Positioning System. These complementary capabilities cover many of the target types and target conditions expected in future conflicts.

GMLRS DPICM is a multi-national, cooperative development and production program that had its Full-Rate Production Decision in 2QFY05 and is scheduled for initial operational capability in 2QFY06. GMLRS Unitary had its Milestone B decision in March 2003. It is scheduled for a 4QFY06 Milestone C, 2QFY08 initial operational capability, and a full-rate production decision in 3QFY08. The dual mode fuzed version of the GMLRS Unitary was fielded as an urgent materiel release to theater in 2005.

II. System Data

- PEO: Missile and Space
- Project Office: Precision Fires Rocket & Missile Systems
- Acquisition Category: IC
- Current Phase: FRP (DPICM) and SDD (Unitary)
- System lead: Army

III. Upcoming Major System Reviews

- CRB March 2007
- ACP March 2007
- ASARC March 2007

IV. Current Status/Issues

- EQLCCE was updated May 2005
- Programmatic Environmental Assessment for PFRMS Activities was completed in 2004
- GMLRS DPICM PESHE updated in January 2005
- GMLRS DPICM successfully completed FRP Decision Review in June 2005
- GMLRS Unitary MS C is currently planned for March 2007. A GMLRS Unitary PESHE will be prepared in late 2006.

V. USAEC Role

Member of the R&R, Cost and T&E IPT, attending meetings and reviewing documents and providing comments, notebooks, etc.

VI. Weapon System Point of Contact

PM: (256) 876-5727

USAEC: (410) 436-6842

PEO Missiles and Space

High Mobility Artillery Rocket System (HIMARS)

I. System Description

The High Mobility Artillery Rocket System (HIMARS) is a C-130 transportable-wheeled version of the Multiple Launch Rocket System (MLRS) launcher that is mounted on a five-ton Family of Medium Tactical Vehicle (FMTV) truck chassis. It will carry one launch pod containing six MLRS rockets or one Army Tactical Missile System (Army TACMS) missile and be capable of firing all current and future MFOM rockets and missiles. It operates with the same MLRS command, control, and communications as well as the same size crew. The HIMARS Fire Control System (FCS) will be common with the M270A1 FCS and fully interoperable with all Allied and North Atlantic Treaty Organization MLRS users. The HIMARS will consist of a launcher, two re-supply vehicles (RSV) with material handling equipment (MHE) and two re-supply trailers (RST). The launcher consists of a chassis with man-rated cab, launcher loader module (LLM), and fire control system.

It provides the Objective and Legacy force an early-entry MLRS capability in a lighter weight, more deployable system. The HIMARS is a "Legacy to Objective Force" system, and is an Office of the Secretary of Defense (OSD) Pilot Program established in response to section 912C of the FY98 Department of Defense (DoD) Appropriations Bill; to address product support and total ownership cost reduction. Army and Congressional interest in HIMARS resulted in FY99/00 budget increases that accelerated to FY05 the First Unit Equipped (FUE) date to the XVIII Airborne Corps (Ft. Bragg) from MAR 2005.

HIMARS is currently fielded at Fort Bragg.

II. System Data

- PEO: Missiles and Space
- Project Office: Precision Fires Rocket & Missile Systems
- Acquisition Category: IC
- Current Phase: FRP June 2005
- System lead: Army

III. Upcoming Major System Reviews

- System is currently being upgraded.

IV. Current Status/Issues

- Programmatic Environmental Assessment for PFRMS Activities was completed in 2004
- Programmatic Environment, Safety, and Occupational Health Evaluation (PESHE) for HIMARS was completed in January 2005.
- Successfully completed FRP Decision Review in June 2005.
- EQLCCE was updated May 2005

V. USAEC Role

Member of the R&R, Cost and T&E IPT attending meetings and reviewing documents and providing comments, notebooks, etc.

VI. Weapon System Point of Contact

PM: (256) 876-2782

USAEC: (410) 436-6842

PEO Missiles and Space

Joint Common Missile (JCM)

I. System Description

The Joint Common Missile (JCM) is an extended range, precision guided, air-to-surface weapon providing both precision point target and fire-and-forget capability to be employed against targets in day, night, obscured battlefield, and adverse weather conditions. Attack and Reconnaissance/ Attack helicopters and fixed-wing aircraft require an advanced air-to-surface weapon to provide precision targeting at greater range in battlefield environmental conditions to accomplish their missions. For Joint and Coalition attack aviation platforms, JCM will enhance targeting capabilities, increase lethality, extend range, and increase aircraft survivability.

The JCM uses advanced seeker technologies to combine improved precision point, fire-and-forget (both active and passive), Lock On Before Launch (LOBL) and Lock On After Launch (LOAL), adverse weather, and obscured battlefield targeting capabilities when compared to current air-to-ground missiles systems. The precision point targeting capability will allow the missile to engage targets designated autonomously (by the launch platform) or cooperatively (e.g., ground observers, manned/ unmanned aircraft, or other joint and combined arms platforms). The fire and forget capability will allow the missile to LOBL or LOAL and navigate to a target without any additional input from the launcher or other outside sources. It is designed to destroy the most advanced threat armored vehicle and provide increased lethality against an expanded, non-traditional (other than armored vehicle) target set.

The JCM consists of a multi-mode seeker, guidance electronics unit, warhead assembly, boost/sustain propulsion unit, and a control actuation system. The missile software will be designed for modularity, flexibility, reuse, and growth. The missile is mounted on and fired from a launcher. Any hardware or software modifications will depend on the host platform that the JCM will interface with. The four major functional subsystems of the missile include Armament, Guidance and Control, Propulsion, and the Airframe. The armament subsystem houses the main warhead. The guidance and control subsystem performs target tracking and missile steering from launch to target intercept and house the precursor warhead. The propulsion subsystem houses the boost-sustain rocket motor. The airframe provides the basic structural support of the missile and produces lift and control forces. A notional depiction of the major missile components is shown in the following Figure:

JCM is designed to replace the Hellfire II and Longbow Hellfire missiles. Additionally, it will be compatible with the Hellfire II and Longbow Hellfire missile platforms and their associated launch rails. Weight of the encased missile is not to exceed 49.98 kg (108 lbs). The JCM is designed for a range of 16+ km after launch from a Rotor Wing (RW), taking approximately 90 seconds to travel that distance. For RW applications, the JCM must operate over temperature extremes from +71˚C to –43˚C, and have a minimum smoke propellant formulation.

The tri-mode seeker is the most critical and expensive part of the weapon system. The combination of the three sensors — Semi-Active Laser (SAL), Millimeter Wave (MMW) radar, and Imaging Infrared (IIR) — in one missile aperture, together with the inertial navigation capabilities offer significant improvements in performance over conventional single sensor missile systems. The use of MMW radar offers the capability to find targets in reasonably large target uncertainty areas (TUAs) at ranges out to 16 km. The use of the IIR sensor during the terminal portion of the flight can compensate for the poor hit point distributions resulting from MMW guidance and provide improved probability of kill (Pk) for a large number of target types. The use of the IIR sensor with the SAL sensor will allow consistent missile lethality performance despite variations in laser designation quality. With an IIR seeker and Global Positioning System (GPS) availability, the JCM can fly long ranges and acquire stationary targets totally passively, without any emissions from either MMW radar or laser designators. The measurement of target properties in multiple spectral bands can enhance the performance of automatic target recognition (ATR) algorithms. Attempts to use countermeasures against JCM will be made more complicated by the availability of the three sensors.

The JCM is designed to defeat a wide spectrum of targets including heavy armor (T-90 PIP1), soft armor (BMP and ZSU), Military Operations Urban Terrain (MOUT) structures (building and bunkers), and patrol craft (up to corvette class, Tarantul). Each of these targets requires specific defeat mechanisms to achieve the required lethality. Additional JCM targets include air defense, command and control units, transporter erector launchers, helicopter, ammunition dumps, and fuel depots.

JCMs use of a multi-mode seeker and other technical design specifications to meet requirements of the U.S. Army, USN, USMC, and UK aviation will allow a high degree of commonality across a large number of platforms and minimize the life cycle cost of the combined services.

II. System Data

- PEO: Missiles and Space
- PO: Joint Attack Munition Systems (JAMS)
- Acquisition Category: ID
- Current Phase: System Design & Development
- System lead: Army

III. Upcoming Major System Reviews

- TBD

IV. Current Status/Issues

N/A

V. USAEC Role

IPT membership – Program Management/Senior IPT; ESOH IPT; Supportability/Safety IPT; and System Test & Evaluation IPT

VI. Weapon System Point of Contact

PM: (256) 876-1141

USAEC: (410) 436-6842

PEO Missiles and Space

Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System (JLENS)

I. System Description

The JLENS is a cost effective, airborne sensor platform that provides over-the-horizon land attack cruise missile defense; enhances cruise missile detection; and provides extended engagement ranges that support the Air-Directed Surface-to-Air Missile (ADSAM) engagement concept for current air defense weapons such as Patriot, Standard Missile, Advanced Medium Range Air-to-Air Missile, and ultimately the Medium Extended Air Defense System.

The JLENS sensor suite consists of a surveillance radar (SR) and a precision track and illumination radar (PTIR). The SR provides a long-range air picture enhanced by identification of friend or foe (IFF). This information, distributed via the Joint Data Network and Joint Composite Tracking Network (presently LINK 16 and cooperative engagement capability), contributes to the Single Integrated Air Picture (SIAP). The PTIR is a steerable, lightweight array capable of tracking multiple targets in a sector. JLENS prioritizes remote and local tracks autonomously or accepts external requests for precision tracking and engagement support.

II. System Data

- PEO: Missiles and Space
- Project Office: Cruise Missile Defense Systems
- Product Office: JLENS
- Acquisition Category: ID
- Current Phase: System Development and Demonstration
- System lead: Army

III. Upcoming Major System Reviews

- CARD: Approved 13 June 2005
- POE/CCA: Approved 13 June 2005
- ACP: Approved 13 June 2005
- Cost Review Board: 26 May 2005
- ASARC: 4QFY10
- DAB: 4QFY10

IV. Current Status/Issues

The JLENS is currently in the system development and demonstration phase of the acquisition cycle and is preparing for a Milestone C in FY10. JLENS Product Office personnel are cooperating with USAEC personnel with a program review and performance of an independent Environmental Quality Impact Analysis and Environmental Quality Life Cycle Cost Analysis. A JLENS PESHE was completed in August 2004 and a JLENS Life Cycle Environmental Assessment in July 2005.

V. USAEC Role

USAEC performs independent Environmental Quality Impact Analyses and cost analyses for the Deputy Assistant Secretary of the Army (Installations and Environment) to ensure Army weapon system programs meet requisite environmental criteria prior to milestone reviews.

VI. Weapon System Point of Contact

JLENS: (256) 313-3015 (DSN 897)

USAEC: (410) 436-6853 (DSN 584)

PEO Missiles and Space

Non-Line of Sight-Launch System (NLOS-LS)

I. System Description

The Non-Line of Sight Launch System (NLOS-LS), a core system within the Future Combat Systems (FCS), consists of a pair of precision guided missile types loaded into a highly deployable, platform-independent Container Launch Unit (CLU) with self-contained technical fire control, electronics, and software for remote and unmanned fire support operations.

The NLOS-LS CLU will contain a total of 15 missiles and will launch Precision Attack Missiles (PAM) focused on defeating hard targets and Loitering Attack Missiles (LAM's) against fleeting, high-value targets. The LAM will also search, survey targets, verify, and assess battle damage, and serve as an airborne radio transmission platform for other FCS systems. Either a PAM and/or LAM will automatically launch vertically from the CLU when receipt of fire mission orders are received via the FCS UA network. Each missile will be responsive to in-flight target updates via their on-board Joint Tactical Radio Set Cluster 5 radio, and will possess limited automatic target recognition capability. Both PAM and LAM will possess multi-capable warheads effective against armor and soft target. Future missile in the follow-on FCS increments may include air defense and non-lethal capabilities.

Key FCS NLOS-LS advantages include the following:

- Real-time battlefield surveillance
- Remote fire control
- Remote replacement
- Enables extending-range target engagements and battle damage assessment
- Jam-resistant Global Positioning System

II. System Data

- PEO: Missiles and Space
- Project Office: Non-Line of Sight Launch System
- Acquisition Category: ACAT I D
- Current Phase: SDD
- System lead: Army

III. Upcoming Major System Reviews

- LRIP decision planned for Oct 2008
- ASARC March 2008

IV. Current Status/Issues

Development of the NLOS-LS Life Cycle Environmental Assessment is planned for FY06. Development of a system PESHE is planned for FY08. LRIP decision scheduled for OCT 2008.

V. USAEC Role

Member of the R&R, Cost and T&E IPT attending meetings and reviewing documents and providing comments, notebooks, etc.

VI. Weapon System Point of Contact

PM: (256) 955-0190

USAEC: (410) 436-6842

PEO Missiles and Space

Surface Launched Advanced Medium Air-to-Air Missile (SLAMRAAM)

I. System Description

The Surface Launched Advanced Medium Range Air-to-Air Missile (SLAMRAAM) is a lightweight, day or night, limited adverse weather, Beyond-Line-of-Sight/Non-Line-of-Sight (BLOS/NLOS) Fire Unit for countering low altitude rotary wing (RW), fixed wing (FW), cruise missile (CM), unmanned aerial vehicle (UAV), unmanned combat aerial vehicles (UCAVs), and Reconnaissance, Surveillance, and Target Acquisition (RSTA) platforms. SLAMRAAM utilizes Sentinel Radar, and the AIM-120C Advanced Medium Range Air to Air Missile (AMRAAM), to provide capability Air Defense to Short-Range Air Defense (SHORAD) elements. It supports blue sky and background clutter engagements in close combat areas where maneuvering forces and their supporting units operate. SLAMRAAMs force protection mission is to engage the low-altitude aerial threats within the kinematic range of AMRAAM in the ground-launched mode. It uses the Forward Area Air Defense (FAAD) Command and Control (C2) to interface with legacy SHORAD elements. The SLAMRAAM Fire Unit is a platform consisting of a basic load of four to six AMRAAMs, a High Mobility Multi-Purpose Wheeled Vehicle (HMMWV), rotatable launch rails, launcher electronics, and on-board Battle Management Command, Control, Communications, Computers, and Intelligence (BMC4I) components. The SLAMRAAM System will include an Integrated Fire Control Station (IFCS) as the primary BMC4I node between the Fire Units and the sensors and legacy force. The IFCSs will be located at the Platoon, Battery, and Battalion command levels.

II. System Data

- PEO: Air, Space, and Missile Defense
- PM: Cruise Missile Defense Systems
- Acquisition Category: II
- Current Phase: System Development and Demonstration
- System lead: Army

III. Upcoming Major System Reviews

- CARD: TBD at a time nearer the 4Q FY07 MS C decision
- POE/CCA: TBD at a time nearer the 4Q FY07 MS C decision
- ACP: TBD at a time nearer the 4Q FY07 MS C decision
- Cost Review Board: TBD at a time nearer the 4Q FY07 MS C decision

- ASARC: 4Q FY07
- DAB: TBD at a time nearer the 4Q FY07 MS C decision

IV. Current Status/Issues

On September 16, 2003, SLAMRAAM received Milestone B approval from the Army Acquisition Executive. SLAMRAAM is currently in the System Development and Demonstration phase and continuing to cooperate with the USAEC. A life-cycle Environmental Assessment is scheduled for completion in FY06 in preparation for a MS C decision in September 2007.

V. USAEC Role

USAEC performs independent Environmental Quality Impact Analyses and cost analyses for the Deputy Assistant Secretary of the Army (Installations and Environment) to ensure Army weapon system programs meet requisite environmental criteria prior to milestone reviews.

VI. Weapon System Point of Contact

PM: (256) 842-0335 (DSN 788)

USAEC: (410) 436-6853 (DSN 584

Tube-Launched, Optically Tracked, Wire-Guided Bunker Buster Missile (TOW Bunker Buster)

I. System Description

The TOW (tube-launched, optically tracked, wire-guided) Bunker Buster Missile System incorporates a newly developed warhead onto the exciting, reliable TOW 2A missile airframe. The TOW BB missile provides a precision-guided capability to breach eight-inch thick, double concrete walls and provide a structural overmatch against earth and timber field fortifications.

TOW BB is a heavy, precision guided, anti-fortification, and breaching weapon system, consisting of a launcher and missile. The gunner defines the aim point by maintaining the sight cross hairs on the target. The launcher automatically steers the missile along the line of sight toward the aim point via a pair of control wires, which physically link the missile and the launcher. The missile impact is at the charge glove and a pyrotechnic detonation delay enhances warhead effectiveness.

TOW BB is optimized for performance against urban structures, earthen bunkers, field fortifications, and light-skinned armor threats. TOW BB has a 6.25 lbs, 6-inch diameter high explosive, bulk charge warhead. The PBXN-109 explosive is housed in a thick casing for maximum performance. The missile is fired directly from the case. Range is 65 to 3,750 meters. The TOW BB missile weighs 45.2 lbs. The missile is nominally 6 inches in diameter and 49 inches in length. Encased, the missile weighs 62.5 lbs., and the diameter is 8.6 inches. The missile has 91 percent reliability and shelf life is 17 years.

TOW BB fits all launcher and stowage racks currently in the inventory and requires no modification to the current TOW platforms for fire. TOW BB missile is fired from the Stryker Anti-Tank Guided Missile Vehicles and Bradley Fighting Vehicles.

II. System Data

- PEO: Missiles and Space
- Project Office: Precision Fires Rocket and Missile Systems
- Aquisition Category: II
- Current Phase: Fielded
- System lead: Army

III. Upcoming Major System Reviews

- CARD: TBD
- POE/CCA: TBD
- ACP: TBD
- Cost Review Board: TBD
- DAB: TBD

IV. Current Status/Issues

A modified TOW 2B with Aero modifications is currently being fielded FY04-FY09

V. USAEC Role

Member of the R&R, Cost and T&E IPT, attending meetings and reviewing documents and providing comments, notebooks, etc.

VI. Weapon System Point of Contact

USAEC: (410) 436-6842

PEO Soldier

Advanced Crew Served Weapon

I. System Description

As part of the Future Combat Systems Brigade Combat Team (BCT) the ACSW is an Acquisition Category (ACAT) ID program by default. As part or the Stryker Brigade Combat Team the ACSW is an ACAT III program and Milestone B was approved by PEO Soldier in June 2005. Attainment of this milestone allows the spiral development program to proceed into Increment I System Development and Demonstration (SDD) to ensure a producible, supportable, and cost-effective design. Prototype demonstrations and Limited User Tests (LUT) take place followed by Milestone C in 1QFY09. Initiation of Low Rate Initial Production (LRIP) is FY09. After Initial Operational Test and Evaluation (IOT&E) of the LRIP hardware, a Full Rate Production Decision Review will be held prior to proceeding to Full Rate Production in late FY10. Increment II SDD starts in FY11 with a Milestone B (II) decision and runs thru to Milestone C (II) in FY14.

The 25 mm XM307 will displace selected MK19 40 mm Grenade Machine Guns, and the XM312 .50-caliber will displace selected M2-.50 caliber heavy machine guns. The XM307 has been selected as the Common Close Support Weapon requirement for six of the eight manned ground vehicles and one, possibly two, of the unmanned ground vehicles for Future Combat Systems BCT. It is expected to be employed as the primary defensive armament for Combat, Combat Support, and Combat Service Support units as well as on the Future Tactical Truck Systems.

The XM307 System will integrate cutting-edge technologies to include the lethality of a 25 mm air-bursting munition, a 25 mm Armor Piercing (AP) munition, and an integrated, full solution, target acquisition/fire control system (TA/FCS) to provide decisively violent and suppressive target effects and a leap ahead in crew served weapons performance. The TA/FCS will incorporate a laser rangefinder, ballistic computer, direct optics, video sight, electronic compass, thermal capability, motion tracker, Combat Identification for the Dismounted Soldier (CIDDS), and Modular Integrated Laser Engagement System (MILES). The XM307 System will include High Explosive Air Burst (HEAB) munitions capable of defeating not only exposed targets, but also those in defilade (targets that have taken cover behind structures, terrain features, and/or vehicles). The XM307 will defeat light and lightly armored vehicles beyond one kilometer with its armor-piercing warhead, provide a heavy machinegun capability in a medium machinegun package, and be employable for vehicle mounted or tripod ground mounted applications.

II. System Data

- PEO: Soldier
- PM: Crew Served Weapon
- Acquisition Category: ACAT ID
- Current Phase: Increment I SDD
- System lead: Army

III. Upcoming Major System Reviews

- Cost Review Board: TBD
- ASARC: TBD
- DAB: TBD

IV. Current Status/Issues

The SDD system contract was awarded to General Dynamics in April 2004. USAEC prepared an Environmental Quality Life Cycle Cost Estimate (EQLCCE). USAEC has prepared an ASARC Briefing Notebook for ASA (ESOH). USAEC has recently reviewed and provided comments on the PESHE, ORD, and the TEMP.

V. USAEC Role

USAEC prepared an Environmental Quality Life Cycle Cost Estimate (EQLCCE) and is an active member of the Cost WIPT.

VI. Weapon System Point of Contact

PM Crew Served Weapons Office: Picatinny, NJ, (973) 724-4042

PEO Soldier

Land Warrior Infantry System

I. System Description

The Land Warrior Infantry (LW) System enhances the lethality, battle-command compatibility, survivability, mobility, and sustainability of dismounted combat soldiers, enabling them to engage and defeat enemy targets, while minimizing friendly casualties. The LW System is modular, to permit tailoring for mission requirements, minimize the combat load, and facilitate maintenance. LW facilitates command, control, and sharing of battlefield information, thus providing "total battlefield visibility" and integration into the digitized battlefield.

The system integrates previously distinct components such as protective clothing, communications, sensors, and power, thereby adding enhanced capabilities without adding weight. The LW system includes weapons, sensors, laser rangefinder, displays, integrated load-carrying equipment with ballistic protection, protective clothing, helmet, speaker, microphone, computer, navigation, radio, and controls with a consistent and intuitive interface for use under battlefield conditions. These components are integrated into a system that enhances the dismounted combat soldier's lethality, survivability, mobility, command-control communications, situational awareness, and sustainability.

Lethality: LW will increase dismounted soldier lethality by providing an improved capability to detect, acquire, identify, locate, and engage targets at greater ranges in all visibility conditions. LW fire control devices will allow the soldier to engage targets quicker with more accurate direct and indirect fires.

Command and control: LW will increase the dismounted leader's command and control capabilities by providing an integrated radio/computer/Global Positioning System (GPS) with software and an integrated display that links the soldier to the digitized battlefield. Information collection and dissemination throughout the chain-of-command will be enhanced through real-time voice and digital reporting and still-frame video transmission and capture.

Survivability: LW increases soldier survivability through improved situational awareness, improved body armor, laser detectors, improved chemical protection, and ballistic/laser eye protection. Survivability will also be increased as a result of the LW soldier's ability to engage the enemy with only his hands and arms exposed through the integration of the thermal weapon sight and daylight video sight with the modular weapon and head-mounted display.

Mobility: LW increases soldier mobility by providing improved situational awareness, navigation/location support, and better load carrying capability.

Sustainment: A digital reporting capability will enhance resupply capabilities and increase unit effectiveness. Additionally, Government Furnished Equipment (GFE) has been integrated into the LW system to enhance repair parts commonality and reduce the logistics burden. Power management techniques are also included in the LW system to reduce battery consumption.

II. System Data

- PEO: Soldier
- PM: Soldier Warrior
- Acquisition Category: ACAT IC
- Development and Demonstration: B
- System lead: Army

III. Upcoming Major System Reviews

- CRB: Jun 2006
- ASARC: ASARC Milestone C Decision 4th Quarter 2005

IV. Current Status/Issues

No environmental issues currently associated with LW.

V. USAEC Role

Member of the Cost IPT. Advisory member for the CRB and ASARC Reviews. The Cost IPT reconvened in April 2002. The Army Cost Position (ACP) was approved in October 2003. Environmental costs (i.e., battery disposal issues, computer disposal/demil issues, disposal of radios, and laser components, etc.) have been identified in the Environmental Quality Life Cycle Cost Estimate (EQLCCE) and as part of the POE. The EQLCCE includes disposal costs for all hardware purchased. The LW EQLCCE used an analogy to the WIN-T disposal estimate. USAEC has reviewed and provided comments on the LW ORD. Attended the Council of Colonels in March 2004 to review for the upcoming Design Readiness Review in November 2004. USAEC is monitoring the development of the LM145 battery.

VI. Weapon System Point of Contact

PM Soldier: (703) 704-3860

ASA (ALT): (703) 604-7151

XM8

I. System Description

XM8 features a short piston stroke, gas-operated action, with rotating bolt locking. Barrels are quick detachable, and planned to be available in several sizes, ranging from 229 mm (9.5 inch) for Compact/PDW version, 318 mm (12.5 inch) in Basic version, and two 508 mm (20 in) barrels, one for Sharpshooter/Sniper version, and a heavier one (along with bipod) for Squad Automatic Rifle role. The entire construction is modular and built around the polymer receiver with bolt group; magazine housings could be easily swapped for compatibility with various types of magazines; various buttstocks could be installed in a second for various roles (standard buttstock is a telescoped five-position adjustable one). Top of the receiver is fitted with proprietary sight rail, which can accept illuminated red-dot (collimator) sight, or any other type of sighting equipment. Detachable forend will be available in various sizes, and could be replaced with XM320 40 mm grenade launcher (the improved HK AG36). Ambidextrous fire controls are mounted on the trigger unit, integral with pistol grip and trigger guard, and in basic configuration are planned to deliver single shots and full auto fire.

This modularity includes the exchange of interchangeable assembly groups such as the barrel, handguard, lower receiver, buttstock modules, and sighting system with removable carrying handle. The unique buttstock system allows the operator exchange buttstocks without tools from the standard collapsible multi-position version, to an optional buttcap for maximum portability or an optional folding or sniper buttstock with adjustable cheekpiece for special applications. Internally the XM8 employs a combat-proven robust rotary locking bolt system that functions and fieldstrips like that used in the current M16 rifle and M4 carbine. However, this bolt is powered by a unique gas operating system that employs a user-removable gas piston and pusher rod to operate the mechanism. Unlike the current M4/M16 direct gas system with gas tube, the XM8 gas system does not introduce propellant gases and the associated carbon fouling back into the weapon's receiver during firing. This greatly increases the reliability of the XM8 while at same time reducing operator cleaning time by as much as 70 percent. This system also allows the weapon to fire more than 15,000 rounds without lubrication or cleaning in even the worst operational environments. A cold hammer forged barrel will guarantee a minimum of 20,000 rounds service life and ultimate operator safety in the event of an obstructed bore occurrence.

The XM8 has fully ambidextrous operating controls to include a centrally located charging handle that doubles as an ambidextrous forward assist when required, ambidextrous magazine release, bolt catch, safety/selector lever with semi and full automatic modes of fire and release lever for the multiple position collapsible buttstock. The operating controls allow the

operator to keep the firing hand on the pistol grip and the weapon in the firing position at all times while the non-firing hand actuates the charging handle and magazine during loading and clearing. Major components of the weapon are produced from high-strength fiber reinforced polymer materials that can be molded in almost any color to include OD green, desert tan, arctic white, urban blue, brown, and basic black. Surfaces on the XM8 that interface with the operator are fitted with non-slip materials to increase comfort and operator retention. The XM8 uses 10 or 30-round semi-transparent box magazines and high-reliability 100-round drum magazines for sustained fire applications.

II. System Data

- PEO: Soldier
- PM: Individual Weapon
- Acquisition Category: II
- Development and Demonstration: Milestone B
- System lead: Army

III. Upcoming Major System Reviews

- Program currently on hold, no major reviews scheduled at this time.

IV. Current Status/Issues

The RFP for the program was suspended in August 2005, and an analysis of alternatives is currently being conducted along with updating the CDD.

V. USAEC Role

USAEC prepared an Environmental Quality Life Cycle Cost Estimate and has participated in past IPTs.

VI. Weapon System Point of Contact

PM Soldier: (973) 724-8515

USAEC: (410) 436-6851

PM Future Combat Systems

Future Combat System Brigade Combat Team

I. System Description

The Future Combat Systems Brigade Combat Team – FCS BCT – is the core of the Army's efforts to ensure that the Army, as a member of the Joint team, will move, shoot, and communicate better than ever before and better than any opponent it will face in the 21st century – any time, under any circumstances, anywhere that the nation needs us. FCS is about the 21st century Soldier. Lessons learned in Operation Iraqi Freedom and the Global War on Terrorism have shown that a joint, combined arms, network centric force has the ability to both rapidly defeat an enemy in battle and act as a key element in follow-on peacekeeping efforts. The Army is using these lessons to fundamentally transform into a faster, more agile force with superior situational awareness and power projection capability. This force – the Army's FCS-equipped Modular Force – will be part of a Joint team that is decisive in any operation, against any level threat, in any environment. The FCS BCT balances the capabilities for battlespace dominance, lethality, and survivability with its agility and versatility, deployability and sustainability. Although optimized for offensive operations, the UA can execute stability and support operations. The hallmark of FCS BCT operations will be the ability to develop situations out of contact, engage the enemy in unexpected ways, maneuver to positions of advantage with speed and agility, engage enemy forces beyond the range of their weapons, and destroy enemy forces with enhanced fires and assault at times and places of our choosing. At the same time, the FCS BCT is designed with the durability, endurance, and stamina to fight battles and engagements for the duration of a campaign, focused on decisive points and centers of gravity. The core of the FCS BCT is a highly integrated structure of 18 manned and unmanned (MUM) air and ground maneuver, maneuver support, and sustainment systems, bound together by a distributed network and supporting the soldier, (18+1+1 systems) acting as a unified combat force in the Joint environment. The network uses a battle command architecture that integrates networked communications, network operations, sensors, battle command system, training, and MUM reconnaissance and surveillance capabilities to enable situational understanding and operations at a level of synchronization not achievable in current network centric operations.

The MUM systems include:

- Unattended ground sensors (UGS)
- Two (2) unattended munitions
- Non-Line of Sight - Launch System (NLOS-LS)
- Intelligent Munitions System (IMS)

- Four (4) classes of Unmanned Aerial Vehicles (UAVs) organic to platoon, company, battalion, and Modular Force echelons
- Three (3) classes of Unmanned Ground Vehicles (UGVs)
- Armed Robotic Vehicle (ARV)
- Small Unmanned Ground Vehicle (SUGV)
- Multifunctional Utility/Logistics and Equipment Vehicle (MULE)
- Eight (8) Manned Ground Vehicles (MGVs)
- Infantry Carrier Vehicle
- Command and Control Vehicle
- Mounted Combat System
- Reconnaissance and Surveillance Vehicle
- Non-Line of Sight–Cannon (NLOS-C)
- Non-Line of Sight–Mortar
- FCS Recovery and Maintenance Vehicle
- Medical Treatment and Evacuation

The FCS BCT will have several key attributes:

- Situational awareness that enables superior knowledge and survivability for the Soldier.
- Networked information and advanced, seamless command and control to allow soldiers to make faster decisions and move more quickly and more lethally than the enemy.
- Reduced platform (manned and unmanned) and organizational size, cube and weight, and the agility needed to get the right force to the right place at the right time.
- Embedded training and networked support that reduces the traditional logistics footprint for fuel, water, ammunition, and repair parts by 30-70 percent.

II. System Data

- PM: Future Combat System Brigade Combat Team
- Acquisition Category: 1D
- Current Phase: System Development and Demonstration
- System lead: Army

III. Upcoming Major System Reviews

FCS BCT System Readiness Review, April 2006.

FCS BCT Defense Acquisition Board (DAB) June 2006.

IV. Current Status/Issues

The PM FCS BCT and Lead System Integrator (LSI) are evaluating alternatives to mature and accelerate the most critical and promising technologies within the UA, enabling the Army to start fielding initial network capabilities to the current force in FY 2008. This action will significantly increase connectivity, intelligence, and information sharing within fielded units while at the same time demonstrating incremental capabilities on the road to fielding of the future force. This approach allows the Army to incorporate the FCS BCT technological developments as new technologies mature, while maintaining a comprehensive approach to the development of the Army's new Future Force. Fielding FCS BCT capabilities to Current Force units will be accomplished in discrete "spirals" starting in FY08. Development and demonstration of the C4ISR network and System of System Common Operating Environment (SoS COE), unattended munitions, sensors, and Non-Line of Sight Launch System (NLOS-LS) will be prioritized.

The PM FCS BCT manages their Environment, Safety, and Occupational Health (ESOH) responsibilities through the ESOH Working Group. The ESOH Working Group is part of the System of Systems Engineering and Integration Integrated Product Team. The PM had published Revision G of their Programmatic Environment, Safety, and Occupational Health Evaluation (PESHE). Highlights of the system's ESOH program are an initial evaluation of potential ESOH impacts, and the development of a Hazard Tracking System. The program is preparing for the June 2006 DAB.

V. USAEC Role

Participate as a member on the FCS ESOH Working Group by reviewing or commenting on Programmatic Environment, Safety, and Occupational Health Evaluation, participating in the FCS Advanced Collaborative Environment (ACE) ESOH Compliance database design, review of FCS

Test and Evaluation Master Plan, review of Prohibited Material Usage Approval Process, and review of FCS National Environmental Policy Act (NEPA) compliance strategy.

VI. Weapon System Point of Contact

Technical Director: (586) 574-8631

Department of Army System Coordinator: (703) 695-8488

USAEC: (410) 436-6869

TECHNOLOGY BRANCH

Army Sustainability Video

Purpose

The Sustainability Video is a complement to a series of other concurrent Army efforts aimed at helping support education, awareness, and support for the implementation of sustainable practices throughout the Army. Sustainability is the foundation for the recently released Army Environmental Strategy.

Benefits

The video will promote awareness to the concept of installation sustainability so that it can be integrated into all functional areas throughout the Army. Sustainability ensures that today's operations will not impede the operations of soldiers tomorrow and in future generations. It is about helping soldiers perform their mission and maintain readiness in the most efficient and effective manner possible.

Technology Users

Users of this product include HQDA management and installation personnel, especially Army strategic and master planners. The broader audience also includes members of the public, non-governmental organizations, regulators, Congress, and environmental groups.

Description

USAEC will use the Army Multimedia & Visual Information Directorate to award and oversee development of the sustainability video. One main video was developed containing four sections; the main section delivers a 16-minute overview of sustainability and the Army and also highlights the strategy for the environment contained within six goals. The other three parts are case studies that elaborate on the Army's sustainability strategy for the environment. The video will be distributed as a chaptered DVD with each section accessible from the main menu.

Accomplishments and Results

The OASA(I&E) and OACSIM produced the Army sustainability training video in which the Secretary of the Army, Chief of Staff of the Army and Sergeant Major of the Army each participated and offered their support. The video educates viewers on the concept of sustainability and how it relates to the Army Strategy for the Environment. The target audience includes Army leaders at all levels and installation staff members across all functional areas. The video includes interviews with Army leaders promoting sustainability and footage of Soldiers and Army civilians demonstrating sustainable practices at a troop installation (Fort Lewis); a National Guard installation (Fort Indiantown Gap); and an industrial installation (Anniston Army Depot). It also includes three case studies, which focus on the application of sustainability to the following specific

operations: the Stryker family of vehicles, ordnance weapon systems, and installation infrastructure and facility systems. Emphasis is placed on the acquisition life cycle of these systems and their relationship to the natural environment.

Program Partners

U.S. Army Environmental Center

Army Multimedia & Visual Information Directorate

Office of the Department of Environmental Programs for the Assistant Chief of Staff for Installation Management

Office of the Environmental Safety and Occupational Health for the Assistant Secretary of the Army for Installations and Environment

Publications

Video distribution is anticipated for spring 2006. Please visit the "News and Events" section of the Army Sustainability Web site, www.sustainability.army.mil, for information on how to view or obtain a copy of the video.

INSTALLATION DECONSTRUCTION EFFORTS

PURPOSE

The deconstruction efforts serve to promote the ideals of a sustainable development and design by reselling material byproducts of unused military facilities for resale or salvage. It promotes an environmentally economic approach to reducing waste sent to landfill or lying dormant on reusable land. These efforts complement a series of other concurrent Army efforts aimed at helping support education, awareness, and support for the implementation of sustainable practices throughout the Army. Sustainability is the foundation for the recently released Army Environmental Strategy.

BENEFITS

Deconstruction recycles the useful and beneficial substance of a structure and integrates its potential value in alternative areas of reuse, such as roadways and housing structures, and promotes awareness of the concept of installation sustainability so that it can be integrated into all functional areas throughout the Army. Sustainability ensures that today's operations will not impede the operations of soldiers tomorrow and in future generations. It is about helping soldiers perform their mission and maintain readiness in the most efficient and effective manner possible.

TECHNOLOGY USERS

Those that benefit from these deconstruction practices include HQDA management and installation personnel, especially Army strategic and master planners. The broader audience also includes members of the public, non-governmental organizations, regulators, Congress, and environmental groups.

DESCRIPTION

Fort Lewis and Seattle District USACE

In response to the directives of the Army, Fort Lewis has developed an installation-wide sustainability program. Several of the stated goals relate to sustainable waste management practices. One goal is to cycle all material use to achieve zero net waste by 2025. Another goal is to attain a healthy, resilient Fort Lewis and regional lands that support training, ecosystem, and cultural and economic values by 2025. In order to support the Army and specifically the Fort Lewis sustainability goals, the Seattle District USACE has actively teamed with representatives of Fort Lewis Public Works to develop and execute a carefully designed sustainable solid waste approach to the demolition projects planned over the next several years. The Seattle District USACE teamed with the Fort Lewis DPW, USACE CERL, and the U.S. Army Environmental Center to develop construction specifications and demolition contracts that directly address this new approach to demolition projects that are part of the

military construction (MILCON) and facilities reduction (FRP) programs.

Fort Campbell, Kentucky

This facility deconstructed three large-scale buildings in March 2005, two World War II-era structures and a 1970's operations building. Fort Campbell sought a new innovative way to remove excess building materials from the site in an effort at deconstruction and sustainability; they were able to recycle these buildings by selling them to public and/or private organizations and owners.

Pentagon Renovation and Construction Program – Wedge Three Deconstruction Project

Multiple site visits and weekly planning meetings took place between 19 April and 8 June with USAEC providing consultation support to the Pentagon Renovation (PENREN) office. PENREN submitted a permit application to the Pentagon Building Management Office on 20 May and requested permission to host a public auction on the grounds of the Pentagon in late June. Solid Waste Solutions and USAEC would host an auction (similar to the Fort Knox public auctions) and final proceeds would be donated to the Pentagon Memorial Fund, Inc.

Fort Jackson, South Carolina

Fifty-eight structures on the Army Facility were set for deconstruction and recycled for a variety of uses as of Fall 2005. Many of the building's parts were donated to local organizations and other pieces were bought by reuse stores and recycling facilities, in the hopes of reducing the waste incurred on base from taking down the structures. Representatives from USAEC, USACE CERL, and Fort Jackson itself were present to undertake this task and oversee the redistribution of subsequent materials.

Accomplishments and Results

All projects and auctions were very successful removing large quantities of reusable materials from these military facilities. Large amounts of the proceeds from all endeavors benefited worthy causes.

Program Partners

U.S. Army Environmental Center

Army Multimedia & Visual Information Directorate

Office of the Department of Environmental Programs for the Assistant Chief of Staff for Installation Management

Office of the Environmental Safety and Occupational Health for the Assistant Secretary of the Army for Installations and Environment

Solid Waste Reduction and Installation Sustainability

Introduction to Sustainability Training Course

The U.S. Army Environmental Center (USAEC) hosted a two-day *Introduction to Sustainability* training course. The Army's strategic vision mission statement states that the Army will sustain the environment to enable the Army mission and secure the future. The Army recognizes the interdependence between the mission, the environment, and the community, and is actively promoting an ethic that goes beyond environmental compliance to sustainability, while minimizing impacts and total ownership costs of Army systems, material, facilities, and operations and management. To succeed at these goals, the Army recommends the use of innovative technology and sustainable practices to meet installation needs and anticipate future challenges.

Purpose

The course was intended to provide a basic understanding of sustainability to better understand installation needs and practices.

Benefits

The training provides participants with knowledge about sustainability frameworks the Army is employing to integrate sustainability into strategic planning and community interactions. The course also allowed staff to learn about the Army Strategy for the Environment with regards to sustainability, so Army environmental professionals will understand why installations are moving towards sustainable practices and will be able to incorporate the principles of sustainability into future programs.

Technology Users

USAEC Project Officers and Program Managers

Description

The sustainability course consisted of two days of presentations and exercises taught by a team of well-known sustainability advocates. The course began with the presentation of information related to the science behind the need for sustainability, current sustainability trends, and new technology innovations that support sustainable practices. Participants were taught methods to help spread sustainable ideas and explain the need for sustainability within the Army. Corporate case studies were presented to explain how large corporations and agencies are making changes in the way they operate and function that support sustainable practices. Specific challenges and possible solutions were presented that could help the Army reach their goal of sustainability. At the end of the course participants engaged in a group exercise to produce ideas on how the Army can better use the idea and practices involved with sustainability to meet current and future needs.

Accomplishments and Results

Over 40 participants from USAEC, ODEP, and government contractors

Follow-On Program Requirements

There have been discussions about a similar course in FY06.

Program Partners

U.S. Army Environmental Center

Office of the Department of Environmental Programs

U.S. Army Installation Environmental Personnel

BEST MANAGEMENT PRACTICES FOR SMALL ARMS RANGES

Bullets are often fragmented and pulverized upon impact with backstops, berms, or bullet traps located on the range. Lead is the primary soil contaminant of concern at small arms ranges. Antimony, copper, and zinc also contribute to soil contamination. As with most metals, lead, antimony, copper, and zinc tend to adhere to soil grains and organic material and remain "fixed" in shallow soils. The normal operation of a range can produce lead concentrations of several percent in soils located behind and adjacent to targets and impact berms. Range management practices need to be initiated to ensure lead is not transported off range where it may trigger regulatory enforcement actions.

PURPOSE

Normal range use produces soil contaminated with metals from the spent rounds. This contamination has the potential to create environmental and occupational health problems during range operation and maintenance; however, proper management of ranges can alleviate these problems. Small arms range best management practices are being identified and demonstrated to support sustainment of small arms range activities.

BENEFITS

Cost-effective best management practices to ensure range sustainability while protecting human health and the environment.

TECHNOLOGY USERS

Installation range managers

DESCRIPTION

Lead accumulating in the environment as a result of active small arms range use does not by itself constitute a problem. The determination of appropriate response actions at an active range should result from an assessment of the potential fate of the lead being placed on the range. The initial unit for assessment of small arms range areas is the watershed or sub-watershed scale. A firing range and its surrounding areas should be examined as a whole to identify their potential effects on each other and the contribution(s) each make to environmental concerns. Typically there is an entire series or complex of ranges near each other. The watershed scale of a range assessment takes into consideration the combined or cumulative effects of the entire range complex on the watershed(s) in which they lie.

The best management practices selected for an active range should be based upon the results of the range assessment of the potential fate of the lead being placed on the range. The practice(s) selected should be

limited to the minimum required to address the operation, site-specific condition, range design feature, or maintenance procedure that most effects lead transport. These actions may involve the prevention of lead migration, pollution prevention, or lead removal methods.

Prevention of lead migration methods are typically the most cost-effective means of managing lead on small arms ranges. These methods consist of minor changes to range operations or maintenance methods, vegetative methods of controlling erosion, stormwater management methods, use of geosynthetic or erosion control materials, structural enhancements or modifications to impact berms, and soil amendments to promote chemical stabilization of the lead.

Accomplishments and Results

Final Small Arms Range Best Management Practices (BMP) Guidance Manual

Design elements will be incorporated into Huntsville, TC-25-8, Standard Range Design Document

Follow-On Program Requirements

Demonstration/validation of the U.S. Environmental Protection Agency Region 2's Best Management Practices for Lead at Outdoor Shooting Ranges, January 2001

Program Partners

U.S. Army Environmental Center

U.S. Army Aberdeen Test Center

U.S. Army Corps of Engineers, Huntsville,
U.S. Army Engineering and Support Center

U.S. Environmental Protection Agency, Region 2

Sustainable Ranges

Changing Dyes in Smokes

Regulatory enforcement of environmental laws and regulations continues to expand with regards to munitions production and military range operations. Particularly, a rapid trend has developed towards the increased accountability of the Department of Defense (DoD) for the emissions from the use of munitions items during training and testing operations.

Purpose

In 1997, the need to quantify the emissions resulting from munitions use, and to assess the risk to human health and the environment from these emissions, was identified as a critical issue for the U.S. Army and the other services. Environmental Protection Agency (EPA) Region I requested information on the emissions and residues from the use of munitions at the Massachusetts Military Reservation (MMR). DoD was unable to provide the requested data and thus could not present any valid assessment of the impacts from the use of munitions there. Since that time, additional data requirements, such as Emergency Planning and Community Right-to-Know Act–Toxic Release Inventory (EPCRA-TRI) reporting have evolved.

In September 1997, the Chief of Staff of the Army directed the Assistant Chief of Staff for Installation Management (ACSIM) to establish a General Officer Steering committee to address the implications of the restrictions on operations at MMR. The ACSIM directed and funded the U.S. Army Environmental Center (USAEC) to gather emissions data. The USAEC has developed a comprehensive program to identify the emissions resulting from range operations that involve weapons firing, smoke and pyrotechnic devices, and exploding ordnance, and to assess the environmental and health hazard impacts resulting from their use. In the execution of that program, it was identified that two of the colored signal smoke grenades contain and emit toxic smokes and dyes in significant quantities. These signaling items are critical to training and combat operations and provide a method to immediately cease operations in the event that safety issues or operational needs are identified. These dyes or smokes may present a risk to the soldier, any nearby receptors, and to the production and test personnel as well. It is in the best interest of the Army and DoD to demonstrate and implement a material substitution for the dyes or smokes in these specific munitions items.

Benefits

The substitution of sugar and the dyes in these two smoke grenades will complete efforts for the reduction of toxic materials from the signaling smoke devices. This will provide reduced risk to soldiers, the environment and surrounding communities. In addition, this will reduce the potential

for restricted operations and for fines and penalties associated with the impacts of these items. Training realism will be maintained due to the lessening of restrictions. This next generation of colored smokes, while having less impact on the environment, will also provide a very real training and operational capability to the soldier.

Technology Users

Soldiers

Installations

Police

Department of Transportation

Description

Several alternative materials have been identified, but funding is required to validate the functional and operational capabilities of these items with the alternative (less toxic) dye and smoke materials prior to their implementation.

Accomplishments and Results

The test smoke grenades have been developed. During the testing new techniques were developed and utilized that have reduced the cost of the production of these two smoke grenades. This was accomplished through the use of starter patches and material changes in the composition of the starter and smoke material that have made the production simpler and lowered the temperature of the burning materials to keep it from flaming. Pilot and production quantities of the smoke grenades (Red) have been produced that meet the technical needs but which may need the dye combination adjusted to meet the visual requirements of the military community. Pilot quantities of the smoke grenades (Violet) have been produced that meet the technical and visual requirements of the military community. Final grenades were provided and tested under the emissions characterization program in 2004. As part of the program the Edgewood Chemical and Biological Center (ECBC) used several of the current configuration smoke grenades and under field conditions set them off and took measurements of the concentrations of the smoke at 6 feet, 18 feet, and edge of cloud. After several iterations of this test it was determined that the 18 ft and edge of cloud concentrations were so similar that the 18 ft concentrations were eliminated from consideration. The two concentrations from 6 ft and edge of cloud were sent to CHPPM for incorporation into their toxicity testing protocol and for use in the toxicity testing of the current and new violet smoke grenades. The current violet smoke grenade and

the new violet smoke (which is being made by ECBC) have been provided to CHPPM for the set up of the chambers for the toxicity testing. Currently CHPPM is ensuring the setup is appropriate for toxicity testing of the violet smoke grenade combustion products prior to the beginning of the toxicity testing. Once that is completed they will begin toxicity testing to determine the toxicity of the current violet smoke grenades versus the new smoke grenades that this project has produced.

Limitations

The new smoke grenades must meet military standard criteria. To complete the transition, the new smoke formulations must meet Soldiers Observer and Maintainer Test and Evaluation requirements. This requirement includes a color comparison, part of the Production Validation Test (PVT). The color comparison includes soldiers testing the items on the ground, as well as helicopters flying over to ensure the color is accurate from the sky. The actual PVT is a testing of the item that was produced outside the normal line type production. After completion of the PVT, an emissions test was completed. Upon completion of the emissions testing, an inhalation and toxicology assessment starts. After all of these have been completed, the Engineering Change Proposal (ECP) may be prepared for submission to the Configuration Control Board (CCB) for their review and approval. If the ECP is approved, the Material Change Approval is issued. Upon the change in formulation, a phased-in production occurs. The first article states that a large sample of the items is to be tested to ensure they can be made by line operators and function as intended. After this final testing, the material is released for full-scale production and use.

Program Partners

Environmental Security Technology Certification Program

West Desert Test Center, Dugway Proving Ground

Pine Bluff Arsenal

Edgewood Chemical and Biological Center

Environmental Protection Agency

Publications

Planned publications:

- Final Report of the Smoke and Dye Program
- Cost and Performance Report for the Smoke and Dye Program

EMISSION SOURCE CHARACTERIZATION MODEL (SCM)

Existing models for predicting emissions and transport from munitions detonation and burning do not make use of the measured emissions data for firing point (FP), exploding ordnance (EO), and smoke/pyrotechnics (SP) gathered from the testing at Dugway Proving Ground (DPG) and the Aberdeen Test Center (ATC). As a result, current models have difficulty predicting volatile and semi-volatile emissions accurately. The U.S. Army Environmental Center (USAEC) has teamed with Aerodyne Research, Inc. and has received Strategic Environmental Research and Development Program (SERDP) funding (1) to improve the modeling of chemical emissions fate from munitions testing, use, and demilitarization by collecting, evaluating, warehousing, and publishing modeling source terms, and (2) to use the source terms in an existing model. This project will not generate data but will use data generated by emissions testing and similar efforts at USAEC, from elsewhere within the Department of Defense (DoD), and from other databases. The source term data will be customized to a particular model but will also be available to any modelers upon request. The EPA (Office of Air Quality Planning and Standards, at Research Triangle Park) is a technical advisor for this effort, to ensure the model will be accepted for use upon completion.

PURPOSE

The goals of the SCM are to understand and quantify the major chemical and physical processes in FP, EO, and SP munition items when they are functioned properly; develop an SCM for accurately predicting source terms resulting from the detonation of munitions, link the SCM output to appropriate fate and transport models, and validate the final transport SCM against real world scenarios. The SCM will also serve as a model to bridge a data gap between available emission data obtained from actual munition testing to those munition items that were not able to be tested. The SCM will allow modelers to determine what the levels of emissions are from various munition items with some level of certainty. USAEC has tested and collected emission factor data for over 175 FP, EO, and SP munition items as part of the Munitions Air Emissions Characterization Program to date, and is expected to test a total of 223 by the time testing is completed. However, the Army currently has over 13,000 munition items in use. The SCM will serve as a model to fill in the data gap between available emission data obtained from actual munition testing to those munition items that were not able to be tested.

BENEFITS

The SCM will allow DoD to have a predictive tool for emissions factor data from munitions where real world data may not be available.

Technology Users

Installation personnel

Air modelers

Description

The SCM will allow modelers to determine what the levels of emissions are from various munition items with some level of certainty.

Accomplishments and Results

The beta version of model is available for use and the final report has been published.

Limitations

The model current has data from 14 of emission events. Further validation will be required to ensure all emissions are accurately calculated.

Follow-On Program Requirements

Validation of the model using all 223 munitions to be quantified.

Program Partners

Aerodyne Research Inc.

Strategic Environmental Research and Development Program

Environmental Protection Agency

EMISSION HEALTH RISK ASSESSMENT AND FACT SHEET DEVELOPMENT

This project defines the on-going effort by the U.S. Army Environmental Center (USAEC) and the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) Environmental Health Risk Assessment Program (EHRAP) to evaluate potential risks to offsite residents who live near Army training facilities.

PURPOSE

USAEC has developed the Emissions Characterization Program to identify and quantify emissions resulting from weapons use. Emission factors are being developed for more than 220 munition items, including Firing Point (small, medium, and large caliber ammunition); Exploding Ordnance (items of ¼ lb to 40 lbs net explosive weight); and smoke/pyrotechnics (signal flares and smoke grenades). Munitions are tactically fired in a closed facility to capture the airborne emissions generated. The emission data is collected using state-of-the-art sampling techniques. Emission factor data is used by USACHPPM in an air dispersion model to determine ambient air concentrations at locations downwind from a training site. Modeled air concentrations are combined with a typical use scenario to estimate the amount of each substance a hypothetical off-site residential population breathes. Air concentrations are time adjusted for both acute and chronic exposure, and compared with health-based screening levels. Exposures are based on a residential population most likely to be affected, consisting of older adults and children living 100 meters away, directly downwind under worst case meteorological conditions, with the wind constantly blowing toward the exposed population 350 days a year.

BENEFITS

Potential risks to offsite residents who live near Army training facilities are able to be determined using real world emission factor data obtained from testing. Through conducting the Health Risk Assessments, it has been determined that there is minimal, if any, potential inhalation risk to offsite residents.

TECHNOLOGY USERS

Installation personnel

Air modelers

Risk Assessors

Description

These assessments determine potential human health effects to offsite residents breathing air emissions from munitions used during training activities on Army installations.

Accomplishments and Results

Over 60 Health Risk Assessments and fact sheets are available, and it is anticipated that 223 will be available in the next two years.

Limitations

The evaluation is limited to the assessment of potential health risks from inhalation of air emissions that are released upon the use of training munitions. Each munition is evaluated separately with a typical use scenario provided. Also, since these studies are not modeled after any one existing training facility, conservative model input data is used so that the results are generic enough to be applicable to most facilities using these munitions.

Follow-On Program Requirements

None

Program Partners

U.S. Army Center for Health Promotion and Preventive Medicine

Environmental Protection Agency

ITRC Small Arms Range Training and Technology Transfer

The Interstate Technology Regulatory Council (ITRC) Small Arms Range Team (SMART) is in the process of completing its document entitled "Environmental Management at Operational Outdoor Small Arms Firing Ranges." In an effort to transfer the small arms range best management practices expertise that the USAEC has developed over the last decade, the USAEC has participated in the development of this document and incorporated Army information into the SMART document. The ITRC SMART team will use training, both remote Internet training and classroom training, to transfer their efforts from the document stage to field-users of small arms range technologies. This effort covers the training at four Army-attended conferences, specific locations to be determined at a later time. The ITRC will hold approximately four other classroom-training sessions for the general public at various environmental venues.

Purpose

The primary objective of this effort is to provide operational small arms range classroom training at Army attended conferences.

Benefits

We will transfer all the lessons learned from our many small arms range projects and best management plan efforts to private ranges, state and federal regulators, and Department of Defense range managers and operators. Training will be at no cost to those attending the training and will occur at conferences where those most likely to want the training will likely attend. The effort leverages our in-house efforts and creates regulatory acceptance simultaneously with technical training.

Technology Users

Range community

Regulators

Description

The ITRC small arms range team, including USAEC, has developed training modules for Internet training. This module has also been modified to suit "on-site" training for use at conferences, where interpersonal interaction makes training even more effective. This effort allows the Department of Defense (DoD) to insure that range managers have access to the on-site training available at heavily attended Army conferences. USAEC will ensure that the conferences will be geographically spread, so we have the widest possible attendance. State regulators will also attend this training, so that range community will have the understanding that any techniques

they employ from this training will automatically have high degree of regulatory acceptance.

Accomplishments and Results

Internet training is complete and will be given several more times in 2006, as is the document from which training is derived. One of the four classroom training sessions was given in 2005 and three more are expected for 2006.

Follow-On Program Requirements

Training will occur in 2005 and 2006.

Program Partners

Office of the Department of Environmental Programs

U.S. Army Environmental Center

Interstate Technology Regulatory Council

ORDNANCE EMISSIONS CHARACTERIZATION PROGRAM

Military installations need to characterize the emissions generated by munitions during training and testing activities. The Ordnance Emissions Characterization Program will provide the Army and Defense Department with data to help them assess the environmental impacts from munitions use, as well as to build various models and health and risk assessments.

PURPOSE

- To obtain data and identify models that quantify the emissions generated from munition items.
- To provide the U.S. Army with data to assess potential air emissions.
- To create defensible data to be used for fate, transport, and effect work.

BENEFITS

The data generated from this effort will help the Army and Army installations assess the environmental impacts of using munitions during training and testing operations. The emissions data can be used to feed various models (such as air, fate, and transport) and support the generation of health risk assessments. Installations can also use the data to meet Emergency Planning and Community Right-to-Know Act or the Toxic Release Inventory reporting requirements. Environmental restrictions on training U.S. military personnel will be minimized, due to more scientific data. Future cleanup costs may be reduced. Furthermore, environmental stewardship shown will enhance both public image and trust.

TECHNOLOGY USERS

Army and Department of Defense installations.

U.S. Army Installations

U.S. Army Research Laboratory

U.S. Army Corps of Engineers – Waterways Experiment Station

National Guard Bureau

DESCRIPTION

The U.S. Army Environmental Center (USAEC) has developed a test program to identify and quantify the emissions that result from weapons firing and from the use of pyrotechnic devices. The data to be gathered will provide information on the concentrations of the emission products. The requirement for this information was identified as a result of the Administrative

Orders (AOs) issued by the Environmental Protection Agency (EPA) Region I, which severely restricted training operations at the Massachusetts Military Reservation. The Army questioned the validity of the claims made by the EPA Region I, but was unable to provide data regarding training range emissions and the fate and transport of those emissions in the environment. This test program is focused on obtaining and developing data such that the Army will be able a present an incontrovertible case for the continuation of operations or at least limit the breadth of restrictions to those activities that are in fact causing peril. The three distinct but related project areas to quantify emissions have been developed as follows:

1) Firing Point Emission Study

This effort will develop data on the emissions resulting from weapons firing at the firing position and associated emissions factors. The focus of the effort will be to quantify the emissions, develop emissions factors, and evaluate the fate of emissions from representative U.S. Army weapon system ammunition classes. The data generated will support the U.S. Army and U.S. Army installations in assessing the environmental impact of weapons firing as a part of training and testing operations. Limited data exist on the emissions associated with weapons firing. Research efforts such as those conducted by IIT Research Institute on small caliber (5.56 mm) and large caliber (105 mm) were very limited in scope. A phased approach has been developed. Phase I encompassed a data search and analysis, test matrix and methodology development, model development, and an interim report. An important objective of Phase I was to establish item similarities and data crossover so that the item test matrix and costs are minimized. Phase I was completed in October 1998. Phase II, currently ongoing, involves actual weapons firing at the Aberdeen Test Center, Aberdeen Proving Ground, Maryland, with sampling and analysis results used to develop emission factors for specific weapons systems and ammunition types.

2) Characterization of Smoke and Pyrotechnic Emissions

This effort will develop data on the emissions resulting from smoke grenades and flare use during training and testing. A phased approach will be used to accomplish this task. Phase I encompassed a comprehensive data search followed by Phase II, actual testing to develop data on the emissions resulting from smoke grenade and flare use. The emissions will be characterized in the Bang Box at the Dugway Proving Ground, Utah, for various smoke grenades (colored and uncolored) and flare devices (colored and uncolored). Results of these characterization efforts will then be used to generate emission factors for the various items. The emission factors can then be used in conjunction with standard dispersion models to estimate downwind concentrations and rates of deposition.

3) Exploding Ordnance Emissions

This effort identifies and evaluates the fate of explosive compounds in projectiles that have properly functioned during training and testing operations. Efforts will be focused to assess and document the completeness of reaction, and to quantify the emission residuals and byproducts from explosive detonation of military projectiles. The dispersal of the residuals and byproducts in air, soil, and water will be evaluated, as well as factors affecting their environmental degradation and transport. A phased approach is planned. Phase I efforts consisted of a significant data search and review, test matrix and methodology development, and model identification. One aspect of test methodology was to assess the potential of using small-scale detonations that mimic much larger sized ordnance. Phase II provides for the actual testing and for the development of emission factors.

Phase III for all studies in this effort involves a comprehensive study on the environmental fate and transport of the emission products in the environment.

For all of the emissions studies, it is known that in perfect combustion of an organic (carbon-containing) substance, only carbon dioxide and water are created. However, because explosions and other types of combustion do not always take place under optimum conditions, and because there are other substances included in these items, researchers look for many other substances in addition to carbon dioxide and water. During testing, the item being evaluated is placed in the testing chamber, and the system used to collect the emissions from the ignition of the item is activated. Upon detonation, the emission products are collected through a vacuum system. The samples collected are then processed by chemists to determine amounts of any substances present. Chemists analyze the samples collected for over 280 different substances that can be byproducts of any combustion. The airborne compounds sampled during these tests included total suspended particulate (TSP), particulate matter that was smaller than 10 microns and 2.5 microns, metals, volatile organic compounds, dioxins and furans, carbon monoxide, and similar compounds that might lead to public health concerns.

The tests were also videotaped with high-speed film, enabling researchers to play back the video and measure the fire plumes and smoke patterns from the detonations. The temperature and velocity of the firing are also being measured. The information obtained can be used by modelers to determine what is ultimately happening to the emissions and their effects, if any.

Accomplishments and Results

- Testing of 178 items for emissions characterization was completed. Reports are being generated recording emission factors, actual concentrations, and analysis of emissions.
- Forty-three health risk assessments and fact sheets have been produced based on the emission factors generated.
- Publication of 57 munition items and their respective background documents and AP-42 sections addressing the emission factors on EPA's Web site in the standard AP-42 document.

The EPA-Research Triangle Park (EPA-RTP) has been reviewing Detailed Test Plans (DTPs) prior to the firing or detonating of the ordnance. EPA-RTP's comments and approval of the plans has added great validity to the testing.

Follow-On Program Requirements

- Complete at least 28 various tests in fiscal year 2006 at Dugway Proving Ground and the U.S. Army Aberdeen Test Center
- Complete documents publishing emission factor results
- Publish emission factors in the EPA's standard document (AP-42)
- Publish fact sheets and technical documents for each item tested (with descriptions of the item, its emissions and a generic health risk assessment).

Program Partners

U.S. Army Environmental Center

U.S. Army Aberdeen Test Center

U.S. Army West Deseret Test Center, Dugway Proving Ground, Utah

Environmental Protection Agency

U.S. Army Center for Health Promotion and Preventive Medicine

RANGE DESIGN RISK ASSESSMENT MODEL – EQT

Due to a significant growth in environmental regulations, Army ranges and training lands are increasingly being impacted by environmental compliance requirements that affect the use and capabilities of ranges. A tool is required that permits early identification of environmental compliance issues affecting the design, construction, operation, maintenance, and closure of ranges. The product of this effort is a Range Risk Assessment Model (tool) that provides the capability for early identification of environmental compliance issues that affect the design, construction, operation, and maintenance and closure of ranges.

PURPOSE

The purpose of this effort is to develop a matrix methodology that identifies environmental compliance issues and other risk factors related to sustainable ranges, and that assists range managers in planning for and designing new ranges and retrofitting existing ranges.

BENEFITS

The model being developed under this program will enable range managers and planners to more quickly identify and assess environmental compliance issues and other risk factors related to sustainable ranges, and in planning for and designing new ranges, and in retrofitting existing ranges. This will favorably impact budgeting and scheduling of range projects.

TECHNOLOGY USERS

All installations will be able to use the model being developed under this program.

DESCRIPTION

The product of this effort is a tool that will provide for early identification of environmental compliance issues that affect the design, construction, operation, and maintenance and closure of ranges. It will enable range managers to focus time and resources, shorten the NEPA process, and reduce overall costs. The tool will "walk" users through the environmental issues and related risks related to range projects, as well as support the NEPA process. The tool will support assessment of existing ranges and support construction of new ranges. The tool will be computer based with a graphical user interface. It will have reference links to the Environmental Performance Assessment System (EPAS), Range Munitions User Guide, and Web-based links to environmental modeling tools. Users will include all personnel that have a role in the planning, design, construction, operation, maintenance, and closure of ranges.

The research and development (R&D) phase has three elements as follows: 1) develop a range environmental risk methodology, 2) qualify or quantify environmental compliance risk for individual ranges or suite of range types, and 3) identify and incorporate into the model appropriate mitigation approaches and techniques to address risk. Risk will be assessed in terms of significant environmental compliance risks now, or future risks anticipated being associated with sustaining ranges and training activities.

The model will be developed in three phases with each phase representing an interim product. The first phase will be a computer-based tool with an initial assessment methodology. This will provide an automated matrix that scores the probability of environmental compliance vulnerability for ranges. The second phase product will expand the analysis capability to include spatially explicit analysis of regional and site-specific issues. The third phase product will include numerical modeling capability that may be applied to site-specific factors.

Accomplishments and Results

The Construction Engineering Research Laboratory (CERL) recently completed the first phase (as described above).

Limitations

This model is intended to be a tool to assist range managers; however, range managers will still need to consult with installation environmental personnel.

Follow-On Program Requirements

Technology transfer to interested users will likely be accomplished in early 2006 by the U.S. Army Environmental Center.

Program Partners

U.S. Army Environmental Center

U.S. Army Engineer Research and Engineering Laboratory, Construction Engineering Research Laboratory

Army Training Support Center

Publications

Being developed.

Range Design Specifications Incorporating Environmental Compliance – EQT

Due to a significant growth in environmental regulations, Army ranges and training lands are increasingly being impacted by environmental compliance requirements that affect the use and capabilities of ranges. Existing range design elements that contribute to environmental degradation and regulatory non-compliance need to be identified and assessed, and improved designs developed to mitigate future environmental degradation and potential regulatory non-compliance risk. This project analyzes range design elements with respect to mission, environmental degradation, and regulatory non-compliance. The project will develop new designs and provide retrofit and upgrade packages for selected high-risk elements. The long term operation and maintenance (O&M) requirements of existing designs, and their cost implications and impact on range down time will also be assessed.

Purpose

The overall purpose of this effort is to: 1) identify range design elements that pose an environmental compliance risk, and develop improved range design elements to mitigate that risk, 2) to demonstrate, validate, and document selected new/improved range design elements, and 3) to incorporate recommended technologies into standard range design criteria.

Benefits

The new range design elements being developed under this program will mitigate future environmental degradation and potential regulatory non-compliance risk.

Technology Users

All installations will be able to use the specifications, range retrofit packages, and design guides being developed under this program.

Description

Engineering aspects of the new designs will be assessed and compared to existing designs according to their cost, effectiveness, and O&M requirements over the range life cycle. Several design criteria are as follow: 1) must meet acceptable tactical standards; 2) should achieve 50% reduction in O&M costs; 3) reduce berm maintenance time intervals to 20-36 months; 4) more effectively capture munitions; and 5) identify optimal berm composition and design methods.

Products of this effort will be new designs that incorporate sustainable components and reduce the risk of range operations. Products will be in the form of evaluation reports and design packages to be incorporated into existing standard range design processes. Evaluation reports and design packages will also be provided as general guidance for installation range managers so they can be used at the installation level for planning and modification of operations associated with existing ranges.

The approach is as follows. Existing environmental degradation and regulatory non-compliance data will be captured, along with design data relative to previous work on ranges. Design elements will then be assessed, and prioritized based on readiness requirements and common environmental degradation problems and non-compliance risks. Finally, improved range design elements, siting criteria, and upgrade packages for existing ranges will be developed.

Accomplishments and Results

The Construction Engineering Research Laboratory (CERL) has transferred the design packages to USAEC. The three major final products associated with this effort are: 1) a report documenting development of range design retrofit and upgrade packages; 2) a final report detailing improvements to existing range design elements; and 3) an engineering cost assessment. As part of this program USAEC has completed a preliminary engineering and cost analysis of the following commercial off-the-shelf (COTS) technologies: 1) Shock Absorbing Concrete (SACON) blast mat for use on tank defilade positions; 2) Camouflaged Erosion Control Mat (CAMO-MAT) for erosion control and slope stabilization; 3) articulating concrete block (cable concrete) for tank turn points and stream ford crossings; 4) rail tie mats for tank turn points and stream ford crossings; 5) Oligosaccharide aldonic acids as a dust palliative. Currently, four design elements are being demonstrated at two installations, with results expected by the end of calendar year 2006.

Limitations

Limitations of the new range design elements and guidelines currently being developed have not yet been determined.

Follow-On Program Requirements

Demonstration and validation testing of selected range design elements will be performed beginning in early 2005; technology transfer to interested users will likely be accomplished in 2006, by the U.S. Army Environmental Center. New and improved range design elements must also be incorporated into standard range design criteria, and commercialization assessments

must still be performed for promising technologies.

Program Partners

U.S. Army Environmental Center

U.S. Army Engineer Research and Engineering Laboratory, Cold Regions Research and Engineering Laboratory

U.S. Army Engineer Research and Engineering Laboratory, Construction Engineering Research Laboratory

Army Training Support Center

Publications

Design specifications for new/improved range design elements are still being developed at this time.

Range Munitions Carrying Capacity Model or ATTACC for Munitions (AFM) – EQT

Due to a significant growth in environmental regulations, Army ranges and training lands are increasingly being impacted by a diverse set of environmental compliance requirements that affect the use and capabilities of ranges. Characterization of environmental risk associated with munitions use on ranges is required to sustain mission operations on ranges. Range managers and planners must understand the current environmental risks, and be able to assess future environmental risks as a function of munitions use. The ability to project risk as a function of planned range use is critical since it impacts documentation, justification, budgeting, and scheduling of range projects. Assessment of environmental risk to ranges from ongoing and future training and testing activities can be met through development of a munitions management and prediction tool.

Purpose

The purpose of this effort is to develop a munitions-based carrying capacity capability for ranges that is similar to the existing Army Training and Testing Area Carrying Capacity (ATTACC) methodology which addresses maneuver impacts on ranges. Some other objectives are to integrate the model with Integrated Training Area Management (ITAM) ATTACC methodology, so as to develop a capability to model the cumulative effects of range operations.

Benefits

The model being developed under this program will enable range managers and planners to better assess current environmental risks and future environmental risks as a function of munitions use. In addition to being able to project risk as a function of planned range use, the tool will enable range managers to improve budgeting and scheduling of range projects.

Technology Users

All installations will be able to use the Range Munitions Carrying Capacity Model/AFM being developed under this program. ARAMS will use this module as a front end for risk assessment.

Description

The product of this effort will be a munitions carrying capacity methodology that is able to predict the munitions carrying capacity of a range, as a function of munitions type and quantity, and existing environmental conditions associated with that range. Range use will be characterized using existing military data repositories, programs, and computer methods

such as ATTACC, and the Range Facility Management Support System (RFMSS). Munitions use will be defined by Standards in Training Commission (STRAC) requirements. Environmental condition of ranges will be based upon active and inactive range inventories, and related environmental data sources.

Accomplishments and Results

The Construction Engineering Research Laboratory (CERL) completed the first phase (as described above) of developing an ATTACC-like range munitions training load quantification methodology – the training load characterization. The model will be tested in late 2005/early 2006 for validity and then transitions to ARAMS for incorporation as a front-end module.

Limitations

The Range Munitions Carrying Capacity Model/AFM will initially be applicable only to United States training ranges.

Follow-On Program Requirements

Technology transfer to interested users will likely be accomplished in late 2005/early 2006 by the U.S. Army Environmental Center.

Program Partners

U.S. Army Environmental Center

U.S. Army Engineer Research and Engineering Laboratory, Construction Engineering Research Laboratory

Army Training Support Center

U.S. Army Engineer Research and Engineering Laboratory, Cold Regions Research and Engineering Laboratory

Publications

ATTACC-Like Range Munitions Training Load Quantification Methodology – Phase I, Final Report, dated April 20, 2004, CALIBRE with the Construction Engineering Research Laboratory

REPLACING PERCHLORATE IN SIMULATORS

Regulatory enforcement of environmental laws and regulations continues to expand with regards to munitions production and military range operations. Particularly, a rapid trend has developed regarding increased accountability of the Department of Defense (DoD) for the emissions from the use of munitions items during training and testing operations.

PURPOSE

In 1997, the need to quantify the emissions resulting from munitions use and to assess the risk to human health and the environment from these emissions, was identified as a critical issue for the U.S. Army and the other services. Environmental Protection Agency (EPA) Region I requested information on the emissions and residues from the use of munitions at the Massachusetts Military Reservation (MMR). DoD was unable to provide the requested data and thus could not present any valid assessment of the impacts from the use of munitions there. Since that time, additional data requirements, such as Emergency Planning and Community Right-to-Know Act–Toxic Release Inventory (EPCRA-TRI) reporting have evolved.

In September 1997, the Chief of Staff of the Army directed the Assistant Chief of Staff for Installation Management (ACSIM) to establish a General Officer Steering committee to address the implications of the restrictions on operations at MMR. The ACSIM directed and funded the U.S. Army Environmental Center (USAEC) to gather emissions data. The USAEC has developed a comprehensive program to identify the emissions resulting from range operations that involve weapons firing, smoke and pyrotechnic devices, and exploding ordnance, and to assess the environmental and health hazard impacts resulting from their use. In the execution of that program, it was identified that two of the simulators (that contain perchlorate) were being used in significant quantities. These training items are critical to training and enhance the performance of our Soldiers in combat operations and provide a method to train Soldiers for combat operations. These perchlorates move very quickly into the ground water and are suspected of health effects that may present a risk to the Soldier and anyone drinking the water. It is in the best interest of the Army and DoD to demonstrate and implement a material substitution for the perchlorate in these specific munitions items.

BENEFITS

The replacement of the perchlorate in these two training devices will encourage the effort for finding substitute materials for the elimination of perchlorate in other devices. This will provide reduced risk to Soldiers, the environment, and surrounding communities. In addition, this will reduce

the potential for restricted operations and for fines and penalties associated with the impacts of these items. Training realism will be maintained due to the lessening of restrictions. This next generation of simulators, while having less impact on the environment, will also provide a very real training capability to the Soldier.

Technology Users

Soldiers

Installations

Description

Several alternative materials have been identified, and funding was provided to validate the functional and operational capabilities of these items with the alternative (less toxic) materials, prior to their implementation.

Accomplishments and Results

The test simulators have been developed. During the testing new techniques were developed and utilized that have identified the requirements for these training devices for future evaluations. This was accomplished through the use of sound and visual recording devices that allowed the accurate measurements of the sound and flash from the original devices for comparison with the experimental devices. Pilot quantities of the two simulators have been produced that meet the technical needs. During the manufacturing of these items, it was discovered that they would have to change several steps in the production of these items. This was accomplished during the production of the test items so it can be incorporated into the production line if the item is approved for use and limited or full production begins. Final simulators will be available in calendar year 2005 and will be tested under the emissions characterization program. Additional simulators will be made for toxicity testing to determine their toxicity in comparison to the simulators they are expected to replace.

Limitations

The new simulators must meet military standard criteria. To complete the transition, the new simulator formulations must meet an Environmental Fate Assessment. Upon completion of the environmental testing, an Inhalation and Toxicology testing/assessment occurs. After all of these have been completed, the Engineering Change Proposal (ECP) may be submitted to the Configuration Control Board (CCB) for their review and approval. If the ECP is approved, the Material Change Approval is issued. Upon the change in formulation, a phased-in production occurs. The first

article test requires a large sample of the items be tested to ensure line operators can make them and function as intended. After this final testing, the material is released for full-scale production and use.

Program Partners

Edgewood Chemical and Biological Center

Army Research and Development Center, Picatinny

U.S. Army Environmental Center

Publications

Planned for publication are the Final Report of the Replacement of the Perchlorate in the M115A1 and M116A2 Simulators.

TOOLS FOR MONITORING RANGE ACCESS – EQT

Increasing urban encroachment and the rise of international terrorism have resulted in an increased need for intrusion detection systems (IDS) on Army ranges. Minimizing unauthorized intrusion on Army ranges requires the detection and deterrence of intruders. This can be attempted on a range wide scale by lining the range perimeter with IDS sensors and cameras, or on a local scale to protect specific sites on a range. Selection of security equipment depends on which approach is to be implemented, and on site-specific factors such as terrain, weather, and existing infrastructure. The success of either approach in preventing injury, damage, or theft will depend on the response time of military police once they have been alerted that an intruder has been detected. IDS technologies must 1) be cost effective and require minimum army personnel interaction, 2) must not impact training requirements, 3) must be able to discriminate between human and animal intrusion, 4) must meet DoD and Army requirements for range access and control, and 5) must be incorporated into standard range designs manuals and specifications.

PURPOSE

The overall purpose of this effort is to 1) identify, evaluate, and document existing government and commercial surveillance/monitoring technologies for their applicability to range access security, 2) to provide tools that will aid installations in acquiring the needed protection, and 3) to incorporate recommended technologies into standard range design criteria. The immediate goals are to 1) develop and demonstrate IDS Decision tree software, and 2) develop and demonstrate an IDS GIS line-of-sight software tool.

BENEFITS

This program will help ensure increased force protection levels, and will assist installations in the procurement and preliminary design of IDS. The tools currently being developed and demonstrated under this program will allow range managers to quickly down select applicable IDS technologies from the wide array of technologies available, and will enable them to more easily estimate the number of IDS sensors required, and the best location for these sensors.

TECHNOLOGY USERS

All installations can use the tools being developed; the tools can easily be applied by installation personnel, provided the necessary computer hardware, software, and requisite GIS data are available.

Description

The Security Technology Decision Tree Tool (STDTT) currently being developed will allow installation personnel to quickly identify the type of IDS best suited for their needs, based on site-specific conditions. The Training Land (TL)-See GIS Tool being developed will assist users in placing cameras or line-of-sight IDS. The user will specify camera height, camera format, and lens (both selected from menu), and whether the potential target is an upright or crawling person. The user will set a camera location and a target location by clicking the mouse. The tool will consider topography and vegetation in calculating view shed, and display effective camera coverage between camera and target as a green overlay on a site image. Blocked areas will be in red. The tool will allow the user 'what if' planning of camera placements for security.

Accomplishments and Results

The Cold Regions Research and Engineering Laboratory (CRREL) has built an information database of IDS technologies and their capabilities and cost. CRREL has also invited demonstration of technologies for evaluation purposes, and evaluated technologies according to applicability to Army range needs and requirements stated above. They have documented technologies that meet requirements. A report evaluating commercial and government IDS that are applicable to ranges was published in September 2003. The report outlines options for detecting intrusion using Commercial Off-the-Shelf (COTS) and Government Off-the-Shelf (GOTS) equipment for both detection and surveillance assessment. It provides guidance to assist range managers in selecting IDS technologies best suited to their installation, and provides an evaluation of intrusion detection and surveillance equipment applicable to range applications. CRREL is currently developing the STDTT and TL-See GIS Tool described above; and draft detailed test plans (DTPs) for the demonstration and validation of these tools are being developed.

Limitations

The Training Land (TL)-See GIS Tool currently being developed will only be applicable to cameras and line-of-sight IDS.

Publications

Follow-On Program Requirements

Technology transfer to interested users will be accomplished in late 2005/early 2006 by the U.S. Army Environmental Center (USAEC). IDS technology must still be included in standard range design criteria, and commercialization assessments must still be performed on promising technologies.

Program Partners

U.S. Army Environmental Center

U.S. Army Engineer Research and Engineering Laboratory, Cold Regions Research and Engineering Laboratory

U.S. Army Engineer Research and Engineering Laboratory, Construction Engineering Research Laboratory

Army Training Support Center

Publications

Technology for Range Security. September 2003. U.S. Army Engineer Research and Engineering Laboratory, Cold Regions Research and Engineering Laboratory (CRREL).

TUNGSTEN SMALL ARMS EVALUATION

In 1999 and 2000, the Army National Guard at the Massachusetts Military Reservation (MMR) began using a newly developed tungsten nylon bullet for training. Twelve ranges at MMR were being used for training using this round in fiscal year 2005. Several other installations around the country also use the tungsten round. During development and testing, the solubility of this material was considered a non-issue, as the handbook of chemistry and physics as well as all other literature considered the material "insoluble." Recently, the fate and transport of tungsten on small arms ranges has come into question with the potential solubility of the tungsten nylon bullet as the primary concern.

PURPOSE

The primary objective is to characterize the mobility of tungsten, lead, and other small arms munitions metal constituents on three installations with varying climate and soil conditions.

BENEFITS

We will gain knowledge about the field potential of tungsten to move from the bullet fragments into the vadose zone and into either surface water or ground water.

TECHNOLOGY USERS

Range community

Installations

DESCRIPTION

The mobility of tungsten fired at three installations with varying site characteristics will be investigated. This involves the development of quantitative data on the munitions metal constituent levels in soil, groundwater, surface water, storm water, and sediment on the range and in flow paths leaving the range impact areas. Characterization of the tungsten, lead, antimony, copper species developed in the soil matrix will also be determined. The potential for metals mobility will be identified. The data collected will be compared to federal, state, and local water quality requirements/standards.

ACCOMPLISHMENTS AND RESULTS

We developed a sampling plan for our first site, the Massachusetts Military Reservation. In the fall of 2005, we sampled soils and installed lysimters at this first of three installations.

Follow-On Program Requirements

Sampling plans will be developed for the second and third installations and then field sampling will occur at those installations.

Program Partners

Office of the Department of Environmental Programs

U.S. Army Environmental Center

Massachusetts Military Reservation

U.S. Army Engineer Research and Engineering Laboratory, Cold Regions Research and Engineering Laboratory

U.S. Army Engineer Research and Engineering Laboratory, Construction Engineering Research Laboratory

UNEXPLODED ORDNANCE CORROSION

Testing and training operations using exploding ordnance continue to play a key role in maintaining the readiness of the warfighter. Roughly 3.5 percent of the rounds used in these operations malfunction, resulting in unexploded ordnance (UXO). Many of these UXO contain high explosives (HE). UXO exists at impact areas on the surface and buried in soil, in wetlands sediment and in water, under both aerobic and anaerobic conditions. Prior to 1999, data on the condition of existing UXO and its impacts on the environment had not been collected or evaluated. Additionally, factors that may affect the condition of UXO (such as munition type, soil type, aqueous conditions, and pH) had not been evaluated. This study evaluated the rate and mode of UXO corrosion. We collected soil explosives concentrations beneath a significant portion of ordnance on 14 ranges.

PURPOSE

Provide the U.S. Army with a tool to assess the site-specific years to perforation for unexploded ordnance (UXO), and evaluate under what conditions, if any, UXO might place explosives into soils on ranges.

BENEFITS

This project enables installation range managers to evaluate the potential risk from UXO corrosion and release of munitions-related compounds on their installations. We developed a user-friendly computer tool that provides the number of years to perforation for a user-specified thickness of metal. This computer tool can be used as a program management aid, giving the range manager and risk assessor information to manage the need and timing for range maintenance. Environmental restrictions on training U.S. military personnel will be minimized. Future cleanup costs may be reduced. Furthermore, the environmental stewardship observed will enhance both public image and trust.

TECHNOLOGY USERS

U.S. Army Installations

U.S. Army Corps of Engineers

Risk Assessment Community

DESCRIPTION

The Army has a growing need to respond to regulatory questions about the environmental impact of UXO in and around firing ranges. As a result, the University of Louisiana at Lafayette, Praxis Environmental Technologies, the Naval Research Laboratory, and the U.S. Army Corps of Engineers in Huntsville, under the direction of the U.S. Army Environmental Center,

addressed these issues. The Strategic Environmental Research and Development Program funded the project, in part. The data gathered for this program provide information on the likelihood of UXO to degrade to the point of perforation. This work addressed if and how conventional UXO on military test ranges corrodes over time and provided the parameters, assumptions, and constraints of the modeling techniques being used in the development of this UXO Corrosion Model. The results of this modeling effort provide input (time to perforation) in future range risk assessments.

Completed work for SERDP: gathered 161 ordnance items from 14 sites where the UXO age is well constrained and over a variety of soil/environmental conditions that may influence corrosion rates. The data generated will support the U.S. Army and Army installations in assessing the environmental impact of weapons firing as a part of testing and training operations.

Accomplishments and Results

Final report, corrosion model, and database were submitted to SERDP in April 2004 containing information on the sampling and results from 14 sites in which approximately 161 ordnance samples for corrosion and associated properties were gathered.

Follow-On Program Requirements

Final model update is expected late in 2005. Modeling report will include several release scenarios to increase the understanding of UXO range risk. Transition of the data corrosion model and release modeling to the Army Range Assessment Modeling System (ARAMS) is also expected in 2005, completing the technology transfer of these tools to the users.

Program Partners

U.S. Army Environmental Center

Strategic Environmental Research and Development Program

U.S. Army Engineer Research and Engineering Laboratory,
Cold Regions Research and Engineering Laboratory

Louisiana State University-Lafayette, Corrosion Research Center

Naval Research Laboratory

U.S. Army Corp of Engineers, Huntsville Alabama

U.S. Army Center for Health Promotion and Preventative Medicine

VEGETATION WEAR TOLERANCE

Military land stewardship integrates natural resources management objectives with land warfare training requirements. The Army Environmental Requirements and Technology Assessments (AERTA) Environmental Compliance requirements that address these issues include: 2.1.b "…Range and Road Maintenance" and 2.5.e "Sustainable Army Live-Fire Range Design and Maintenance." Meeting these requirements requires plants that can reduce soil erosion under training and rangeland conditions. Erosion can affect the quality of training and range sites and the environment. The Army must constantly balance its military mission and its commitment to stewardship on millions of acres of lands. The military mission requires that vegetation, primarily grasses, be as resilient as possible to maintain realism and control soil erosion. In the future, the military faces increasingly difficult land-management challenges. As weapons technology improves, training and testing needs change. Complicating this challenge is the impact of continuing development, especially urbanization, outside the boundaries of military installations.

PURPOSE

The purpose of the requirement is to 1) demonstrate the effectiveness of new germplasms (plants) to better tolerate wear and appropriate seed mixtures to improve establishment in northern desert climates (Intermountain West); and, 2) develop a planting guide to help land managers establish desired vegetative stands and prevent soil erosion from troop and vehicle traffic on individual installations.

BENEFITS

The Environmental Cost Analysis Methodology (ECAM) tool, designed to facilitate the gathering and analyzing of economic data in a manner that will allow for more accurate evaluation of investment in pollution prevention technologies, was used to determine savings on reseeding costs from this new technology. The average annual cost of seeding an acre of moderately used land, assuming a four-year cycle for existing germplasms and a six-year cycle for the Strategic Environmental Research and Development Program (SERDP) improved germplasms, resulted in a seed cost savings of 28 to 33%. These erosion prevention techniques could save some or all of these costs.

TECHNOLOGY USERS

Many Army facilities will benefit from these improved plants and seeding techniques. The Intermountain West Region contains three major FORSCOM facilities, five AMC facilities, and seven NGB locations. The FORSCOM and AMC facilities total over one million acres of land. Individuals at the installations include range and natural resource managers.

Description

Demonstrations will evaluate resiliency of new plants by comparing the improved plants to plant cultivars and mixtures traditionally used at the facility. Evaluations are being conducted at two western training facilities –Yakima Training Center (Washington) and Camp Guernsey (Wyoming). Planting at the two facilities took place in 2002, 2003, and 2004. An additional planting was done in 2005 at Camp Guernsey and one is planned for Dugway Proving Ground (Utah).

Researchers are monitoring these demonstration sites for three years. At Yakima, the demonstrations also involve controlled vehicle traffic, submitting the plants to diverse levels of wear. Based on the test results, certain species will be recommended for installations with similar soil and climate conditions. Information on these species will be available on the VegSpec computer program and in a new planting guide, so natural resource and range managers can easily identify and select the plants best suited for their revegetation needs.

Researchers are conducting this demonstration in cooperation with the Environmental Security Technology Certification Program (ESTCP).

Accomplishments and Results

Evaluations continue at the Camp Guernsey and Yakima Training Center plots. At YTC, almost all improved varieties are outperforming the existing varieties in terms of percent stand. In June 2005, YTC plots were tracked with a Stryker vehicle in straight tracks of 0, 1, and 4 passes perpendicular to rows of individual plantings. Several soil and plant measurements were taken before or after tracking or both. Follow-up data will be taken for the next two years and a second tracking will be done during a wetter season, if possible. Initial data shows that all SERDP-improved varieties except slender wheatgrass appear to be the same as or more resilient to the traffic than existing varieties. Two greenhouse experiments at CRREL have been harvested and data is being analyzed to determine the carbohyrate status of the SERDP-select germplasms, which is another indication of resiliency, and to evaluate humic acid relationships in eco-bridge seedings. To provide seeds for large-scale use on military lands, seed increase is being carried out by the USDA-NRCS in Aberdeen, Idaho for western, Siberian, and slender wheatgrasses. To date three cultivars and four germplasm lines have been released.

Follow-On Program Requirements

- Monitor project
- Carry out additional vehicle tracking at Yakima Training Center
- Record results, summarize data, prepare technical report, and publish results, including a planting guide.

Program Partners

Environmental Security Technology Certification Program

U.S. Army Engineer Research and Engineering Laboratory, Cold Regions Research and Engineering Laboratory

ARMY ENVIRONMENTAL (USER) REQUIREMENTS AND TECHNOLOGY ASSESSMENTS

During the first 15 years of Army environmental research, most research, development, test, and evaluation (RDT&E) goals and objectives were established through informal coordination within the Army development community. Given greater emphasis on relevance to Army users, a more rigorous, requirements-based approach was developed in the early 1990s. Since 1993, the environmental user requirements process has been formalized into a two-year cycle aligned with the Program Objective Memorandum process.

PURPOSE

U.S. Army Environmental (User) Requirements and Technology Assessments (AERTA) serves as the Headquarters Army central repository for environmental user requirements and related information in support of the Army's Environmental Quality Technology (EQT) Program. AERTA facilitates Army's validated and prioritized environmental user requirements to help the RDT&E community identify opportunities for developing and demonstrating improved environmental systems and identify applicable off-the-shelf technologies to help Army users make informed decisions on technologies that are better, faster, and more cost-effective.

BENEFITS

In addition to satisfying the annual Department of Defense (DoD) tri-service reporting requirement to the Environmental Security Technology Requirements Group (ESTRG), the AERTA process enhances communication between the "users" of environmental technologies and the Army's environmental RDT&E community. It gives the RDT&E community a better understanding of users' environmental technology requirements with associated performance metrics, their priorities, and the Army's cost of living with the problem, all of which provide the basis for developing RDT&E environmental technology management plans. AERTA provides Army installations with information on the development and availability of faster and more cost-effective environmental technologies. Organizations with technology requirements can use AERTA to identify and share "lessons learned" in a time of shrinking resources.

TECHNOLOGY USERS

Army and DoD major commands and installations use technologies to satisfy their environmental requirements. The AERTA Web site documents technology needs from four user communities: (1) users responsible for installation infrastructure; (2) users responsible for weapons systems acquisition; (3) major commands that use these weapons systems; and (4) agencies responsible for collecting and tracking needs related to infrastructure and weapons systems.

DESCRIPTION

The initial database contained approximately 200 environmentally related operational problems throughout the Army. These were screened to focus on those requiring long-term research and development. These were then prioritized based on six ranking criteria: (1) environmental impact; (2) impact on readiness; (3) annual cost of operating with the unresolved requirement; (4) extent of the problem throughout the Army; (5) impact on quality of life; and (6) regulatory time limits.

The Office of the Assistant Chief of Staff for Installation Management (ACSIM), through the U.S. Army Environmental Center (USAEC), refined and updated these requirements from 1995 through 1997, expanding the scope of the effort into the Technology User Needs Survey (TNS). The Army's environmental databases were analyzed to maximize existing user environmental reporting, and several site visits were conducted across Army installations and major commands. These actions refined the qualitative and quantitative data on user needs and allowed requirements to be compiled in a common format that supports the DoD Tri-Service Environmental Quality Requirements Strategy (prepared by ESTRG). The updated requirements were presented at technology team meetings in 1996 and 1997 for review and validation. The list was narrowed to 142 requirements in 1997 and further focused to 44 requirements in 1999, which were prioritized within each program area (i.e., pillar) by the user community.

The TNS was retailored as a database, tailored to Internet access and was renamed AERTA. AERTA is a database that is kept current through the Army's EQT and ACSIM's user-requirements process and schedule. Army EQT adopted the recent changes to the Chairman Joint Chiefs of Staff Instruction that defines the process for identifying capabilities. AERTA is being revised to meet the new reporting format of the Joint Capabilities Integration and Development System (JCIDS) by the end of FY2004. The conversion of AERTA to JCIDS process and format began in FY2003 and was planned to be completed during FY2005, however, this revision was suspended indefinitely pending a reconfiguration of the EQT program. At the conclusion of FY2005 the existing AERTA requirements were revalidated to support the timetable for EQT program builds for the FY08-13 POM.

The AERTA database can be accessed and reviewed on the Defense Environmental Network and Information exchange (DENIX) at www.denix.osd.mil/denix/DOD/Policy/Army/Aerta. The advantage of storing information on the DENIX Web site is that access is restricted to DoD employees and contractors with approved accounts and passwords. To address problems of data management, two versions of the Army's environmental technology requirements are maintained. The first version contains unfiltered information and is maintained on the DENIX Web site. A second version, from which

"sensitive" information not readily needed by the public has been deleted, is on the ESTRG Web site at xre22.brooks.af.mil/estrg/estrgtop.htm. The ESTRG site will also identify primary points of contact (one to two per program area, per service) as a gateway for interested parties outside DoD.

Accomplishments and Results

This year we validated existing requirements supporting EQT program builds for the FY08-13 POM.

Limitations

The technology teams are responsible for screening out needs for which the solutions clearly do not involve technology.

Program Partners

U.S. Army Environmental Center

Members of the Army RDT&E community

Army Technology Users

Publications

Army Technology Needs Survey.

Army Environmental Requirements and Technology Assessments. (www.denix.osd.mil/denix/DoD/Policy/Army/Aerta).

Fiscal Year 2002 Army Environmental Requirements and Technology Assessments, Final Report. October 2002.

ARMY RISK ASSESSMENT MODELING SYSTEM (ARAMS)

PURPOSE

ARAMS is a computer-based, information delivery, dynamic modeling, and analysis system that integrates multimedia fate/transport, exposure, intake/uptake, and effects of contaminants and military relevant compounds to assess human and ecological health impacts/risks for existing, baseline, and future conditions.

BENEFITS

ARAMS can assess human and ecological risks, use measured or predicted exposure data, assess existing or future time-varying exposure/risks, conduct site-specific assessments, conduct screening or comprehensive risk assessments, assess a wide array of exposure pathways and uptake routes and provides flexibility for describing exposure/risk scenarios.

TECHNOLOGY USERS

ARAMS is available to the entire environmental community free of charge and could be utilized by remediation project managers and cleanup personnel.

DESCRIPTION

The Army Environmental Center has been involved with the Army Engineer Research and Development Center and the Army Center for Health Promotion and Preventive Medicine to complete ARAMS. ARAMS consists of an object-oriented framework (FRAMES) for linking objects to describe risk scenarios and provides seamless linkages to Web-based and local databases to filter and load data for assessment. The system has flexible graphical and textual output options that include generating Risk Assessment Guidance for Superfunds (RAGS) reports. ARAMS was designed to perform uncertainty analyses, and has modules for multi-media fate, transport, exposure, and effects analysis.

ACCOMPLISHMENTS AND RESULTS

ARAMS was first released June 2002. The most current version of ARAMS is 1.3, which was released in December 2005. This version uses FRAMES version 1.6 and is currently undergoing a demonstration/validation by the NDCEE.

LIMITATIONS

Users must have Windows 2000 or XP with 64K RAM, 800 MB of free disk space, and Microsoft Excel and ACCESS.

Follow-On Program Requirements

Follow-on requirements will be developed following the NDCEE Demonstration/Validation.

Program Partners

U.S. Army Engineer Research and Development Center

U.S. Army Center for Health Promotion and Preventive Medicine

U.S. Army Environmental Center

National Defense Center for Environmental Excellence

Publications

ARAMS is free to download at http://el.erdc.usace.army.mil/arams.

2005 ENVIRONMENTAL TECHNOLOGY SYMPOSIUM AND WORKSHOP (ETS)

As technology continuously progresses, it is important that the environmental community leverage available resources and share information to meet current and future mission requirements, improve efficiency, and reduce costs while protecting human health and the environment. The 2005 Environmental Technology Symposium and Workshop (ETS) provided such an opportunity.

PURPOSE

The 2005 ETS provided environmental professionals a forum for technical exchange and interaction regarding environmental technology strategies, innovations, demonstrations, and products. ETS attendees were involved in meetings, training, technical presentations, exhibits, and networking events.

BENEFITS

The symposium helps disseminate information across the services, reducing the "reinventing the wheel" syndrome. Engaging all three branches of the Armed Forces and combining what could have been three conferences into one reduced personnel travel expenses and time away from the office.

TECHNOLOGY USERS

Department of Defense (DoD) installations, government agencies, businesses, and academia.

DESCRIPTION

In 1995, the U.S. Army Environmental Center (USAEC) hosted the DoD Environmental Technology Workshop. This event brought together the three military environmental support centers and offered the opportunity for a unified position on environmental technology. The services recognize the need to share information and since 1995 the Tri-Service Environmental Support Centers Coordinating Committee (TSESCCC) has supported several Tri-Service Environmental Technology Workshops. Eventually the ITRC joined the service centers and improved the venue to include state and federal regulatory partnerships, guidance documents, and training sessions.

The 2005 ETS was hosted and financed entirely by the U.S. Army Environmental Center in coordination with the TSESCCC, which is composed of the Air Force Center for Environmental Excellence (AFCEE), Naval Facilities Engineering Service Center (NFESC), and the U.S. Army Environmental Center (USAEC). The event was held in Portland, Oregon, from 14-16 March at the Hilton Portland and Executive Tower. The 2005 slogan was "Sustaining the Environment through Technology" and emphasis

was placed on technologies that are "field ready" and are currently being demonstrated, or have been demonstrated. Presentations focused on technologies related to environmental management on military installations and topics such as sustainability, technology transfer, cleanup, pollution prevention and compliance, conservation, and risk-assessment technologies.

The 2005 ETS was unique in that it offered free registration to all attendees and also included a field trip around the city of Portland to view that city's progressive attitude towards sustainability, specifically their public transportation, recycling, and green construction efforts.

Accomplishments and Results

The ETS 2005 attracted over 300 attendees from the military services and a variety of professions including state and federal regulatory agencies; federal, state, and local policymaking organizations; private sector environmental firms; and academic and research institutions. The plenary session consisted of guest speakers from each of the commands centers of all three service centers and guest speakers from the ITRC, the Office of the Deputy Secretary of the Army, and the Office of the Secretary of Defense. There were over 90 technical presentations given over a two-day period and 18 exhibitors attended from both the government and private sector.

Follow-On Program Requirements

The TSESCCC met during the 2005 ETS and discussed the possibilities and requirements necessary to hold a seventh Tri-service Environmental Technology Symposium within 18 months following the 2005 ETS. Currently there are no plans to hold such a symposium in FY06.

Program Partners

U.S. Army Environmental Center

Naval Facilities Engineering Service Center

Air Force Center for Environmental Excellence

Interstate Technology Regulatory Council

Publications

Proceedings from the 2005 Symposium at www.ets2005.com.

Technology Transfer

Army Installation Technology Transfer Site Visits

As part of ongoing technology transfer efforts, the U.S. Army Environmental Center (USAEC) and National Defense Center for Environmental Excellence (NDCEE) visited six Army installations in early 2005 to identify current site technical needs, review alternative solutions with site managers, and facilitate technology transfer and implementation. The teams made technology transfer visits to Fort Bliss, TX; Fort Carson, CO; Fort Hood, TX; Fort Lewis, WA; Fort Stewart, GA; and Radford Army Ammunition Plant, VA.

Purpose

The purpose of these visits was to initiate technology transfer on site; by gaining a better understanding of the installations' environmental challenges, and then providing information on commercially available technology solutions.

Benefits

Gained knowledge about environmental technology needs at installations while also seeing success stories to share with other communities with similar issues. Understanding what types of environmental problems that installations face now will allow USAEC to better focus technology implementation efforts that will be most beneficial to installations around the country.

Technology Users

Installations

Description

The USAEC/NDCEE teams were organized to include experts in four technology focus areas; sustainable painting operations to reduce hazardous air pollutants (HAPs); reduction of HAPs and volatile organic compounds (VOCs) from combustion sources; LBP removal and solid waste reduction. However, once the teams started working with installation managers, they investigated and responded to any need that came up. The teams provided performance and cost information on a wide variety of equipment and processes, such as water-dispersible, chemical agent-resistant coating (WD-CARC) and corrosion inhibitor alternatives, biodiesel, LBP detectors, composting technologies and methods, non-aerosol brake cleaners, vacuum-assisted grinding equipment, wood recovery units for LBP removal, drinking water treatments, nitrous oxide (NOx) reduction technologies, and solvent parts washers and weapons cleaners.

The teams also saw examples of how installations effectively and

successfully implemented environmentally sustainable technologies and processes. Sharing these success stories and lessons learned between installations is an important aspect of technology transfer

Accomplishments and Results

Through the open cooperation of Army installation personnel, the visiting teams were able to effectively formulate more than 90 potential solutions in the form of alternative technology recommendations, equipment upgrades, and material substitutions. Furthermore, many of these solutions support installations' 25-year sustainability goals. Some example of the results of these site visits were that Fort Lewis received an analysis of its future compliance with the National Emissions Standard for Hazardous Air Pollutants (NESHAPs) that potentially saves them over $50,000. Fort Stewart learned about Fort Campbell's success in keeping concertina wire out of its landfill and Radford Army Ammunition Plant received assistance in developing its lead-based paint (LBP) management program and lead hazard management plan. In many instances, a visited site was linked with other installations that had successfully adopted innovative solutions.

Follow-On Program Requirements

Each installation visited received a trip report that provided follow-up information regarding on-site activities and the teams' recommended solutions. As applicable, information on other installations' best management practices was included.

In addition the teams developed Technology Transfer Implementation Plans for two of the technology needs that were most common among the installations visited. The Implementation Plans for water-dispersible chemical agent-resistant coating (WD-CARC) and solid waste diversion by composting are designed to transfer those solutions across multiple installations. These plans detail the opportunity, solution, and sequence of steps that are required to implement a new technology—tailored to the specific installation and identified process. Other NDCEE tasks responded to the installation needs identified by the site visits, and are using these Implementation Plans to support demonstration and validation testing of the technologies at Army sites.

Additional installations will receive similar site visits in fiscal year 2006.

Program Partners

Program Partners

Fort Bliss, TX

Fort Carson, CO

Fort Hood, TX

Fort Lewis, WA

Fort Stewart, GA

Radford Army Ammunition Plant, VA

Army Regional Environmental Offices

Installation Management Agency Regional Offices

U.S. Army Environmental Center

National Defense Center for Environmental Excellence

Technology Transfer

Remediation Technologies Screening Matrix and Reference Guide Updates

Several Web-based tools exist that aid Environmental Project Managers in making intelligent, informed decisions on cleanup technologies; few are as comprehensive as the Federal Remediation Technologies Roundtable (FRTR) Remediation Technologies Screening Matrix (SM) and Reference Guide (RG). The FRTR developed this guide to serve as a neutral platform from which to evaluate technologies from all media areas.

Purpose

The U.S. Army Environmental Center's Technology Branch manages and updates the FRTR Remediation Technologies Screening Matrix and Reference Guide, Version IV, to enhance user-friendliness, increase awareness of the document, foster close cooperation between government agencies, and provide an improved technology transfer product to both environmental technology users and the research and development community. As acceptance of environmental technologies changes and new technologies emerge, it is necessary to review and revise both the screening matrix and reference guide.

Benefits

The guide serves as a "one-stop shopping" document, allowing remediation project managers to sort through volumes of information in a direct and guided manner saving them time and effort. The guide can be referenced from either a contaminant or technology perspective dependent on the users need. The guide is also recognized as a comprehensive source for environmental restoration technology information. The screening matrix and reference guide is located on the FRTR Web site, www.frtr.gov, making it easy to access and update.

Technology Users

Remediation Project Managers

Government agencies

Private organizations and academia

Description

The SM and RG was first developed in 1994 to serve as a neutral platform to assist remediation project managers sort through large volumes of related and overlapping information. The matrix includes 59 *in situ* and *ex situ* soil and groundwater remediation technologies that can be evaluated from either a technology or contaminant perspective. Screening variables

include contaminants, development status, relative cost and performance, treatment train, and cleanup time. In-depth information on each technology is available in the RG, including direct links to a database of cost and performance reports written by FRTR members.

Version III of the guide was published in November 1997 and posted on the FRTR Web site, www.frtr.gov, as a living online document, making it easier to update and use. Periodic maintenance was performed between November 1997 and February 2001. In 2001, the SM and RG Committee (SMRGC) realized a major revamping of the document was necessary. To avoid complete overhauls similar to the 2001 revision it was decided an update of the online document should be completed annually.

The FY03 SM and RG update focused on improving the user-friendliness of the Treatment Technologies Screening Matrix (Table 3.2) and sought to develop rating symbols that would be more easily understood. The SMRGC decided the new symbols should resemble those used by *Consumer Reports* magazine; full, empty, and partially filled circles. No technical information was altered or deleted during the FY03 update. Matrix posters were printed for distribution.

Directed by the SMRGC the FY04 update focused on the development of realistic cost information to be included in technology profiles. After an analysis of cost estimating tools the SMRGC decided to use a parametric-based cost-estimating tool, RACER-2004 and the new RACER-2005, to provide a systematic, reproducible process to develop cost scenarios. Malcolm Pirnie Inc. was retained as the incumbent contractor for the FY04 update to complete the cost estimation process begun at the end of FY03. Multiple scenarios, of varying complexity and scale, were applied to selected remediation technologies to produce costs for small and large sites with both simple and complex conditions. Currently cost estimates for 14 technologies have been completed and need review.

The SMRGC is comprised of representatives from FRTR agencies who determine what aspect of the SM and RG will be updated. Updates seek to encompass all five sections of the guide to include the introduction, contaminant perspectives, treatment perspectives, technology profiles, and references on a piece-by-piece basis. An entire revision of the guide would be far too costly to complete in a single year, and because of financial constraints the committee must identify the primary focus of each year's revision.

The SMRGC is also responsible for reviewing and commenting on previous update tasks before they are finalized and eventually placed on the FRTR Web site. Sometimes committee members choose to circulate selected

aspects of an update task to technical departments within their organization to ensure a thorough review.

Accomplishments and Results

This project helps to demonstrate and foster cooperation among many federal agencies. Committee members established the personal relationships necessary to coordinate the update effort and in the past there has been successful leveraging of resources from the Army, Navy, and Air Force. The Environmental Protection Agency and other FRTR member agencies donate significant support in the form of in-house personnel hours toward the effort.

In early FY06, the 14 cost estimates will be reviewed by the SMRGC, and after any necessary revisions it will eventually be posted in the RG and made available to the public. The updated SM from the FY04 update will be posted on the Web at the same time.

Limitations

The document is an electronic Web file, so there is no conveniently accessed paper version. Links must be continually monitored and information updated.

Follow-On Program Requirements

The FY06 update effort will be determined by the SMRGC after the FY05 update has been approved. A contract is already in place for the FY06 effort that will be managed by USAEC in coordination with the SMRGC.

Program Partners

U.S. Army Environmental Center

U.S. Army Corps of Engineers

Federal Remediation Technologies Roundtable

Naval Facilities Engineering Service Center

Air Force Center for Environmental Excellence

Environmental Protection Agency

U.S. Geological Survey

Department of Energy

National Aeronautics and Space Administration

PUBLICATIONS

Federal Remediation Technologies Screening Matrix and Reference Guide, Version IV. April 2002.

- www.frtr.gov

U.S. Army Environmental Support to Executive Agent for the National Defense Center for Environmental Excellence

The U.S. Army Environmental Center (USAEC) is providing support to the Department of Defense (DoD) Executive Agent (EA) for the National Defense Center for Environmental Excellence (NDCEE). The EA is the Deputy Assistant Secretary of the Army (Environment, Safety and Occupational Health). USAEC is providing Program Management (PM), Alternate Contracting Officer's Representative (ACOR), and Technical Monitoring (TM) support.

USAEC provides the full-time NDCEE PM onsite at the EA's Program Management Office (PMO). The PM reviews and submits applications for new work to the Program Director (PD); ensures that existing work is completed properly by the TMs and the operating contractor; coordinates NDCEE actions with DoD, the other Services, the COR/ACOR, and the operating contractor; and ensures that the PD is aware of the progress of the program.

The ACOR cell is made up of a team of three people: the ACOR, one Department of Army Civilian, and one support contractor. The ACOR team has two main functions. First, the ACOR is responsible for coordinating the review of and approving all deliverables. Second, the ACOR team provides oversight of the contract mechanisms and technical program. This is done by working with the NDCEE PMO, and TM selected from the appropriate DoD organization for a given task.

In addition to the PM and ACOR efforts, USAEC functions as TM on selected projects, including Unexploded Ordnance (UXO) and Technology Transfer. USAEC also identifies prospective NDCEE contract tasks to meet high-priority Army environmental technology needs.

The NDCEE operates with three types of funded projects: Army-budgeted funds, congressionally directed projects, and reimbursable projects from other DoD and federal agencies. Of the Army budgeted funds, the Army uses approximately half for overall management of the NDCEE program, and the remaining portion for technical projects. The FY05 Army funds are being used to support small projects that address an Army requirement and conduct information management and dissemination of all NDCEE information through a variety of media.

The NDCEE is working on several congressionally directed and funded projects. These projects consist of UXO, Solid Waste Sustainability, MANATEE, Joint Service Initiative, Sustainable Installations Initiatives, and Commercialization of Technologies. Several are continuations of efforts funded prior to FY05, such as UXO, Sustainable Installations

Initiatives and MANATEE; with other projects awarded during FY05. For example, the Joint Service Initiative addresses high priority environmental quality and infrastructure sustainability research, development, test, and evaluation requirements across the DoD Services.

FY05 NDCEE reimbursable work totaled approximately $15M in 15 task awards, including large tasks to support the Defense Safety Oversight Council and efforts to implement OSHA's Voluntary Protection Program within DoD. The USAEC NDCEE team is coordinating the technical level efforts of many of these tasks across the Department of Defense.

Please contact the USAEC Technology Branch at (410) 436-5910 for additional information.

UXO TECHNOLOGY DEMONSTRATION PROGRAM

The Department of Defense (DoD) needs to continue advancing methods to detect, locate, discriminate, neutralize, recover, and dispose of munitions and explosives of concern (MEC), such as unexploded ordnance (UXO) and discarded military munitions (DMM). Building on the success of the UXO Technology Demonstration Program conducted at Jefferson Proving Ground (JPG), Indiana, the Standardized UXO Technology Demonstration Site Program was implemented at Aberdeen Proving Ground, Maryland, and Yuma Proving Ground, Arizona. The program provides UXO technology developers with standardized sites for UXO sensor/system technology testing and demonstration. Once demonstrations have been completed, each system is scored to determine its overall ability to correctly detect and discriminate ordnance items that have been emplaced in a variety of scenarios.

Other products resulting from the program include a standardized site for shallow water-based sensors, an Active Response Site that allows for testing of UXO sensors under true field conditions (i.e., a former range area with unknown subsurface ordnance items), a standardized target repository, standardized protocols for performing geophysical prove-outs, and a variety of technology transfer and marketing materials.

PURPOSE

Provide the MEC community with standardized UXO technology demonstration sites that allow technology users and developers to define the range of applicability of specific detection and discrimination technologies, gather data on sensor and system performance, compare results, and document realistic cost and performance information.

BENEFITS

Advancements in MEC detection and discrimination technologies are necessary to support the operation, restoration, and transfer of the DoD's ranges. Characterization technologies can be affected by variations in site terrain, geology, vegetative cover, and weather conditions. This program has created an in-field experience for the evaluation of these characterization technologies in a "real world" situation under controlled conditions. Baseline technologies were established under the Jefferson Proving Ground Program, and now technology developers will be able to advance these baseline technologies using sites established in Maryland and Arizona. In addition, data collected at these sites will support the development of software algorithms for the detection and discrimination of buried UXO. This program will contribute to the safer and more efficient remediation of UXO sites.

Technology Users

Military installations with munitions response areas that contain UXO will contract the remediation efforts through civilian explosive ordnance disposal (EOD) contractors.

Description

Congress mandated the development of the UXO Technology Demonstration Program. The Standardized UXO Sites Program provides the UXO sensor technology users and developers with two standardized sites to define the range of applicability of specific UXO technologies, gather data on sensor and system performance, compare results, and document real life cost and performance information. This program will utilize standardized test methodologies, procedures, and facilities to help ensure that critical UXO technology performance parameters such as detection capability, false alarms, discrimination, reacquisition, and system efficiency are accurate and repeatable.

In order to satisfy both the research and development community and the technology demonstration community, both of the standardized sites consist of three areas, a Calibration Lane, a Blind Test Grid, and an Open Field Site. The Calibration Lane allows demonstrators to test equipment, build a site library, document signal strength, and deal with site-specific variables. The Blind Test Grid allows the demonstrator to operate the sensor system without platform, coordinate system, or operational concerns. The Open Field Site will document the performance of the entire system in simulated range conditions. Additionally, each site consists of areas known as "scenarios" that are specific to the region's geography. Aberdeen's scenario site highlights issues associated with utilizing UXO sensor/systems in heavily wooded areas, while Yuma's scenario illustrates issues associated with subsurface detection in desert areas.

In addition to the ground-based standardized site located at Aberdeen, the installation also hosts the newly opened standardized site for shallow-water detection as well as the Active Response Site. The Standardized Shallow Water Site is modeled after the ground-based sites and contains calibration lanes, a blind grid, and an open water area that varies in size from four to six acres depending on the water level. To meet varying definition of shallow water, the site's water level is adjustable from two feet to eight. The Active Response Site is a test area approximately four acres in size and located adjacent to the standardized site in a former range area known to contain an array of ordnance and clutter.

The Program also maintains a repository of Standardized Targets (inert munitions or calibration targets) that have the same model type, configuration, and relative magnetism to each other. These items are available for

temporary loan for technology developers to build signature libraries of sensor system performance under various conditions (i.e., soil, climate, geographic, vegetative, etc.). In addition, these targets are available to support geophysical prove-outs for the remediation of DoD facilities. The borrower is responsible for providing all raw data generated during utilization of standardized items to the U.S. Army Aberdeen Test Center for analysis.

The Program also assisted the Interstate Technology Regulatory Council (ITRC) with the development of a guidance document and Internet-based training course for performing geophysical prove-outs. This is a guidance manual that outlines the process of site selection, site construction, test operations, demonstrators' data, and field requirements, performance scoring, and site closure procedures.

Accomplishments and Results

Results from this program will be used across the United States to aid the development and use of sensor system technologies for the detection and discrimination of buried UXO and the remediation of UXO munitions response areas.

Follow-On Program Requirements

- Technology enhancements
- Technology application
- Technology performance reports
- Technology transfer

Program Partners

The Standardized UXO Technology Demonstration Sites Program is a multi-agency program spearheaded by the U.S. Army Environmental Center (USAEC). The U.S. Army Aberdeen Test Center (ATC) and the U.S. Army Corps of Engineers Engineer Research and Development Center (ERDC) provide programmatic support. The program is being funded and supported by the Environmental Security Technology Certification Program (ESTCP), the Strategic Environmental Research and Development Program (SERDP), and the Army Environmental Quality Technology (EQT) program.

Unexploded Ordnance

UXO Technology Program

Environmental Quality Technology Program (EQT)

The 2001 Unexploded Ordnance (UXO) Report to Congress estimates that over 11 million acres in the United States may be contaminated with munitions and explosives of concern (MEC) including UXO and discarded military munitions. This includes munitions response areas located on more than 760 Formerly Used Defense Sites (FUDS) and 23 Base Realignment and Closure (BRAC) installations, which must be cleared of UXO by the Department of Defense (DoD) before being released for reuse. A mixture of political, regulatory, technology limitations, and budgetary drivers continue to emphasize the need to improve DoD's ability to remediate munitions response areas. The screening, detection, and discrimination of UXO ranges classified as "other than operational" is the Army's highest priority requirement in the Environmental Restoration category.

Purpose

The purpose of the UXO Technology Program is to take a multi-tiered approach to advance the current state-of-the-art in UXO detection and discrimination technology so that sensor systems used during remediation efforts provide accurate and cost effective solutions to the MEC contamination problem.

Benefits

The Army's Environmental Quality Technology (EQT) program focuses specifically on ground-based and shallow water UXO detection and discrimination technologies. The EQT program managers and researchers are actively involved in the DoD's Strategic Environmental Research and Development Program (SERDP) and Environmental Security Technology Certification Program (ESTCP) funded UXO-related projects, and applicable results from these programs will be leveraged to the fullest extent.

Many of the underlying science and engineering principles associated with the detection and discrimination of UXO as it relates to environmental restoration are similar to those associated with the countermine, explosive ordnance disposal, active range clearance, and humanitarian demining mission areas. Research, development, testing, and evaluation (RDT&E) activities addressing these mission areas are coordinated through the Joint UXO Coordination Office. EQT program managers are cognizant of the ongoing activities in related mission areas and will ensure conservation of RDT&E resources by coordinating across mission areas as appropriate and leveraging RDT&E efforts conducted in other mission areas where possible to meet UXO remediation needs.

Technology Users

Generally, technologies demonstrated in support of this program will be employed by private industry UXO remediation firms who conduct detection, discrimination, and removal activities for DoD, under contract. Additionally, the U.S. Army Corps of Engineers' Engineer Research and Development Center will oversee the development of an Army prototype dual-mode system that will be baseline demonstrated at the Standardized UXO Technology Demonstration Site at Aberdeen Proving Ground, Maryland, before being tested as active munitions response sites. This system baseline will take place at the Standardized Test Site at Aberdeen Proving Ground, to ensure that detection and discrimination technologies meet established performance metrics to gain regulatory and user community acceptance of the systems. For this reason all EQT UXO technologies have their regulatory concerns addressed, have input from the user community incorporated into sensor advancement as appropriate, and ultimately the program seeks regulatory and user buy-in.

Description

Current state-of-the-art UXO detection and discrimination technologies cannot effectively or efficiently cover large tracts of land or conduct wide-area assessments under all weather and geophysical conditions. The lack of efficient wide-area characterization technologies makes site-specific planning and remediation efforts difficult. The Army EQT program will rely on ESTCP/SERDP programs to advance the state-of-the-art in wide-area survey and will develop advanced sensing, analysis, and positioning technologies that could be transitioned to airborne platforms.

Accomplishments and Results

Program performance metrics are based on tests conducted at the Standardized UXO Technology Demonstration Sites. The Standardized UXO Technology Demonstration Sites are located at Aberdeen Proving Ground and Yuma Proving Ground. Descriptions, standardized procedures, and protocols for demonstrations at either of the sites have been clearly established in the Standardized UXO Technology Demonstration Site Program Protocols, January 2002. These protocols were developed based on the need for absolute levels of standardization. Standardized test sites represent the only approach to ensure repeatable testing and realistic test scenarios because of the known ground truth and the stability of the sites. Additional demonstrations may be conducted at active munitions response sites to be chosen through the EQT program. Demonstrations at active response sites will ensure a correlation between the validated capabilities of technologies at the active response sites and the standardized sites.

Technologies developed and demonstrated under this program are required

to operate in a wide range of environments where ambient temperatures may range from -30 to +50 ºC and relative humidity can reach 99 percent. Demonstrated systems must be capable of operating in the vicinity of power lines and other sources of electromagnetic interference. In addition, ground-based systems must be water resistant to allow for functional operation during rain/snow conditions. All systems have sufficient battery and data storage capacity to allow for five hours of continuous operation without recharging or downloading.

Follow-On Program Requirements

Continue demonstrations at the Standardized UXO Technology Demonstration Sites and begin demonstrations at the newly opened Standardized Site for Shallow Water Demonstrations at Aberdeen Proving Ground, Maryland.

Program Partners

The UXO Technology Program is a multi-agency program spearheaded by the U.S. Army Environmental Center (USAEC) and the Army EQT Program. The U.S. Army Aberdeen Test Center (ATC) and the U.S. Army Corps of Engineers' ERDC provide programmatic support. The program is funded and supported by the ESTCP, SERDP, and the Army Environmental Quality Technology (EQT) program.

Program Partners

The Army Environmental Quality Technology User Requirement A (1.6.a) UXO Program FY04 Annual Report, April 2005

The Army Environmental Quality Technology User Requirement A (1.6.a) UXO Program FY02 and FY03 Annual Report, April 2004

Standardized UXO Technology Demonstration Site Program Protocols, January 2002

The Army Environmental Quality Technology Program A (1.6.a) UXO Screening, Detection, and Discrimination Management Plan, April 2002

The Army Environmental Quality Technology Program A (1.6.a) UXO Screening, Detection, and Discrimination AERTA Requirement, July 1999

Unexploded Ordnance

UXO Technology Program

National Defense Center for Environmental Excellence (NDCEE)

The 2001 Unexploded Ordnance (UXO) Report to Congress estimates that over 11 million acres in the United States may be contaminated with munitions and explosives of concern (MEC), including UXO and discarded military munitions. This includes munitions response areas located on more than 760 Formerly Used Defense Sites (FUDS) and 23 Base Realignment and Closure (BRAC) installations, which must be cleared of UXO by the Department of Defense (DoD) for reuse. A mixture of political, regulatory, technology limitations, and budgetary drivers continue to emphasize the need to improve DoD's ability to remediate munitions response areas. The screening, detection, and discrimination of UXO ranges classified as "other than operational" is the Army's highest priority requirement in the Environmental Restoration category.

Purpose

The purpose of this program is to more fully document MEC issues associated with the closure of military installations and the turnover of those installations for civilian use during the BRAC process.

Benefits

This program provides support to research, development, testing, and evaluation (RDT&E) community efforts to study the limitations and improve the capabilities of sensor technologies used to detect, discriminate, and remediate munitions response areas associated with former military ranges. Results of NDCEE-supported studies will be used to advance the current state-of-the-art in UXO detection and discrimination technologies to produce senior systems that are more accurate, efficient, and cost effective.

Technology Users

Products from this program will support advancements within the UXO technology RDT&E community and ultimately will enable military installations contaminated with MEC to be remediated to levels consistent with reuse standards.

Description

NDCEE UXO Task N.407, to be conducted during fiscal years 2004-2006 will:

1) Evaluate the state of the art for bullet traps;
2) Evaluate electromagnetic induction (EMI) influences on live fuzes;
3) Evaluate safety aspects during UXO removal from sediment;

4) Survey shallow water detection and discrimination technologies;

5) Continue enhancing the UXO Recovery Database and transition it to the U.S. Army Corps of Engineers;

6) Survey munitions constituents and correlate environmental regulations;

7) Conduct safety analysis of UXO equipment;

8) Continue UXO migration studies;

9) Develop a Web-based UXO tool box for remediation site managers;

10) Continue testing the effects of EMI on electronic fuzes;

11) Expand functionality of the electronic data collect tool;

12) Conduct enhanced ordnance detectability field studies;

13) Survey the state-of-the-art for range scrap recycling;

14) Evaluate the state-of-the-art for magnetic recovery of UXO;

15) Scan archived ammunition engineering drawings from Lake City Army Ammunition Plant; and

16) Expand the dud rates versus environmental factors study.

Accomplishments and Results

Results from this program will support efforts across the United States to aid in the development of technologies and protocols for the remediation of UXO sites.

Follow-On Program Requirements

Contingent on congressional funding support

Program Partners

U.S. Army Environmental Center

U.S. Navy Explosive Ordnance Disposal Technology Div., Indian Head, MD

U.S. Army Aberdeen Test Center

U.S. Army Corps of Engineers Engineer Research and Development Center

Environmental Security Technology Certification Program

Strategic Environmental Research & Development Program

U.S. Air Force Robotics Laboratory, Tyndall AFB, FL

U.S. Army Corps of Engineers, Huntsville, AL

U.S. Army Corps of Engineers Waterways Experimental Station, Vicksburg, MS

Department of Defense Explosives Safety Board

U.S. Air Force Research Lab

U.S. Navy Facilities and Engineering Service Center

JUXOCO

PUBLICATIONS

Subtask 2: UXO Neutralization Technologies Technical Report

Subtask 4: UXO Recovery Database Technical Report

The Army Environmental Quality Technology Program Operating Principles of October 2001

Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3170.01B 15 April 2001

Army Regulation 71-9 Requirements Generation

Department of Defense Directive (DODD) 5000.1 2002

MIL-STD-331B (Military Standard Fuses and Fuse Components)

UXO Multi-service Procedures for Operations in an Unexploded Ordnance Environment, FM 100-38/MCRP 4-5/WP TP 3-02.4.1 ACCPAM 10- 752/ PACAFPAM 10-752/USAFEPAM 10-752, July 1996

APPENDICES

APPENDIX - A

ACRONYMS

AAA	Army Audit Agency
ABCS	Army Battle Command Systems
ACE	Advanced Collaborative Environment
ACOR	Alternate Contracting Officer's Representative
ACP	Army Cost Position
ACS	Aerial Common Sensor
ACSIM	Assistant Chief of Staff for Installation Management
ACSW	Advanced Crew Served Weapon
AERTA	U.S. Army Environmental Requirements and Technology Assessments
AFM	ATTACC for Munitions
AHS	Ammunition Handling System
AMRAAM	Advanced Medium Range Air-to-Air Missile
AOs	Administrative Orders
AR	Army Regulation
AR 200-2	Environmental Effects of Army Actions
AR 70-1	Army Acquisition Policy
ARAMS	Army Risk Assessment Modeling System
ARDEC	U.S. Army Armament Research, Development and Engineering Center
ARL	U.S. Army Research Laboratory
ARL	Airborne Reconnaissance Low
ARV	Armed Robotic Vehicle
ASA(ALT)	Assistant Secretary of the Army (Acquisition, Logistics and Technology)
ASA(I&E)	Assistant Secretary of the Army (Installations and Environment)
ASARC	Army Systems Acquisition Review Council
ASMD	Air, Space, and Missile Defense
ATC	U.S. Army Aberdeen Test Center
ATD	Acquisition and Technology Division
ATGM	Anti-Tank Guided Missile
ATIRCM	Advanced Threat Infrared Countermeasures
ATK	Alliant Techsystems
ATR	Automatic Target Recognition
ATSC	Army Training Support Center
ATTACC	Army Training and Testing Area Carrying Capacity

BFVS	Bradley Fighting Vehicle Systems
BLOS/NLOS	Beyond-Line-of-Sight/Non-Line-of-Sight
BMC4I	Battle Management Command, Control, Communications, Computers, and Intelligence
BRAC	Base Realignment and Closure
BW	Biological Warfare
C2	Command and Control
C2V	Command and Control Vehicle
C4ISR	Command, Control, Computers, Communications Intelligence, Surveillance and Reconnaissance
CAM	Cost Analysis Manual
CAP	Combined Aggregate Program
CARD	Cost Analysis Requirements Description
CCA	Close Combat Attack
CCB	Configuration Control Board
CEAC	U.S. Army Cost and Economic Analysis Center
CERL	Construction Engineering Research Laboratory
CFR	Code of Federal Regulations
CFV	Cavalry Fighting Vehicle
CIDDS	Combat Identification for the Dismounted Soldier
CJCSI	Chairman of the Joint Chiefs of Staff Instruction
CLU	Command Launch Unit
CM	Cruise Missile
CMWS	Common Missile Warning System
COCOM	Joint Combatant Commanders
COE	Common Operating Environment
CONOPS	Concept of Operations
COP	Common Operational Picture
COR	Contracting Officer's Representative
COTS	Commercial Off-the-Shelf
CRB	Cost Review Board
CRREL	Cold Regions Research and Engineering Laboratory
CSS	Combat Support Systems

CV	Commander's Vehicle
CX	Categorical Exclusion
DA	Department of the Army
DAB	Defense Acquisition Board
DDESB	Department of Defense Explosives Safety Board
DENIX	Defense Environmental Network and Information Exchange
DJAS	Defense Joint Accounting System
DL	Distributed Learning
DLA	Defense Logistics Agency
DLS	Distributed Learning System
DMWRFRP	Directorate Morale Welfare and Recreation Fund, Recycle Program
DNT	Dinitroluene
DoD	Department of Defense
DoD 5000.2-R	Mandatory Procedures for Major Defense Acquisition Programs and Major Automated Information System Acquisition Programs
DoD 5000.4-M	Department of Defense Cost Analysis Guidance and Procedures
DODD	Department of Defense Directive
DOE	Department of Energy
DOPAA	Description of Proposed Action and Alternatives
DOTMLPF	Doctrine, Organization, Training, Materiel, Leadership & Education, Personnel, and/or Facilities
DPG	Dugway Proving Ground
DPICM	Dual-purpose Improved Conventional Munitions
DTF	Digital Training Facilities
DTPs	Detailed Test Plans
DTRA	Defense Threat Reduction Agency
EA	Environmental Assessment
ECP	Engineering Change Proposal
EHRAP	Environmental Health Risk Assessment Program
EIS	Environmental Impact Statement
EMI	Electromagnetic Induction
EO	Exploding Ordnance

EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
EPA-RTP	EPA-Research Triangle Park
EPAS	Environmental Performance Assessment System
EPCRA-TRI	Emergency Planning and Community Right-to-Know Act – Toxic Release Inventory
EPLRS	Enhanced Position Location Reporting System
EQLCCE	Environmental Quality Life Cycle Cost Estimate
EQT	Environmental Quality Technology
ERDC	U.S. Army Corps of Engineers Engineer Research and Development Center
ER-MLRS	Extended Range Multiple Launch Rocket System
ERP	Enterprise Resource Planning
ESH	Environmental, Safety and Health
ESOH	Environment, Safety and Occupational Health
ESTCP	Environmental Security Technology Certification Program
ESTRG	Environmental Security Technology Requirements Group
ESV	Engineer Squad Vehicle
FAA	Functional Area Analysis
FAAD	Forward Area Air Defense
FBCB2	Force XXI Battle Command Brigade and Below
FCS	Future Combat System
FCS	Fire Control System
FFMIA	Federal Financial Management Improvement Act
FLIR	Forward Looking Infrared
FMTV	Family of Medium Tactical Vehicle
FNA	Functional Needs Analysis
FOA	Functional and Operational Analysis
FP	Firing Point
FRAMES	Framework for Analysis in Multimedia Environmental Systems
FRMV	FCS Recovery and Maintenance Vehicle
FRP	Full Rate Production
FRTR	Federal Remediation Technologies Roundtable
FSA	Functional Solutions Analysis

FSV	Fire Support Vehicle
FUDS	Formerly Used Defense Sites
FUE	First Unit Equipped
FW	Fixed Wing
GAO	General Accounting Office
GC	Gas Chromatographic
GCCS-A	Global Command and Control System-Army
GCSS	Global Combat Support System
GCSS-A	Global Combat Support System-Army
GD	General Dynamics
GFE	Government Furnished Equipment
GFEBS	General Fund Enterprise Business System
GHz	Gigahertz
GIG	Global Information Grid
GIS	Geographic Information System
GMLRS	Guided Multiple Launch Rocket System
GOTS	Government Off-the-Shelf
GPS	Global Positioning System
GRCS	Guardrail Common Sensor
GSA	General Services Administration
HE	High Explosives
HEAB	High Explosive Air Burst
HIMARS	High Mobility Artillery Rocket System
HMMWV	High Mobility Multi-Purpose Wheeled Vehicle
HMX	Cyclotetramethylene
HQDA	Headquarters
HTML	Hypertext Markup Language
ICH	Improved Cargo Helicopter
ICV	Infantry Carrier Vehicle
IDS	Intrusion Detection Systems

IFCS	Integrated Fire Control Station
IFF	identification of friend or foe
IFV	Infantry Fighting Vehicle
IG	Inspector General
IIR	Imaging Infrared
IMINT	Imagery Intelligence
IMS	Intelligent Munitions System
IOT&E	Initial Operational Test and Evaluation
IPT	Integrated Process Team
IR	Infrared
ISR	Intelligence, Surveillance, and Reconnaissance
ITAM	Integrated Training Area Management
ITAS	Improved Target Acquisition System
ITRC	Interstate Technology Regulatory Council
JBPDS	Joint Biological Point Detection System
JBSDS	Joint Biological Stand-off Detection System
JCB	Joint Control Board
JCIDS	Joint Capabilities Integration and Development System
JCM	Joint Common Missile
JFMIP	Joint Financial Management Improvement Program
JLENS	Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System
JPG	Jefferson Proving Ground
JROC	Joint Requirement Oversight Council
JSSED	Joint Service Sensitive Equipment Decontamination
JTRS	Joint Tactical Radio System
JUXOCO	Joint Unexploded Ordinance Coordination Office
JVIA	Joint Visual Information Activity
KEM	Kinetic Energy Missile
LCAAP	Lake City Army Ammunition Plant
LCCE's	Life-Cycle Cost Estimates

LCEA	Lifecycle Environmental Assessment
LEAD	Letterkenny Army Depot
LM	Lockheed Martin
LOAL	Lock on after launch
LOBL	Lock on before launch
LOSAT	Line-of-Sight Anti-Tank
LRAS3	Long Range Advanced Scout Surveillance System
LRIP	Low Rate Initial Production
LSI	Lead System Integrator
LW	Land Warrior Infantry
MACOM	Army Materiel Command
MANATEE	Managing Army Technology Environmental Enhancements
MASINT	Measurements and Signals Intelligence
MB	Major Budget
MC4	Medical Communications for Combat Casualty Care
MCB	Mounted Combat System
MC-B	Mortar Carrier B
MCO	Major Combat Operations
MCS	Maneuver Control System
MDAP	Major Defense Acquisition Programs
MEADS	Medium Extended Air Defense System
MEV	Medical Evaluation Vehicle
MGS	Mobile Gun System
MHE	Material Handling Equipment
MILES	Modular Integrated Laser Engagement System
MIPR	Military Interdepartmental Purchase Request
MLRS	Multiple Launch Rocket System
MMR	Massachusetts Military Reservation
MMW	Millimeter Wave
MOUT	Military Operations Urban Terrain
MULE	Multifunction Utility/Logistics and Equipment vehicle
MV	Medical Vehicle

NAOC	National Association of Ordnance and Explosive Waste Contractors
NATO	North Atlantic Treaty Organization
NAVEOD	U.S. Navy Explosive Ordnance Disposal
NBCRV	Nuclear Biological Chemical Reconnaissance Vehicle
NDCEE	National Defense Center for Environmental Excellence
NEPA	National Environmental Policy Act
NESHAPs	National Environmental Standards for Hazardous Air Pollutants
NLOS	Non-line of sight
NLOS-C	Non-line of sight - Cannon
NLOS-LS	Non-line of sight - Launch System
NLOS-M	Non-line of sight - Mortar
NQ	Nitroguanidine
NSWC	Naval Surface Warfare Center-Crane
NTDR	Near Term Digital Radio
O&M	Operation and Maintenance
O&O	Operational and Organizational
OASA (ILE)	Office of the Assistant Secretary of the Army for Installations, Logistics and Environment
ODASA-CE	Office of the Deputy Assistant Secretary of the Army for Cost & Economics
ODCs	Ozone Depleting Chemicals
OEMs	Original Equipment Manufacturers
OIF/OEF	Operation Iraqi Freedom/Operation Enduring Freedom
ORD	Requirements Document
ORNL	Oak Ridge National Laboratory
ORR	Operational Readiness Rates
P2AD	Pollution Prevention Assistance Division
PAC-3	PATRIOT Advanced Capability-3
PATRIOT	Phased Array Tracking to Intercept of Target
PEO	Program Executive Office
PESHE	Programmatic Environmental, Safety and Health Evaluation
PGMM	Precision Guided Mortar Munition
PM	Program Manager

PMO	Program Manager's Office
POE	Program Office Estimate
PTIR	Precision Track and Illumination Radar
PVT	Production Validation Test
QC	Quality Control
QPLs	Qualified Products Lists
R&D	Research and Development
R&SV	Reconnaissance and Surveillance Vehicle
RAGS	Risk Assessment Guidance for Superfunds
RAM	Reliability, Availability and Maintainability
RDA	Development and Acquisition
RDT&E	Research, Development, Test & Evaluation
RDX	Royal Demolition Explosive
REC	Record of Environmental Consideration
RFMSS	Range Facility Management Support System
RISTA	Reconnaissance, Intelligence, Surveillance, and Target Acquisition
RSTA	Reconnaissance, Surveillance, and Target Acquisition
RSV	Re-supply Vehicles
RV	Reconnaissance Vehicle
RW	Rotary Wing
RWS	Remote Weapon Station
SAL	Semi-active Laser
SBCT	Stryker Brigade Combat Team
SCA	Software Communications Architecture
SCM	Source Characterization Model
SD&D/SDD	System Development and Demonstration
SDR	Software Defined Radios
SECDEF	Secretary of Defense
SERDP	Strategic Environmental Research and Development Program
SFM	Sensor Fuzed Munition

SGS	Smoke Generator System
SHORAD	Short-range Air Defense
SI	Systems Integrator
SIAP	Semi-Automated Imagery Processing
SIGINT	Signals Intelligence
SLAMRAAM	Surface Launched Advanced Medium Range Air-to-Air Missile
SO/LIC	Special Operations & Low-Intensity Conflicts
SOMARDS	Standard Operations and Maintenance, Army R&D System
SoS	System of Systems
SoS COE	System of System Common Operating Environment
SP	Smoke/Pyrotechnics
SPOTA	Sustainable Painting Operations for the Total Army
SR	Surveillance Radar
SSC	Small-scale Contingencies
STANFINS	Standard Finance Systems
STRAC	Standards in Training Commission
SUGV	Small Unmanned Ground Vehicle
TA/FCS	Target Acquisition/Fire Control System
TACMS	Tactical Missile System
TACP	Tactical Control Party
TC-AIM	Transportation Coordinators-Automated Information for Movement Management
TEMP	Test and Evaluation Master Plan
TM	Technical Monitors
TNS	Technology User Needs Survey
TNT	Trinitrotoluene
TOW	Tube-launched, Optically Tracked, Wire-guided
TRI	Technical Resources International
TSM-CCMS	TRADOC System Manager - Close Combat Missile Systems
TSP	Total Suspended Particulate
TUAs	Target Uncertainty Areas
TWG	Technical Working Group

UA	Unit of Action
UAV	Unmanned Aerial Vehicle
UCAVs	Unmanned Combat Aerial Vehicles
UDLP	United Defense Limited Partnership
UE	Unit of Employment
UGS	Unattended ground sensors
UK	United Kingdom
USACHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
USAEC	U.S. Army Environmental Center
USAFRL	U.S. Air Force Research Laboratory
USAIC	U.S. Army Infantry Center
USMC	United States Marine Corps
UXO	Unexploded Ordnance
VOC	Volatile Organic Compound
WBS	Work Breakdown Structure
WIN-T	Warfighter Information Network-Tactical
WIPT	Working-level Integrated Product Team

Appendix - B

Program Partners

Aerodyne Research Inc.
Air Force Center for Environmental Excellence
Army installations
Army Materiel Command
Army Multimedia & Visual Information Directorate
Army Research and Development Center (ARDEC), Picatinny
Army Training Support Center (ATSC)
Augusta Chronicle

Booz Allen Hamilton

Cedric Adams and Associates
CERDEC, Night Vision Electronic Sensors Directorate

Department of Defense Explosives Safety Board (DDESB)
Department of Energy

Edgewood Chemical and Biological Center (ECBC)
Environmental Protection Agency
Environmental Security Technology Certification Program (ESTCP)
Environmental Security Technology Certification Program Office

Federal Remediation Technologies Roundtable
Florida Department of Environmental Protection
Fort Gordon, Georgia

Georgia P2AD

Installation Management Agency Headquarters
Interstate Technology Regulatory Council

Louisiana State University-Lafayette, Corrosion Research Center

Massachusetts Military Reservation (MMR)

National Aeronautics and Space Administration
National Association Ordnance and Explosive Waste Contractors
National Defense Center for Environmental Excellence
Naval Explosives Ordnance Disposal Technology Division
Naval Facilities Engineering Service Center
Naval Ordnance Center, Indianhead
Naval Research Laboratory

Office of the Assistant Chief of Staff for Installation Management
Office of the Assistant Secretary of Defense Special Operations and Low-Intensity Conflicts
Office of the Department of Environmental Programs for the Assistant Chief of Staff for Installation Management
Office of the Deputy Assistant Secretary of the Army for Cost & Economics
Office of the Director of Environmental Programs
Office of the Environmental Safety and Occupational Health for the Assistant Secretary of the Army for Installations and Environment
Office of the Project Manager for Close Combat Systems

Parsons Engineering Science
Pine Bluff Arsenal
Praxis Environmental Technologies

Strategic Environmental R&D Program Office
Strategic Environmental Research & Development Program (SERDP)

Teledyne Solutions Incorporated

U.S Army Cost and Economic Analysis Center
U.S. Air Force Research Lab
U.S. Air Force Robotics Laboratory, Tyndall AFB, Florida
U.S. Army Aberdeen Test Center (ATC)
U.S. Army Center for Health Promotion and Preventive Medicine
U.S. Army Corps of Engineers
U.S. Army Corps of Engineers Engineer Research and Development Center (ERDC)
U.S. Army Corps of Engineers Waterways Experimental Station, Vicksburg, Mississippi
U.S. Army Corps of Engineers, Engineering and Support Center, Huntsville, Alabama
U.S. Army Engineer Research and Engineering Laboratory, Cold Regions Research and Engineering Laboratory (CRREL)
U.S. Army Engineer Research and Engineering Laboratory, Construction Engineering Research Laboratory (CERL)
U.S. Army Environmental Center (USAEC)
U.S. Army Product Manager for Non-Stockpile Chemical Materiel
U.S. Army Research, Development & Engineering Command
U.S. Army Space and Missile Defense Command
U.S. Army West Deseret Test Center, Dugway Proving Ground, Utah
U.S. Environmental Protection Agency, Region 2
U.S. Geological Survey

Unexploded Ordnance Center of Excellence
University of Florida School of Architecture

Various PM offices