Weapon Systems

United States Army 2001

TO THE READER:

In the 21st Century, the Army will remain the preeminent land warfighting force in the world. It will be capable of successfully conducting two nearly simultaneous major theater wars (MTWs), and will also be capable of conducting a wide range of operations, such as peace enforcement, peacekeeping, and humanitarian assistance.

At the present time, however, Army forces are not optimally designed and organized to fully support these missions. For the 21st Century, the Army envisions a strategically responsive force that is dominant across the entire spectrum of operations and is responsive, deployable, agile, versatile, lethal, survivable, and sustainable. The requirements for greater lethality, survivability, and deployability across the entire force, resulting in greater versatility and agility for full-spectrum operations, point to the need for fundamental transformation and a new vision.

To achieve its vision, the Army has implemented a three-phase strategy: recapitalization of the Current Force, development of an Interim Force, and evolution to an Objective Force. This handbook outlines the major programs that we are pursuing during the Army's transformation and that will help bridge the gap to the Objective Force. These systems are the tools which will enable America's trained and ready soldiers to remain the most powerful force in the world. We hope that you find this book a valuable and informative reference.

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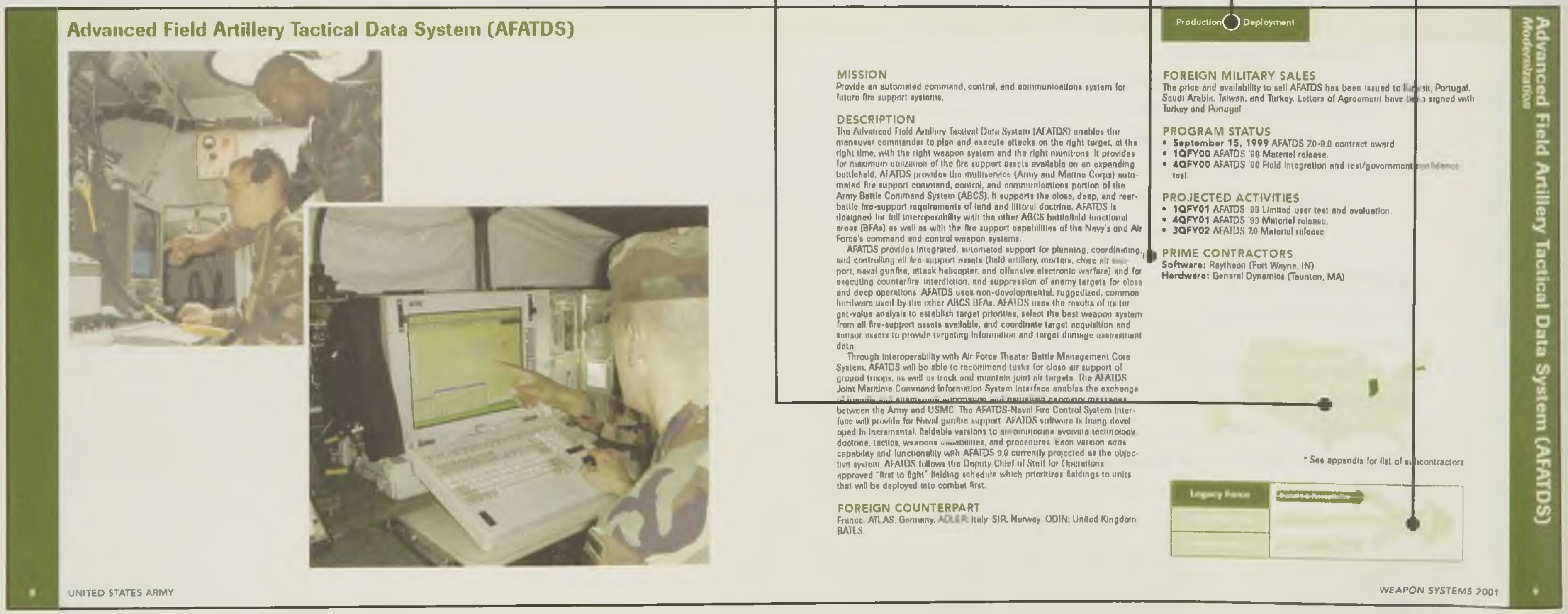
The **Prime Contractor(s)** for the system is displayed. The major subcontractors are listed in the Appendices.

The **U.S. Outline** highlights the states in which system contractors with ≥ 5% of total program value for FY01 are located.

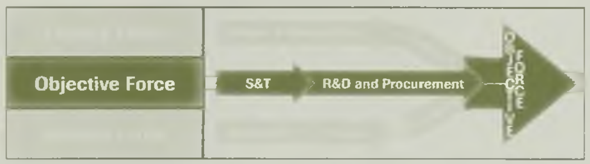


TRANSFORMATION PATH KEY:

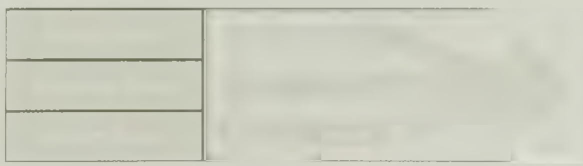
Legacy Force only

Legacy Force to Objective Force

Interim Force only



Objective Force



Multiple Narratives

INTRODUCTION: AN ARMY IN TRANSFORMATION

The Challenge of a New Century

In the opening decades of the 21st Century, the United States will retain its international leadership role in promoting democratic values, free markets, and global peace. It will do so, however, in a dynamic and uncertain environment that poses complex challenges and a wider range of threats. These include regional instabilities, fragmented states, terrorism, religious and ethnic strife, the proliferation of weapons of mass destruction, and humanitarian crises.

Our military forces will play an essential role in safeguarding our national interests and enabling the United States to fulfill its global responsibilities. Above all, our military forces must be able to fight and win our Nation's wars. They must also be prepared to engage in varied and often nontraditional support and sustainment operations, such as peace enforcement, peacekeeping and humanitarian assistance. To exercise the military superiority essential to our global leadership, the United States will require world-class forces capable of rapid response and dominance across the full spectrum of operations in a joint, interagency, and multinational environment.

The Army's Challenge

The Army plays a critical role in America's National Military Strategy. Its job is to remain the preeminent land warfighting force in the world, to be capable of successfully conducting two nearly simultaneous major theater wars (MTWs). It must also be capable of conducting a wide range of operations, such as those in Bosnia and Kosovo.

Currently, Army forces are not optimally designed and organized to fully support these missions. Our heavy forces, while decisive in a variety of combat and non-combat environments, require tremendous resources to deploy quickly and sustain themselves. In contrast, our current light forces can strike quickly but lack survivability, lethality, and tactical mobility.

Both types of forces lack capabilities that will assume increasing importance in future decades. The requirements for greater lethality, survivability, and deployability across the entire force, resulting in greater versatility and agility for full-spectrum operations, point to the need for fundamental transformation and a new vision.

The Army Vision

For the 21st Century, the Army envisions a strategically responsive force that is dominant across the entire spectrum of operations and is responsive, deployable, agile, versatile, lethal, survivable, and sustainable.

Strategic responsiveness requires forward-deployed forces, forward-positioned capabilities, and force projection from the continental United States or any other location where needed capabilities reside. Specifically, the Army will be able to deploy a combat-capable brigade anywhere in the world within 96 hours, a combat-capable division within 120 hours, and five combat-capable divisions within 30 days.

Agility and versatility is the ability to move forces quickly from stability and support operations to warfighting and back. It requires platforms that are smaller and lighter, yet lethal and survivable.

Lethality calls for every element in the warfighting formation to be capable of generating combat power and contributing decisively to the fight.

Survivability means maximum protection to forces at the individual soldier level, whether mounted or dismounted.

Sustainability is achieved by reducing the Army's logistics footprint and replenishment demands, by controlling the number of vehicles deployed, leveraging reach-back capabilities, and investing in a system-of-systems approach to the weapons and equipment we design.

Achieving the Army Vision

To achieve its vision, the Army has implemented a three-phase strategy: *sustainment of the Legacy Force, development of an Interim Force,* and *evolution to an Objective Force.*

Objective Force

The Objective Force is the ultimate transformation goal. It is the future force that achieves all the characteristics described in the Army Vision. The Objective Force includes systems available today, as well as those planned for the future.

The centerpiece of the Objective Force will be Future Combat Systems (FCS). FCS is envisioned as a digitized system-of-systems land combat capability with multi-mission functionality. Its main characteristics will include:

- A common design, allowing interchangeable full-spectrum capability;
- Increased responsiveness, accuracy and lethality for a full range of fire-support missions;
- Improved operational force autonomy with reduced demands for fuel, spare parts, and munitions;

- Improved networked command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) links;
- Use of unmanned air and ground systems performing as reconnaissance, surveillance, or attack systems, as well as providing other battlefield functions;
- Current or enhanced levels of survivability;
- Enhanced lift capability, to enable rapid deployment; and
- Improved early warning and intercept of enemy ground- and air-launched conventional and smart weapons.

The Objective Force concept and its enabling technologies are currently under development. Its enabling capabilities will require continued investments in science and technology.

Interim Force

To bridge the gap between today's capabilities and the Objective Force, the Army is fielding an Interim Force. This force will be combined arms in design and organized as a rapidly deployable, full-spectrum force. Its core qualities include operational and tactical mobility, enhanced situational understanding, combined arms integration down to company level, and increased dismounted strength for close combat in urban and complex terrain.

The Interim Force includes systems that will not be a part of the ultimate Objective Force, though they may be in use for an indefinite period. The primary Interim Force combat platform will be a family of Interim Armored Vehicles (IAVs), capable of deployment anywhere in the world in a combat-ready configuration.

The family will consist of two-vehicle variants (the Infantry Carrier Vehicle and the Mobile Gun System) and eight additional configurations of the Infantry Carrier Vehicle (Mortar Carrier, Reconnaissance Vehicle, Anti-Tank Guided Missile Vehicle, Fire Support Vehicle, Engineer Squad Vehicle, Commander's Vehicle, Medical Evacuation Vehicle, and the Nuclear, Biological and Chemical Reconnaissance Vehicle).

As a prelude to the Interim Force, the Army has established two Brigade Combat Teams at Ft. Lewis, Washington, to evaluate and refine Interim Force concepts. Upon fielding the first IAVs, these units will be designated as Interim Brigade Combat Teams (IBCTs). Eventually, six to eight IBCTs will join the Army force structure. By 2005, it is expected that the IBCTs will extend beyond brigade echelon, to include interim division capabilities. Interim Force units will complement legacy forces to provide the tactical overmatch required to meet the full range of future operational requirements.

Legacy Force

The Army's transformation process will span decades. During this time, the Legacy Force will be recapitalized and selectively modernized. The objectives of this Legacy Force include the following:

- Retain today's level of combat overmatch over all potential adversaries;
- Sustain combat power and survivability, with less weight and bulk;
- Achieve a commonality among platform, chassis, caliber, component, and battlefield operating systems that responds to a much broader range of operations;
- Reduce the deployed logistical footprint; and
- Enhance strategic responsiveness.

Systems now being fielded, and systems that will be fielded in the near term, may not be part of the ultimate Objective Force, though they could be used for up to thirty years or longer. The Crusader advanced field artillery system and the Heavy Equipment Transport (HET) are examples. The Crusader restores combat overmatch in cannon artillery to the United States. Cost-effective enhancements to the HET will reduce future operations and support (O&S) costs.

For the immediate future and well into the mid-term, the Legacy Force, complemented by the Interim Force as it is fielded, will be the primary means by which the Army fulfills its readiness responsibilities to the Nation.

Beginning with the Legacy Force, followed by the Interim Force, transformation to the Objective Force will eventually encompass the entire Army.

The Army's three-phase approach is illustrated by this "trident." Each system described in ***Army Weapon Systems 2001*** *is labeled as contributing to either the Legacy, Interim, or Objective Force.*

The Legacy-Interim-Objective Force strategy is the foundation of the Army's transformation process. Implementing this strategy involves a comprehensive approach that includes four components:

- Modernization;
- Recapitalization;
- Maintenance; and
- Investments in Science and Technology.

Each chapter in *Army Weapon Systems 2001* describes one of these components and the systems associated with it.

Modernization

Modernization involves the development and/or procurement of new systems with improved warfighting capabilities. The Army's modernization strategy aims to produce the Objective Force and a current force fully capable of meeting the Army's ongoing responsibilities to the Nation. The three main components of the Army's modernization strategy include the following:

- Focus science and technology to enable timely fielding of the Objective Force and, in particular, the Future Combat Systems (FCS).
- Transform to meet immediate warfighting requirements (Interim Force).
- Maintain and improve the warfighting capabilities of the Legacy Force through selected modernization, recapitalization, and digitization, thus ensuring preservation of superiority or combat overmatch at all likely levels of conflict.

Modernization Processes. Two important processes are integral to implementing the Army's modernization plan: Total Package Fielding and Unit Set Fielding.

Total Package Fielding is the foundation of successful Unit Set Fielding; its goal is to effect a total system fielding of new and modified equipment. It provides for the concurrent fielding of a single system and all its required support. The process aims to minimize the logistics burden on the gaining unit.

Unit Set Fielding (USF) refers to both a strategy and process that modernizes the force through a family-of-systems approach to fielding. It involves assembling and issuing several, individual, interactive systems as a set, to a particular unit within a specified time period. USF, therefore, focuses on fielding enhanced capability instead of individual systems. This approach requires the development of individual system fielding plans; these are synchronized in a single unit fielding schedule that matches system interdependencies, deconflicts demands on soldiers, and ensures that operational requirements remain the top priority. The goal of USF is to transform the receiving unit, organizationally with upgraded equipment and with enhanced command and control capabilities, in the shortest possible time with minimum risk to operational availability.

Digitization. Digitization is the application of digital information age technologies to acquire, exchange, and employ data throughout the battlespace. This enables U.S. and friendly forces to penetrate the enemy's decision loop and to act faster than the enemy can react. Embedding digitization in Army systems will also increase lethality and survivability. In short, digitization is a critical enabler of the entire transformation process.

Elements of the digital command and control architecture include the Global Command and Control System-Army (GCCS-A), Maneuver Control System (MCS), Air Missile Defense Planning and Control System (AMDPCS), Combat Service Support Control System (CSSCS), Force XXI Battle Command Brigade-and-Below (FBCB2), Theater Air Information System (TAIS), Digitized Terrain Support System (DTSS), Integrated Meteorological and Environmental Terrain System (IMETS), Advanced Field Artillery Tactical Data System (AFATDS), the Forward Area Air Defense Command and Control (FAAD C2), and the All Source Analysis System (ASAS). These systems form the Army Battle Command System (ABCS), a complex system-of-systems that enables commanders and their staffs to monitor the tactical battlefield and plan future operations.

Systems that contribute to achieving knowledge-based battlespace awareness include the Comanche and the Tactical Unmanned Aerial Vehicle (TUAV). Networked in a digital environment, the synergy of these systems provides warfighters with a significant advantage in information gathering and distribution.

Selective digitization upgrades include variants of fielded equipment, such as the M1A2 Abrams Tank System Enhancement Program (SEP), the M2A3 Bradley Fighting Vehicle (BFV), and the AH-64D Apache Longbow helicopter.

Digitizing the force began with completion of fielding to the 4th Infantry Division (First Digitized Division [FDD]), at the end of 2000. The fielding to the III Corps will complete the first digitized corps by the end of 2004.

Overmatch. Combat overmatch endows Army forces with an operational advantage over potential adversaries. The modernization strategy defines three primary overmatch initiatives: equipment modernization, enhancements to light-unit lethality, and improvements to strategic responsiveness. Systems in this area include the following:

- The speed, firepower, and survivability of M1A2 Abrams tanks and M2A3 Bradley Fighting Vehicles provide the Army with superior agility and lethality in high-intensity combat.
- The High Mobility Artillery Rocket System (HIMARS) and the Army Tactical Missile System (ATACMS) greatly heighten the ability of early-entry forces to fight and survive across the full range of operational environments.
- Other systems that contribute to overmatch include the Lightweight 155mm Howitzer (LW155), the Family of Medium Tactical Vehicles (FMTV)/Family of Light Tactical Vehicles (FLTV), and the Multiple Launch Rocket System (MLRS).

Systems in development that will provide overmatch capabilities for the Objective Force include the Comanche helicopter, and the Crusader advanced field artillery system.

Recapitalization

Recapitalization is the rebuild and selected upgrade of currently fielded systems to ensure operational readiness and a zero time/zero miles system. Recapitalization objectives include reducing operating and support costs, extending useful life, improving reliability, and enhancing capability.

Recapitalization includes pre-planned product improvements (P3I), extended service programs (ESPs), and major system modifications.

A new engine for the Abrams tank, for example, will reduce fuel consumption and increase reliability. Improvements to the CH-47D Chinook cargo helicopter include the installation of a new digital cockpit, modifications to the airframe to reduce vibration and operation and support (O&S) costs, and the installation of more powerful and reliable engines.

Improvements to the PATRIOT missile system include: a new PAC-3 missile, which provides greater lethality against Theater Ballistic Missiles (TBMs) armed with weapons of mass destruction; and the capability to install up to 16 PAC-3 missiles per launcher, increasing firepower and missile defense capabilities.

Maintenance

Maintenance refers to the repair or replacement of end items, parts, assemblies, and subassemblies that wear out or break. For example, the Army is installing a series of safety and performance modifications in the OH-58 Kiowa helicopter to keep the aircraft safe and mission-effective until it is retired. Systems such as the High Mobility Multipurpose Wheeled Vehicle (HMMWV), and other equipment are being extended through continued maintenance, though not receiving further upgrades or recapitalization.

Science and Technology

Science and Technology (S&T) program investments are designed to maintain the technological superiority of our current forces and to develop the revolutionary technologies needed to achieve the force characteristics and operational capabilities of the Objective Force. The S&T community is working hard to develop answers to questions such as the following:

- How do we reduce armored volume in combat vehicles while increasing survivability?
- How do we increase deployability without sacrificing survivability and lethality?
- How do we reduce in-theater support needs, and thereby reduce strategic lift requirements?
- How do we improve fuel-efficient propulsion—ground and rotorcraft?

The goal is to enable full-spectrum capabilities. Key S&T initiative areas include those directed at information dominance and air and missile defense. A high priority is the development of the revolutionary technologies needed to make the FCS a reality. The stretch goal is to begin equipping the force not later than FY08 with a C-130-like transportable family of FCS that are capable of fighting and surviving at least as well as today's armored force.

The S&T process will facilitate development of future platforms that are smaller and lighter, yet are more lethal and survivable. The Army will seek "paradigm shifts" in warfighting capabilities as significant as past shifts to the tank and helicopter. S&T will also involve advances in compact electric power generation, advanced simulation, and the application of technology to soldier systems. Additionally, Army S&T supports medical research for national health issues, as directed by Congress.

Conclusion

America's Army is transforming itself into a force with the strategic responsiveness needed to maintain dominance across the full spectrum of operations. *Army Weapon Systems 2001* describes the investments being made today to ensure the readiness of our Army tomorrow. Tomorrow's Army, and the trained and committed soldiers who fill its ranks, will rely upon these systems as they support and defend our Nation and its global interests well into the 21st Century.

Modernization

The Army's modernization strategy will support the goal of transforming the Army into a more responsive and dominant force in the future through the development and/or procurement of new systems with improved warfighting capabilities. The strategy aims to produce that capable force while at the same time providing a current force able to meet the Army's ongoing responsibilities to the Nation.

Modernization programs support the transformation process. Three major components of the Army's modernization strategy include the following:

- An Objective Force, focusing on science and technology to enable timely fielding and utilization of Future Combat Systems (FCS);

- The Interim Force, a transformation entity to meet immediate warfighting requirements; and

- The Legacy Force, our current capabilities enhanced through modernization, recapitalization, and digitization.

The desired end-state is a strategically responsive Army that is more capable of dominance along the full spectrum of military operations in a joint and combined environment.

Advanced Field Artillery Tactical Data System (AFATDS)

MISSION

Provide an automated command, control, and communications system for future fire support systems.

DESCRIPTION AND SPECIFICATIONS

The Advanced Field Artillery Tactical Data System (AFATDS) enables the maneuver commander to plan and execute attacks on the right target, at the right time, with the right weapon system and the right munitions. It provides for maximum utilization of the fire support assets available on an expanding battlefield. AFATDS provides the multi-service (Army and Marine Corps) automated fire support command, control, and communications portion of the Army Battle Command System (ABCS). It supports the close, deep, and rear-battle fire-support requirements of land and littoral doctrine. AFATDS is designed for full interoperability with the other ABCS battlefield functional areas (BFAs) as well as with the fire support capabilities of the Navy's and Air Force's command and control weapon systems.

AFATDS provides integrated, automated support for planning, coordinating, and controlling all fire-support assets (field artillery, mortars, close air support, naval gunfire, attack helicopter, and offensive electronic warfare) and for executing counterfire, interdiction, and suppression of enemy targets for close and deep operations. AFATDS uses non-developmental, ruggedized, common hardware used by the other ABCS BFAs. AFATDS uses the results of its target-value analysis to establish target priorities, select the best weapon system from all fire-support assets available, and coordinate target acquisition and sensor assets to provide targeting information and target damage assessment data.

Through interoperability with the Air Force Theater Battle Management Core System, AFATDS will be able to recommend tasks for close air support of ground troops, as well as track and maintain joint air targets. The AFATDS Joint Maritime Command Information System interface enables the exchange of friendly- and enemy-unit information and battlefield geometry messages between the Army and U.S. Marine Corps. The AFATDS-Naval Fire Control System interface will provide for Naval gunfire support. AFATDS software is being developed in incremental, fieldable versions to accommodate evolving technology, doctrine, tactics, weapons capabilities, and procedures. Each version adds capability and functionality with AFATDS 9.0 currently projected as the objective system. AFATDS follows the Deputy Chief of Staff for Operations-approved "first to fight" fielding schedule which prioritizes fieldings to units that will be deployed into combat first.

FOREIGN COUNTERPART

France: ATLAS; Germany: ADLER; Italy: SIR; Norway: ODIN; United Kingdom: BATES.

FOREIGN MILITARY SALES

The price and availability to sell AFATDS has been issued to Kuwait, Portugal, Saudi Arabia, Taiwan, and Turkey. Letters of Agreement have been signed with Turkey and Portugal.

PROGRAM STATUS

- **September 15, 1999** AFATDS 7.0–9.0 contract award.
- **1QFY00** AFATDS '98 Materiel release.
- **4QFY00** AFATDS '99 Field integration and test/government confidence test.

PROJECTED ACTIVITIES

- **1QFY01** AFATDS '99 Limited user test and evaluation.
- **4QFY01** AFATDS '99 Materiel release.
- **3QFY03** AFATDS 7.0 Materiel release.

PRIME CONTRACTORS

Software: Raytheon (Fort Wayne, IN)
Hardware: General Dynamics (Taunton, MA)

* See appendix for list of subcontractors


T-1620/ALQ-212(V) infrared Jam Head (IRJH) (qty. of 1 or 2)
C-12511/ ALQ-212(V) Jam Head Control Unit (JHCU)
SU-201/ ALQ-212(V) Infrared Jam Laser (IRJL)
C-12510/AAR-57(V) Electronic Controi Unit (ECU)
SU-202/AAR-57(V) Electro-Optic Missile Sensor (EOMS) (qty. of 4 or 6)
(sample flare) (not part of D-61/ALQ-212(V)
"Smart Dispenser" (qty. of 1 or 2 per system) (part of D-61/ ALQ-212(V))
ALE-47 Sequencer (Government Furnished Equipment (GFE)), (qty. of 1 per system) (part of D-61/ALQ-212(V))
D-61/ALQ-212(V) Dispenser, Flare (qty. of 1 or 2 systems) (part of D-61/ALQ-212(V))

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

Modernization

MISSION
Detect, track, and defeat incoming missiles using an airborne countermeasure self-protection system.

DESCRIPTION AND SPECIFICATIONS
The AN/ALQ-212 Advanced Threat Infrared Countermeasures (ATIRCM) is a modular system consisting of the AN/AAR-57 Common Missile Warning System (CMWS), infrared jam head, improved countermeasure dispenser, and improved countermeasure munitions. As a modular system, the ATIRCM can be installed in various configurations:

- With the CMWS only, to provide missile warning.
- With the CMWS and the improved countermeasures dispenser.
- With the laser and flash-lamp jam head to create a complete system.

ATIRCM provides automatic, passive missile detection; threat-type declaration; crew warning; false alarm suppression; and cues to other on-board systems such as dispensers for countermeasure decoys. On the Army version only, the ATIRCM/CMWS adds active, directional countermeasures via a laser and an arc lamp.

FOREIGN COUNTERPART
No known foreign counterpart

FOREIGN MILITARY SALES
None

PROGRAM STATUS
- The ATIRCM is currently transitioning to an Army-only program. It is nearing completion on remaining contractor qualification tests and has successfully completed flight testing as part of the engineering and manufacturing development phase.

PROJECTED ACTIVITIES
- **2QFY02** Initiate low-rate production.
- **2QFY03** Milestone III decision scheduled.
- **1QFY04** First unit equipped.

PRIME CONTRACTORS
BAE Systems (Nashua, NH)

* See appendix for list of subcontractors

Air/Missile Defense Planning and Control System (AMDPCS)

MISSION

Provide air defense command and control capability to Air Defense Artillery (ADA) Brigades, the Army Air and Missile Defense Command (AAMDC), Corps and above headquarters, and joint force command and control elements, such as the Battlefield Coordination Detachment; provide a Fire Control System; provide common air and missile defense planning and battlespace situational awareness; provide joint, interoperable battle management (BM)/C4I capability.

DESCRIPTION AND SPECIFICATIONS

The Air/Missile Defense Planning and Control System (AMDPCS) provides ADA Brigades with a fire control system via the Air Defense System Integrator (ADSI) for monitoring and controlling engagement operations by subordinate battalions. AMDPCS provides a common air and missile defense staff planning and battlespace situational awareness tool via the Air and Missile Defense Workstation (AMDWS) to achieve the common tactical and operational air picture. The AMDWS will be fielded to air and missile defense units at all echelons of command, battery through theater. The AMDPCS provides interoperability for the Army Battle Command Systems (ABCS) BM/C4I capability/interoperability for Army Air and Missile Defense (AMD) forces and provides interoperability with Joint Theater Air and Missile Defense (JTAMD) forces. AMDPCS provides sheltered systems for the ADA Brigades and the AAMDCs. The AMDPCS enables active, passive, and attack operations coordination with the joint forces.

FOREIGN COUNTERPART

No known foreign counterpart

FOREIGN MILITARY SALES

None

PROGRAM STATUS

- **3QFY97** Approved Operational Requirements Document.
- **4QFY97** Approved as Acquisition Category III Program.
- **FY99** Deployment of 1 ADA Brigade (partial), AAMDC update, ADA School update.
- **3QFY00** AMDWS V1.1 formal delivery.
- **4QFY00** 263d South Carolina Army Reserve National Guard (SCARNG) AAMDC initial training configuration delivered.
- **4QFY00** ADSI Minimal Implementation Tactical Data Information Link J Army Service Level Test (SLT).
- **1QFY01** Interim Brigade Combat Team (IBCT) delivery.

PROJECTED ACTIVITIES

- **2QFY01** AMDWS V1.0 software Materiel Release.
- **3QFY01** AMDWS V1.1 software Materiel Release.
- **4QFY01** AMDWS V1.2 software formal delivery.
- **1QFY02** 2nd Interim Brigade Combat Team (IBCT) delivery.
- **3QFY02** Deployment of 263d SCARNG AAMDC tactical configuration.

PRIME CONTRACTORS

Sheltered Systems: Brown International (Huntsville, AL); TRW (Huntsville, AL)
AMDWS: TRW (Huntsville, AL)
ADSI: APC (Austin, TX)

* See appendix for list of subcontractors

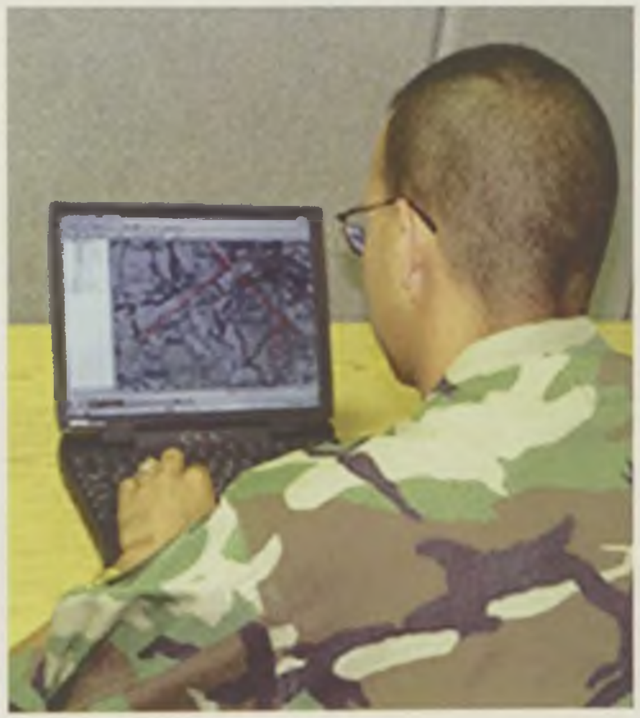
All Source Analysis System (ASAS)

ASAS Remote Workstation V4

ASAS Remote Workstation Training Station

Communications Control Set

ACT Enclave (Interior View)



ASAS Light

All Source Analysis System (ASAS)

Modernization

MISSION
Support the warfighting commander's battle management and information warfare process by fusing intelligence information to present a common picture of the battlefield.

DESCRIPTION AND SPECIFICATIONS
The All Source Analysis System (ASAS) is the intelligence and electronic warfare (IEW) component of the Army Battle Command System (ABCS). ASAS automates IEW asset management, intelligence preparation of the battlefield, and dissemination of intelligence. It supports all echelons and functions in all phases of military operations across the full spectrum of conflict. ASAS supports current operations and future planning.

ASAS receives and correlates information from strategic and tactical intelligence sensors and sources. It automates sensor-to-shooter linkage by providing target nominations directly to the Advanced Field Artillery Tactical Data System (AFATDS). A mission-critical "system of systems," it is built upon the common hardware (CHS-2) platform and is tactically deployable. It operates at compartmented top-secret security levels and fuses signals intelligence (SIGINT), imagery intelligence (IMINT), counter intelligence/human intelligence (CI/HUMINT), measurement and signature intelligence (MASINT), and open sources.

FOREIGN COUNTERPART
No known foreign counterpart

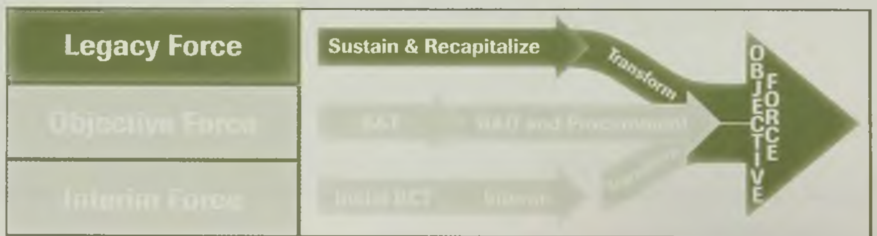
FOREIGN MILITARY SALES
None

PROGRAM STATUS
- Received milestone III decision for full-rate production and Army-wide fielding of ASAS Block II remote workstation (RWS) Version 4.
- Equipped first digitized division with ASAS Block II RWS.
- Demonstrated Block II ACE first prototype.
- Type-classified ASAS RWS Version 4 as "standard" (AN/TYQ-93 [V]1 and [V]2).
- Significantly enhanced the communications control set (CCS); added JWICS, Mobile Subscriber Equipment (MSE) tactical internet, and Secret Internet Protocol Router Network (SIPRNET).
- ASAS Light battalion-level, laptop-configured product completed developmental testing and operational test (1QFY01). Expect fielding decision in 2001.
- Completed extended fielding of Block I ASAS to National Guard enhanced readiness brigades; the entire Army now has ASAS Block I.

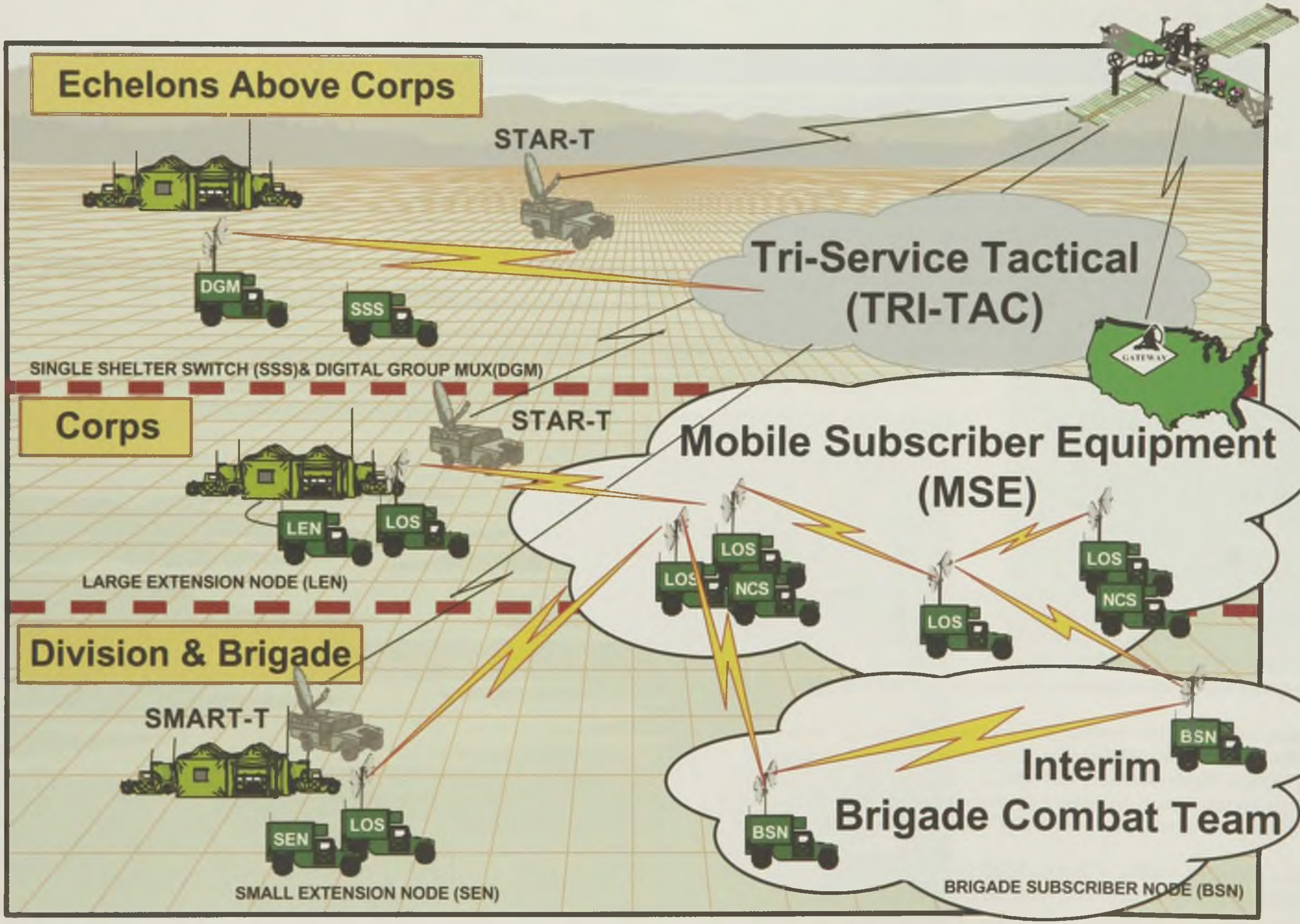
PROJECTED ACTIVITIES
- Continue fielding ASAS Block II RWS Version 4 system.
- Procure and field CHS-2 hardware as part of Block II.
- Develop, test, and field the next iteration of ASAS Light.
- Develop and deliver ABCS and 6.2 Remote Workstation (RWS) and 7.X RWS capabilities.
- Participate in ABCS synchronization event testing, including Digital Capstone Exercise I and II.
- Begin fielding ASAS Light.
- Continue developing Block II ACE.
- Continue to achieve greater joint interoperability.

PRIME CONTRACTORS
Lockheed Martin (Littleton, CO); Austin Information Systems (Austin, TX); Electronic Warfare Associates (Herndon, VA)

* See appendix for list of subcontractors



Area Common User System (ACUS) Communications Architecture



MISSION
Support the power projection force of the 21st century, from sustaining base to foxhole, through planned modifications to the Area Common User System (ACUS) and support for its migration to the Army's Warfighter Information Network–Tactical (WIN-T) systems architecture.

DESCRIPTION AND SPECIFICATIONS
The Area Common User System Modernization Program (ACUS MOD) consists of planned upgrades to the Mobile Subscriber Equipment (MSE) system at echelons at corps and below, Tri-Service Tactical Communications (TRI-TAC) system at echelons above corps, and support for the Army's transformation initiative through technology insertion. The ACUS MOD will implement a prioritized set of tactical operational requirements/capabilities to support current and emerging Army XXI C4ISR initiatives. These capabilities include increased network services, information assurance, network management, enhanced reachback capabilities, and the transport velocity and capacity required to support the warfighter's increasing need to pass high-speed data, voice, video, and imagery by the recapitalization of legacy systems.

The ACUS MOD Program includes the following products: Asynchronous Transfer Mode (ATM) upgrade provides increased data and video capacity on the digitized battlefield; the High Capacity Line of Sight Radio (HCLOS) will provide the larger transmission "pipes" required to transport data on the digital battlefield; the Tactical High Speed Data Network (THSDN) will be an interim solution to provide minimum bandwidth to support enhanced data access through MSE; the Single Shelter Switch (SSS) and High Mobility Digital Group Multiplexer (HMDA) are downsized versions of the legacy TRI-TAC systems, providing for greater deployability and mobility; the TS-21 BLACKJACK (AN/UXC-10) is a rugged, secure tactical fax machine compatible with existing COMSEC; and the Brigade Subscriber Node (BSN) provides an integrated switching/transmission shelter providing high speed ATM backbone and HCLOS for voice/data/video capabilities in the Interim Brigade Combat Teams (IBCTs).

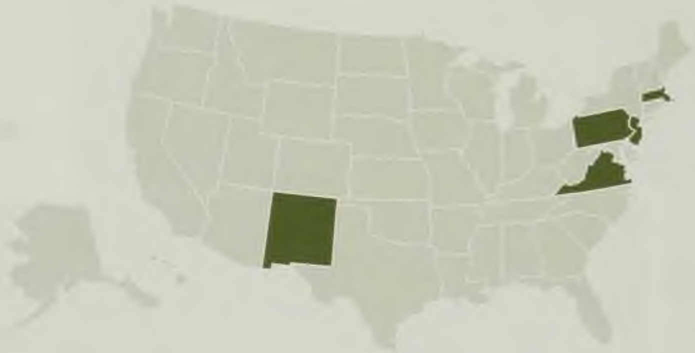
FOREIGN COUNTERPART
No known foreign counterpart

FOREIGN MILITARY SALES
Similar ATM and HCLOS upgrades are planned for Taiwan's Improved Mobile Subscriber Equipment (IMSE).

PROGRAM STATUS
- **1QFY00** SSS Initial operational testing and evaluation completed; The SSS program is in production; 30 units are currently on contract.
- **3QFY00** THSDN received conditional modification work order release in June 2000, currently being fielded.
- **4QFY00** ATM/HCLOS upgrades have been fielded to the First Digitized Division unit at Ft. Hood (124th Sig Bn); Completed customer test; Contract options will be used for balance of First Digitized Corps (FDC).
- **1QFY01** AN/UXC-10 fielding to FORSCOM units started; TS-21 Fax procured for field/issue to authorized Reserve and Guard units; BSN program presently in production; New equipment training for BCT 1.
- **1QFY01** The AN/UXC-10 facsimile will be procured for field/issue to authorized Reserve and Guard units.
- **2QFY01** THSDN will introduce dynamic name service; BSN will equip the 334th Signal Company.

PROJECTED ACTIVITIES
- **2001–04** ATM/HCLOS fielding of FDC units.
- **3QFY01–05** Fielding of HMDA system to Active Army completed; Reserve components scheduled.
- **4QFY01** BSN will complete operational testing.

PRIME CONTRACTORS
ATM, SSS, THSDN: General Dynamics (Taunton, MA)
HCLOS: BAE Systems (Quebec, Canada)
HMDA: Laguna Industries (Laguna, NM)
TS-21 Fax: GD/CRYPTEK (Taunton, MA)
BSN: CECOM (Ft. Monmouth, NJ)



* See appendix for list of subcontractors

Army Airborne Command and Control System (A2C2S)

Army Airborne Command and Control System (A2C2S)

MISSION
Provide commanders, from brigade to corps levels, with an Airborne Tactical Command Post that provides continuous Situational Awareness (SA), robust communications, and battlefield mobility.

DESCRIPTION AND SPECIFICATIONS
The Army Airborne Command and Control System (A2C2S) is the Army's only on-the-move command and control (C2) system, supporting corps, division, and brigade commanders. The A2C2S supports C2 requirements for missions ranging from humanitarian assistance to deep operations in high intensity conflict. Hosted in a UH-60 Black Hawk, this highly mobile Tactical Command Post provides the maneuver commander the capability to maintain SA and exercise C2, either from a temporary remote site or while traversing the expanded battle space of a Force XXI division at speeds up to 300 km per hour. To provide the commander with SA and C2, the A2C2S hosts the Army Battle Command System (ABCS), which enables the commander to access mission plans.

In addition, the A2C2S provides a robust communications suite that includes Non-Line-of-Sight radios, such as High Frequency and Satellite Communications–Demand Assigned Multiple Access (SATCOM DAMA), as well as wide band digital radios. These capabilities enable warfighters to exercise C2 of assigned and attached elements and to coordinate with adjacent, supported, and supporting forces by means of voice and data equipment with battlefield information processing and operations. Finally, the A2C2S serves as a force multiplier in Army XXI and the Objective Force.

FOREIGN COUNTERPART
No known foreign counterpart

FOREIGN MILITARY SALES
None

PROGRAM STATUS
- Currently in the system development and demonstration phase, A2C2S is engaged in Block 1 system integration.
- A system mockup was delivered to the Central Technical Support Facility (CTSF) at Ft. Hood, TX in 4QFY00, and will be used to facilitate ABCS 6.x software integration and relevant hardware upgrades as well as to support future training activities.
- Current activities include system development and preparation for the Division Capstone Exercise II (DCXII) scheduled for 1QFY02, and fabrication of a second system for the 101st Airborne Division (AASLT) for further user evaluation.

PROJECTED ACTIVITIES
- **1QFY01** Upgrade system processors; Integrate selected ABCS 6.x software; Modify UH-60 airframe.
- **2QFY01** Initial airframe modification and airworthiness qualification; Mission Equipment Package (MEP) assembly and integration.
- **3QFY01** Aircraft integration; System performance testing.
- **4QFY01** DCXII system delivery; Individual training for DCXII; Preparation and collective training for DCXII.

PRIME CONTRACTORS
A2C2S development is a collaboration of government agencies including U.S. Army Communications–Electronics Command (CECOM), Army Armament Munitions Chemical Command (AMCOM), and Applied Aviation Technology Directorate (AATD), with the bulk of prototype development being completed by AATD in Ft. Eustis, VA.

* See appendix for list of subcontractors


Army Battle Command System
Horizontal and Vertical Integration of Information to Produce a Common Picture of the Battlefield
UAV
Platforms
Sensors
Simulations WARSIM 2000
MSE /ATM NTDR
GBS
IMETS
AMPS
CSSCS
ASAS
AMDWS
MCS
CTIS
AFATDS
Client/Server
Client/Server
Client/Server
ISYSCON
TAIS
DTSS
A2C2
IMETS
WIN TI
ABCS
SATCOM
Radios
AFATDS
FAAD
GCCS-A
FBCB2
MCS
ASAS
CSSCS
The Common Tactical Picture
Army
Navy
Army Battle Command System (ABCS)
Joint Maritime Command Info System (JMCIS)
GCCS COE
Theater Battle Mgt Control System (TBMCS)
Tactical Combat Operation System (TCO)
Air Force
Marine Corps
Company
FBCB2 /EBC
Platoon
Tactical Internet
FBCB2/EBC
Squad
FBCB2 /EBC
Situational Awareness

MISSION

Link battlefield automation assets, communications media, and operational facilities to support commanders and their staffs in collecting and analyzing information, developing plans and orders, and monitoring the tactical battlefield, while simultaneously planning future operations.

DESCRIPTION AND SPECIFICATIONS

Army Battle Command System (ABCS) is the Army's component of the Global Command and Control System (GCCS). It is a complex system of systems that provides the mechanism to receive and transmit information among the joint forces. The systems that comprise ABCS when fielded as a system of systems, provide the core capability to facilitate world-class C4ISR on the battlefield.

The ABCS consists of subsystems for the battlefield functional areas (BFAs), each of which supports and provides information to other systems, and provides situational awareness of the battlefield. By integrating the ABCS components through the Joint Common Database (JCDB), the common tactical picture can be viewed at any workstation, to the operator's specific requirements. In addition, ABCS subsystems provide an array of specialized capabilities and applications for commanders of diverse units at all levels. The adjacent table shows the ABCS subsystems and describes their functions.

FOREIGN COUNTERPART

No known foreign counterpart

FOREIGN MILITARY SALES

None

PROGRAM STATUS

- ABCS is a system of systems, not a formal program.

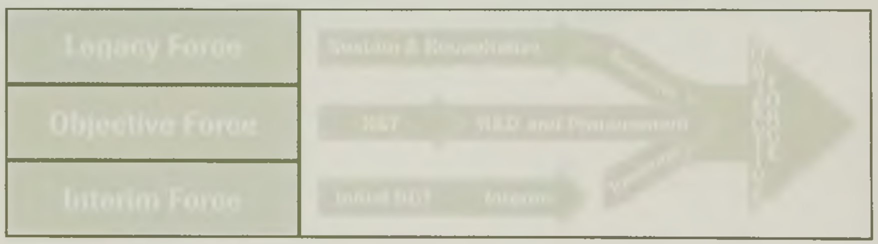
PROJECTED ACTIVITIES

- Develop the ABCS infrastructure (e.g., JCDB, Command and Control Registry, and ABCS servers). Integrate ABCS subsystems into ABCS Version 6.2, 7.0, and beyond.

PRIME CONTRACTORS

ABCS is a system of systems, not a formal program.

BFA	ABCS Subsystem	Functionality
Global C2	GCCS-A	Provides access to the Global Command and Control System.
Maneuver	MCS, FBCB2,	Plans, coordinates, and controls current EBC and future operations. Develops situational awareness and the common tactical picture.
Intelligence	ASAS	Develops and provides pictures of enemy situations, from national, theater, and tactical sources.
Fires	AFATDS	Provides automated support for the planning, coordination, control, and execution of close support and deep fires from Army and joint assets.
Topographic	DTSS	Produces tactical topographic products, services including digital and full color paper maps of the battlefield.
Air Defense	FAAD C2	Integrates air defense units, sensors, and command and control centers into a system for defeating low-altitude air threat and enables the commander to plan and control the counter-air fight.
Combat Service	CSSCS	An automated system for logical, medical, financial, and personnel support to assist decision-making and the battle planning process.
Weather	IMETS	Provides weather information, based on information from Air Weather Service and other sensors.
Airspace	A2C2	Provides the capability to plan air management movements and track aircraft during movement, and to enable deconfliction with weapons systems planning and operations.



Army Common Ground Station (ACGS)

MISSION
Provide long-range radar and other sensor surveillance battle management and targeting data to tactical commanders.

DESCRIPTION AND SPECIFICATIONS
The Army Common Ground Station (ACGS) is a key node on the digitized battlefield, receiving multiple national, theater, and tactical sensor inputs. The ACGS is a mobile, tactical, multi-sensor ground station that receives, displays, processes, and disseminates targeting, battle management, and intelligence information to all echelons.

The primary sensor input is from the Joint Surveillance Target Attack Radar System (Joint STARS). Joint STARS is a joint Air Force/Army program, for which the Army provides the ACGS as the ground component. The airborne platform is a United States Air Force E-8C with a multi-mode radar (wide-area surveillance and synthetic aperture modes), 18 operation-and-control consoles, a surveillance and control data link (SCDL), and secure communications. Orbiting a safe distance from the forward line of troops (FLOT), Joint STARS radar scans a wide area of the battlefield.

The radar data is received by Air Force and Army operators aboard the aircraft and downlinked to multiple CGSs via the SCDL. The information provides tactical commanders with near-real-time, wide-area surveillance, and deep-targeting data. The Joint STARS system can detect, locate, and assist in attacking both fixed and moving targets beyond the FLOT during daylight and darkness in nearly all weather conditions.

In addition to Joint STARS radar data, the ACGS is capable of receiving and displaying Airborne Reconnaissance Low (ARL) radar data, unmanned aerial vehicle imagery, and signals intelligence data via an integrated joint tactical terminal. The ACGS uses commercial off-the-shelf components, and is housed in a shelter on a High Mobility Multipurpose Wheeled Vehicle (HMMWV). The CGS provides increased functionality over the predecessor Ground Station Module (GSM), which it replaced in FY99.

FOREIGN COUNTERPART
Britain: Astor; France: Horizon; Italy: Creso.

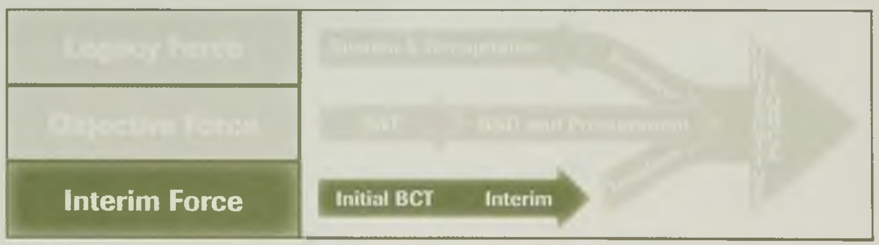
FOREIGN MILITARY SALES
None

PROGRAM STATUS
- **1QFY96** Awarded CGS production contract.
- **2QFY97** Completed fielding of 16 MGSMs and 4 LGSMs.
- **3QFY99** Began initial fielding of CGS.
- **FY99** Completed replacement of all GSMs.
- **2QFY00** Conduct final phase of operational testing.
- **4QFY00** Approved for Milestone III, full rate production; CGS full-rate production decision (Milestone III).

PROJECTED ACTIVITIES
- **FY01** Continue fielding; continue Block 10 upgrades.

PRIME CONTRACTOR(S)
CGS: Motorola (Scottsdale, AZ)
Datalink: Cubic Defense Systems (San Diego, CA)
Aircraft: Northrop Grumman (Melbourne, FL)

* See appendix for list of subcontractors



AKMS LCMS (EKMS) COMSEC Account

Ruggedized Laptop

Tactical Printer

Ruggedized Laptop

NSA Key Processor

Data Transfer Devices

Army Key Management System (AKMS)

Modernization

MISSION

Enable frequency management and communications security (COMSEC) management planners and operators to provide highly responsive and reliable secure communications operations at both theater/tactical and strategic/sustaining base levels.

DESCRIPTION AND SPECIFICATIONS

The Army Key Management System (AKMS) automates frequency management and COMSEC management operations. It eliminates paper-keying material, hardcopy-signal-operating instruction, and associated time- and resource-intensive courier distribution. The Local COMSEC Management System (LCMS) is the Army's position in the four-tiered Electronic Key Management System (EKMS). EKMS is a key management, COMSEC materiel distribution, and logistics support system. The National Security Agency established the EKMS program to meet the following objectives:

- Supply electronic key to COMSEC devices in a secure and timely manner.
- Provide COMSEC managers with an automated system capable of handling ordering, generation, production, distribution, storage, security accounting, and access control.

Automated Communications Engineering Software (ACES) is the frequency management portion of AKMS. ACES has been designated by the Military Communications Electronics Board as the joint standard for use by all services in development of frequency management and cryptonet planning. ACES will replace the legacy Revised Battlefield Electronic Communications-Electronic Operating Instructions System (RBECS) and will become the joint electronic interface to all spectrum management, Integrated System Control, Spectrum XXI, RBECS, Operational Tasking Command, Air Tasking Order (ATO), and Space ATO workstations.

The data transfer device is an improved net-control device to automate cryptonet control operations for communications networks employing electronically-keyed COMSEC equipment.

FOREIGN COUNTERPART

No known foreign counterpart

FOREIGN MILITARY SALES

None

PROGRAM STATUS

- **4QFY00** Commenced LCMS fielding.

PROJECTED ACTIVITIES

- **3QFY01** Commence ACES fielding.

PRIME CONTRACTORS

Group Technology Corporation (Tampa, FL)

* See appendix for list of subcontractors

Army Tactical Missile System (ATACMS) Blocks I and IA

Army Tactical Missile System (ATACMS) Blocks I and IA

Modernization

MISSION

Provide long-range, surface-to-surface, fire support for the Army's Objective Force and Joint Forces Commander.

DESCRIPTION AND SPECIFICATIONS

The Army Tactical Missile System (ATACMS) is a Legacy to Objective Force Program. The Block I and IA are ground-launched missile systems consisting of a surface-to-surface guided missile with an anti-personnel/anti-materiel (APAM) warhead. The ATACMS with APAM attacks soft targets at extended ranges. Targets include:

- Surface-to-surface missile sites.
- Site defense systems.
- Logistics elements.
- Command, control, and communications complexes.

The ATACMS missile is fired from the M270 Multiple Launch Rocket System (MLRS) launcher and the High Mobility Artillery Rocket System (HIMARS) to engage targets at ranges well beyond the capability of existing cannons and rockets. The ATACMS Block IA, with enhanced Global Positioning System (GPS) accuracy, has approximately twice the range of the ATACMS Block I. The ATACMS includes the following components: guided missile and launching assembly, M39; trainer, launch pod container, M68; training set, guided missile, M165; trainer, test device, guided missile, M78; modified M270 launcher; and ATACMS missile facilities.

FOREIGN COUNTERPART

Afghanistan, Bulgaria, China, Egypt, France, Iran, Iraq, Libya, North Korea, Poland, Romania, Russia, Slovakia, Syria, Vietnam, and Yemen.

FOREIGN MILITARY SALES

Bahrain, Greece, South Korea, and Turkey.

PROGRAM STATUS

- **FY00** Completed deliveries for Block I foreign military sales (FMS) case to South Korea; Awarded Block IA full-rate production (FRP) III contract.

PROJECTED ACTIVITIES

- **FY01** Award Block IA FRP IV contract; Award FMS case to Bahrain; Award ATACMS Unitary Quick Reaction Program (QRP) contract; Complete deliveries for Block I FMS case to Greece.
- **FY02** Complete deliveries of ATACMS Unitary QRP.
- **FY03** Complete Block IA fielding.

PRIME CONTRACTORS

Lockheed Martin (Dallas, TX; Horizon City, TX)

* See appendix for list of subcontractors

Army Tactical Missile System—BAT (ATACMS-BAT) Block II

Army Tactical Missile System–BAT (ATACMS-BAT) Block II

Modernization

MISSION

Provide Army's Objective Force and Joint Forces Commanders the capability to delay, disrupt, or destroy moving enemy armored forces before they can influence the close battle; engage stationary enemy armored forces in their assembly areas; destroy, neutralize, or suppress threat Surface-to-Surface Missile Transporter-Erector-Launchers (SSM TELs) and Multiple Rocket Launchers (MRLs) throughout the battlespace.

DESCRIPTION AND SPECIFICATIONS

The Army Tactical Missile System-BAT (ATACMS-BAT) Block II is a Legacy to Objective Force Program. The Block II is a modification of the currently fielded and combat-proven ATACMS Block I missile family and is launched from the Multiple Launch Rocket System (MLRS) M270A1 launcher and the High Mobility Artillery Rocket System (HIMARS).

The Block II will deliver 13 BAT or Preplanned Product Improvement (P3I) BAT submunitions into deep battle at supersonic velocities. The BAT uses acoustic and infrared (IR) sensors to autonomously search for, detect, track, engage, and destroy moving tanks and other armored vehicles. Follow-on incorporation of the P3I BAT will add the capability to engage stationary enemy armored forces in their assembly areas and to destroy, neutralize, or suppress threat Surface-to-Surface Missile Transporter-Erector-Launchers (SSM TELs) and Multiple Rocket Launchers (MRLs) throughout the battlespace. The P3I BAT includes improved target acquisition capability with an upgraded dual mode seeker (imaging IR sensor and millimeter wave radar) for increased lethality and increased ability to defeat countermeasures in near all-weather conditions.

FOREIGN COUNTERPART

No known foreign counterpart

FOREIGN MILITARY SALES

None

PROGRAM STATUS

Block II/BAT:

- **FY00** Completed developmental testing; Awarded Block II/BAT Low-rate initial production (LRIP) II contract.

Block II/P3I BAT:

- **FY00** Completed fourth captive flight test; Completed the first recoverable BAT test series.

PROJECTED ACTIVITIES

Block II/BAT:

- **FY01** Award Block II/BAT LRIP III contract; Conduct/complete operational testing.
- **FY02** First unit equipped.

Block II/P3I BAT:

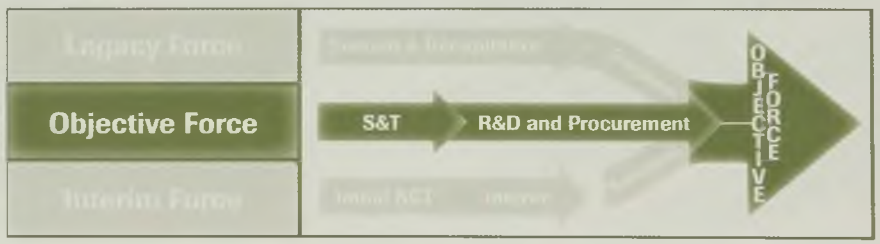
- **FY01–02** Conduct continued development program testing.
- **FY02** Obtain production cut-in decision from the Defense Acquisition Board.
- **FY02–04** Conduct developmental testing program for MRL/TEL target set.

PRIME CONTRACTORS

Block II/BAT: Lockheed Martin (Dallas, TX; Horizon City, TX); Northrop Grumman (Huntsville, AL)

P3I BAT: Northrop Grumman (Baltimore, MD)

* See appendix for list of subcontractors



Automatic Chemical Agent Detector/Alarm (ACADA)

Automatic Chemical Agent Detector/Alarm (ACADA)

MISSION
Detect nerve and blister chemical agents.

DESCRIPTION AND SPECIFICATIONS
The Automatic Chemical Agent Detector/Alarm (ACADA) is an advanced point-sampling, chemical-agent alarm system. It is capable of detecting, warning and identifying standard blister and nerve agents simultaneously. The ACADA is man-portable, operates independently after system start-up, and provides an audible and visual alarm. It is used by Army, Navy, Air Force, and Marine Corps units. ACADA replaces the M8A1 Alarm as an automatic point detector and augments the Improved Chemical Agent Monitor (ICAM) as a survey instrument. It can provide its warning automatically, using the Multiple Integrated Chemical Agent Alarm, to communicate with battlefield data transfer and warning systems. ACADA does not require a specific military operator.

Weight: 24 lb (complete w/carry case, battery pack and M42 remote alarm)
Size: 7" x 7" x 14" detector and battery box (14 lb)
Detection capability: Nerve and blister agents
Battery life: Approximately 15 hours at 70°F

FOREIGN COUNTERPART
United Kingdom: GID-3.

FOREIGN MILITARY SALES
None

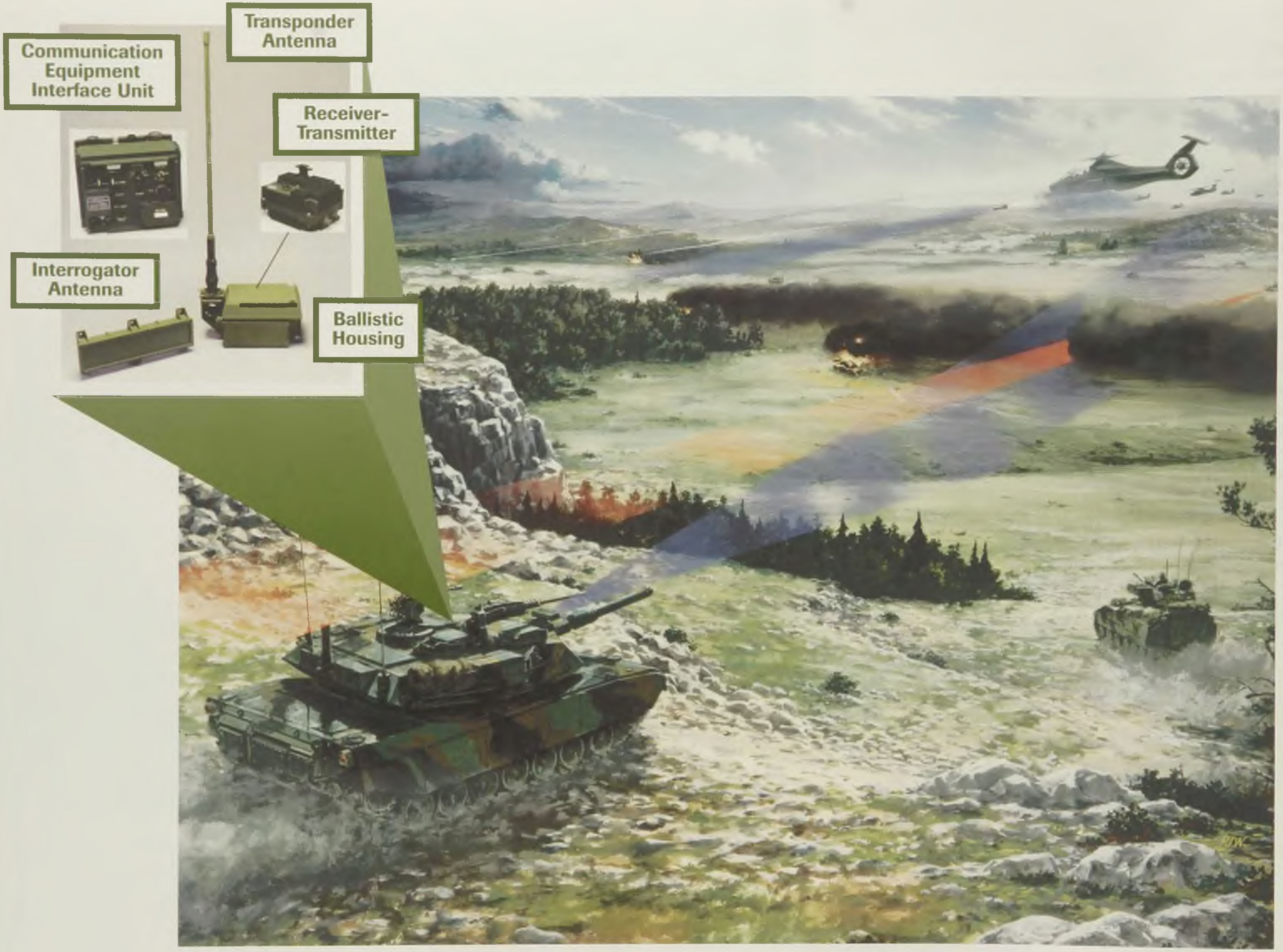
PROGRAM STATUS
- **1QFY96** Awarded contract with priced options (through FY00).
- **3QFY97** Type-classified standard.
- **4QFY98** First unit equipped to the Army.
- **FY99** Initiated fielding to Air Force, Navy, and Marine Corps.
- **FY00** Continued fielding to Army.

PROJECTED ACTIVITIES
- Continue production deliveries and fieldings.
- Continue pre-planned product improvement for surface sampler to provide first-time capability to detect agents/vapor on surface at cold temperatures.

PRIME CONTRACTORS
Graseby Dynamics, Ltd. (Watford, U.K.)

* See appendix for list of subcontractors

Battlefield Combat Identification System (BCIS)



MISSION

Provide the materiel solution for positive identification of friendly ground-combat vehicles to minimize battlefield fratricide incidents and enhance combat effectiveness.

DESCRIPTION AND SPECIFICATIONS

The Battlefield Combat Identification System (BCIS) is a millimeter-wave, question-and-answer combat identification system capable of identifying friendly ground combat vehicles at 150 to 5500 meters ground-to-ground. BCIS interrogation is triggered automatically by activating the shooter platform's laser range-finder or interrogation button, which sends an encrypted, directional query message to the targeted vehicle. If the targeted vehicle is friendly and equipped with BCIS, its transponder answers with an encrypted, omni-directional friend message. A friend light is illuminated in the gunner's sight, supplemented by voice confirmation. If no answer is received, a voice message indicating "unknown" is provided to the gunner. The gunner then continues the engagement, using tactics, techniques, and procedures. The target identification process is completed in less than a second, enabling the gunner to make a rapid-fire/no-fire decision at the point of engagement.

BCIS is a horizontal technology integration (HTI) program and an integral part of the Army's digitized battlefield effort. The system incorporates a digital data link (DDL) feature that provides local situational awareness (SA) updates (friend identification, GPS location, and unit identification) to vehicles within one kilometer of each other at five- to six-second intervals. DDL also provides for SA information exchange between vehicles when interrogated. BCIS will be fielded on combat, combat-support, and combat service-support vehicles that operate forward of the battalion field trains.

FOREIGN COUNTERPART

France: Battlefield Identification Friend or Foe.

FOREIGN MILITARY SALES

None

PROGRAM STATUS

- Continued low-rate initial production (LRIP); contracted for 113 systems for initial operational test and evaluation (IOT&E) and fielding to First Digitized Division (FDD) units.
- Completed development, design and fabrication of installation kits (A-Kit) for the Abrams (M1A1) and Bradley (M2 ODS) vehicles and conducted platform compatibility testing.
- Continued host platform A-Kit design for additional vehicle types in the FDD (M9 ACE, M88 ARV, M109A8, M992, Avenger, M6 Linebacker).
- Conducted a logistics verification demonstration.
- Completed development of NATO STANAG 4579 for Battlefield Target Identification Devices and performed modeling to assess vulnerability risk.

PROJECTED ACTIVITIES

- **FY01** Continue LRIP; Buy systems for fielding to FDD units; Complete host platform A-Kit design for remaining vehicle types in the FDD (M93A1, HEMTT, and MLRS); Conduct system confidence demonstration, reliability development-growth test, production verification test, and IOT&E; Develop NATO STANAG Annex for combat identification for rotary wing aircraft and individual soldiers.
- **FY02** Milestone II.

PRIME CONTRACTORS

TRW (Dominguez Hills, CA)

* See appendix for list of subcontractors

MISSION
Protect and enhance the warfighter's capabilities to operate in a Biological Warfare (BW) environment through the development, Food and Drug Administration (FDA) licensure, and production of medical Biological Defense (BD) products.

DESCRIPTION AND SPECIFICATIONS
Immunization of U.S. forces with Biological Defense (BD) vaccines protects each individual against exposure to BW agents and allows commanders to continue operations. The Biological Vaccine Program/Joint Vaccine Acquisition Program (JVAP) is responsible for advanced development of biological defense vaccines invented in research laboratories by using a prime contractor for activities leading to FDA licensure and production of these vaccines.

FOREIGN COUNTERPART
No known foreign counterpart

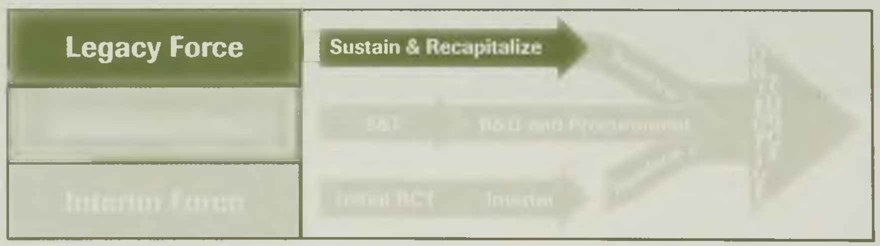
FOREIGN MILITARY SALES
None

PROGRAM STATUS
- **1QFY98** Awarded cost-plus-award-fee prime systems contract to DynPort, LLC as the prime systems contractor.
- **FY00** Current good manufacturing practice (CGMP) pilot lot production and testing of Venezuelan Equine Encephalitis (VEE) IA vaccine.
- **FY00–01** Continued developmental work for consistency model and surrogate model of Tularemia vaccine; Continued manufacturing development and Phase 1 clinical trails of pilot lot for Tularemia vaccine.

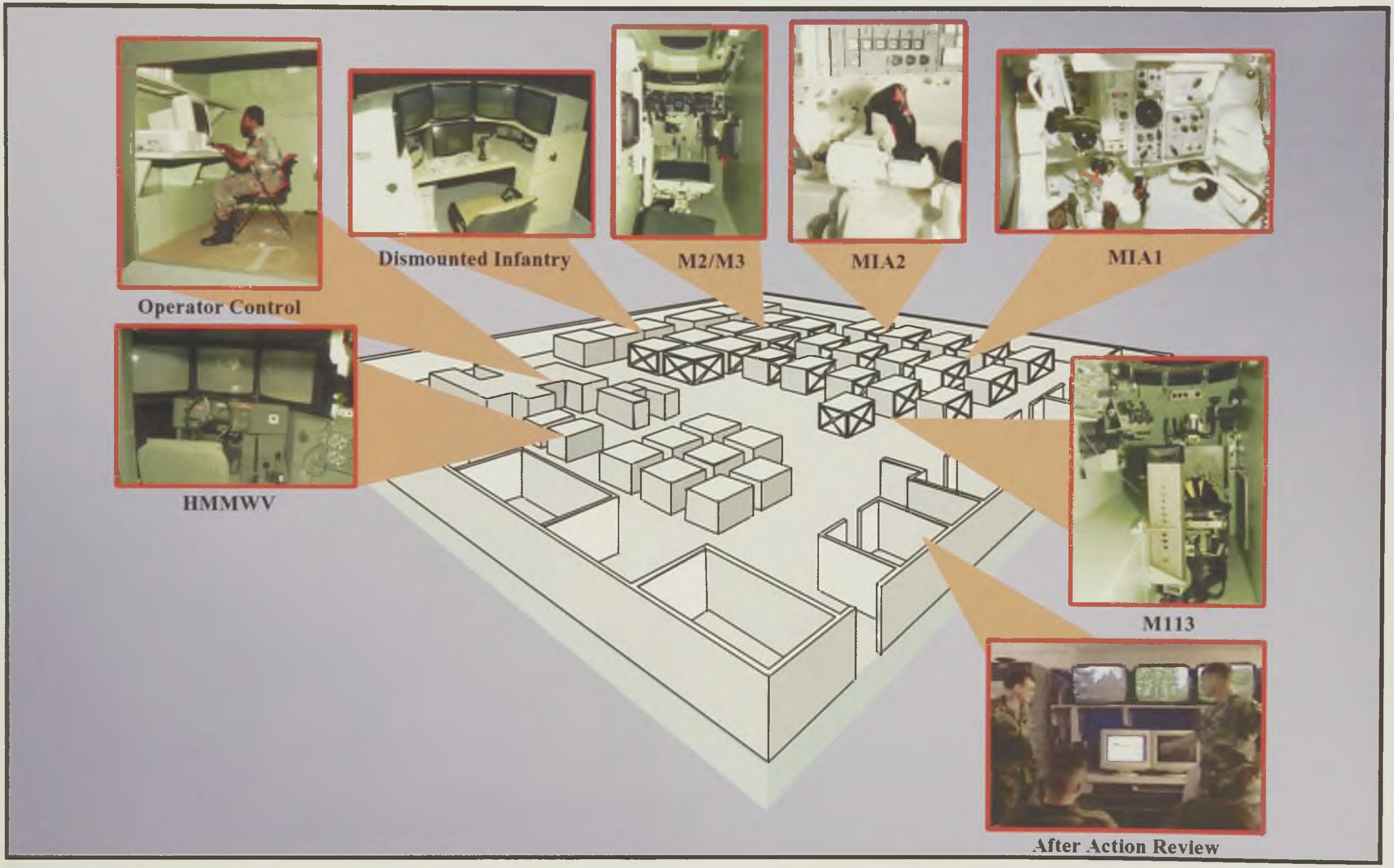
PROJECTED ACTIVITIES
- **3QFY01** Milestone II Smallpox vaccine.
- **3QFY03** Milestone II Tularemia vaccine.

PRIME CONTRACTORS
DynPort, LLC (Reston, VA)

* See appendix for list of subcontractors



Close Combat Tactical Trainer (CCTT)



MISSION
Provide collective training of crews, units, and staffs within a combined arms synthetic environment.

DESCRIPTION AND SPECIFICATIONS
Close Combat Tactical Trainer (CCTT) is the first member of the Combined Arms Tactical Trainer (CATT) family of virtual, distributed interactive simulations for collective training. It supports training of armor, mechanized infantry, and cavalry units from platoon through battalion/squadron echelon, including the staff. The primary training audience operates from both full-crew simulators and mock-up command posts. Crewed simulators–M1A1, M1A2, M2/3A2 BFV, FIST-V, M113A3, and HMMWV–are of sufficient fidelity for individuals and crews to accomplish their collective missions. Ft. Hood CCTTs are equipped with M1A2SEP, M1A1D, M2A2ODS/D, and Force XXI Battle Command Brigade-and-Below (FBCB2) in support of the Army's First Digitized Division. Infantry platoon and squad leaders can also exit the Bradley Fighting Vehicle (BFV) and move to a dismounted infantry workstation with control of virtual dismounted elements.

The training audience uses computer workstations located in mock-up command posts to provide artillery, mortar, combat engineers, and logistics units to the synthetic battlefield. Semi-automated forces workstations provide additional supporting units (i.e., aviation and air defense artillery) and all opposing forces. Thus, while maneuver units (combat crews and battalion-level staff members) constitute the CCTT primary training audience, all battlefield operating systems are represented in the simulation to ensure quality training within a combined arms training environment that encompasses daylight, night, and fog conditions. CCTT's visual and terrain databases currently support desert (National Training Center); temperate (Germany); Ft. Hood, TX; and Kosovo. Mobile versions of CCTT are used to train the National Guard and can deploy with a unit during contingency operations.

FOREIGN COUNTERPART
The United Kingdom Ministry of Defense is developing a counterpart system called United Kingdom-Combined Arms Tactical Trainer (U.K.-CATT). The United States and the United Kingdom have a memorandum of agreement that covers cooperative development of CCTT and U.K.-CATT.

FOREIGN MILITARY SALES
None

PROGRAM STATUS
- **2QFY98** Low-rate initial production award for FY99 deliveries to Ft. Knox, Ft. Benning, and mobile sets.
- **1QFY99** Achieved Army System Acquisition Review Committee Milestone III.
- **FY99** Began fielding CCTT XXI (FBCB2) to Ft. Hood, TX.
- **2QFY99** Full-rate production award for FY00 deliveries to Ft. Stewart, Ft. Hood, Ft. Carson, and mobiles.
- **2QFY00** Full-rate production award for FY01 deliveries to Ft. Carson, Ft. Riley, and mobiles.
- **4QFY00** Provided Battlefield Combat Identification System (BCIS) capability to Ft. Hood CCTT.
- **1QFY01** Full-rate production award for FY02 deliveries to Ft. Riley and OCONUS sites.

PROJECTED ACTIVITIES
- **Continue** Full-rate production of CCTT modules (CONUS and OCONUS) and additional mobile sets.
- **FY00–01** Use CCTT for trainup of FBCB2 and BCIS operational test at Ft. Hood.
- **FY00–03** Continue Abrams Tank system enhancement package simulator fielding.
- **FY01** Develop CCTT Bradley Fire Support Team (BFIST) variant kits; Complete development of terrain database for Korea; Pursue development of additional terrain databases; Continue CCTT currency upgrades for Comanche, Crusader, and FOX NBC systems; Continue CCTT trainer unique performance improvement upgrades.

PRIME CONTRACTORS
Lockheed Martin (Orlando, FL)

* See appendix for list of subcontractors

MISSION

Perform the armed reconnaissance mission for attack helicopter and air cavalry units.

DESCRIPTION AND SPECIFICATIONS

The Comanche (RAH-66) is the Army's next-generation helicopter, designed to perform the armed reconnaissance and light-attack reconnaissance mission. The Comanche will significantly expand the Army's capability to conduct reconnaissance operations in all battlefield environments, day or night, and during adverse weather. The Comanche will protect the force with its advanced electro-optical sensors, aided-target recognition, and sensor/weapons integration.

Comanche's digital communications capacity will enhance the Army's capability to win the battlefield information war, and allow interface with the Joint Surveillance and Target Attack Radar System (JSTARS) and other joint sensors and weapons platforms. Comanche's design for rapid rearm, refuel, and repair will increase the tempo of operations. With low observability, target recognition, and digitized communications, the Comanche can conduct deep, precision-strike missions against time-sensitive targets. The Comanche will replace three types of helicopters (AH-1, OH-58, and OH-6) that currently perform the armed reconnaissance mission.

Crew: 2 pilots (single-pilot operable)
Speed: 175 kt (dash)
Endurance: 2.5 hr (plus 20-minute reserve)
Armament: 20mm turreted gatling gun, air-to-ground rockets and missiles
Mission equipment package: Advanced electro-optical target acquisition and designation system, aided target recognition, and helmet-mounted display. One third of aircraft will include the Fire Control Radar (FCR); every aircraft will have provisions to incorporate the FCR.

FOREIGN COUNTERPART

No known foreign counterpart

FOREIGN MILITARY SALES

None

PROGRAM STATUS

- **3QFY00** Milestone II decision approved; Comanche program entered engineering and manufacturing development (EMD); EMD contract award.
- **Current** Comanche is in the last phase of development, with two prototype aircraft in active flight test status. During EMD, the program plan is to build an additional five test aircraft to complete development testing, followed by eight aircraft that will be devoted to initial pilot training and operational testing.

PROJECTED ACTIVITIES

- **2QFY04** Begin flight testing of EMD aircraft.
- **2QFY05** Low-rate initial production decision scheduled.
- **3QFY06** Conduct initial operational test and evaluation.
- **1QFY07** Milestone III decision scheduled.

PRIME CONTRACTORS

Aircraft: Boeing and Sikorsky Team (Philadelphia, PA; Stratford, CT)
Engine: Light Helicopter Turbine Engine Company (LHTEC), Honeywell/Rolls-Royce Team (Indianapolis, IN)

* See appendix for list of subcontractors

Combat Identification for the Dismounted Soldier (CIDDS)

Stand Alone

CIDDS Weapon Subsystem (1.09 lbs.)

- CIDDS Laser Interrogator
- Integrated MILES Laser
- Integrated IR Aiming Pointer

CIDDS Helmet Subsystem (.74 lbs.)

- CIDDS and MILES Integrated Detectors
- Helmet Electronics (Processor board, RF/IR board)
- Multiple Conformal Antennas for RF Response

Land Warrior

Laser Detectors

- Leverage CIDDS Detectors for MILES and Laser Warning

Multifunctional Laser Transmitter

- CID Interrogator
- Near IR Aiming Pointer
- MILES Interoperable

- Inductive Loop Interface to MILES/MILES 2000 Vest
- Share the LW Antenna for the CID RF Response
- Embed the CIDDS Helmet Electronics (RF Response, Laser Processing) Within the LW Comm Processor

MISSION

Provide the materiel solution for minimizing battlefield fratricide incidents among individual soldiers.

DESCRIPTION AND SPECIFICATIONS

The Combat Identification for the Dismounted Soldier (CIDDS) System (redesignated Individual Combat Identification System [ICIDS]) is a lightweight, laser-interrogate, radio frequency (RF) reply, question-and-answer combat identification system that enables individual soldiers to positively identify each other on the modern battlefield. A horizontal technology integration (HTI) program, CIDDS is designed to be used on a variety of small arms and machine guns. CIDDS's operating range is a minimum of 1100 meters under clear weather conditions, and exceeds the soldier's target acquisition capability under degraded atmospheric conditions. CIDDS fulfills requirements for use by Army, Marine and Special Operations forces. The acquisition objective is approximately 460,000 systems.

Two versions of CIDDS are being developed: Stand-alone and Land Warrior. The Stand-alone version includes a weapon-mounted interrogator and a helmet-mounted transponder. The weapon-mounted interrogator integrates into a single module the following features: an eyesafe combat identification laser for interrogating individual soldiers; a near-infrared laser pointer for aiming the soldier's weapon at night with night vision goggles; and a Multiple Integrated Laser Engagement System (MILES) laser for an embedded training capability that is interoperable with MILES/MILES 2000. The helmet-mounted transponder consists of CIDDS and MILES-integrated laser detectors for detecting CIDDS interrogations and MILES events, an electronics unit for processing interrogations and generating the replies, and omnidirectional conformal antennas for transmitting the RF friendly replies back to the shooter.

The Land Warrior (LW) version is being developed by the Soldier and Biological Chemical Command (SBCCOM), PM Soldier. The LW version will be an embedded version to minimize weight and power impacts on the soldier. It is envisioned that the LW version will utilize the weapon-mounted interrogator developed for the Stand-alone CIDDS and the CIDDS laser detectors. CIDDS RF components will be integrated into the LW communication/navigation subsystem.

FOREIGN COUNTERPART

No known foreign counterpart

FOREIGN MILITARY SALES

None

PROGRAM STATUS

- Successfully completed re-design of helmet electronics and weight reduction effort.
- Continued fabrication, assembly, and testing of engineering and manufacturing development (EMD) systems to support technical testing
- Successfully completed Phase I developmental testing.

PROJECTED ACTIVITIES

- **FY01** Complete fabrication, assembly, and testing of EMD systems; Complete Phase II developmental testing of EMD systems; Begin low rate initial production with a buy of approximately 500 systems for initial operational test and evaluation (IOT&E).
- **FY02** Conduct IOT&E.
- **FY03** Milestone III.

PRIME CONTRACTORS

Motorola (Scottsdale, AZ)

* See appendix for list of subcontractors

Combat Service Support Control System (CSSCS)

Combat Service Support Control System (CSSCS)

Modernization

MISSION
Provide timely situational awareness and force projection information to support current operations and sustain future operations as a key logistical enabler for the Army Transformation.

DESCRIPTION AND SPECIFICATIONS
The Combat Service Support Control System (CSSCS) is a decision-support system that assists commanders and their staffs in planning and executing CSS operations. The CSSCS will rapidly collect, store, analyze, and disseminate critical logistics, medical, and personnel information. Currently, commanders and staffs manually gather, correlate, and analyze volumes of technical data from the existing Standard Army Management Information System (STAMIS) and the Army Tactical Command and Control System (ATCCS). The CSSCS extracts summary information from the STAMIS, accepts input from other elements of the CSS community, and exchanges information with other automated systems to evaluate CSS information about the force-level commander's tactical courses of actions.

The CSSCS is the combat service support component of the Army Battle Command System (ABCS). Additionally, CSSCS is a key logistical enabler for the Army's transformation efforts (i.e. Brigade Combat Teams). The CSSCS is organic to CSS units and headquarters staffs, within the maneuver brigades, separate brigades, armored cavalry regiments, divisions, corps, and echelons above corps (EAC). The CSSCS is comprised of computer units, common operating environment software, and CSSCS-unique software. The CSSCS is deployable in a table-top configuration, with or without storage/transit cases, and can also be housed in the family of Standardized Integrated Command Post Systems (SICPS). While the current sources of CSS data are the STAMIS system and manual entry, the future data sources are automated links to Force XXI Battle Command Brigade-and-Below (FBCB2) and Global Combat Support System–Army (GCSS-A).

FOREIGN COUNTERPART
PM CSSCS participates with Germany, France, and Great Britain in the Quadrilateral Army Communications Information Systems Interoperability Group. In addition, Canada and Australia are monitoring the status of CSSCS development.

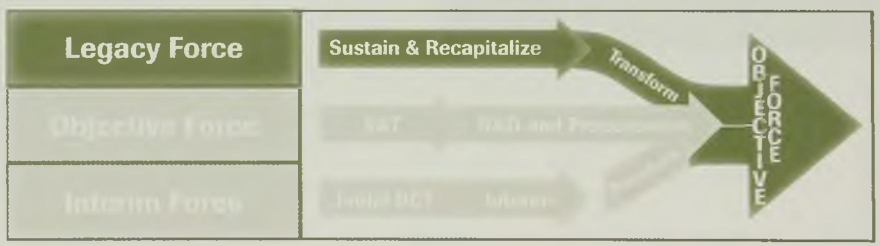
FOREIGN MILITARY SALES
None

PROGRAM STATUS
- CSSCS Version 3 software provided an initial operational capability at division and corps level and included initial horizontal interoperability with ABCS systems.
- Current Version 4 extends CSSCS to EAC, and provides additional capabilities. Version 4 has been fielded to III Corps, XVIII Airborne Corps and Task Force Eagle in Bosnia. Version 5, the objective CSSCS software, will extend CSSCS capabilities to joint, allied, and coalition forces.

PROJECTED ACTIVITIES
- **FY01–02** Field Version 4 to V Corps, U.S. Army Europe, Interim Brigade Combat Team (IBCT) 1 and IBCT 2; Develop Version 5; Support Army Warfighting Experiments.

PRIME CONTRACTORS
TRW (Carson, CA); Lockheed Martin (Tinton Falls, NJ); General Dynamics (Taunton, MA)

* See appendix for list of subcontractors



Common Hardware Systems (CHS)

20" Color Flat Panel Display (CFPD)

Compact Computer Unit-2 (CCU-2)

Versatile Computer Unit (VCU)

High Capacity Computer Unit-2 (HCU-2)

MISSION
Provide common hardware systems for the Army Battle Command System (ABCS) programs, which include the Global Command and Control System–Army (GCCS-A) and Army Tactical Command and Control System (ATCCS) as well as other Army and Joint Programs for use in system development and fielding.

DESCRIPTION AND SPECIFICATIONS
The Common Hardware Systems (CHS) program improves interoperability and lowers life-cycle costs by standardizing battlefield command and control automation through centralized buys of non-developmental items, standardized protocols, and reusable commercial common software. The program provides CHS to over 80 Army and Department of Defense customers. The contractor provides worldwide repair and maintenance and logistics support through strategically located regional support centers established to meet the needs of tactical military units. The CHS-2 program provides the following hardware: CHS-2 Rugged Handheld Computer (RHC); High Capacity Computer Unit (HCU-2); Compact Computer Unit (CCU-2); Versatile Computer Unit (VCU-1 and VCU-2); Color Flat Panel Displays; and Notebook Computer Unit-Rugged (NCU-R). These contracts provide commercial, ruggedized and highly ruggedized hardware versions of computers and peripherals. They also provide commercial industry based logistics support that meets the unique requirements of the tactical military units.

CHS/LCU software: UNIX O/S (Solaris, Solaris X86, SCO UNIX), RDBMS (Informix), Communications Protocols, GKS, PHIGS, PEX; ADA Bindings; DCE; DDN/MPN X.25; C/C++ Compiler; DOS; Purging SW.

	CHS-2(RHC)	**CHS-2(HCU-2)**	**CHS-2(CCU-2)**
Processor:	Pentium III	UltraSPARC IIi	UltraSPARC IIi/Axi
MHz clock:	500	440	440
RAM:	128MB	1GB	1GB

	CHS-2(VCU-2)	**CHS-2(VCU-1)**	**CHS-2(NCU-R)**
Processor:	UltraSPARC IIi/Axi	Pentium III	Pentium III
MHz clock:	440	600	600
RAM:	1GB	1GB	256MB

CHS-2 hardware can be procured in Version 1 (commercial workstations), Version 2 (ruggedized workstations), and Version 3 (MIL-SPEC Rugged Handheld Unit).

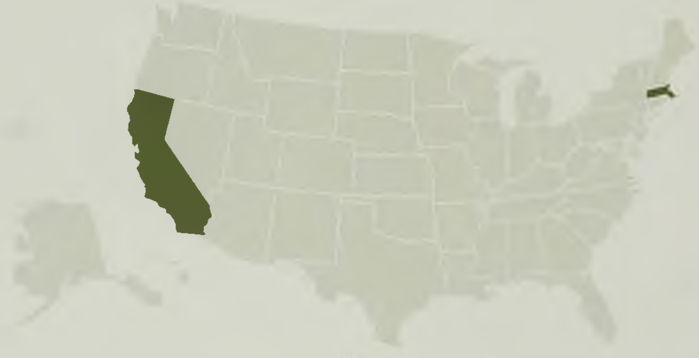
FOREIGN COUNTERPART
No known foreign counterpart

FOREIGN MILITARY SALES
None

PROGRAM STATUS
- **April 10, 1995** General Dynamics (formerly GTE) awarded CHS-2 contract, a follow-on to the CHS-1 contract.
- **4QFY00** Version 2 rugged hardware is fully qualified and was successfully used during the Advanced Warfighting Experiment (AWE) Task Force XXI exercise, Division AWE at Ft. Hood, TX and the Joint Contingency Force Exercise at Fort Polk in September 2000.

PROJECTED ACTIVITIES
- **3QFY01** Litton contract expires.
- **2QFY02** Commence CHS-2 program year 8.

PRIME CONTRACTORS
CHS-2: General Dynamics (Taunton, MA)
LCU: Litton (San Diego, CA)



* See appendix for list of subcontractors

Common Missile

MISSION

Provide a common missile to meet the infantry, aviation, and armor requirements of the next generation missile system.

DESCRIPTION AND SPECIFICATIONS

Expanding regional threats coupled with the expiration of the current stockpile require action to maintain the effectiveness of both Army ground and air combat units. A single missile to accomplish both ground and air missions provides flexibility during combat operations and enables the best use of limited development funds. The Common Missile will provide Bradley-equipped forces, the Apache Attack Helicopter (AH-64), the Comanche Reconnaissance Helicopter (RAH-66) and Future Combat System with an enhanced fire-and-forget capability, greatly increasing weapon system effectiveness and soldier and aircraft survivability.

The Common Missile will effectively engage and destroy a variety of targets, ranging from buildings/bunkers to advanced armor on the digital battlefield well into the future. The Common Missile will be designed and tested to achieve the following:

- Enhanced fire-and-forget capability.
- Increased range.
- Increased survivability (both missile and platform).
- Decreased weight.
- Decreased size.
- Modularity for future technology-based enhancements.

The Common Missile will be compatible with existing ground and air launch platforms as well as the Army's Future Combat System and the RAH-66.

Diameter: 6 in
Weight: ~70 lb
Length: ~50 in

FOREIGN COUNTERPART

No known foreign counterpart

FOREIGN MILITARY SALES

None

PROGRAM STATUS

- **FY99** Selected value tri-mode seeker concept based on tradeoff studies.
- **FY00** Identified alternative seeker that offers highest payoff; Investigated controllable thrust propulsion designs.
- **FY01** Initiated common missile preliminary design and risk reduction efforts.

PROJECTED ACTIVITIES

- **FY01–03** Tri-Mode seeker development; Controllable propulsion development; Warhead development; System design and integration.
- **FY04** Milestones I/II.
- **FY04–07** Integration testing.
- **FY08–10** Low rate initial production.
- **FY08–17** Technology insertion.

PRIME CONTRACTORS

To be determined

Crusader

Crusader
Modernization

MISSION
Provide direct and general support fires to maneuver forces on the future battlefield; become the indirect fire support "system of systems" howitzer and resupply vehicle.

DESCRIPTION AND SPECIFICATIONS
The Crusader Self-Propelled Howitzer (SPH) is the cornerstone system of the Fire Support Modernization Strategy and the strategic hedge necessary for the Legacy Force while the Army transforms itself to the Objective Force. The Crusader is a 155mm self-propelled howitzer system that will increase artillery survivability, lethality, mobility, and operational capability and effectiveness through use and integration of advanced technology. The Crusader program has been restructured to improve its deployability and relevance to the transformation and the Objective Force while retaining all of its key performance parameters (range, rate-of-fire, mobility, and resupply).

Key features of Crusader are lower weight (38–42 tons), smaller size (two howitzers transportable in the C-17), and a change in resupply vehicle philosophy. The lower weight and smaller size are achieved through the extensive use of titanium and composites, reduction in onboard ammunition, employment of reconfigurable armor, elimination of one road wheel, and incorporation of the Abrams-Crusader Common Engine, the LV 100-5. Now, Crusader howitzers will be resupplied by one-tracked and one-wheeled resupply vehicle for each two howitzers, versus one-tracked resupply vehicle per howitzer.

SPH-critical technologies and capabilities include the XM297E2 integral mid-wall cooled cannon, modular artillery charge system, automatic inductive settable multi-option fuze, fully automated ammunition handling and loading systems, composite armor, enhanced survivability, improved mobility, and embedded training and diagnostics.

The tracked and wheeled resupply vehicles (RSV-T and RSV-W) enable automatic transfer of ammunition and fuel to the SPH or another RSV to meet required firing rates; enable autonomous operation; and capitalize on cost and operational advantages of component commonality. RSV-critical technologies and capabilities include an automated docking boom, ammunition resupply system, fuel transfer system, improved mobility, and embedded training and diagnostics. The Crusader will displace the M109A6 Paladin Self-Propelled Howitzer and the M992A2 Field Artillery Ammunition Supply Vehicle (FAASV) beginning in 2QFY08.

SPH
Range: 40+ km (assisted)
Rate of fire: 10–12 rd/min
Multiple round, simultaneous impact: 4–8 rd (1 SPH)
Ammo storage: 48–60 fuzed rds
Weight: 38–42 tons
Crew: 3

RSV
Automated rearm: 48 rounds in less than 10.4 minutes
Automated refuel: 132–190 L/min
Range: 405–450 km
Speed: 48 mph highway; 30 mph cross country
Ammo storage: 100 fuzed rds
Crew: 3

FOREIGN COUNTERPART
No known foreign counterpart

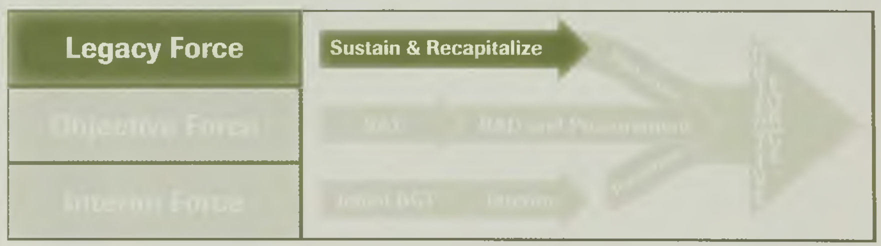
FOREIGN MILITARY SALES
None

PROGRAM STATUS
- **1QFY95** Approved to commence program definition and risk reduction (PDRR) phase.
- **2QFY98** Conducted an in-process review and authorized manufacture of the PDRR prototype systems.
- **3QFY99** Delivered first RSV(-) prototype.
- **2QFY00** Delivered first prototype howitzer SPH 1.

PROJECTED ACTIVITIES
- **2QFY03** Milestone II scheduled.
- **2QFY08** First unit equipped; Milestone III scheduled.

PRIME CONTRACTORS
United Defense, L.P. (Minneapolis, MN)

* See appendix for list of subcontractors



Digital Topographic Support System (DTSS)

Digital Topographic Support System (DTSS)
Modernization

MISSION
Provide commanders at brigade through echelons above corps with automated terrain analysis, terrain database management, and graphics reproduction in support of intelligence preparation of the battlefield, command and control, terrain visualization, and weapons and sensor systems.

DESCRIPTION AND SPECIFICATIONS
The Digital Topographic Support System (DTSS) is a standard, automated, tactical combat support system capable of receiving, formatting, creating, manipulating, merging, updating, storing, and retrieving digital topographic data and then processing these data into hardcopy and softcopy topographic products. DTSS accepts topographic and multi-spectral imagery data from the National Imagery and Mapping Agency's standard digital databases, commercial sources, and national technical means assets.

DTSS functional capabilities include creation of intervisibility, mobility, environmental, 3-D terrain visualization, and special-purpose products; and the creation, augmentation, modification, and management of topographic data. The DTSS will provide updated map background, terrain intelligence, and terrain data management to all the Army Battle Command System (ABCS) workstations on the battlefield and accept terrain intelligence/data updates from these systems.

DTSS uses the latest commercial off-the-shelf technology in printers, scanners, and computer workstations combined with image processing and geographic information system software. DTSS will be supported by environmental control units, generators, and communication equipment that are part of the standard Army inventory. The tactical system will be produced in two variants: heavy (DTSS-H) and light (DTSS-L). DTSS-H will be housed in a 20 ft international standards organization shelter and mounted on a standard 5-ton truck. DTSS-L will be housed in a lightweight multipurpose shelter mounted on a High Mobility Multipurpose Wheeled Vehicle (HMMWV).

FOREIGN COUNTERPART
United Kingdom: TACISYS; Australia: TOPOSS; Canada: DGSS.

FOREIGN MILITARY SALES
None

PROGRAM STATUS
- **April 15, 2000** Completed first article test of DTSS-L.
- **August 31, 2000** DTSS-L First unit equipped (5 systems to 4th Infantry Division).
- **3–4QFY00** Continued fielding DTSS-L.
- **1QFY01** Awarded DTSS-L 2nd production option (16 systems). Fielded DTSS-L (1 system) to Interim Brigade Combat Team (Ft. Lewis, WA).

PROJECTED ACTIVITIES
- **3QFY01** Field DTSS-Deployable (D) (83 systems); Field DTSS-Base (B) (3 systems).
- **FY00–14** Continue DTSS preplanned product improvement program.

PRIME CONTRACTORS
Litton/TASC (Reston, VA); SFA (Frederick, MD); Sechan Electronics (Lititz, PA)

* See appendix for list of subcontractors

Division TUAV-SIGINT Program (DTSP)

- Electronic Mapping of the Battlefield (Primary Mission)
- Electronic Attack
- Providing "Actionable" Intelligence for Targeting Process
- Remote Signal Collection for Off-Platform Signal Exploitation

Tactical SIGINT for the 21st Century

MISSION

Provide electronic support (ES) and mapping of the battlefield, resulting in a near-real-time (NRT) common operating picture (COP) of the electronic battlefield; detect, locate, and identify radio frequency (RF) emitters in the High Frequency (HF), Very HF, Ultra HF, and Super HF communications bands.

DESCRIPTION AND SPECIFICATIONS

The Division TUAV-SIGINT Program (DTSP) is the division-level Signals Intelligence (SIGINT) and Electronic Warfare (EW) system that supports the Army's Transformation, and information dominance. DTSP will provide division and Armored Cavalry Regiment (ACR) commanders with a deep-looking aerial SIGINT/EW platform capable of detecting, identifying, locating, and mapping both conventional and Low Probability of Intercept (LPI) RF emitters throughout the tactical area of operations (AO). The DTSP's ground-control element will remotely task and control the DTSP aerial platform's receivers and provides command control, electronic mapping, and connectivity to the tactical internet. DTSP serves as the preprocessor of tactical SIGINT information before it is input to the All Source Analysis System (ASAS).

The DTSP will exploit threat RF emitters, threat communications networks, counter-mortar/battery and ground surveillance radar, throughout the Division's/ACR's AOs. The DTSP will also be capable of Electronic Attack (EA) against these threat emitters. The DTSP ground-control/processing element will produce an organic Division/ACR SIGINT analysis capability that will provide tasking for Prophet and the DTSP aerial sensor, and will process their detection/identification/location data. The control/processing element will also have an on-the-move (OTM) capability to monitor the electronic battlefield status during displacement operations. The DTSP control will provide near-real-time (NRT) inputs to the COP through its interface with the:

- Division/ACR Analysis and Control Element (ACE) ASAS;
- Maneuver brigade Analysis and Control Team's (ACT) Common Ground Station (CGS); and/or
- ASAS-Remote Work Stations.

During its development, the DTSP will use open systems architecture, modular design, and nonproprietary industry standards to enable evolutionary growth and expansion through circuit card assemblies and software rather than wholesale hardware replacement. The DTSP was restructured from the Army's Prophet Air program in FY00 to counter changes in the threat environment, as well as to incorporate the Army's latest tactical SIGINT/EW doctrine. DTSP will meet the new Army Vision/Transformation/Objective Force requirements, based on the Army's affordability, operational risk, and priority assessments. The DTSP requirement will be included as an appendix to the Tactical Unmanned Aerial Vehicle (TUAV) Operational Requirements Document (ORD).

FOREIGN COUNTERPART

Sweden recently procured an aerial SIGINT/EW capability.

FOREIGN MILITARY SALES

None

PROGRAM STATUS

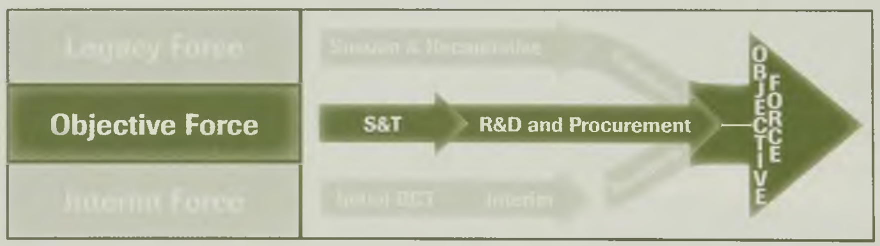
- Prophet System (PS) program restructured in CY00.
- Restructured program replaced helicopter platform with the TUAV platform.
- PS ORD revised to create two distinct programs: Prophet and DTSP.

PROJECTED ACTIVITIES

- **2QFY01** DTSP Decision Review leading to Component Advanced Development (CAD).
- **CY01** DTSP enters concept and technology development phase; DTSP requirement updated.
- **3QFY01** CAD contract(s) awarded–DTSP, ES, subsystem demonstrations.

PRIME CONTRACTORS

To be determined



Driver's Vision Enhancer (DVE)

MISSION

Provide drivers of combat and tactical-wheeled vehicles with unparalleled flexibility to continue day or night operations during periods of severely degraded visual conditions caused by smoke, fog, dust, or similar conditions.

DESCRIPTION AND SPECIFICATIONS

The AN/VAS-5 Driver's Vision Enhancer (DVE) thermal viewing system increases vehicle mobility under very poor driving conditions. The DVE provides mobility under the same conditions as the target engagement sensors, enabling a critical "go" versus "no go" capability. The DVE provides situational awareness, target and ambush detection, and vehicle tracking. For the first time, combat service support vehicles will be able to keep up with the warfighter. The DVE's cost is very low, compared to other forward-looking infrared (FLIR) sensors.

The DVE's sensor module consists of a second-generation FLIR. The output device consists of a high-quality commercial flat-panel display and control module. The system is driver friendly and easy to use. DVE video imagery may be distributed to other vehicle crew members. The DVE also contains a data port for linkage to the digitized battlefield. The DVE can be easily adapted to any current or future U.S. or NATO combat and tactical-wheeled vehicles, due to its horizontal technology integration features. These vehicles include the following:

- Abrams M1A2 and USMC M1A1
- Bradley M2A2 ODS and M2A3
- Family of Medium Tactical Vehicles (FMTV)
- Heavy Equipment Transporter System (HETS)
- Heavy Expanded Mobility Tactical Truck (HEMTT)
- Hercules
- High Mobility Multipurpose Wheeled Vehicle (HMMWV)
- M58 Smoke Vehicle
- M56 Smoke Vehicle
- Paladin
- Palletized Loading System (PLS)
- United States Marine Corps (USMC) Amphibious Assault Vehicle
- USMC Armored Vehicle Launched Bridge
- USMC Light Armored Vehicle
- Wolverine

FOREIGN COUNTERPART

Thompson: CSF's Driver's Viewer Aid.

FOREIGN MILITARY SALES

None

PROGRAM STATUS

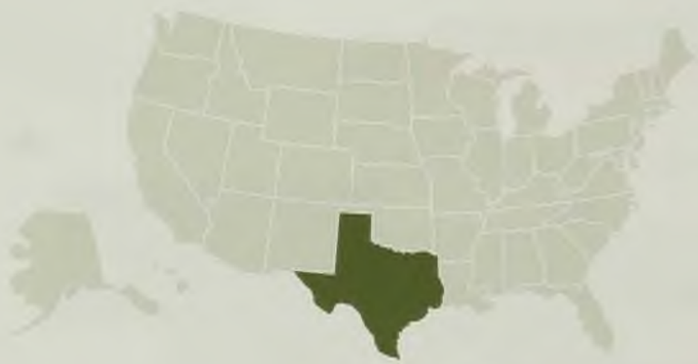
- **3QFY97** Fielded to Bradley M2A2 ODS.
- **3QFY98** Awarded three-year multi-year firm fixed price.
- **4QFY98** Full materiel release M58.
- **1QFY99** Fielded to M58.
- **2QFY99** Second program year award; DVE build.
- **1QFY00** DVE test: production qualification testing.
- **2QFY00** DVE test: USMC operational test and evaluation; PM M56 customer test.
- **1QFY01** DVE deliveries.

PROJECTED ACTIVITIES

- **1QFY01** Third program year award.
- **2QFY01** Interim Brigade Combat Team award; USMC fielding.
- **3QFY01** M56 Fielding.

PRIME CONTRACTORS

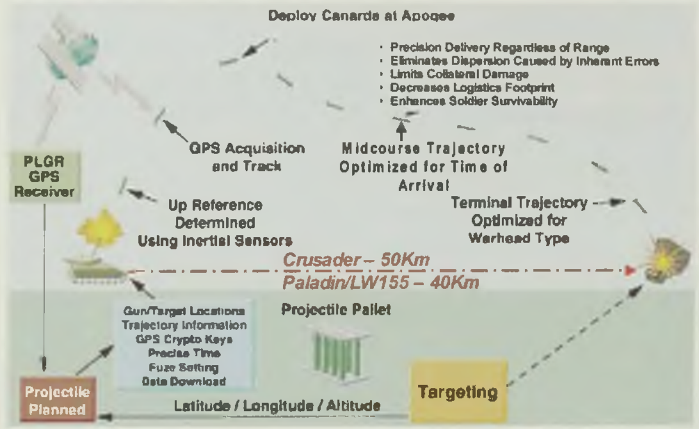
Raytheon (Dallas, TX)



* See appendix for list of subcontractors

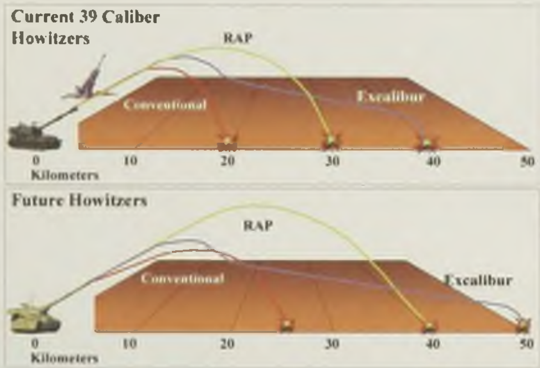
Flight Test

Excalibur Family of Precision Guided Artillery Projectiles

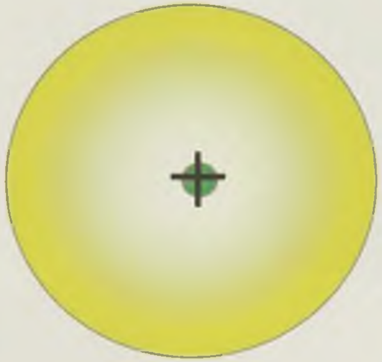


Concept of Operations

Current Configuration

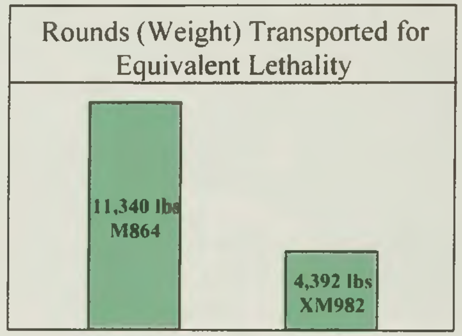


Range Improvements



Accuracy

- Current Artillery Projectiles--up to 370m dispersion
- Excalibur--constant 10m dispersion
- Target Grid



Effectiveness / Lethality

YPG Projectile Test Firings

Guidance Electronics Gun Hardening Tests

MISSION

Provide the maneuver force with improved fire support through a precision-guided, extended-range, accuracy-enhancing, collateral damage reducing, more-lethal family of 155mm artillery projectiles.

DESCRIPTION AND SPECIFICATIONS

The Excalibur, XM982, is a family of precision, 155mm modular projectiles that incorporate three unique payloads. The Dual Purpose Improved Conventional Munitions (DPICM) variant is used against personnel, materiel, light armored targets, and other area targets. A Sensor Fuzed Munition (SFM) variant will be used to engage self-propelled artillery and armored targets. The Unitary Warhead will be used against various personnel, equipment, and building targets in urban or complex terrain. Excalibur permits our 155mm artillery systems to regain range overmatch while precisely engaging targets up to 50km. 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. Excalibur is effective in all weather and terrain. It contains a fuzing system that is inductively set by either an enhanced portable inductive artillery fuze setter or Crusader's inductive automated fuze 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 and time of arrival takes place midway between apogee and the target. Upon arrival, the trajectory is optimized for the DPICM, SFM or Unitary payload variants.

Caliber: 155mm
Weight: 106 lb
Max range: 40 km (from M109A6 and XM777 digital howitzers), 50 km (from Crusader)
Number of submunitions: 64 DPICMs/rd, or 2 SFMs/rd, or 1 Unitary/rd

FOREIGN COUNTERPART

Congress directed the U.S. Marine Corps in FY99 to pursue an international cooperative program with the Government of Sweden to explore a Trajectory Correctable Munition (TCM) concept proposed by BOFORS and their U.S. partner, Science and Applied Technologies, Inc. A number of other European countries expressed interest in joining the Excalibur or TCM efforts.

FOREIGN MILITARY SALES

None

PROGRAM STATUS

- **January 23, 1998** Award contract for DPICM engineering and manufacturing development (EMD).
- **Current** Continue EMD.

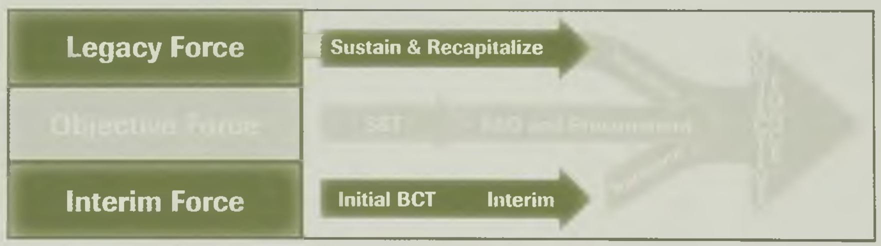
PROJECTED ACTIVITIES

- **2QFY03** Conclude development testing.
- **2QFY04** Commence low-rate initial production.
- **1QFY06** Achieve milestone III.
- **3QFY06** Commence full-rate production.
- **4QFY06** Achieve initial operational capability.

PRIME CONTRACTORS

Raytheon (Tucson, AZ); Primex Technologies (St. Petersburg, FL)

* See appendix for list of subcontractors



Family of Medium Tactical Vehicles (FMTV)

Family of Medium Tactical Vehicles (FMTV)

Modernization

MISSION

Fill the Army's medium tactical-wheeled vehicle requirements.

DESCRIPTION AND SPECIFICATIONS

The Family of Medium Tactical Vehicles (FMTV) consists of a common truck chassis that is used for several vehicle configurations in two payload classes and two tactical trailers with complementary payloads. The Light Medium Tactical Vehicle (LMTV) is available in van and cargo variants and has a 2.5-ton payload capacity. The Medium Tactical Vehicle (MTV) has a 5-ton payload capacity and consists of the following models: standard and long wheel base cargo (with and without materiel-handling equipment), tractor, wrecker, and dump truck. Units are equipped with FMTVs at over 68 different locations worldwide (A0 over 10,000 fielded, A1 fielding underway).

The FMTV will perform line haul, local haul, unit mobility, unit resupply, and other missions in combat, combat support, and combat service support units. Vehicles will operate worldwide on primary and secondary roads and trails. The FMTV is replacing the over-aged and maintenance-intensive trucks currently in the medium tactical vehicle fleet.

The Army has awarded a new four-year, multi-year plus option year contract with Stewart & Stevenson Services and has begun full production of the FMTV A1 series. The FMTV A1 includes a 1999 Environmental Protection Agency-certified engine, upgraded transmission, electronic data bus, an anti-lock brake system and interactive electronic technical manuals. Also under contract are the new FMTV 2.5- and 5-ton tactical trailers that have the same cube and payload capacity as their prime mover.

	LMTV A1 Cargo	MTV A1 Cargo
Payload:	5,000 lb	10,000 lb
Towed load:	12,000 lb	21,000 lb
Engine:	JP8 fuel	JP8 fuel
Transmission:	Automatic	Automatic
Horsepower:	275	330
Drive:	4x4	6x6

FOREIGN COUNTERPART

No known foreign counterpart

FOREIGN MILITARY SALES

Saudi Arabia, Taiwan, Greece and Thailand have executed Foreign Military Sales actions. Egypt, Taiwan, Israel, Argentina and Poland have submitted requests.

PROGRAM STATUS

- **2QFY96** First unit equipped (FUE) A0 at Ft. Bragg, NC.
- **4QFY00** FUE A1 at Ft. Carson, CO.
- **1QFY01** Scheduled completion for A0 fielding.

PROJECTED ACTIVITIES

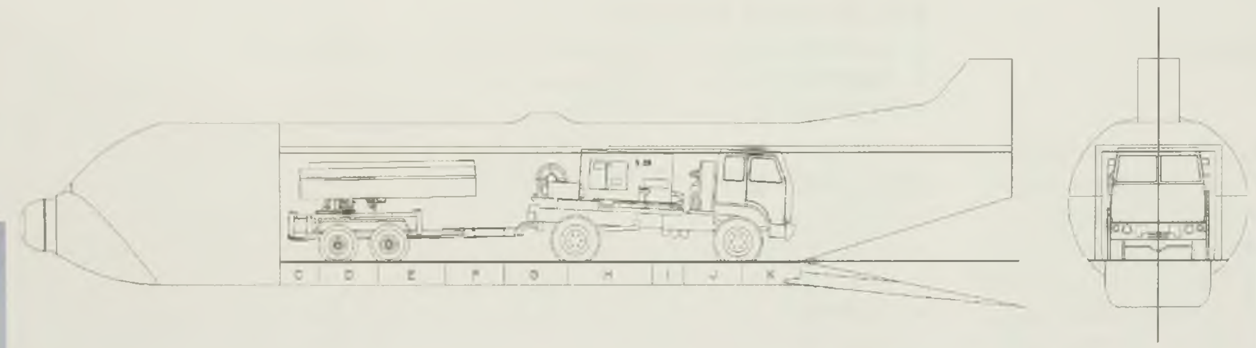
- Fielding will continue to the Army's highest priority "first-to-fight" units.
- Army and PM-MTV have started acquisition actions for a third major buy under the FMTV competitive rebuy program.
- **3QFY01** Phase I (competitive evaluation and downselect) award to no more than three contractors.
- **2QFY03** Phase II (production-one contractor) award.

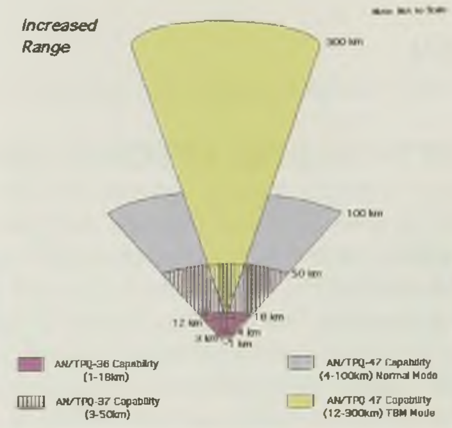
PRIME CONTRACTORS

Stewart & Stevenson Services, Inc. (Sealy, TX)

* See appendix for list of subcontractors

Firefinder (AN/TPQ-47)





MISSION

Develop and field the next-generation Firefinder systems with longer range and enhanced target-location capability while reducing manpower and meeting operational support requirements.

DESCRIPTION AND SPECIFICATIONS

The Firefinder (AN/TPQ-47) system will replace the AN/TPQ-37 Artillery Locating Radar. The AN/TPQ-47 system will double the current AN/TPQ-37 artillery range performance to 60 kilometers, while improving accuracy and target throughput. The AN/TPQ-47 will also provide a new capability for missile and rocket detection at ranges of 150–300 kilometers.

The system will use the standard Army light medium tactical vehicles in a highly mobile, transportable, and survivable configuration that reduces crew size from 12 to 8. The system will be capable of roll-on/roll-off from a single C-130 aircraft for rapid deployment. The program will further leverage the AN/TPQ-36 (V)8 electronics upgrade program by using the same operations central shelter currently being fielded.

FOREIGN COUNTERPART

European Consortium-Sponsored EuroArt Cobra; Ukraine: 1L220-U.

FOREIGN MILITARY SALES

None

PROGRAM STATUS

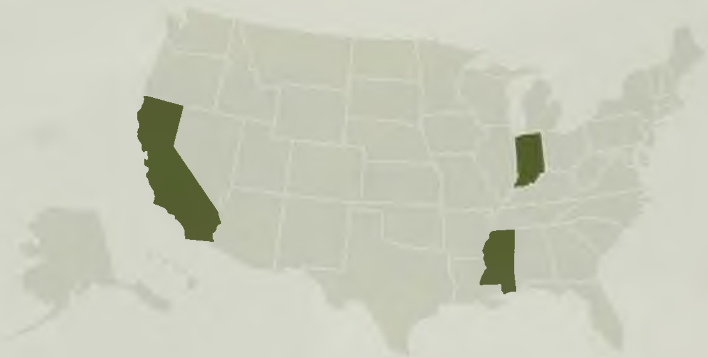
- **1QFY99** Milestone II approval.
- **4QFY99** Start of contract effort with Raytheon Systems; Established partnering agreement with Raytheon.
- **4QFY00** Conducted preliminary design review.
- **3QFY01** Conducted critical design review.

PROJECTED ACTIVITIES

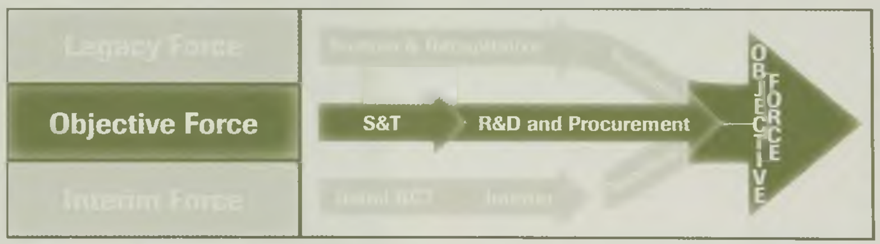
- **1QFY03** Begin developmental test.
- **2QFY04** Conduct limited user test; Award low rate initial production contract.

PRIME CONTRACTORS

Raytheon (El Segundo, CA; Forest, MS; Fort Wayne, IN); TRW (Carson, CA)



* See appendix for list of subcontractors



Force XXI Battle Command Brigade-and-Below (FBCB2)

MISSION
Provide battle command and situational awareness information from brigade level down to the soldier/platform level.

DESCRIPTION AND SPECIFICATIONS
The Force XXI Battle Command Brigade-and-Below (FBCB2) forms the principal digital command and control system for the Army at brigade levels and below. The FBCB2 system is designated ACAT 1D and is in the engineering and manufacturing development (EMD) phase. Applique hardware and software are integrated into the various platforms at brigade and below, as well as appropriate division and corps slices necessary to support brigade operations. The system features the interconnection of platforms through a communications infrastructure called the Tactical Internet to transmit situational awareness data.

FOREIGN COUNTERPART
No known foreign counterpart

FOREIGN MILITARY SALES
None

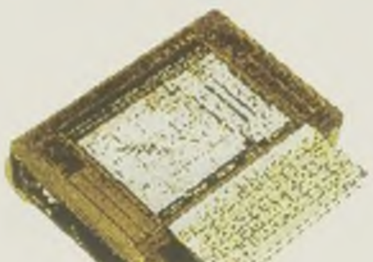
PROGRAM STATUS
- **1QFY00** Conducted Army Systems Acquisition Review Council Review.
- **2QFY00** Delivered Version 3.3.2 software; Awarded low-rate initial production (LRIP) contract; Conducted successful field test #2.
- **3QFY00** Successfully completed field development test and evaluation/customer test.
- **4QFY00–2QFY01** Equip 4th Infantry Division at Ft. Hood (LRIP); Version 3.3 software.

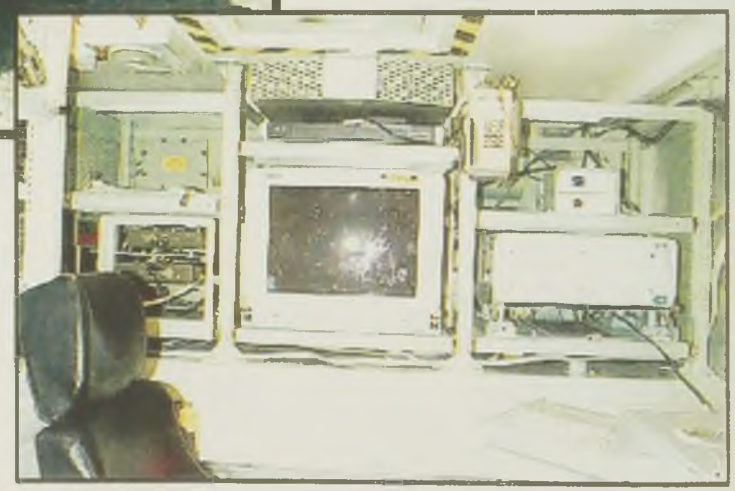
PROJECTED ACTIVITIES
- **2QFY01** Conduct field test #3.
- **3QFY01** Award follow-on system engineering and integration contract; Hold Division Capstone Exercise (DCX)-1 at National Training Center/limited user test (LUT) 2.
- **4QFY01** Field test #4.
- **1QFY02** Undertake initial operational test and evaluation; Hold DCX-2 (Ft. Hood); Version 3.4 software
- **3QFY02** Undertake Milestone III decision; Conduct LUT #3; Award full rate production contract.
- **4QFY02** Reevaluate program acquisition strategy/plan to support the Army's digitized force effectiveness evaluation/Milestone III.
- **3QFY03** Version 4.0 software.

PRIME CONTRACTORS
TRW (Carson, CA)

* See appendix for list of subcontractors

Forward Area Air Defense Command and Control (FAAD C2)





Forward Area Air Defense Command and Control (FAAD C2) Modernization

MISSION

Collect, digitally process, and disseminate real-time target cuing and tracking information, common tactical air picture, and command, control, and intelligence (C2I) information to all Short Range Air Defense (SHORAD) weapons (Avenger, Bradley Linebacker, Manportable Air Defense System [MANPADS], Joint and combined arms); Provide Joint C2 interoperability and horizontal integration with PATRIOT, THAAD, MEADS, and SHORAD weapon systems.

DESCRIPTION AND SPECIFICATIONS

The Forward Area Air Defense Command and Control (FAAD C2), a Battle Management/Command, Control, Communications, Computers, and Intelligence (BM/C4I) system, provides critical, automated air track information (friendly and enemy aircraft, cruise missiles, and Unmanned Aerial Vehicles [UAVs]) to support air defense weapon systems engagement operations and to provide air situation awareness to other Army Battle Command Systems (ABCS). Unique FAAD C2 software provides mission capability by integrating FAAD C2 Engagement Operations software with the following systems:

- Joint Tactical Information and Data System (JTIDS)
- Single Channel Ground and Airborne Radio System (SINCGARS)
- Enhanced Position Location Reporting Systems (EPLRS)
- Global Positioning System (GPS)
- Airborne Warning and Control System (AWACS)
- Sentinel
- Army Battle Command Systems (ABCS) architecture

FAAD C2 is the first system to digitize for the First Digitized Division (FDD)/III Corps.

FOREIGN COUNTERPART

No known foreign counterpart

FOREIGN MILITARY SALES

None

PROGRAM STATUS

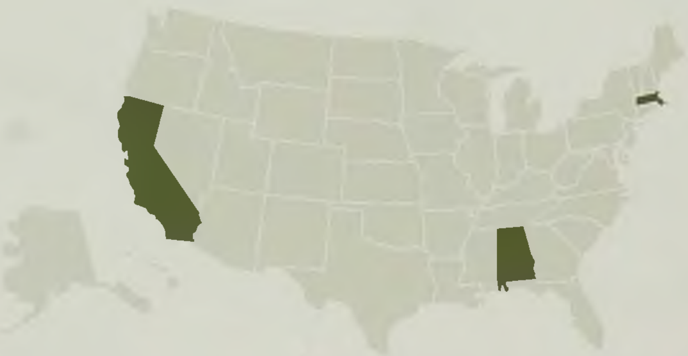
- **3QFY93** Completed Block I.
- **4QFY95** Completed Block II; Awarded Block III contract.
- **3QFY99** Completed Version 5.1 software system certification test (SCT).
- **4QFY00** Completed fieldings for 10 divisions, an armored cavalry regiment, a National Guard corps Avenger battalion, and a training base set; Completed Version 5.2 software integration, assembly, and test.

PROJECTED ACTIVITIES

- **2QFY01** Commence Force XXI Battle Command Brigade-and-Below (FBCB2) limited user test (LUT); Participate in FDD Division Capstone Exercise (DCX)-1 at NTC, Ft. Irwin, CA; Materiel release of FAAD C2 Version 5.1 software.
- **3QFY01** Complete Version 5.2 software SCT.
- **2QFY02** Commence Version 5.2 software LUT.

PRIME CONTRACTORS

TRW (Redondo Beach, CA)



* See appendix for list of subcontractors

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

MISSION

Provide automated command and control (C2) 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.

DESCRIPTION AND SPECIFICATIONS

The Global Command and Control System–Army (GCCS-A) is the Army's strategic and theater C2 system. It provides readiness, planning, mobilization, and deployment capability information for strategic commanders. For theater commanders, GCCS-A provides the following:

- Common operational picture and associated friendly and enemy status information.
- Force-employment planning and execution tools (receipt of forces, intra-theater planning, readiness, force tracking, onward movement, and execution status).
- Overall interoperability with joint, coalition, and the tactical Army Battle Command Systems (ABCS).

The GCCS-A supports Army units from the National Command Authority, commanders-in-chief in the theater, and down through the joint task force commander. As part of ABCS, GCCS-A provides a seamless Army extension from the strategic GCCS system to echelons corps and below. Compatibility and interoperability is achieved by building the GCCS-A applications to operate on the Defense Information Infrastructure (DII)/Common Operating Environment (COE), and through interfaces to other C2 systems within the Army as well as to other services.

DII COE specifies a common system infrastructure for all C2 systems in accordance with the joint technical architecture guidelines. This approach provides common support architecture, with modular software for use by the services/agencies in developing mission specific solutions to their C2 requirements. The system's hardware platform is based on commercial off-the-shelf hardware and the products in the Common Hardware Software II contract. The system architecture links users via local area networks in client/server configurations with an interface to the Secret Internet Protocol Router Network (SIPRNET) for worldwide communication.

FOREIGN COUNTERPART

No known foreign counterpart

FOREIGN MILITARY SALES

None

PROGRAM STATUS

- Fielded GCCS-A to U.S. Army Forces Command; U.S. Army, Europe; U.S. Army, Pacific; U.S. Southern Command; Headquarters, Department of the Army; U.S. Army Central Command; and the Combined Forces Command, Korea.
- GCCS-A fully involved in the Army's digitization efforts.

PROJECTED ACTIVITIES

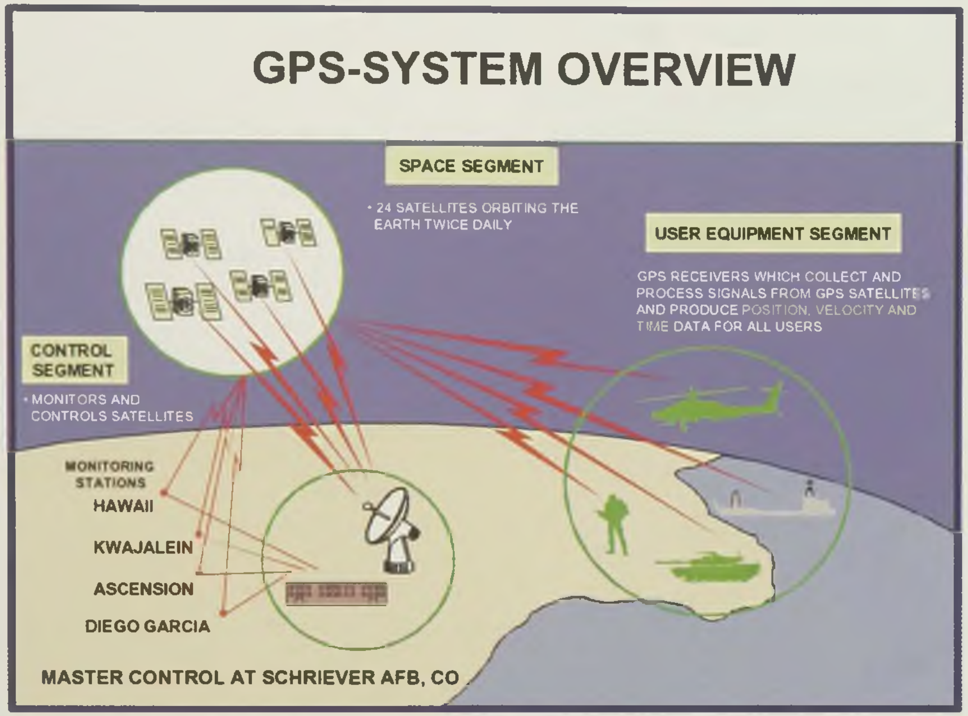
- Complete development and initial fielding of a common theater baseline.
- Modify strategic and theater architectures to support joint GCCS updates.
- Continue the spiral development process in support of Army digitization and program requirements.

PRIME CONTRACTORS

Lockheed Martin (Springfield, VA)

* See appendix for list of subcontractors

Global Positioning System (GPS)



User Equipment Segment


PLGR


SAGR


SLGR


AN/ASN-149


GPS-S


MAGR


CUGR


GRAM


GPS/NS

Global Positioning System (GPS)

Modernization

MISSION

Provide accurate, continuous, all-weather, common-grid, worldwide navigation, positioning, velocity and timing information to land, sea, air, and space-based users.

DESCRIPTION AND SPECIFICATIONS

The Global Positioning System (GPS) is a joint service program, led by the Air Force. GPS is a space-based navigation system that distributes positioning, velocity, and timing data. It has three segments: a space segment (nominally 24 satellites), a ground control segment, and a user equipment segment. User equipment consists of receivers configured for handheld use, ground, aircraft and watercraft applications. Military GPS receivers have precise positioning service capabilities that provide enhanced accuracy and signal protection over commercial units. The primary GPS receiver in the Army today is the Precision Lightweight GPS Receiver (PLGR) with more than 83,000 in hand-held, installed and integrated applications. The Army represents over 80% of the Department of Defense requirement for user equipment.

FOREIGN COUNTERPART

Russia: GLONASS; Europe: GALILEO (planned for initial testing in FY04).

FOREIGN MILITARY SALES

A variety of PPS-capable GPS receivers have been sold to 28 authorized countries.

PROGRAM STATUS

- **System Accuracy:** By Presidential direction on May 2000, the intentional degradation of the Standard Position Service (SPS) signal was set to zero, resulting in greater accuracy for civil SPS users.
- **PLGR:** A major field reprogramming campaign to introduce upgraded PLGR software was completed. A contract was awarded to extend the PLGR warranty period to 10 years.
- **Standalone Air GPS Receiver (SAGR):** The transfer from interim use in overseas aircraft to CONUS aircraft continues.
- **Cargo Utility GPS Receiver (CUGR):** Installation to the UH-1 aircraft fleet was suspended at 371 of 783 planned due to curtailment of UH-1 operations.

PROJECTED ACTIVITIES

Fielding

- Supplemental PLGR fielding will support Army Digitization and Transformation through FY04.
- Installation of CUGR to UH-1 helicopters continues through FY01.
- CUGR may replace SAGR on the OH-58 A/C aircraft fleet beginning in FY01.

Modernization

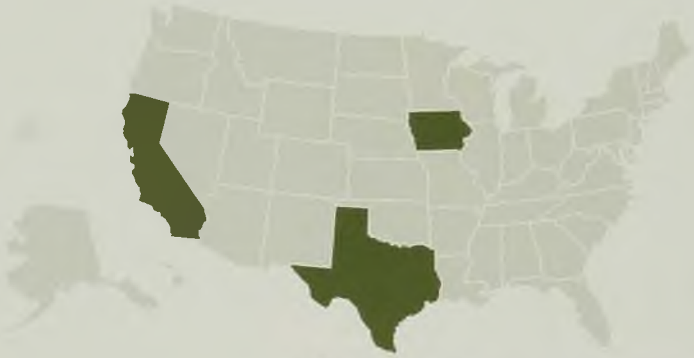
- The Program Research Development Announcement (PRDA) concept is being used to develop new user equipment designs to enhance military receiver performance while preserving uninterrupted civil access to the SPS signal; PRDA contracts will further Defense Advanced GPS Receiver (DAGR) and GPS Receiver Applications Module (GRAM) products.
- DAGR and GRAM will replace most Army GPS receivers during the FY03-11 timeframe.
- Protection and Denial technologies are being developed under the Navigation Warfare program to address GPS vulnerabilities and present GPS modernization solutions.

Horizontal Technology Insertion

- DAGR is now designated an Horizontal Technology Integration initiative; DAGR will replace most PLGRs.
- Two other products, GRAM and GPS Inertial Navigation System (GPS/INS), will be submitted for this designation; GRAM and GPS/INS will integrate new GPS technology to a broad range of host platforms and vehicles.
- The GPS tactical operational requirements document projects the total number of receivers required during this timeframe to exceed 650,000.

PRIME CONTRACTORS

Rockwell Collins (Cedar Rapids, IA); Trimble Navigation (Sunnyvale, CA; Austin, TX)



* See appendix for list of subcontractors

MISSION

Provide a breaching capability compatible in mobility and survivability to the mechanized maneuver force to reduce complex obstacles quickly under fire, in heavy smoke, and in a nuclear, biological and chemical (NBC) environment.

DESCRIPTION AND SPECIFICATIONS

The Grizzly will accompany the maneuver force and breach lanes in natural obstacles (such as streams, dry gaps, and tree falls), simple obstacles (such as wire, craters, berms, abatis, and minefields), and complex obstacles (combinations of natural and simple obstacles in mutually reinforcing arrays). The lane must be clear of obstacles and negotiable by the maneuver task force. The Grizzly, supported by friendly direct and indirect fire, will lead the maneuver force through complex obstacles with minimal preparation and with little or no loss in momentum. The Army currently has no system with these capabilities.

The Grizzly integrates M1 Abrams tank-chassis technologies with other technology and Grizzly mission modules. The technologies associated with the M1 chassis include armor, directed energy protection, propulsion system, an overpressure collective protection system for NBC operations, and advanced track and suspension components. The Grizzly has an open-architectured vehicle electronics system that facilitates the U.S. Army's first drive-by-wire capability on a tracked vehicle and features modularity, dual digital data bus, built-in-test, fault tolerance, and reconfigurability. Survivability is enhanced by ballistic shock protection, a smoke/obscurant protection system, an automatic fire extinguishing system, NBC detection/warning systems, and a remotely controlled self-defense weapon station.

The Grizzly incorporates several specialty mission modules and associated technologies in accomplishing its functions. They include a mine clearing blade (MCB) equipped with automatic depth control (ADC), a power driven arm (PDA), and a commander's control station (CCS) for a two-person crew. The MCB is designed to clear a lane to depths of 12 inches and cut a triple standard concertina wire obstacle without reduction in breaching performance. The ADC senses and maintains selected blade depth without additional input/control by the operator, facilitating missions in rolling, varying terrain covered with vegetation and battlefield debris.

The PDA functions with the MCB to reduce anti-tank ditches; it can also dig, lift, fill and grapple. The CCS consists of two stations that contain all controls and displays for manipulating mission equipment from a buttoned up or hatch open configuration. Vision to support mission accomplishment is facilitated by an array of vision devices including seven cameras. The system contains digital battlefield command and control functions suitable for battlefield interoperability and situational awareness and an integrated global positioning/inertial navigation system.

FOREIGN COUNTERPART

Germany: Pionierpanzer 2; Israel: MIKI; Russia: IMR-2; United Kingdom: Vickers TROJAN.

FOREIGN MILITARY SALES

None

PROGRAM STATUS

- Funding for the Grizzly program was deleted from the FY01 President's Budget in support of the Army Vision and its modernization efforts. However, a valid requirement still exists for a combat engineer vehicle with breaching capabilities. Congress provided FY01 research, development, test, and evaluation funding. As a result of the Army's budget decision, system development was ramped down in FY00, and a shortened contractor shakedown test was conducted on the two prototypes during the summer of 2000. The prototypes demonstrated the ability to meet all key performance requirements. The program has been assessed to be approximately 18 months effort away from government tests leading to a low-rate initial production decision.

PROJECTED ACTIVITIES

- **FY01** Decision expected regarding the future of the program.

PRIME CONTRACTORS

United Defense, L.P. (York, PA)

* See appendix for list of subcontractors

MISSION

Provide signal intercept and precision target location of threat communications and non-communications electronic emitters.

DESCRIPTION AND SPECIFICATIONS

The Guardrail/Common Sensor (GR/CS) is a corps-level, fixed-wing airborne signals intelligence (SIGINT) collection and target location system. The GR/CS system supports corps, division, and joint land force component commanders by detecting, identifying, exploiting, and precisely locating threat communications, radars, and other electronic emitters throughout the corps area of interest. It provides information dominance to the tactical commander. One GR/CS system is authorized per aerial exploitation battalion in the military intelligence brigade at each corps. A standard system consists of six to twelve RC-12 aircraft that fly operational missions in sets of two or three. Ground processing is conducted in the integrated processing facility (IPF). Interoperable data links provide microwave connectivity between the aircraft and the IPF. GR/CS systems provide near real-time SIGINT and targeting information to tactical commanders throughout the corps area via the Joint Tactical Terminal. Key features include:

- Integrated communications intelligence (COMINT) and electronic intelligence (ELINT) collection and reporting.
- Enhanced signal classification and recognition.
- Near-real-time direction finding.
- Precision emitter location.
- Advanced integrated aircraft cockpit.

Planned product improvements include greater mobility and deployability via smaller "mini-" IPFs and system upgrades to increase GR/CS capability to exploit a wider range of signals. The GR/CS shares technology with the Airborne Reconnaissance Low and other joint systems.

FOREIGN COUNTERPART

Numerous countries possess airborne electronic warfare systems, but none achieve the direction-finding accuracy of the Guardrail system.

FOREIGN MILITARY SALES

None

PROGRAM STATUS

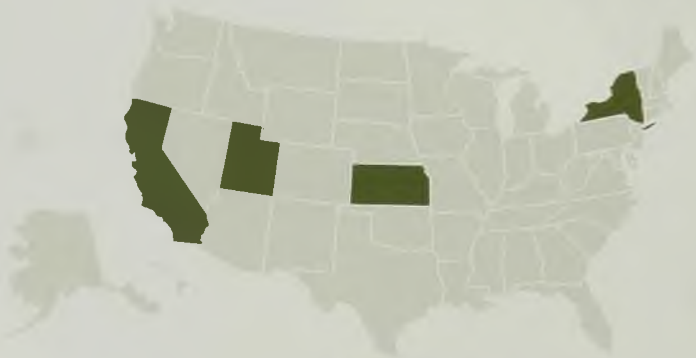
- Completed fabrication and functional testing of GR/CS Reporting systems.
- Integrated GR/CS Reporting shelters into GR/CS System 1 and 4.
- Completed initial GR/CS Reporting accreditation testing.
- Completed initial certification testing of Tactical Information Broadcast Service (TIBS) with AIA.
- **3QFY00** System 2 first unit equipped to Ft. Hood, TX.

PROJECTED ACTIVITIES

- **2QFY01** Train and field GR/CS to Systems 1 and 4; Field INTEROP to System 1.
- **3QFY01** Train and field GR/CS to System 3; Train and field TIBS to Systems 1 and 4; Train and field TIBS to System 3.
- **4QFY01** Field CHALS processor to System 1; System 2 materiel release.
- **1QFY02** Field TIBS to System 2; Field reporting to System 2.
- **1–4QFY02** Joint Tactical Terminal integration all Systems; DMS integration—all Systems.

PRIME CONTRACTORS

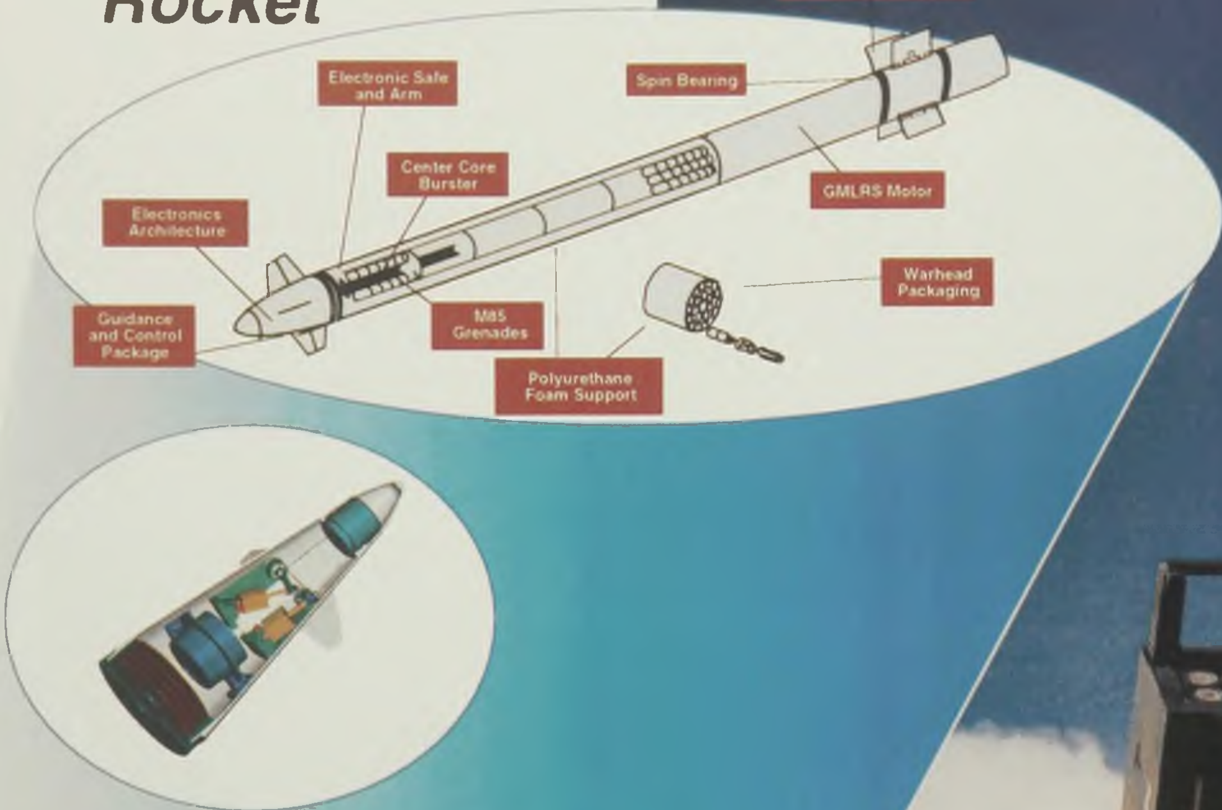
Raytheon (Wichita, KS); TRW (Sunnyvale, CA); L-3 Communications (Salt Lake City, UT); Lockheed Martin (Owego, NY)

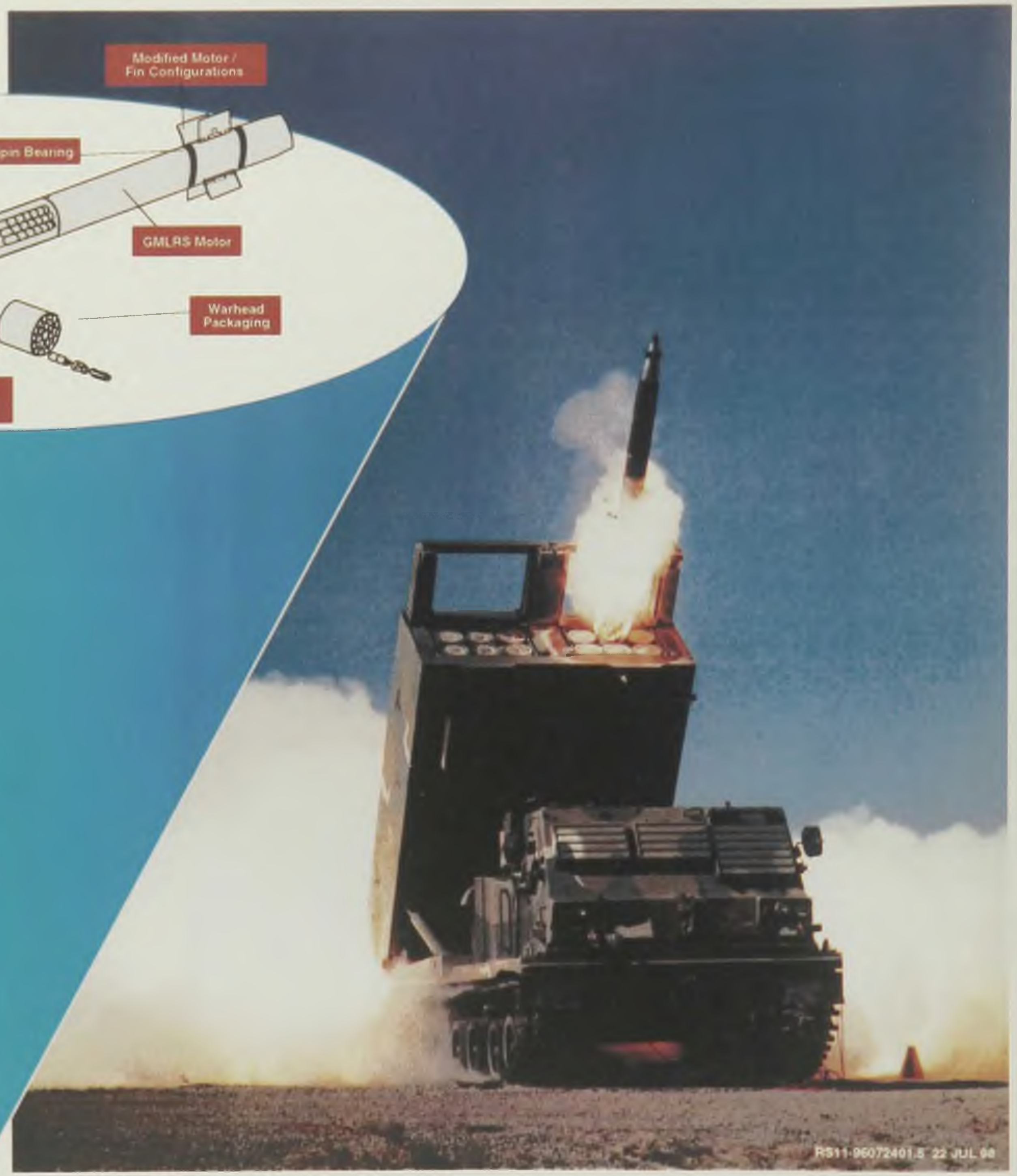


* See appendix for list of subcontractors

Guided Multiple Launch Rocket System (GMLRS)

Guided MLRS Rocket





	Guided
Rocket Length	3937 mm
Rocket Diameter	227 mm
Warhead Length	1686 mm
Motor Length	2251 mm
Launch Weight	??
Grenades	409 - 469
Maximum Range	60 km

Guided Multiple Launch Rocket System (GMLRS)
Modernization

MISSION
Provide longer-range, precision Multiple Launch Rocket System (MLRS) fires while reducing hazards to friendly maneuver.

DESCRIPTION AND SPECIFICATIONS
The Guided Multiple Launch Rocket System (GMLRS) supports the Army Transformation with increased overmatch capabilities and reduced logistics footprint over current freeflight rockets. GMLRS will be employed with the M270A1 upgrade and the HIMARS launchers. GMLRS is a multinational development program that upgrades the Extended Range Multiple Launch Rocket System (ER-MLRS).

Using various components from the ER-MLRS (e.g., grenades, rocket pod), it will transform the MLRS freeflight rocket into a precision-guided rocket by incorporating a guidance and control package, and a new rocket motor to achieve greater range and accuracy. Guidance will be performed by a low-cost tactical-grade inertial measurement unit (IMU) which will be aided by a Global Positioning System (GPS) receiver. GPS is not mission-essential, but provides a further increase in accuracy when used in conjunction with the IMU. GMLRS provides the necessary components (guidance, controls, and motor) for further precision and smart submunition variants.

Warhead: Dual Purpose Improved Conventional Munition (DPICM)
Propulsion: Solid
Guidance: GPS-aided IMU
Control: 4-axis Canard

FOREIGN COUNTERPART
The Israeli Ministry of Defense is developing a ground-commanded, trajectory-correcting MLRS variant.

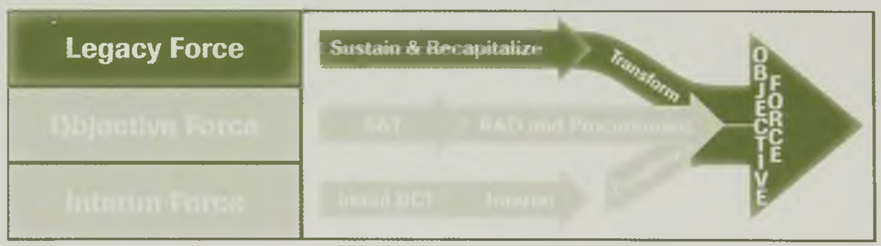
FOREIGN MILITARY SALES
None

PROGRAM STATUS
- **1994** Commenced the Advanced Technology Demonstration phase, which is managed by the U.S. Army Aviation and Missile Command's Missile Research, Development, and Engineering Center.
- **3QFY98–2QFY99** Conducted five ATD flight tests.
- **4QFY98** Completed development phase international memorandum of understanding with France, Germany, Italy, and the United Kingdom.
- **1QFY99** Transitioned GMLRS program to the engineering and manufacturing development (EMD) phase, which is managed by the Project Manager MLRS as an international cooperative development program.
- **4QFY99** Successfully completed the EMD preliminary design review.
- **4QFY00** Demonstrated DPICM dispense threshold; Completed rocket motor pre-flight readiness tests.
- **1QFY01** Restructured program with new guidance set; Successfully completed the first ballistic flight test.

PROJECTED ACTIVITIES
- **3QFY02** EMD critical design review.
- **1QFY03** Production qualification test flight readiness
- **2QFY03** Product definition data package completion.
- **3QFY03** Low-rate initial production decision.
- **3QFY05** Initial operational test.
- **2QFY06** Milestone III decision; Initial operational capability.

PRIME CONTRACTORS
Lockheed Martin (Dallas, TX)

* See appendix for list of subcontractors



Heavy Equipment Transporter System (HETS)

MISSION

Transport, deploy, recover and evacuate combat-loaded M1-Series Abrams Tanks or other vehicles of similar weight in support of legacy equipped and digitized combat units.

DESCRIPTION AND SPECIFICATIONS

The Heavy Equipment Transporter System (HETS) consists of the M1070 truck tractor and M1000 semi-trailer. HETS is capable of transporting vehicles in the 70-ton weight range, primarily M1-Series Abrams Tanks. It operates on highways (worldwide with permits), secondary roads, and cross-country. HETS has a number of features that significantly improve the mobility and overall performance of the system in a tactical environment. The M1070 tractor has front and rear-axle steering, a central tire-inflation system, and cab space for six personnel to accommodate the two HETS operators and four tank crewmen. The M1000 semi-trailer has automatically steerable axles and a load-leveling hydraulic suspension. The M1070 and M1000 are procured under separate acquisition programs.

Truck/trailer payload: 70 tons
Engine type: Diesel
Transmission: Automatic
Number of driven wheels: 8
Range: 325 miles at convoy speed
Speed: 40–45 mph on highway (25–30 mph with 70 ton payload)
Mobility: 95% on road; 5% off road
Air transportability: C-17, C-5

FOREIGN COUNTERPART

Czech Republic: TATRA T-816 Tractor; Germany: Daimler-Benz Actros Tractor, Mercedes-Benz Type 2648S Tractor, M.A.N. Tractor, Kogel ST 70-93 Semi-trailer; Italy: IVECO Tractor; France: Lohr SMC 60 DT Semi-trailer; Russia: Volat Tractor, ChMZAP-9990 Semi-trailer; Spain: Kynos ALJABA Tractor and Semi-trailer; United Kingdom: Alvis Unipower MH8875 Tractor with TST 70MD6/2 Semi-trailer, King GTS100/6S-19.5 Semi-trailer.

FOREIGN MILITARY SALES

Israel has procured 37 M1000-type trailers (trailer configuration varies from the U.S. M1000). Egypt has purchased 100 M1070 Tractors; deliveries will continue through 2QFY01.

PROGRAM STATUS

- Approximately 1,932 HETS have been fielded to active- and reserve-component forces as of 1QFY01.

PROJECTED ACTIVITIES

- Remaining M1070 tractor procurement, through FY02, contained in the Family of Heavy Tactical Vehicles contract; Contract award projected in 2QFY01; Remaining M1000 trailer procurement through FY02; Sole-source contract award projected in 2QFY01.
- Fieldings are scheduled for the new, active component cargo transport companies, National Guard transportation companies, and war-reserve stocks.

PRIME CONTRACTORS

Tractor: Oshkosh Truck (Oshkosh, WI)
Trailer: Systems & Electronics, Inc. (St. Louis, MO)

* See appendix for list of subcontractors

High Mobility Artillery Rocket System (HIMARS)

High Mobility Artillery Rocket System (HIMARS)

Modernization

MISSION

Provide light, airborne, and air assault divisions and early-entry/contingency forces with Multiple Launch Rocket System (MLRS) firepower capability to conduct counterfire, suppression of enemy air defenses, and precision indirect fires to destroy materiel and personnel targets.

DESCRIPTION AND SPECIFICATIONS

The High Mobility Artillery Rocket System (HIMARS) supports the Army Transformation by providing the Legacy through Objective Force with a rapidly deployable, lethal fire-support system for early entry/contingency forces. HIMARS is mounted on a family of medium tactical vehicles (FMTV) 5-ton truck and can be transported by C-130 or larger aircraft. The wheeled chassis allows for faster road movement, lower operating costs, and requires 30 percent fewer strategic airlifts (via C-5 or C-17) to transport a battery than the current tracked M270 MLRS launcher unit. The HIMARS can fire the suite of MLRS family of munitions, including all Army tactical missile system variants. The HIMARS carries either a rocket or a missile pod, has a self-loading capability, and is manned by a three-man crew.

FOREIGN COUNTERPART

There are several foreign wheeled multiple rocket launch systems on the international market; none, however, have the mobility and munitions suite capabilities of HIMARS.

FOREIGN MILITARY SALES

None

PROGRAM STATUS

- In FY00, Congress provided additional funding to accelerate HIMARS development. Additional procurement funding is programmed in FY03 and FY04 to accelerate HIMARS procurement in order to field two HIMARS Battalions in FY05.
- Four HIMARS prototypes were built as part of the Rapid Force Projection Initiative (RFPI) Advanced Concept Technology Demonstration (ACTD). Three of the prototype HIMARS remained with the XVIII Airborne Corps for training and further evaluation during the highly successful RFPI ACTD's two-year extended user evaluation that ended 4QFY00. Due to the fine performance of the system in the ACTD and the limited "go-to-war capability" that it provides the force, the Army has decided to retain these prototypes in the unit until formal fielding.
- The HIMARS prototypes have received both a live-fire safety release and C-130 air certification. Lessons learned in the RFPI ACTD's field experiment and early-user experiment are being used in the re-design of the HIMARS during the engineering and manufacturing development (EMD) program.
- HIMARS EMD phase began 1QFY00.

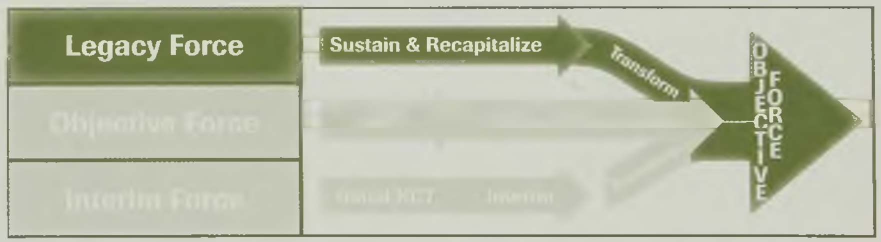
PROJECTED ACTIVITIES

- **FY01–05** Conduct developmental testing/operational testing.
- **2QFY03** Low rate initial production decision.
- **2QFY05** Battalion-level first unit equipped.

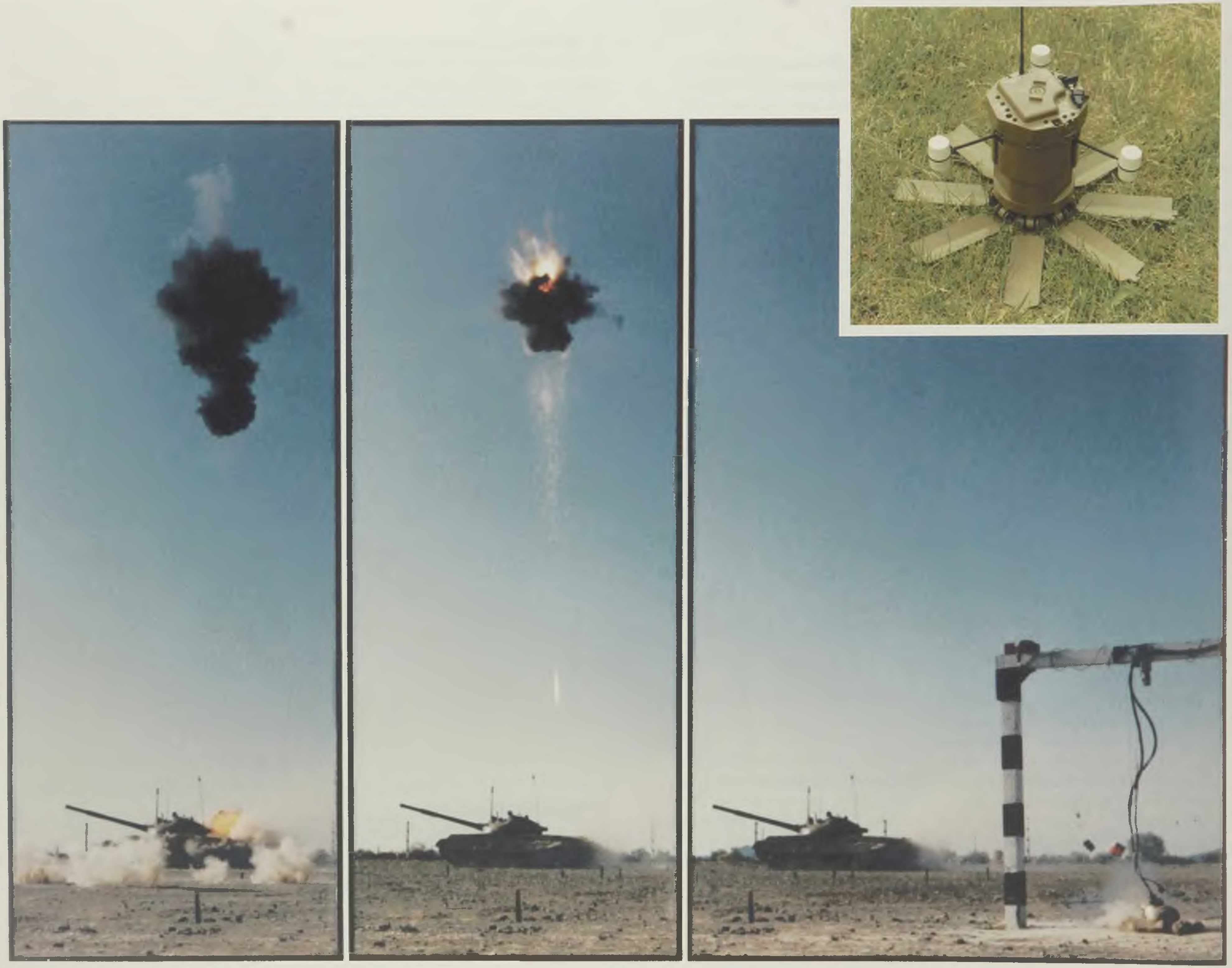
PRIME CONTRACTORS

Lockheed Martin (Dallas, TX; Camden, AR)

* See appendix for list of subcontractors



Hornet



MISSION

Counter enemy's mobility; delay, disrupt, and canalize enemy vehicle movement in the close battle; provide survivability for small isolated forces to minimize casualties and protect against armored vehicle attacks.

DESCRIPTION AND SPECIFICATIONS

Hornet is the Army's first generation of a smart, autonomous, top-attack munition. It employs seismic and acoustic sensors to detect, classify, and track a target. Once the target is validated by internal control electronics and is within the 100-meter lethal radius, the munition determines the optimum firing point and launches a smart submunition over the target. The sublet acquires the target by infrared sensor and fires a tantalum explosively formed penetrator at the top of the target vehicle. Hornet is planned for immediate use today with early entry forces such as the 82nd Airborne Division.

FOREIGN COUNTERPART

No known foreign counterpart

FOREIGN MILITARY SALES

None

PROGRAM STATUS

- **2QFY00** First units of Basic Wide Area Munition (WAM) delivered.

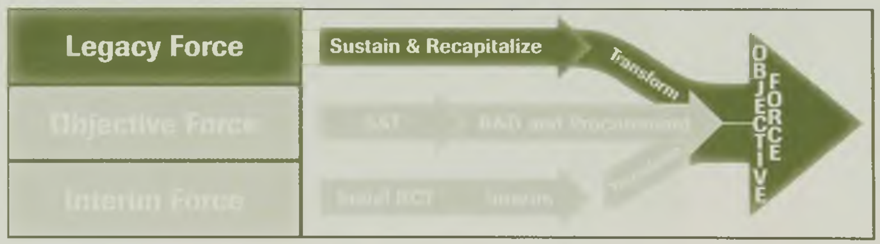
PROJECTED ACTIVITIES

- **2QFY01** Conditional materiel release of WAM Basic.
- **3QFY02** Award of low rate initial production run of product improved WAM.

PRIME CONTRACTOR(S)

Textron (Wilmington, MA)

* See appendix for list of subcontractors



Integrated Meteorological System (IMETS)

MISSION
Provide commanders at all echelons with an automated tactical weather system that receives, processes, and disseminates weather observations, forecasts, battlefield visualization, and weather effects decision aids to all Army Tactical Command and Control System (ATCCS) battlefield functional areas (BFAs).

DESCRIPTION AND SPECIFICATIONS
The Integrated Meteorological System (IMETS) is the weather component of the intelligence electronic warfare (IEW) sub-element of the Army Battle Command System (ABCS). IMETS is an Army furnished system that is operated by Air Force weather personnel and maintained within Army support channels. IMETS consists of three configurations: Vehicle Mounted Configuration (VMC), Light Configuration (LC), and Command Post Configuration (CPC). It provides automation and communications support to Air Force combat weather teams assigned to the Army at echelons-above-corps down to aviation battalions and to Army Special Operations forces.

IMETS receives weather information from polar-orbiting civilian and defense meteorological satellites, civilian forecast centers, the Air Force Weather Agency, artillery meteorological sections, and remote sensors. IMETS processes and collates forecasts, observations, and climatological data to produce timely and accurate weather products tailored to the specific warfighter's needs. The most significant weather and environmental support tools available to warfighters are the automated tactical decision aids, which display the impact of the weather on current or planned operations for both friendly and enemy forces. This enables the warfighter to more effectively employ his forces and weapons systems to achieve success in battle.

FOREIGN COUNTERPART
No known foreign counterpart

FOREIGN MILITARY SALES
None

PROGRAM STATUS
- Fielded 27 Block II VMC as of end of FY00.
- Redirected IMETS in response to the Operational Requirements Document (ORD) and realigned it with the Air Force reengineering initiative. The ORD now requires three separate configurations of IMETS–HMMWV-mounted, Command Post, and Light–tailored to different tactical echelons.
- Continued development of light version of the weather effects workstation.

PROJECTED ACTIVITIES
- **FY01** Field seven VMC; LC developmental test/operational test.
- **FY02** Initiate fielding of sixteen LC; Develop and test CPC.
- **FY03** Field twenty-five LC; Initiate fielding of nine CPC.

PRIME CONTRACTORS
Logicon (Tacoma, WA); New Mexico State University (Las Cruces, NM)

* See appendix for list of subcontractors

Integrated System Control (ISYSCON)

Modernization

MISSION

Provide an automated, theater-wide system that signal units can use to manage multiple tactical communications systems and networks in support of battlefield operations.

DESCRIPTION AND SPECIFICATIONS

The Integrated System Control (ISYSCON) facility is a centralized network management solution that satisfies shortfalls identified in this area during Operation Desert Storm and other recent deployments. The ISYSCON facility will:

- Provide an automated capability for managing the tactical communications network;
- Establish an interface with each technical control facility in the Army Tactical Command and Control System (ATCCS) architecture; and
- Enable automation-assisted configuration and management of a dynamic battlefield.

The ISYSCON V(1)/V(2) program supports the Area Common User System Modernization Program (ACUS MP) and the Army Battle Command System (ABCS) as an integral part of the Army Vision 2010 for Information Dominance on the battlefield. The ISYSCON V(1)/V(2) will provide the Signal Command and staff with a centralized planning and control capability to manage tactical communication networks in support of combat forces, weapons systems, and battlefield automated systems.

The ISYSCON V(1)/V(2) will function as the battlefield communications infrastructure management system at division through theater and in support of independent task force operations. The ISYSCON V(1)/V(2) program serves as the baseline foundation to support the future network management initiatives tied to the digitized Army and Warfighter Information Network-Tactical (WIN-T) architecture. An ISYSCON V(1)/V(2) node consists of a Standardized Integrated Command Post System (SICPS) shelter on a High Mobility Multipurpose Wheeled Vehicle (HMMWV) and two SICPS extension tents, two servers, and four client workstations, and peripherals.

FOREIGN COUNTERPART

No known foreign counterpart

FOREIGN MILITARY SALES

None

PROGRAM STATUS

- Milestone III decision approved.
- 1QFY01 Material release/fielding.

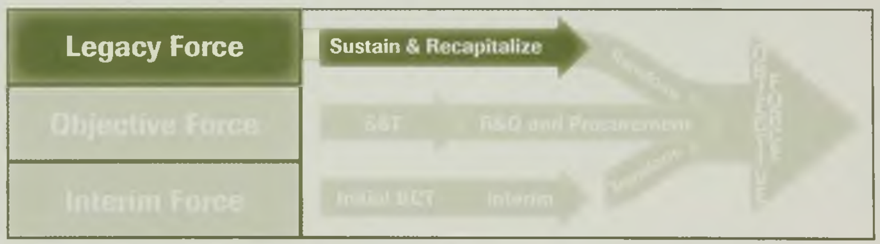
PROJECTED ACTIVITIES

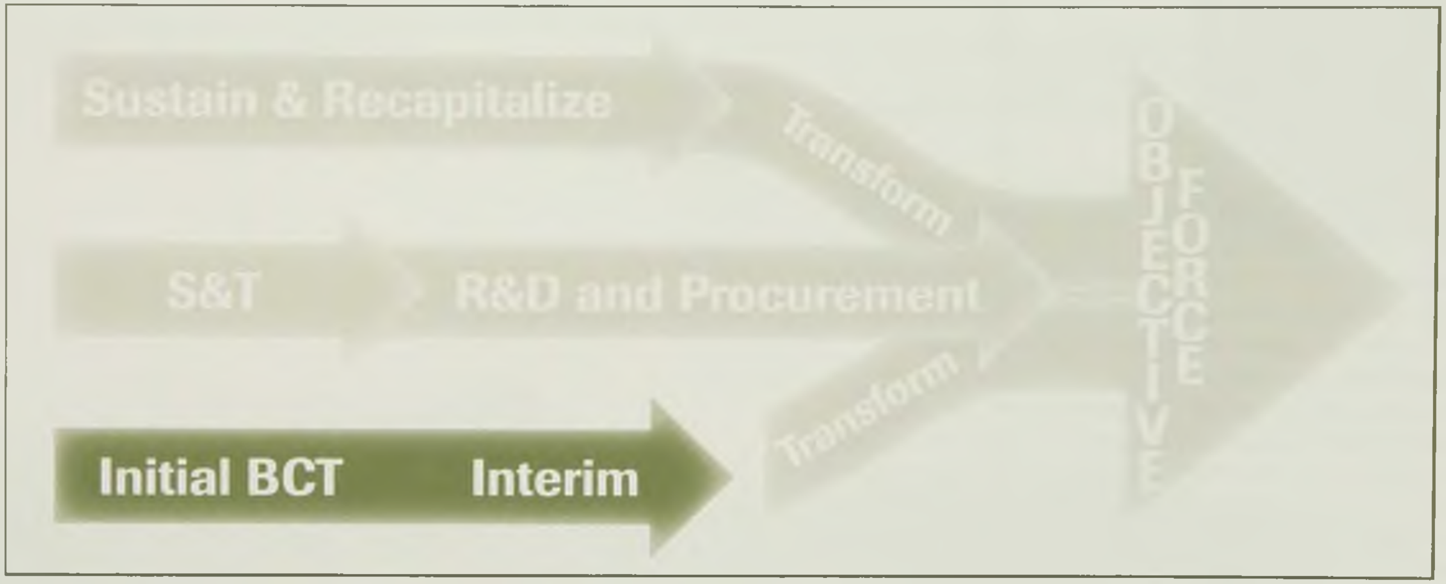
- First Digitized Division Division Capstone Exercise.

PRIME CONTRACTORS

General Dynamics (Taunton, MA; Raleigh, NC); Laguna Industries (Laguna, NM)

* See appendix for list of subcontractors




Sustain & Recapitalize
Transform
S&T
R&D and Procurement
Transform
Initial BCT
Interim
OBJECTIVE FORCE

MISSION

Ensure the effectiveness of the Brigade Combat Team (BCT) such that the BCT can deploy anywhere in the world in a combat-ready configuration within 96 hours of liftoff.

DESCRIPTION AND SPECIFICATIONS

The Interim Armored Vehicle (IAV) will play a key role in the BCT. The BCT is a full-spectrum combat force whose effectiveness was confirmed, through extensive analysis, in all operational environments and against all current and projected threats. BCT is designed and optimized primarily for employment in small scale contingency operations in complex and urban terrain, against low-end and mid-range threats that may employ both conventional and asymmetric capabilities.

The BCT is capable of conducting all major doctrinal operations including offensive, defensive, stability, and support actions. Its core operational capabilities derive from excellent operational and tactical mobility, enhanced situational understanding, combined arms integration down to company level, and high dismount strengths for close combat in urban and complex terrain. Properly integrated through a mobile robust C4ISR network, these core capabilities lead to enhanced force effectiveness and compensate for platform limitations that may exist in the close fight. The BCT's success will result from its early entry, battlefield shaping, and decisive actions.

A family of IAVs will be the primary weapons system for the BCT. IAVs will be capable of infantry, reconnaissance, direct and indirect fires, command and control, engineering, medical, and other combat and combat support missions. The vehicle provides integral protection level against munitions up to 14.5mm armor piercing. It will be deployable by C-130 aircraft and be combat capable upon arrival in a contingency area. It can move about the battlefield quickly and is optimized for close, complex or urban terrain.

The IAV program takes advantage of non-developmental item systems with common subsystem and components to quickly acquire and field these systems. Where appropriate, IAVs will integrate existing Government Furnished Material subsystems, such as Long Range Advanced Scout Surveillance System (LRAS), and Forward Looking Infrared (FLIR).

The IAV vehicle is capable of self-deployment by highway (no heavy equipment transports) and self-recovery (no separate recovery vehicle). It has a low noise level that reduces crew fatigue and enhances survivability.

FOREIGN COUNTERPART

Not applicable

FOREIGN SALES

Not applicable

PROGRAM STATUS

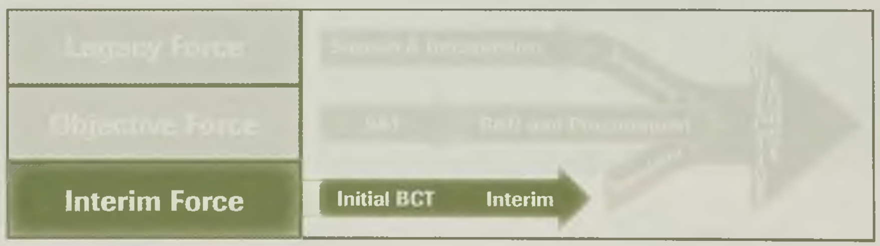
To be determined

PROJECTED ACTIVITIES

To be determined

PRIME CONTRACTOR

To be determined



Javelin

MISSION
Provide a medium anti-tank capability to the infantry, scouts, and combat engineers.

DESCRIPTION AND SPECIFICATIONS
The Javelin is a man-portable, anti-armor system that is fielded to the U.S. Army and U.S. Marine Corps. Javelin, which replaces the Dragon Weapon System, is comprised of two major components: a reusable command launch unit (CLU) and a missile sealed in a disposable launch tube assembly. The CLU incorporates an integrated day/night sight and provides target engagement capability in adverse weather and countermeasure environments. The CLU also may be used in stand-alone mode for battlefield surveillance and target detection. Javelin's very small logistics tail provides the ability to rapidly deploy forces capable of carrying out anti-tank missions. The system is highly lethal against tanks with both conventional and reactive armor.

The Javelin system weighs 48 lb and has a maximum range in excess of 2500m. The key feature of Javelin is the use of fire-and-forget technology that enables the gunner to fire and immediately take cover. Additional special features include the top-attack or direct-fire mode (for targets under cover), integrated day/night sight, advanced tandem warheads, imaging infrared seeker, target lock-on before launch, and soft launch (Javelin can be fired safely from enclosures and covered fighting positions).

The Javelin Training System consists of three training devices, each with a specific role. The missile simulation round is used to familiarize the gunner with the physical characteristics of the Javelin; the basic skills trainer is used to develop the basic tactical and technical gunnery skills required to operate the Javelin; and the field tactical trainer, is used to refine the gunner's ability and enable the gunner to participate in both range training and force-on-force exercises.

Javelin's fielding to the U.S. Army Rangers at Ft. Benning met First Unit Equipped in June 1996. Since then Javelin has been successfully fielded to the 82nd Airborne, 2nd ID (Korea), 1-508th IN (Italy), U.S. Army Rangers at Ft. Lewis and Ft. Stewart, and begun fielding to the 10th Mountain Division.

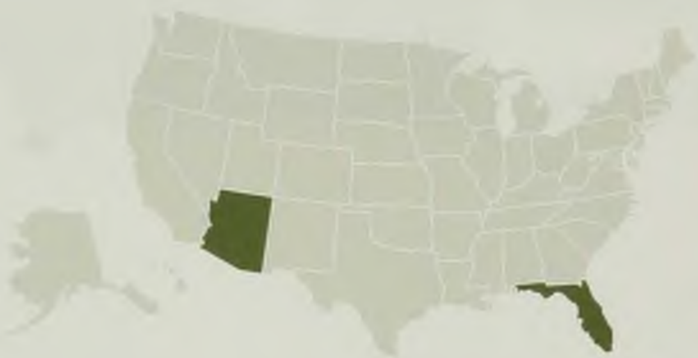
FOREIGN COUNTERPART
The Israeli Spike/Gill are being promoted as having fire-and-forget capability. Other medium range systems currently fielding or in development include the Russian AT-7, the Swedish Bofors Bill, the French MILAN 2T, and the Euro Missile TRIGAT.

FOREIGN MILITARY SALES
Two Foreign Military Sales (FMS) test cases are complete. No other FMS cases have been signed, although over a dozen countries have requested pricing and availability data on Javelin. Extensive discussions are being conducted with the U.K. for an evaluation program starting in April 2001.

PROGRAM STATUS
- **4QFY00** Four-year, multi-year contract awarded.
- **1QFY01** Technical issues resolved, production and deliveries resumed.
- **Current** Hardware deliveries and fielding to the Army and Marine Corps continues on schedule.

PROJECTED ACTIVITIES
- Complete fielding to the 10th Mountain Division.
- Field to the first Interim Brigade Combat Team.

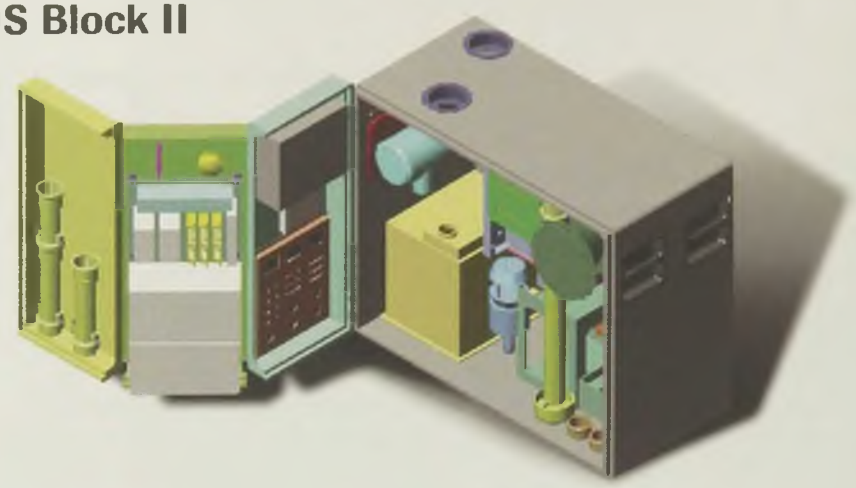
PRIME CONTRACTORS
A Joint Venture between Raytheon (Tucson, AZ) and Lockheed Martin (Orlando, FL)



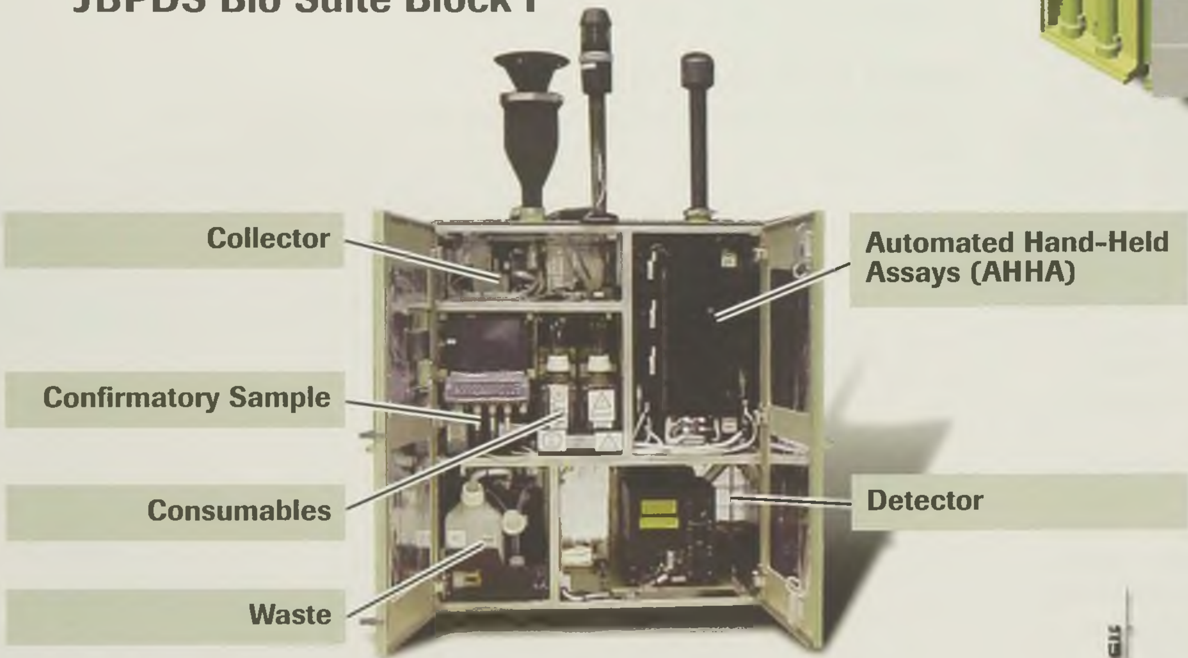
* See appendix for list of subcontractors

Joint Biological Point Detection System (JBPDS)

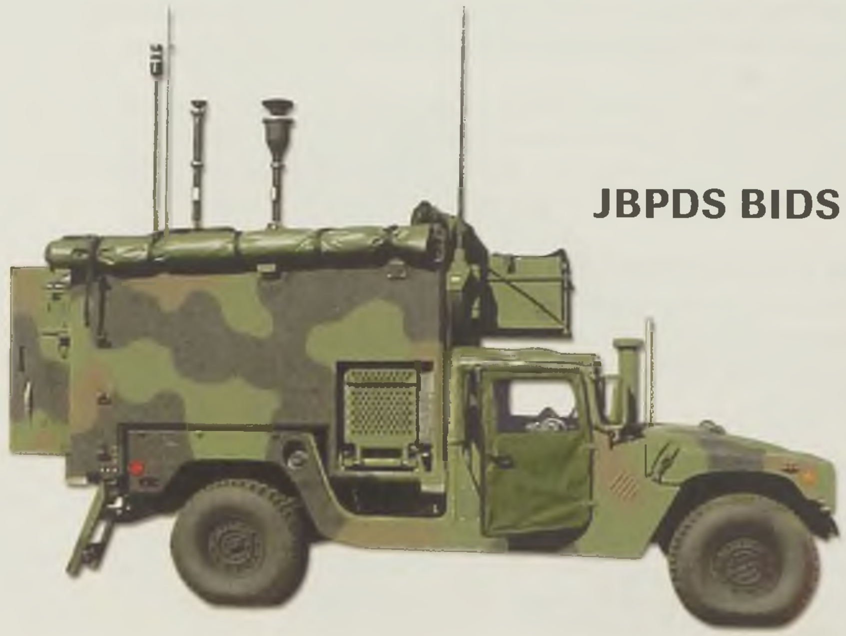
JBPDS Block II



JBPDS Bio Suite Block I



JBPDS BIDS



MISSION
Automatically detect and identify biological warfare agents.

DESCRIPTION AND SPECIFICATIONS
The Joint Biological Point Detection System (JBPDS) is the first Joint Biological Warfare (BW) agent detection program. It consists of a common biosuite that can be installed on vehicles, ships, and at fixed sites to provide biological detection and warning to all service personnel. The system is fully automated and is fully Joint Technical Architecture (JTA) compliant. The JPBPDS is a Block development and upgrade program. Block I will identify 10 BW agents simultaneously in less than 20 minutes. It will also collect a liquid sample for confirmatory analysis and identification. The Block II program will focus on reducing size, weight, and power consumption while increasing system reliability. It will also be able to identify up to 26 agents simultaneously.

The JBPDS can operate remotely up to five kilometers by either hardwire or radio modem. A single command station can operate up to 30 JBPDS systems. The JBPDS is designed to meet the broad spectrum of operational requirements encountered by the Services. The JBPDS meets all environmental, vibration, and shock requirements of its intended platforms, as well as requirements for reliability, availability, and maintainability. The JBPDS includes both military and commercial global positioning, meteorological, and network modem capabilities. The system will interface with the Joint Warning and Reporting System (JWARN). The JBPDS is the first biological warfare detection system capable of meeting all operational requirements across the entire spectrum of conflict.

FOREIGN COUNTERPART
Canada: Integrated Biological Agent Detector System; United Kingdom: Integrated Biological Detection System.

FOREIGN MILITARY SALES
None

PROGRAM STATUS
Block I
- **FY00** Completed pre-production qualification testing, operational assessment, and field trial testing.
- **1QFY01** Awarded contract for low rate initial production (LRIP).

PROJECTED ACTIVITIES
Block I:
- **4QFY01** Conduct operational assessment II.
- **2QFY02** Award contract for LRIP (Phase II) with options for full rate production.
- **4QFY02** Complete initial operational test and evaluation.
- **3QFY03** Conduct Milestone III.

Block II:
- **FY01** Conduct simulation and modeling of candidate systems.
- **2QFY02** Milestone I/II.

PRIME CONTRACTORS
Block I: Intellitec (Deland, FL), Battelle (Columbus, OH), MIT Lincoln Laboratories (Lexington, MA)
Block II: To be determined

* See appendix for list of subcontractors

Joint Chemical Agent Detector (JCAD)

MISSION
Provide local detection and early warning of chemical agents, and rapid-alarm response indication to high-concentration exposure; determine decontamination requirements for vehicles, equipment, and personnel; monitor aircraft interiors and cargo during on/off load operations and monitor terrain during chemical surveys.

DESCRIPTION AND SPECIFICATIONS
The Joint Chemical Agent Detector (JCAD) is a multi-mission, chemical-agent, point-detection system currently in development for the U.S. military. JCAD will detect, identify, quantify, warn, and report the presence of nerve, blister, and blood agents. JCAD will also provide real-time detection and identification of toxic industrial chemicals. Equipped with a cumulative dosimeter, JCAD will be capable of accumulating and reporting miosis-level cumulative concentrations of one chemical agent, while still providing a rapid alarm response indication to a high concentration exposure from a different agent.

JCAD will store up to 72 hours of cumulative dosages and chemical alarms in its on-board memory for hazard level reporting or download. JCAD may also be used as a surface contamination survey instrument to pre-sort vehicles, equipment, and personnel to determine decontamination requirements and verify the completion of decontamination. It will also be used to monitor terrain during chemical surveys. JCAD will be mounted in cargo aircraft to monitor the cargo/cockpit areas and cargo during on/off load operations. In aircraft configurations, JCAD will alarm prior to miosis-levels to allow sufficient time for protective measures.

JCAD will be handheld or worn in a pouch that attaches to a warfighter's load-bearing equipment. The JCAD will also be installed in/on military ground vehicles, aircraft, naval ships, and military installations.

JCAD interfaces to the user with a digital/graphic liquid crystal display, and a user-selectable audio and/or LED alarm. JCAD also provides for external data interface via an RS-232 port. Its communication protocol complies with the Joint Technical Architecture and the Joint Warning and Reporting Network. The JCAD detector unit will weigh less than two pounds (0.9 kg), including the internal battery weight. The JCAD will operate on internal battery power using rechargeable or non-rechargeable cells. JCAD will also operate under a variety of external power sources as well as in a wide range of temperatures, altitudes and environmental conditions including blowing sand and rain, freezing rain, salt fog, and salt spray.

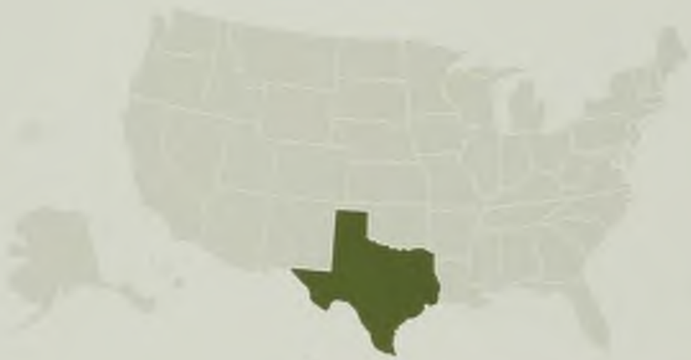
FOREIGN COUNTERPART
France: AP-2C.

FOREIGN MILITARY SALES
None

PROGRAM STATUS
- Engineering and manufacturing development is ongoing.

PROJECTED ACTIVITIES
- **FY03** Commence five-year Department of Defense procurement of more than 257,000 JCAD units. JCAD will eventually replace all current U.S. inventory chemical point-detection systems.

PRIME CONTRACTORS
BAE Systems (Austin, TX)



* See appendix for list of subcontractors

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

Modernization

MISSION
Provide over-the-horizon, land-attack cruise missile defense; enhance cruise missile detection; and provide extended engagement ranges to support the Air-Directed Surface-to-Air Missile (ADSAM) engagement concept for current air defense weapons such as PATRIOT, Standard Missile, and the Advanced Medium Range Air-to-Air Missile.

DESCRIPTION AND SPECIFICATIONS
The Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System (JLENS) is a cost-effective, airborne sensor platform that provides over-the-horizon land attack cruise missile defense. The JLENS advanced sensor technologies, when elevated, will provide battlefield commanders the following capabilities:

- Detection and tracking of low-altitude threats (cruise missile and aircraft) that may go undetected by surface-based sensors due to terrain masking and line-of-sight locations of targets;
- Support of ADSAM engagements, including engage-on-remote and forward pass;
- Development and display of the Single Integrated Air Picture (SIAP); and
- Detection and tracking of enemy surface units.

These technologies provide a low cost, long-endurance capability to protect U.S. troops and assets in foreign lands, and provide a significant contribution to the defense of the Continental United States and the public from cruise missile attacks. The JLENS sensor suite consists of a surveillance radar (SR) and a precision track and illumination radar (PTIR). SR provides a long-range air picture enhanced by identification friend or foe. This information, distributed via the Joint Data Network and Joint Composite Tracking Network (presently LINK 16 and cooperative engagement capability), contributes to the SIAP.

The PTIR is a steerable, lightweight array capable of tracking multiple targets in a sector. The JLENS prioritizes remote and local tracks autonomously or accepts external requests for precision tracking and engagement support.

FOREIGN COUNTERPART
No known foreign counterpart

FOREIGN MILITARY SALES
None

PROGRAM STATUS
- The Department of Defense and the Joint Chiefs of Staff directed the Army to take the lead in establishing a joint project office (Army, Navy, and Air Force). The U.S. Army Space and Missile Defense Command established the joint project office in Huntsville, AL, with Navy and Air Force deputy program managers. The JLENS Program was designated by the Army Acquisition Executive as an Acquisition Category II program and is currently in the program definition and risk reduction phase of the acquisition cycle, concentrating on prototype development and risk reduction activities.

PROJECTED ACTIVITIES
- **FY01–05** Continued system design, integration, and demonstration efforts, leading to Milestone II decision.

PRIME CONTRACTORS
Raytheon (Bedford, MA)

* See appendix for list of subcontractors

Joint Network Management System (JNMS)

Joint Network Management System (JNMS)

Modernization

MISSION
Provide a common, automated joint communications planning and management system for Commanders In Chief, Commanders of Joint Task Forces, and their supporting Service Component headquarters.

DESCRIPTION AND SPECIFICATIONS
The Joint Network Management System (JNMS) is an automated software system that will provide communications planners with a common set of tools to conduct high-level planning, detailed planning and engineering, monitoring, control and reconfiguration, spectrum planning and management, and security of systems. It will promote force-level situational awareness, provide enhanced flexibility to support the commander's intent, improve the management of scarce spectrum resources, and provide increased security of critical systems and networks.

The JNMS will be developed and implemented in increments based on incorporating key performance parameter (KPP) threshold requirements, non-KPP threshold requirements, and objective requirements.

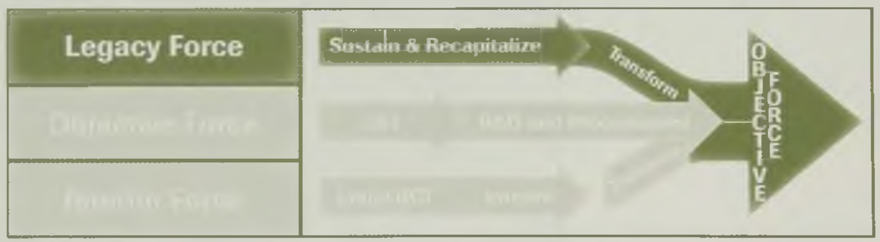
FOREIGN COUNTERPART
No known foreign counterpart

FOREIGN MILITARY SALES
None. The objective JNMS will include a releasable version for Combined/Allied/Coalition use.

PROGRAM STATUS
- **3QFY00** Operational requirements document approved (Rev 2).
- **4QFY00** Milestone I/II approval.
- **1QFY01** Solicitation issued.

PROJECTED ACTIVITIES
- **2QFY01** Contract award.
- **3QFY01** System requirements review.
- **4QFY01** Architecture demonstration.
- **1QFY02** Critical design review.

PRIME CONTRACTORS
To be determined



Joint Service Lightweight Integrated Suit Technology (JSLIST)

MISSION
Provide a joint service chemical/biological (CB) protective clothing ensemble that can be tailored to the diverse operational needs of the individual soldier, marine, airman, and sailor and is compatible with existing and emerging individual protective equipment.

DESCRIPTION AND SPECIFICATIONS
The Joint Service Lightweight Integrated Suit Technology (JSLIST) system will consist of three components: lightweight CB protective garments, multi-purpose overboots, and gloves. Each component is based on state-of-the-art material technologies that have undergone extensive user evaluation and field and laboratory testing. This system provides the highest level of protection against current CB threats, while reducing heat strain, weight, and bulk to an absolute minimum. Balancing CB protection and heat-strain management with service-defined mission requirements optimizes user performance.

The main thrust of the JSLIST is to develop the next-generation CB protective system. Considerable focus also continues, however, on ensuring full compatibility and integration with equipment such as developmental masks and body armor, and developmental systems such as Land Warrior, Air Warrior, and Mounted Warrior. Under management of the four service program managers, JSLIST has joint participation in every aspect of the program, including management, system planning, system and component design, material selection, test execution, and data assessment. The program structure and approval processes have been configured to assure full user participation and to meet common and service-unique requirements.

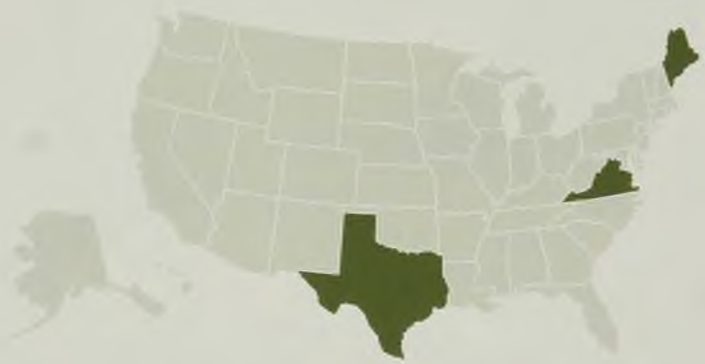
FOREIGN COUNTERPART
Many countries have similar products.

FOREIGN MILITARY SALES
Egypt.

PROGRAM STATUS
- **3QFY97** Milestone III decision.
- **4QFY97** Commenced production.
- **Current** Continuing production.

PROJECTED ACTIVITIES
- The JSLIST block upgrade program is an iterative process that will allow for periodic technology insertion of tested, approved materials into the JSLIST production cycle, the pursuit of Special Operations Command requirements, and production of improved gloves and footwear.

PRIME CONTRACTORS
NCED (El Paso, TX); Group Home Foundation (Belfast, ME); Creative Apparel (Belfast, ME); Battelle (Stafford, VA)



* See appendix for list of subcontractors

MISSION
Provide field unit commanders with real-time point and standoff intelligence for real-time field assessment of nuclear, biological, and chemical (NBC) hazards.

DESCRIPTION AND SPECIFICATIONS
The Joint Service Lightweight Nuclear Biological Chemical Reconnaissance System (JSLNBCRS) is an NBC detection and identification system. It will consist of a base vehicle equipped with hand-held, portable and mounted, current, and advanced NBC detection and identification equipment (both government-furnished equipment, non-developmental item, and parallel development). The vehicle will be equipped with collective protection, an overpressure system, environmental control system, auxiliary power supply system, navigation system, meteorological data processing system, internal and external communication system, and surface samplers. There will be two variants of the JSLNBCRS: the High Mobility Multipurpose Wheeled Vehicle (HMMWV) and the Light Armored Vehicle (LAV).

The JSLNBCRS will provide on-the-move reconnaissance and surveillance in support of combat, combat support, and combat service support forces. The JSLNBCRS will provide accurate and rapid NBC intelligence by detecting, sampling, identifying, marking, and reporting the presence of NBC hazards within the unit's area of responsibility.

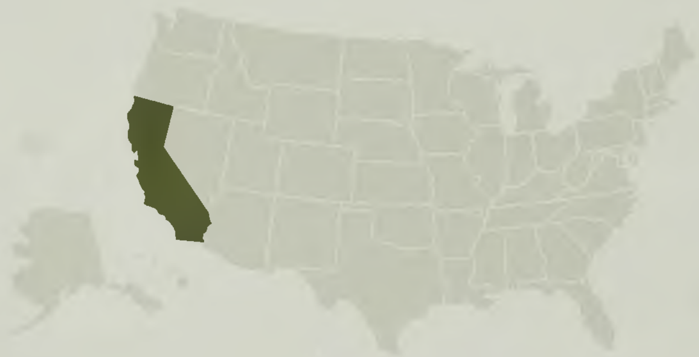
FOREIGN COUNTERPART
China: NBC reconnaissance vehicle; Russia: BRDM-ZRKH, MTLB, RKHM, UAZ-469RKH; Germany: ABC Reconnaissance System.

FOREIGN MILITARY SALES
None

PROGRAM STATUS
- **4QFY98** Awarded integration contract for prototype development and integration.
- **FY99** Initiated concept exploration and program definition and risk reduction phases.

PROJECTED ACTIVITIES
- **FY01–02** HMMWV/LAV variants continue engineering, manufacturing and development.
- **4QFY01** Developmental testing II/limited usability testing HMMWV.
- **1QFY02** Low rate initial production contract award HMMWV.
- **2QFY03** HMMWV/LAV initial operational test and evaluation.
- **3QFY03** Award full production contract.
- **4QFY03** HMMWV Variant initial operational capability.

PRIME CONTRACTORS
TRW (Dominguez Hills, CA)



* See appendix for list of subcontractors

Joint Service Lightweight Stand-off Chemical Agent Detector (JSLSCAD)

Joint Service Lightweight Stand-off Chemical Agent Detector (JSLSCAD)

Modernization

MISSION
Detect the presence of chemically contaminated battlespaces and provide enhanced early warning to joint service forces.

DESCRIPTION AND SPECIFICATIONS
The Joint Service Lightweight Stand-off Chemical Agent Detector (JSLSCAD) is a lightweight, passive, standoff, chemical agent detector. It will provide on-the-move detection, identification, mapping, and reporting of nerve, blister, and blood agent vapors. The JSLSCAD can communicate its warning automatically through the Joint Warning and Reporting Network (JWARN). It will provide 360° x 60° coverage, from a variety of tactical and reconnaissance platforms, at distances of up to five kilometers. When avoidance is not possible, the system will give personnel extra time to put on mission-oriented protective posture gear.

Intended applications include various ground-vehicle, aerial, shipboard, and fixed-emplacement platforms such as the following: M93A1 Fox Block II; Light NBC Reconnaissance System (JSLNBCRS); Unmanned Aerial Vehicle (UAV); C130 Aircraft; CH53 Helicopter; ships; and fixed-site installations. The JSLSCAD detector and the operator display unit weigh approximately 55 lb and the power adapter used for shipboard and fixed-site applications weighs approximately 10 lb. The detector is approximately one cubic foot and the total of all three components is approximately one-and-a-half cubic feet.

FOREIGN COUNTERPART
No known foreign counterpart

FOREIGN MILITARY SALES
None

PROGRAM STATUS
- **2QFY98** Initiated engineering, manufacturing, and development program; Integrated product team formed to develop the test methodology for the JSLSCAD.
- **1QFY99** Completed preliminary design review.
- **3QFY99** Completed detailed design review.
- **4QFY99** Initiated fabrication of engineering design test (EDT) units.
- **1QFY00** Conducted critical design review.
- **2QFY00** Completed fabrication of EDT units; Conducted EDT.

PROJECTED ACTIVITIES
- **1–3QFY01** Fabricate development and operational test items.
- **3QFY01** Initiate developmental tests.

PRIME CONTRACTORS
Intellitec (Deland, FL)

* See appendix for list of subcontractors

Joint Tactical Ground Station (JTAGS)

MISSION

Provide theater commanders with real-time, space-based infrared warning, alerting and cuing information on theater ballistic missiles and other tactical events.

DESCRIPTION AND SPECIFICATIONS

The Joint Tactical Ground Station (JTAGS) is a transportable information processing system that receives and processes in-theater, direct, downlinked data from Defense Support Program (DSP) and follow-on Space-Based Infrared System (SBIRS) satellites. JTAGS disseminates warning, alerting, and cuing information on theater ballistic missiles and other tactical events throughout the theater, using existing communications networks.

A JTAGS unit consists of a standard 8 x 8 x 20 ft shelter with mobilizer, external collapsible high-gain antennas, standard military generator, and standard 5-ton trucks as prime movers. JTAGS can be deployed worldwide; the system is transportable by C-141 aircraft and can be made operational within hours. For redundancy during contingency situations, the system will deploy in pairs. During crisis situations, the system will conduct joint operations.

JTAGS preplanned product improvement (P3I) Phase I upgrades, completed in FY00, provide Joint Tactical Information Distribution System (JTIDS) integration and data fusion with other sensors. The Phase II P3I (FY98–05) upgrades JTAGS to the SBIRS common Multi-Mission Mobile Processor (M3P). A memorandum of agreement between the Army and Air Force program executive offices implemented the joint program development of the SBIRS M3P between the Army JTAGS Product Office and the Air Force SBIRS System Program Office. JTAGS/M3P is an Acquisition Category III joint interest program under the Program Executive Office Air and Missile Defense.

FOREIGN COUNTERPART

No known foreign counterpart

FOREIGN MILITARY SALES

None

PROGRAM STATUS

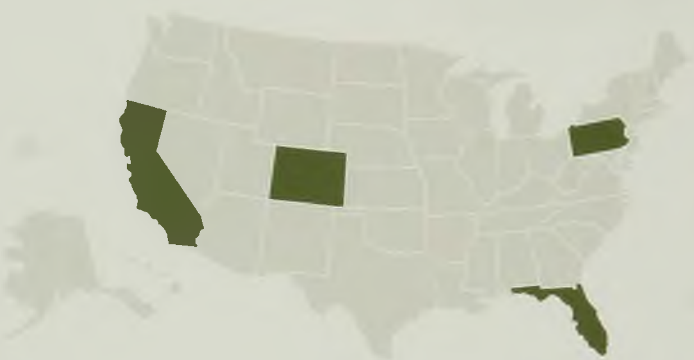
- **FY97** Fielded five production units to the European Command, Pacific Command, and Army Space Command Continental United States.
- **1QFY97** Initiated JTAGS P3I Phase I.
- **4QFY98** Initiated P3I Phase II JTAGS to M3P upgrade to permit operation with SBIRS and DSP satellites and provide coverage for both Army theater and Air Force strategic missions.
- **4QFY99** Conducted M3P preliminary design review.
- **2QFY00** Phase I upgrade fielding approval decision.
- **4QFY00** Completed P3I Phase I upgrades: Sensor Fusion and JTIDS integration; Conducted M3P critical design review.

PROJECTED ACTIVITIES

- **1QFY01** Conduct M3P integrated baseline review.
- **2QFY01** Complete M3P software design review.
- **4QFY02** Conduct developmental test.
- **1QFY03** Conduct operational test.
- **4QFY03–04** Field M3Ps (DSP only).

PRIME CONTRACTORS

Deployment, Production, and P3I Phase I: GenCorp (Azusa, CA; Colorado Springs, CO)
P3I Phase II: Lockheed Martin (Sunnyvale, CA; Boulder, CO); GenCorp (Azusa, CA)



* See appendix for list of subcontractors

MIDS LVT (2) Terminal

JTIDS Class 2M Terminal

Joint Tactical Information Distribution System (JTIDS)/Multifunctional Information Distribution System (MIDS) *Modernization*

MISSION
Provide an interoperable joint and allied Link-16 Tactical Digital Information Link (TADIL) with air, ground, surface, and subsurface platforms; enhance multiservice/NATO interoperability and situational awareness; support Army air and missile defense engagement operations at division, corps, and theater levels.

DESCRIPTION AND SPECIFICATIONS
The Joint Tactical Information Distribution System (JTIDS)/Multifunctional Information Distribution System (MIDS) (Link-16) is the Department of Defense's primary tactical data link. JTIDS Class 2M and MIDS Low Volume Terminal (LVT) (2) are two generations of the Army's solution for Link-16 (TADIL-J) connectivity. JTIDS and MIDS utilize time division, multiple access, and frequency hopping with forward error detection and correction.

It provides the TADIL-J link for the near-real-time distribution of air and missile tracks, and nets air defense control centers for the control and engagement of air and missile defense operations. JTIDS Class 2M terminals are currently being fielded to Army air and missile defense platforms, while the more affordable follow-on, MIDS LVT (2) will fulfill the Army's future Link-16 requirements.

FOREIGN COUNTERPART
Link-16 is a joint and multi-national system that will be interoperable with NATO units. MIDS was developed by a five-nation consortium and is being produced in both the United States and Europe.

FOREIGN MILITARY SALES
Link-16: Netherlands Air Force procured two JTIDS Class 2M Terminals in FY96; German Air Force procured three JTIDS Class 2M Terminals in FY98. Two planning cases are in process for the Hellenic Air Force and Japanese Air Self Defense Force to support PATRIOT.

PROGRAM STATUS
- **1QFY00** Completed MIDS LVT (2) limited user test.
- **3QFY00** MIDS low-rate initial production (LRIP) program review; MIDS LVT (2) contract award; Completed MIDS LVT (2) engineering and manufacturing development phase.

PROJECTED ACTIVITIES
- **3QFY01** MIDS LRIP 2 decision.
- **1QFY02** MIDS Milestone III.
- **2QFY02** MIDS LVT (2) initial operational test and evaluation.
- **3QFY02** MIDS LVT (2) full-rate production decision.

PRIME CONTRACTORS
Link-16-JTIDS: BAE Systems (Wayne, NJ)
Link-16-MIDS: MIDSCO (Fairfield, NJ)—consisting of BAE Systems (USA), Thomson (France), MID (Italy), DASA (Germany), INDRA (Spain)
Link-16-MIDS LVT (2): ViaSat (Carlsbad, CA)

* See appendix for list of subcontractors

Joint Tactical Terminal (JTT)

MISSION
Provide the joint warfighter with seamless, near-real-time tactical intelligence, targeting, and situational awareness information.

DESCRIPTION AND SPECIFICATIONS
The Joint Tactical Terminal (JTT) provides the critical data link to battle managers, intelligence centers, air defense, fire support elements, and aviation nodes across all services. The JTT enables Army, Air Force, Navy, Marine Corps, and other agency users to exploit current intelligence broadcast networks. JTT supports the following intelligence networks:
- Tactical Reconnaissance Intelligence Exchange Service (TRIXS)
- Tactical Information Broadcast Service (TIBS)
- Tactical Related Applications Data Dissemination System (TDDS)
- Tactical Data Information Exchange System-B (TADIXS-B)
- Secondary Imagery Dissemination (SIDS)
- Integrated Broadcast Service (IBS) Architecture

In addition to receiving intelligence data, the JTT provides data provider or relay functions. The JTT can be integrated into systems on vehicles, aircraft, ships, and fixed sites. There is also a reduced-size, stand-alone briefcase JTT-B variant of the baseline JTT/CIBS-M. The JTT-B has a built-in laptop computer that provides terminal control and network display.

FOREIGN COUNTERPART
No known foreign counterpart

FOREIGN MILITARY SALES
None

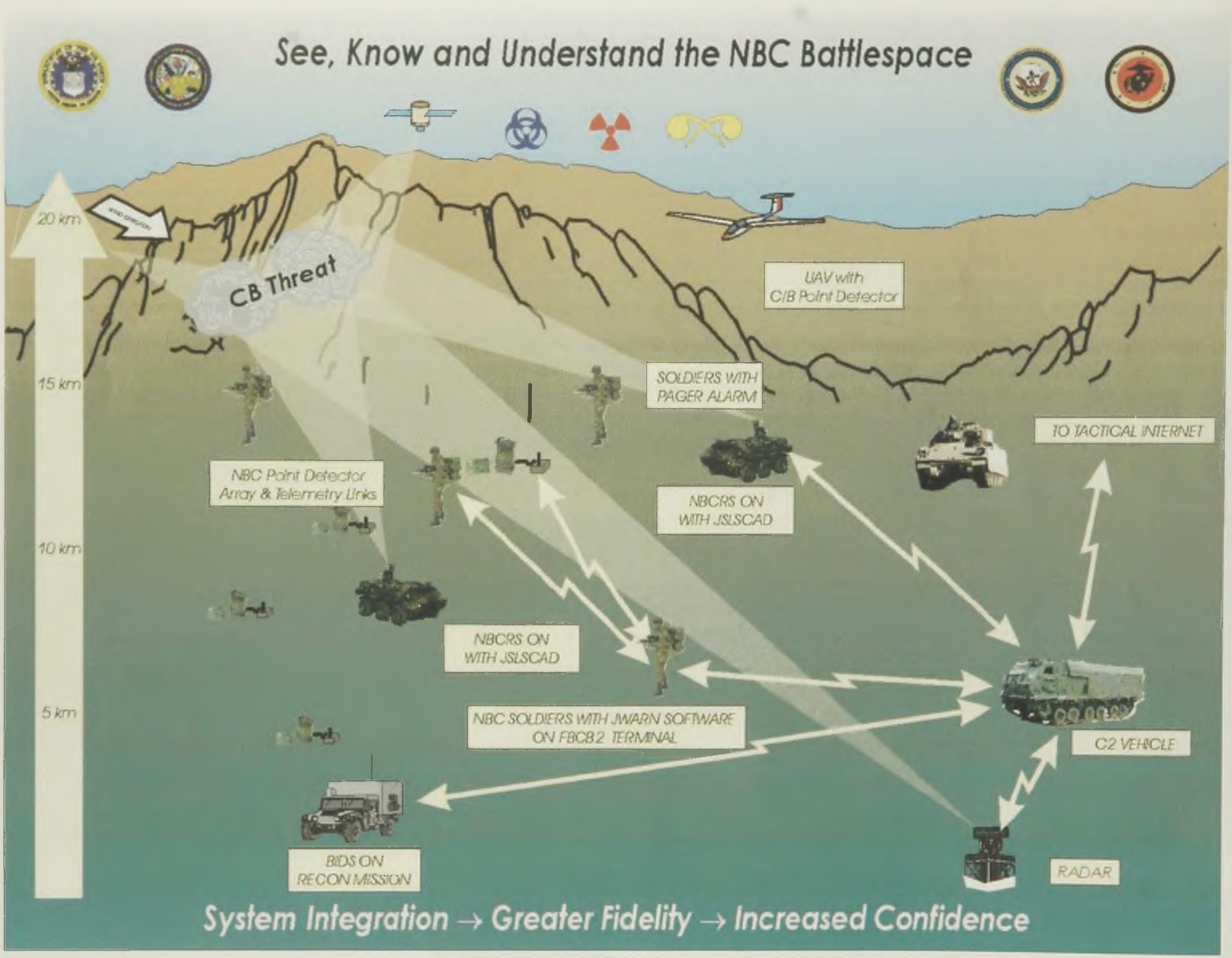
PROGRAM STATUS
- **4QFY97** Awarded contract for 132 JTTs.
- **3QFY98** Awarded options for 95 JTTs.
- **3QFY99** Awarded options for 85 JTTs and 16 JTT-Bs.
- **3QFY00** Began JTT delivery.

PROJECTED ACTIVITIES
- **3QFY01** Milestone III, JTT receive-only.
- **3QFY02** Milestone III, JTT transmit/receive.

PRIME CONTRACTOR(S)
JTT and JTT-B: Raytheon (St. Petersburg, FL)

* See appendix for list of subcontractors

Joint Warning and Reporting Network (JWARN)



Joint Warning and Reporting Network (JWARN)

Modernization

MISSION

Provide the joint forces with the capability to report, analyze, and disseminate nuclear, biological, and chemical (NBC) agent detection, identification, location and warning information; accelerate the warfighter's response to an enemy NBC attack.

DESCRIPTION AND SPECIFICATIONS

The Joint Warning and Reporting Network (JWARN) system is a U.S. Marine Corps-led program with full participation by the Army, Navy, and Air Force. The JWARN system employs NBC-warning technology to collect, analyze, identify, locate, report, and disseminate information on NBC threats. JWARN software and hardware will be compatible and integrated with joint service command, control, communications, computer, and intelligence information (C4I2) systems. JWARN will be located in command and control centers and will be employed in making decisions about warning dissemination down to the lowest level on the battlefield. JWARN will provide additional data processing, as well as plan and report production and access to specific NBC information, all of which will improve the efficiency of NBC defense personnel assets.

The system has a three-block acquisition approach:

- **Block I:** Non-developmental item/commercial off-the-shelf (COTS)/government off-the-shelf (GOTS) products, standardizing warning and reporting.
- **Block II:** Provide the total JWARN capability, by integrating NBC detector systems, warning and reporting software modules, and battlefield management software modules into the services' C4I2 systems.
- **Block III:** Preplanned product improvements will include artificial intelligence modules for NBC operations, an upgrade to match future C4I2 systems, and standard interfaces for use with future detectors.

FOREIGN COUNTERPART

The BRACIS (Biological, Radiological, and Chemical Information System) software system has been developed for the United Kingdom Armed Forces. BRACIS is a system for computerized NBC hazard prediction and warning, in accordance with the NATO standard ATP-45 (A).

FOREIGN MILITARY SALES

None

PROGRAM STATUS

- **1QFY98** JWARN Milestone III approval for Block I; JWARN Block II approved to enter program definition and risk reduction (PDRR) phase.
- **2QFY00** JWARN Block II completed PDRR.
- **Current** Completed fielding of the COTS NBC analysis software pack and GOTS models; Integrate COTS software (with battlefield management functionality) with the Maneuver Control System (MCS) and the Windows 32-bit environment.

PROJECTED ACTIVITIES

- **1QFY01** Award JWARN Block II engineering and manufacturing development contract.
- **3QFY03** JWARN Block II Milestone III.

PRIME CONTRACTORS

Block I: Bruhn NewTech (Columbia, MD)
Block II: To be determined

* See appendix for list of subcontractors

Land Warrior (LW)

MISSION

Provide significant improvement in soldier lethality, survivability, battle command, mobility, sustainment, and training/mission rehearsal.

DESCRIPTION AND SPECIFICATIONS

The Land Warrior (LW) is a first-generation, modular, integrated fighting system for dismounted combat soldiers that incorporates an assortment of systems, components, and technologies into a lethal, survivable soldier system. LW systems/components include:

- Modular weapon system with thermal weapon sight (TWS), laser rangefinder, digital compass, laser aiming light, daylight video sight, and close combat optic;
- Integrated headgear with helmet mounted display, TWS sight picture, and image intensifier;
- Enhancements to protective clothing and individual equipment; and
- Integrated individual soldier computer/radio.

LW science and technology advanced components include integrated sight, combat ID, enhanced radio, and voice recognition. The system's approach will optimize and integrate these capabilities, without adding to the soldier's combat load.

The integrated squad and soldier radios and the Global Positioning System (GPS) within the computer/radio subsystem (CRS) provide digital command and control and situational awareness capability previously unavailable to the combat soldier. The GPS provides the soldier's location to the computer, integrates the soldier's position with location reports from other soldiers, and displays the information on a digital map on his helmet-mounted display. The radios of the CRS, controlled by the computer, provide both digital and voice capabilities to the dismounted soldier. The soldier radio is provided to all Land Warriors; the leader radio is provided to team leaders and above. The leader radio is Single Channel Ground and Airborne Radio System (SINCGARS)-compatible while the soldier radio is not. LW is designed to be fully compatible on the digitized battlefield.

FOREIGN COUNTERPART

No known foreign counterpart

FOREIGN MILITARY SALES

None

PROGRAM STATUS

- **2QFY99** New commercial off-the-shelf/government off-the-shelf technology inserted in LW program.
- **3QFY99** First hybrid prototype system (V0.4) w/VIA computer delivered.
- **4QFY99** Version 0.5 w/PC104 computer delivered.
- **2QFY00** JCF AWE system (V0.6) delivered for initial testing.
- **3QFY00** JCF AWE system (V0.6) delivered to Ft. Bragg for unit training.
- **4QFY00** LW Platoon successfully participated in JCF AWE at Ft. Polk.

PROJECTED ACTIVITIES

- **2QFY01** Award V1.0 development contract.
- **3QFY01** Contractor testing begins on V1.0 systems.
- **4QFY01** 1st group of V1.0 systems delivered to the government; Developmental testing starts.
- **1QFY02** Initial operational test and evaluation begins.
- **3QFY03** Milestone III full production decision for 34,000+ systems.
- **FY04** First unit equipped.
- **FY07** Achieve initial operational capability.

PRIME CONTRACTORS

Exponent (Menlo Park, CA); Computer Science Corp (Eatontown, NJ); Pacific Consultants (San Jose, CA); PEMSTAR (Rochester, MN); Omega Training Group (Columbus, GA)

* See appendix for list of subcontractors

Lightweight Forward Entry Device (LFED)/Forward Entry Device (FED)

MISSION

Compose, edit, transmit, receive, and display alphanumeric and graphic messages for transmission over standard military radios; enable users to plan, control, and execute fire support operations at maneuver platoon, company battalion, and brigade levels.

DESCRIPTION AND SPECIFICATIONS

The Lightweight Forward Entry Device (LFED)/Forward Entry Device (FED) is a programmable input/output device that is an integral part of the digitized system architecture. Using Forward Observer System (FOS) software, it provides the vital sensor-to-shooter link required for effective fires. Its most critical mission is to "call for fires." The LFED/FED also provides critical situational awareness for forward deployed field artillery units. It provides the initial digital entry device required for forward observers and combat observation lasing teams.

The LFED/FED program provides the hardware platform to support Department of Defense-mandated interoperability/Army digitization requirements. These include implementation of Military Standard-188-220 protocol and variable message format to support the new functional user requirements under the next software release, and command, control, communications, computers and intelligence (C4I) technical architecture requirements. It is used in the heavy divisions by the forward observer, field artillery battery commanders, and fire support team personnel.

FOREIGN COUNTERPART

United Kingdom: Data Entry Device.

FOREIGN MILITARY SALES

Portugal, Taiwan, Kuwait, Saudi Arabia.

PROGRAM STATUS

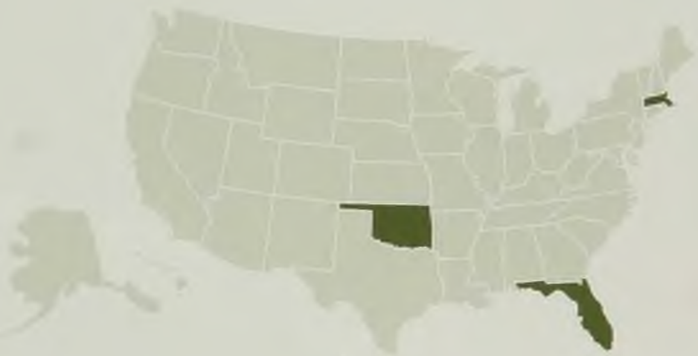
- **2QFY99** First unit equipped (FUE) with forward observer command and control (FOCC); Final qualification test (FQT), FOS.
- **4QFY99** Materiel release, FOS; FUE, FOS.
- **FY00** First Digitized Division fielding, FOS.
- **1QFY00** 10th Mountain division field test of voice recognition.
- **4QFY00** Participation in Joint Contingency Forces.
- **1QFY01** FQT, Package 12.

PROJECTED ACTIVITIES

- **2QFY01** Materiel release, Package 12; Digital capstone exercise (DCX-1).
- **1QFY02** DCX-2; FQT, fire support version 7; Materiel release, fire support version 7.

PRIME CONTRACTORS

Hardware Common Hardware Systems (CHS) II Ruggedized Handheld Computer (RHC) and CHS: General Dynamics (Taunton, MA); Talla-Tech (Tallahassee, FL)
Software: TELOS (Lawton, OK)



* See appendix for list of subcontractors

Lightweight Laser Designator Rangefinder (LLDR)

MISSION

Provide artillery light forces and U.S. Marine Corps forward observers with the capability to detect, recognize, locate, and designate targets and digital self/target data to fire control centers.

DESCRIPTION AND SPECIFICATIONS

The Lightweight Laser Designator Rangefinder (LLDR) is a man-portable, modular target location and designation system whose major components are the target locator module (TLM), laser designator module (LDM), battery, and tripod. LLDR supports direct, indirect, and laser-guided munitions.

The TLM contains a charge coupled device camera, thermal imager, eye-safe laser rangefinder, digital magnetic compass, Global Positioning System (GPS), and digital export capability. The TLM performs boresight verification by "see-spot" technology.

The Department of Defense/NATO-compatible LDM can designate targets up to five kilometers. Since the LLDR is modular, however, the target location capability can be operated without the LDM.

The LLDR weighs less than 35 lb and can be easily transported by a two-person team.

FOREIGN COUNTERPART

Although several countries have man-portable target location and/or target designation systems, there is no existing system providing all of the capabilities of the LLDR within a 35 lb package.

FOREIGN MILITARY SALES

None

PROGRAM STATUS

- **4QFY00** Completed contractor qualification testing and began development testing. Initiated development of an improved LLDR-Long Range (LR) program to extend the thermal recognition range. The LLDR-LR is intended for mounted and dismounted roles as part of the Striker Vehicle and Brigade Combat Team Fire Support Vehicle mission equipment package.

PROJECTED ACTIVITIES

- **1QFY01** Conduct operational testing.
- **3QFY01** Milestone III.

PRIME CONTRACTORS

Litton (Apopka, FL)

* See appendix for list of subcontractors

Line-of-Sight Anti-Tank (LOSAT)

MISSION

Provide highly lethal, accurate missile fire, effective against heavy armor systems and field fortifications at ranges exceeding tank main gun range, thus reducing the light infantry force lethality shortfall against heavy armor.

DESCRIPTION AND SPECIFICATIONS

The Line-of-Sight Anti-Tank (LOSAT) weapon system is an integral component of the Army Vision. LOSAT consists of four hypervelocity Kinetic-Energy Missiles (KEM), and a Second Generation Forward-Looking Infrared (FLIR)/TV acquisition sensor, mounted on an air-mobile High Mobility Multipurpose Wheeled Vehicle (HMMWV) chassis. Key LOSAT advantages include the following:

- KEM overmatch lethality, which defeats all anticipated future armored-combat vehicles and hardened high-value targets, including bunkers and reinforced urban structures;
- Deployability, including UH-60L sling load and C-130 air drop; and
- Compatibility with the early-entry forces.

LOSAT also provides increased survivability and countermeasure effectiveness. LOSAT will operate to the maximum range of direct-fire combat engagements, providing dramatically increased rates of fire and enhanced performance under day and night, adverse weather, and obscured battlefield conditions.

KEM
Weight: 177 lb
Length: 112 in
Diameter: 6.4 in
Range: Greater than the TOW Missile
Max velocity: > 1500 meters/sec

FIRE UNIT
Crew: 3
Combat weight: 11,630 lb

FOREIGN COUNTERPART

No known foreign counterpart

FOREIGN MILITARY SALES

None

PROGRAM STATUS

- Restructured program accelerates production start by two years.
- Completed initial design requirements: allocation to fire unit and missile/launch pod performance requirements documents.
- Completed inertial measurement unit (IMU) performance verification ground tests.
- Completed the preliminary design review for the missile/launch pod and fire unit hardware and software designs.
- Completed two early soldier evaluations of the fire unit control and display layouts and functionality.

PROJECTED ACTIVITIES

- Conduct two risk-reduction tests to verify fire unit missile launch effects on HMMWV chassis and IMU in-flight performance.
- Complete initial design of the missile and fire unit and initiate materiel purchases for prototype test quantities.
- Continue hardware-in-the-loop and closed-loop simulation evaluation and verification of hardware/software designs.
- Continue early soldier evaluations of emerging hardware/software designs.

PRIME CONTRACTORS

Lockheed Martin (Dallas, TX)

* See appendix for list of subcontractors

Long Range Advanced Scout Surveillance System (LRAS3)

MISSION
Provide the U.S. Army armor and infantry scout platoons with a long-range sensor system whose capability is significantly enhanced, as compared to the currently fielded AN/TAS-6, Night Observation Device, Long Range (NODLR).

DESCRIPTION AND SPECIFICATIONS
The Long Range Advanced Scout Surveillance System (LRAS3) consists of a Second Generation Forward Looking Infrared (FLIR) with long-range optics, an eyesafe laser rangefinder, a day video camera, and a Global Positioning System (GPS) with attitude determination.

The LRAS3 permits scouts to detect targets at ranges in excess of three times beyond the NODLR system's capabilities. This additional standoff capability enables scouts to operate well outside the range of currently fielded threat direct fire and sensor systems. The LRAS3's line-of-sight, multi-sensor suite provides real-time target detection, recognition, and identification capability to the scout with 24-hour and adverse-weather operation. The LRAS3 also determines far-target location coordinates for any target. The LRAS3 will operate in both mounted and dismounted configurations. The LRAS3 design includes a digital port for future export of targeting information.

FOREIGN COUNTERPART
No known foreign counterpart

FOREIGN MILITARY SALES
None

PROGRAM STATUS
- **2QFY00** Completed Milestone III decision brief; Awarded production contract.
- **3QFY00** Completed far target location developmental testing.
- **4QFY00** Completed far target location limited user test.

PROJECTED ACTIVITIES
- **2QFY01** Begin initial production testing.
- **4QFY01** First unit equipped.

PRIME CONTRACTORS
Raytheon (McKinney, TX); DRS Optronics (Palm Bay, FL)

* See appendix for list of subcontractors

Maneuver Control System (MCS)

MISSION
Provide automated, online, near-real-time capability for planning, coordinating, monitoring, and controlling tactical operations.

DESCRIPTION AND SPECIFICATIONS
The Maneuver Control System (MCS) automates the creation and distribution of the common tactical picture of the battlefield, and creates and disseminates operations plans and orders for combined arms maneuver commanders. MCS integrates battle information from other battlefield functional area command and control systems to provide timely, accurate status information, as well as situational awareness for the Army Battle Command System (ABCS).

MCS Block IV software has as its foundation the Defense Information Infrastructure Common Operating Environment software and will be compliant with the joint technical architecture. MCS software will also evolve to ABCS. MCS will be fielded on common hardware and will implement a client/server architecture.

FOREIGN COUNTERPART
The MCS is designed to interoperate with the respective command and control systems of the United Kingdom, Germany, France, Italy, and Canada. The implementation is based upon NATO and Australia, Britain, Canada, and America agreements and therefore is extendible to other coalition partners.

FOREIGN MILITARY SALES
None

PROGRAM STATUS
- **4QFY96** Awarded contract for MCS Block IV software development to produce the software for the First Digitized Division (FDD) in FY00 and the First Digitized Corps (FDC) in FY04.
- **3QFY98** Conducted initial operational test and evaluation (IOT&E) of MCS Block III Version 12.01; Block III currently being used by the training school for leader development and evolution of digitized doctrine; Block IV currently focused on producing Version 6.2 to be used in support of Force XXI Battle Command Brigade-and-Below (FBCB2) test events and the MCS IOT&E (FY02).

PROJECTED ACTIVITIES
- Continue development of MCS Block IV software for the FDD and FDC.
- Continue Advanced Warfighting Experiment participation.
- Conduct Block IV IOT&E in FY02 with subsequent Milestone III decision.

PRIME CONTRACTORS
Block IV Software: Lockheed Martin (Tinton Falls, NJ)
High Capacity Computer Unit: General Dynamics (Taunton, MA)

* See appendix for list of subcontractors

MISSION
Provide the U.S. Army with superior medium caliber armaments.

DESCRIPTION AND SPECIFICATIONS
Medium caliber armaments provide a capability against a variety of battlefield threats, including light armor, dismounted infantry, anti-tank guided missile (ATGM) sites, aerial threats, and modern fielded targets. The 25mm Bushmaster, M242 Gun is the primary medium-caliber system employed by the U.S. Army.

The M919 is a 25mm armor-piercing, fin-stabilized discarding sabot with tracer (APFSDS-T) cartridge; it is the primary armor piercing round for the M256 auto cannon. The M919 cartridge employs a high L/D depleted uranium penetrator, high-energy propellants, an aluminum sabot, and low drag, stainless steel fin. The M919 was developed for substantial performance increase over its predecessor, the M791 armor piercing discarding sabot-tracer (APDS-T) cartridge. The M919 is used primarily in the M2 or M3 Bradley Fighting Vehicles.

The M910E1 target practice discarding sabot with tracer (TPDS-T) will provide an improved target practice cartridge for the 25mm, M919 APFSDS-T cartridge. The M910E1 will allow the soldier to train more closely to tactical conditions. The trajectory will be a ballistic match to the M919, and possess a similar tracer signature to the M919 cartridge when viewed through the Bradley Fighting Vehicle System Improved Bradley Acquisition System (BFVS IBAS). The M910E1 will replace the 25mm, M910, TPDS-T cartridge. Currently, the M910E1 is an unfunded requirement.

Other medium caliber initiatives include future upgrades to the BFVS armament system, and support of the future scout combat system for the armament selection decision. Other areas of interest include the demonstration of critical technologies such as air-bursting munitions, and case-telescoped ammunition development.

FOREIGN COUNTERPART
No known foreign counterpart

FOREIGN MILITARY SALES
None

PROGRAM STATUS
- **M919:** In production, with FY01 deliveries scheduled to be completed in 2QFY02.
- **M910E1:** A program that was previously in development, but is currently an unfunded requirement.

PROJECTED ACTIVITIES
- **1QFY01** Award option for 279K M919 cartridges.

PRIME CONTRACTORS
M919: Primex Technologies (St. Petersburg, FL)

* See appendix for list of subcontractors

Medium Extended Air Defense System (MEADS)

MISSION
Provide lower-tier theater air and missile defense to maneuver forces and other land component commanders' designated critical assets throughout all phases of tactical operations.

DESCRIPTION AND SPECIFICATIONS
The Medium Extended Air Defense System (MEADS) will use its netted and distributed architecture to ensure joint and allied interoperability, and to enable a seamless interface to the next generation of battle management command, control, communications, computers, and intelligence. MEADS's improved seeker/sensor components and its ability to link other airborne and ground-based sensors facilitates the employment of its battle elements. This provides a robust 360 degree defense against the full spectrum of Theater Ballistic Missile, cruise missile, unmanned aerial vehicle, Tactical Air-to-Surface Missile, rotary, and fixed wing threats.

MEADS will provide the following:
- Defense against multiple and simultaneous attacks by Short Range Ballistic Missiles, low cross-section cruise missiles, and other air-breathing threats to the force
- Immediate deployment for early entry operations with C-130 and C-17 deployability
- Mobility to displace rapidly and to protect maneuver force assets during offensive operations
- A distributed architecture and modular components to increase survivability and flexibility of employment in a number of operational configurations
- A significant increase in firepower with greatly reduced requirements for personnel and logistics

Given these characteristics, MEADS can rapidly respond to a variety of crisis situations and satisfy the needs of the joint operational and tactical commanders.

FOREIGN COUNTERPART
No known foreign counterpart

FOREIGN MILITARY SALES
None

PROGRAM STATUS
- Completed the transition effort of the project definition and validation phase.
- Selected international contractor team to continue development in 4QFY00.

PROJECTED ACTIVITIES
- **1QFY01** Begin a three-year risk reduction effort to minimize the technical, cost, and schedule risk of a follow-on, cooperative program.

PRIME CONTRACTORS
MEADS International was selected as the prime contractor to continue MEADS development during the risk reduction effort. This consortium comprises Lockheed Martin (Orlando, FL), Alenia-Marconi (Italy), and DaimlerChrysler Aerospace (Germany).

* See appendix for list of subcontractors

SMART-T AN/TSC-154

SCAMP-BLOCK II

SCAMP-BLOCK I AN/PSC-11

MISSION
Achieve end-to-end connectivity to meet Joint Chiefs of Staff command, control, communications, computers, and intelligence requirements and support the National Command Authority, commanders-in-chief, military departments, and other departments and agencies of the government.

DESCRIPTION AND SPECIFICATIONS
Military Satellite Communications (MILSATCOM) includes satellite terminals, satellite control subsystems, communications subsystems, and all related equipment. MILSATCOM projects consist of the following:

Extremely High Frequency (EHF) Milstar Satellite Program. This program provides worldwide, two-way, anti-jam, low-probability-of-intercept detection, secure voice, teletype, and data communications through all levels of conflict and crisis. Advanced EHF (AEHF) will greatly increase both the available single-user data rate and total satellite capacity while maintaining the essential features of Milstar.

Milstar. Milstar provides a seamless protected communications capability to meet the Army's requirement for critical operational communications. Its range-extension capability is interoperable with all services and other satellite and ground systems, and provides assured communications to the warfighting commander. The terminals are capable of rapid setup and tear-down and provide uninterrupted, secure communications for tactical forces, even under harsh electromagnetic conditions.

SMART-T. The SMART-T, mounted on a standard High Mobility Multipurpose Wheeled Vehicle (HMMWV), provides range extension for the Army's Mobile Subscriber Equipment (MSE) system at echelons corps and below. It processes data and voice communications at both low data rate (LDR) and medium data rate (75 bps–1.544 Mbps).

SCAMP. The SCAMP is a manportable, battery-powered terminal that provides LDR secure voice at 2400 bps and secure data at 75–2400 bps. The legacy SCAMP Block I System will be recapitalized as a System Enhancement Program (SEP) to support the AEHF Pathfinder satellite acceleration (64 Kbps U/L (N/B)–128 Kbps D/L). Development is underway for technologies leading to an AEHF SCAMP Block II 12–15 lb manpackable terminal.

FOREIGN COUNTERPART
A memorandum of understanding (MOU) was signed with Canada in November 1999, for cooperation and participation in the development, production, operational and support phase of the AEHF satellite program. MOU discussion is ongoing with United Kingdom and the Netherlands for possible participation of a 5th satellite.

FOREIGN MILITARY SALES
None

PROGRAM STATUS
SCAMP Block I:
- **July 28, 2000** Conditional materiel release approved.
- **4QFY00** Multiservice fielding began.

SMART-T:
- **2QFY99** In full-rate production phase.
- **FY99/00** Twenty-three terminals are currently hand-receipted to units.

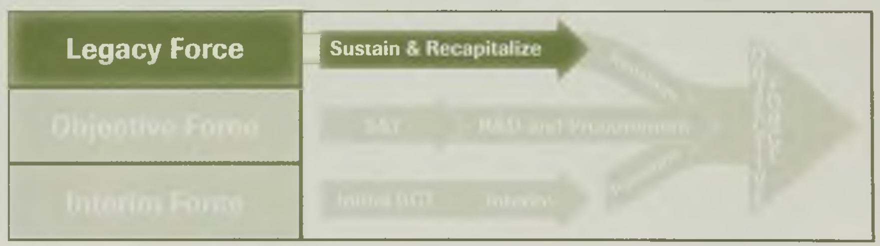
PROJECTED ACTIVITIES
SCAMP Block I:
- Field to multi-service units.

SCAMP AEHF SEP Manportable:
- **2QFY01** Award development contract for ECP enhancement to AEHF capability.

SMART-T:
- **2QFY01** RGT scheduled; final operational and test evaluation scheduled; Award development contract for AEHF upgrade.

PRIME CONTRACTORS
SCAMP Block I: Rockwell Collins (Richardson, TX)
SCAMP Block II
AEHF Manportable: Rockwell Collins (Cedar Rapids, IA)
AEHF Manpackable: Lincoln Labs (Lexington, MA)
SMART-T: Raytheon (Marlborough, MA; Largo, FL)

* See appendix for list of subcontractors




SPITFIRE


LHGXA


STAR-T

GBS

Military Satellite Communications (MILSATCOM)-UHF/SHF/TACSAT
Modernization

MISSION
Achieve end-to-end connectivity to meet Joint Chiefs of Staff command, control, communications, computers, and intelligence (C4I) requirements and support the National Command Authority, commanders-in-chief, military departments, and other departments and agencies of the government.

DESCRIPTION AND SPECIFICATIONS
Military Satellite Communications (MILSATCOM) includes satellite terminals, satellite control subsystems, communications subsystems, and all related equipment. MILSATCOM projects consist of the following:

Ultra High Frequency (UHF), Super High Frequency (SHF), and Commercial C and Ku Band Tactical Satellite (TACSAT) programs. These programs provide the reach-back capability between the forward deployed force and the Continental United States sustaining base required to support power projection.

TACSAT. The AN/PSC-5 Spitfire UHF Manpack Terminal supports Army, Air Force, Marine Corps, and Special Operations Forces use of Fleet Satellite/Air Force Satellite/UHF follow-on satellites. The Spitfire has embedded communications security and demand-assigned, multiple-access capability, and will replace the existing inventory of single-channel satellite communications radios.

For SHF TACSAT terminals, the SHF Tri-Band Advanced Range Extension (STAR-T) terminal is mounted on an Enhanced Capacity Vehicle (ECV), and will selectively replace the aging fleet of AN/TSC-85B/93B TACSAT terminals at echelons corps and above. The terminal provides Tri-Band (C and Ku bands in addition to the existing DSCS, X-Band) communications capability for split-based operations; it will be upgraded to Ka to support Wideband Gapfiller Satellite interoperability. Selected terminals will have an integrated switch to interface with commercial and joint military switching systems.

GBS. Global Broadcast Service (GBS) is an integrated communications system that provides users worldwide with a one-way, high-speed information flow of high-volume multi-media information, including imagery, maps, weather data, logistics, air tasking orders, and other data. GBS will transmit up to 24 Mbps on each of four transponders on the Navy's UFO 8, 9, and 10 satellites. Transportable Ground Receiver Suites (TGRS) will receive information from GBS Ka-band or commercial Ku-band transponders. The Theater Injection Point (TIP) will provide commanders-in-chief and the commander of the joint task force with an in-theater uplink transmit capability.

FOREIGN COUNTERPART
No known foreign counterpart

FOREIGN MILITARY SALES
Spitfire: Australia; Italy

PROGRAM STATUS
Spitfire:
- 5634 Joint Service requirements on contract to date with 2564 Army Spitfires procured (1785 systems fielded through FY00).

STAR-T:
- In low-rate initial production (LRIP); Test and evaluation is ongoing.

GBS: In LRIP.

PROJECTED ACTIVITIES
Spitfire:
- Fielding to 1st IBCT unit (3rd Brigade, 2ID); Continue modification work order/retrofit effort for Joint Service fielded radios; Continue fielding.

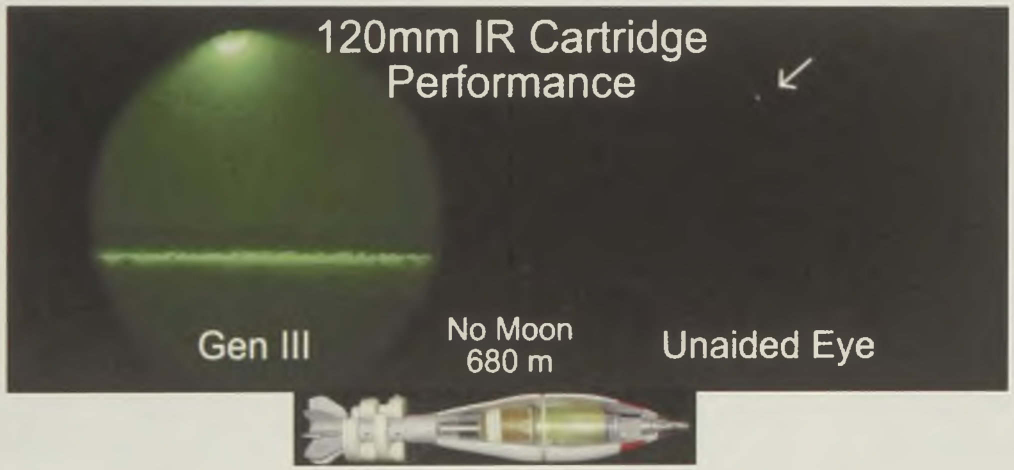
STAR-T:
- **2QFY01** Conditional Milestone IIIB decision; production contract award.

GBS:
- **3QFY01** Handreceipt 8 LRIP TGRS to Ft. Hood, TX.
- **4QFY01** TIP #1 to the 11th Signal Brigade, Ft. Huachuca, AZ.

PRIME CONTRACTORS
Spitfire: Raytheon (Fort Wayne, IN; Largo, FL)
STAR-T: Raytheon (Marlborough/Sudbury, MA; Largo, FL)
GBS: Raytheon (Reston, VA)

* See appendix for list of subcontractors

Mortar (120mm)



MISSION

Provide organic indirect fire support to the maneuver unit commander.

DESCRIPTION AND SPECIFICATIONS

The 120mm mortar system is a conventional smoothbore, muzzle-loaded mortar system that provides increased range, lethality, and safety compared to the World War II-vintage 4.2-inch (107mm) heavy mortar system it replaced in mechanized infantry, motorized, armored, and cavalry units. It is employed in both towed (M120) and carrier versions (M121) and fires a family of enhanced, U.S.-produced ammunition. The Mortar Fire Control System (MFCS) will provide Paladin-like (M109A6) fire control capability that greatly improves mortar lethality, responsiveness, and crew survivability. MFCS links mortar fires with the digital battlefield. It integrates a fire control computer with an inertial navigation and pointing system, allowing crews to fire in less than 1 minute, down from the current 8–12 minute (day/night) standard. The M303 sub-caliber tube insert enables mortar crews to perform cost-effective live-fire training with stockpiled older M300 series 81mm ammunition. New infrared illumination ammunition, the first of its kind in the world, provides enhanced night fighting capability. Munitions in the Advanced Technology Demonstration phase include the XM395 Precision Guided Mortar Munition (PGMM) and the XM984 Dual Purpose Improved Conventional Munition (DPICM). PGMM is a 120mm extended-range precision-guided munition with a strap-down laser detector seeker, making it a surgical strike, organic weapon for the Battalion Commander. DPICM is an extended-range munition that incorporates composites to maximize the number of dual-purpose grenades that can be carried.

Range: 7,240 m
Rate of fire: 16 rounds/min for the first minute; 4 rounds/min sustained
Weight: 319 lb
Crew: 4 M121 carrier-mounted on the M1064; 5 M120 towed
Ammunition: High explosive, smoke, illumination (visible light and infrared), full-range practice

FOREIGN COUNTERPART

Many countries have similar systems.

FOREIGN MILITARY SALES

None

PROGRAM STATUS

- The Mortar Ballistic Computer (MBC) qualified new hardware platform, integrated existing MBC software, conducted limited user test and began fielding; Initial fielding of the 120mm mortar system was completed; M120 version was issued to the Initial Brigade Combat Team and 82nd Airborne Division. The M67 sight unit, currently used on 120mm mortar, qualified for use on the M224 60mm and M252 81mm mortars. MFCS currently in engineering and manufacturing development. The M934A1 High Explosive Round production has commenced. The XM395 PGMM and XM984 DPICM are currently in the Advanced Technology Demonstration phase.

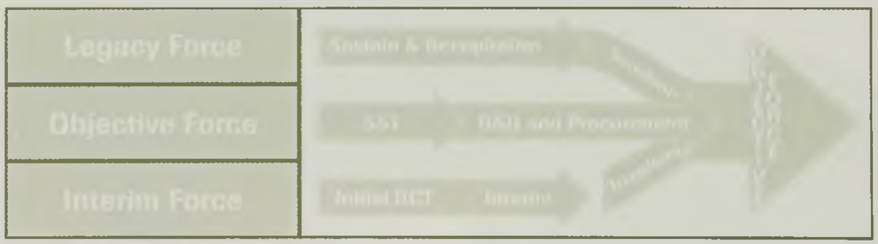
PROJECTED ACTIVITIES

- **PGMM:** In FY01, PGMM will complete component high-G testing, demonstrate the extended-range glide concept and live fire.
- **DPICM:** In FY01, DPICM will demonstrate its rocket motor extended-range capability via live fire.
- **XM930 Visible Light Illum Round:** In FY01, Conditional materiel release; limited fielding scheduled.
- **M983 Infrared Illuminating Round:** In FY01, full materiel release.
- **MFCS:** In 3QFY02, MFCS will complete software development, complete technical testing, conduct initial operational test and begin fielding.
- **M934A1E1 HE round (IM compliant):** In FY03, production of a new insensitive munition cartridge scheduled. A materiel change to develop and qualify an insensitive munition solution for the M934A1 HE round approved.

PRIME CONTRACTORS

Hitech (Camden, AR); Pocal Industries (Scranton, PA); SNC-TEC (Quebec, Canada); KDI (Cincinnati, OH); Chamberlain Manufacturing Corporation (Scranton, PA); Pine Bluff Arsenal (Pine Bluff, AR); Lockheed Martin (Orlando, FL; Archbald, PA); Primex Technologies (St. Petersburg, FL); Matech (Hebron, MD); Brockway Standard (Atlanta, GA); United Ammo Container (Milan, TN); Crane AAA (Crane, IN); Mills Manufacturing (Ashville, NC); Armtec (Coachella, CA); Junghans (FRG)

* See appendix for list of subcontractors



National Missile Defense (NMD)

MISSION

Defend the United States against limited strategic ballistic missile threats.

DESCRIPTION AND SPECIFICATIONS

The initial National Missile Defense (NMD) system will be a fixed-site, land-based system. It will operate in conjunction with the Integrated Tactical Warning and Attack Assessment (ITW/AA) system, and ground and space-based early warning (EW) systems. It will acquire, track, discriminate, destroy, and provide kill assessment of strategic ballistic missiles. The Army elements of the NMD system include the following:

- Ground-based, exo-atmospheric, hit-to-kill interceptors
- Ground-based, phased-array, X-band defense radar (XBR) (for surveillance, tracking, object classification, and kill assessment)
- Site battle management command, control, and communication (BMC3) for human-in-control, engagement planning, top-level decision making, and system communications

An NMD engagement is initiated based on the detection and designation of a hostile ballistic missile launched toward the United States. BMC3 aids the operators in identifying the reentry vehicles and planning the engagement, using data from surveillance and tracking systems, including the ground-based radar. After launch and burnout of the Ground-Based Interceptor (GBI) booster, an Exo-atmospheric Kill Vehicle (EKV) separates and repositions itself, pointing the seeker field-of-view to the predicted target position. The onboard computer receives additional target updates from the BMC3 based on surveillance data and executes intercept course correction maneuvers. Once uncapped, the on-board passive seeker searches and acquires the target and any associated objects in its field of view. The target is designated, using on-board target selection capabilities. The kill vehicle then tracks the target, executing "end-game" maneuvers to achieve a direct-impact kill. The intercept is monitored by the X-band radar and EW sensors for kill assessment or further battle management action.

FOREIGN COUNTERPART

Russia: Moscow ABM System

FOREIGN MILITARY SALES

None

PROGRAM STATUS

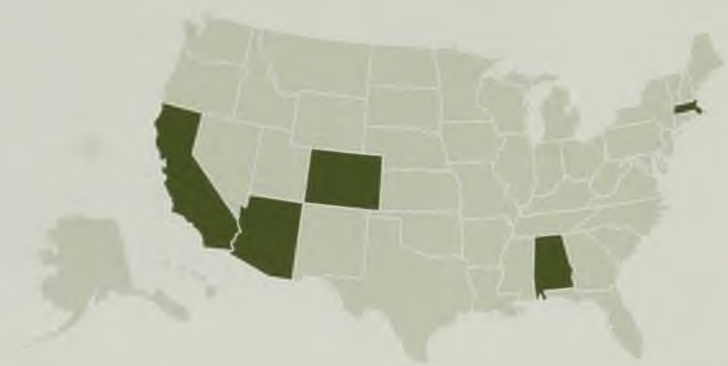
- **3QFY97–2QFY98** Conducted two successful flight tests of EKV sensors from the U.S. Army Kwajalein Atoll (USAKA).
- **3QFY98** Awarded lead system integration contract.
- **4QFY98** Selected commercial off-the-shelf booster approach for GBI.
- **1QFY99** Selected primary EKV contractor.
- **1QFY00** Conducted successful integrated flight test (IFT) of EKV, launched from USAKA, resulting in intercept of a medium re-entry vehicle launched from Vandenberg Air Force Base, CA. Successfully operated prototype Ground-Based Radar (GBR) and portions of BMC3 in "shadow mode" during testing.
- **2QFY00** Conducted second EKV intercept attempt (IFT 4).
- **4QFY00** Conducted integrated system test (IFT 5); Completed deployment readiness review; President's decision: defer deployment, continue research, development, test, and evaluation.

PROJECTED ACTIVITIES

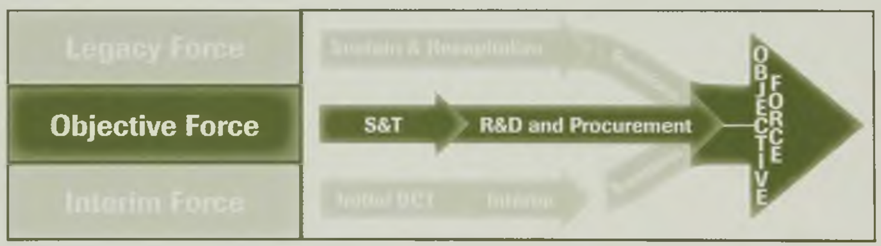
- **3QFY01** Integrated system test (IFT 6).

PRIME CONTRACTORS

Lead System Integrator (LSI): Boeing (Huntsville, AL)
EKV: Raytheon (Tucson, AZ)
Payload Launch Vehicle (PLV): Lockheed Martin (Sunnyvale, CA)
GBR: Raytheon (Bedford, MA)
BMC3: TRW (Huntsville, AL; Colorado Springs, CO)



* See appendix for list of subcontractors




MAINT
RT STATUS
HUB LOW
PORT 2
DIM
VOL
COM
FILL
BIT
(STBY)
OFF
MUTE
FUNCTION
FILL
PORT 1
PWR ON
E-NET
HUB

Near Term Digital Radio System (NTDRS)

Modernization

MISSION
Provide on-the-move, tactical operation center-to-tactical operation center (TOC-to-TOC) communications data backbone for the First Digitized Division (FDD) and the first two Transformation Brigades; provide the primary wide-band waveform data communications network between Tactical Brigade and Battalion TOCs.

DESCRIPTION AND SPECIFICATIONS
The Near Term Digital Radio System (NTDRS) is a largely non-developmental item research and development program that fulfills near-term requirements for a higher capacity data network between critical nodes within the tactical internet. NTDRS provides additional network capacity in the timeframe required for FDD. NTDRS will be the primary data hauler between the brigade TOCs and the battalion TOCs, high data rate logistics hosts and all mobile TOCs. It will also help support the Mobile Subscriber Equipment (MSE) Tactical Packet Network (TPN) and Enhanced Position Location Reporting System (EPLRS) data networks for FDD. It provides the following:
- Operation on-the-move in all terrain and foliage;
- Tactical multi-net gateway/internet controller interfaces for seamless links with Single Channel Ground and Airborne Radio System (SINCGARS) data, MSE TPN, and EPLRS data nets;
- Compliance with the Joint Technical Architecture-Army; and
- Secret high system operations.

FOREIGN COUNTERPART
No known foreign counterpart

FOREIGN MILITARY SALES
Canadians have procured 18 radios.

PROGRAM STATUS
- **1QFY01** Deploy 104 NTDRS to FDD to perform TOC-to-TOC data networking mission.

PROJECTED ACTIVITIES
- **2QFY01/02** Deploy 88 NTDRS to first two transformation brigades.

PRIME CONTRACTORS
International Telephone and Telegraph (ITT) (Fort Wayne, IN; Clifton, NJ); GTE (Cambridge, MA)

* See appendix for list of subcontractors

Night Vision (NV) Image Intensification (I2) System

Target Location & Observation System (TLOS)

Aviator's Night Vision Imaging System Heads-up Display (ANVIS/HUD)

AN/PVS-7D Night Vision Goggle

AN/PVS-10 Night Vision Sniper Night Sight

Target Location & Observation System (TLOS)

MISSION

Provide a family of several different night vision image intensifier systems to enable soldiers to operate more effectively and safely in day or night and under degraded battlefield conditions.

DESCRIPTION AND SPECIFICATIONS

Night Vision (NV) Image Intensification (I2) systems include the following: The **AN/AVS-6 Aviator's Night Vision Imaging System (ANVIS)** provides image intensification that enables helicopter crew members to conduct night missions under minimal ambient light conditions. It is powered by existing aircraft power, a helmet-mounted battery pack, or a clip-on power supply.

The **AN/AVS-7 Aviator's Night Vision Imaging System Heads-Up Display** provides aviators with flight information superimposed on the visual image of the ANVIS. The system is electro-optical and provides the pilot and copilot critical, real-time, high-resolution flight and navigational information.

The **AN/PVS-7D Night Vision Goggle** is a lightweight, biocular goggle. It uses a single passive third-generation image intensifier tube. The goggle is used in combat, combat support, and combat service support operations.

The **AN/PVS-14 Monocular Night Vision Device** provides leaders of combat infantry units with a small, lightweight, night vision device for use in observation and command and control. It interfaces with the AN/PVS-7D head and helmet mount and the 3X magnifier.

The **AN/PVS-10 Night Vision Sniper Night Sight** is an integrated day/night sight for the M24 sniper rifle. It enables the sniper to acquire and engage targets during low and high ambient light conditions. The system mounts on the M24 and uses the same mil-dot reticle as the existing Leopold day scope. Magnification for day and night operation is 8.5X, and the system's maximum weight is 4.9 lb.

The **AN/TVS-5A** is a long-range night vision sight used with the MK-19 grenade launcher and the M2 machine gun. The sight provides a magnification of 5.8X, a field of view of 9.2 degrees, and employs an adjustable mounting bracket that corrects for trajectory and/or windage, depending on the weapon. The current upgrade program improves operational range by replacing the TVS-5 second-generation image intensifier tube with a third-generation tube, reducing operator fatigue with the use of a biocular viewer.

The **Lightweight Video Reconnaissance System (LVRS)** consists of a man-portable outstation and a vehicle-mounted base station. The outstation is used by surveillance or reconnaissance teams to capture, compress, and transmit still-frame images over military radios to a base station located at a higher echelon.

The **Target Location and Observation System (TLOS)** is a lightweight, self-contained, image-intensified day/night sight that employs a near-infrared low-energy laser to actively acquire direct view and electro-optic targets.

FOREIGN COUNTERPART

I2, laser, and thermal devices are produced in many countries.

FOREIGN MILITARY SALES

AN/AVS-6(V)1 and 2: Bahrain, Colombia, Greece, Jordan, Mexico, Saudi Arabia, Taiwan, Thailand, United Arab Emirates; AN/PVS-7: Italy, Kuwait, Mexico, Portugal, Saudi Arabia, Taiwan; AN/PVS-7D: Bahrain; ANVIS/HUD: Israel.

PROGRAM STATUS

- **FY99** Completed basic heads up display (HUD) fielding.
- **1QFY99** LVRS first unit equipped at Ft. Bragg, NC.
- **2QFY99** Completed TLOS deliveries; first unit equipped (FUE).
- **3–4QFY99** Test new LVRS outstation.
- **Current** Field AN/TVS-5A; Fielding AN/PVS-7D and AN/PVS-14 to Interim Brigade Combat Team.

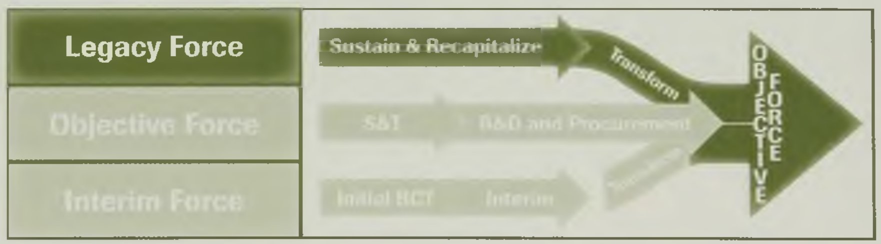
PROJECTED ACTIVITIES

- **1–2QFY01** Operational testing of TVS-5A system, with adjustable sight bracket, biocular viewer, rail grabber, and GEN III tube.
- **2QFY01** First delivery of gated/filmless image intensifier for AN/PVS-7D.
- **2–3QFY01** FUE/Initiate execution of fielding schedule; Complete advanced HUD retrofit.

PRIME CONTRACTORS

International Telephone and Telegraph (ITT) (Roanoke, VA); BAE Systems (Austin, TX); Litton (Garland, TX; Tempe, AZ); Lockheed Martin (Orlando, FL; Nashua NH)

* See appendix for list of subcontractors



Objective Individual Combat Weapon (OICW)

Modernization

MISSION

Provide the infantry soldier with a decisive overmatch capability by developing the next-generation weapon system that will dramatically increase lethality, range and capability through the use of high explosive air-burst ammunition.

DESCRIPTION AND SPECIFICATIONS

The Objective Individual Combat Weapon (OICW) will replace selected M16 rifles and M4 carbines. The modular, dual-barrel OICW will combine the lethality of 20mm air-bursting munitions, 5.56mm NATO ammunition, with a full-solution fire control to affect decisively violent and suppressive target effects and to greatly improve small arms performance. This fire control will incorporate a laser rangefinder, ballistic computer, direct view optics, video sight, electronic compass, thermal capability and a target tracker.

The OICW's high explosive air bursting munitions will be capable of defeating not only exposed targets, but those in defilade (targets that have taken cover behind structures, terrain features and/or vehicles), a capability lacking in current rifles and carbines. The OICW will provide an overmatch in system effectiveness while increasing the versatility and survivability of the soldier by:

- Doubling the infantryman's stand-off range to 1,000 meters;
- Providing effective day/night operation; and
- Providing significant improvements in lethality and target effects (probability of incapacitation and suppression).

The OICW will be fully compatible with the digital battlefield and will provide the lethality upgrade for the Land Warrior.

FOREIGN COUNTERPART

No known foreign counterpart

FOREIGN MILITARY SALES

None

PROGRAM STATUS

- **FY00** The U.S. Government joint service and user team and the contractor team led by Alliant Techsystems completed the OICW Advanced Technology Demonstration (ATD). The ATD successfully demonstrated the concept and highlighted areas of risk.
- **2QFY00** A Milestone I decision was made and the OICW Program transitioned to the Office of Product Manager, Small Arms (OPMSA).
- **3QFY00** A program definition and risk reduction (PDRR) effort was initiated under OPMSA management and a PDRR contract was awarded.

PROJECTED ACTIVITIES

- **FY01–05** Implement PDRR phase, which will utilize simulation and modeling for acquisition, requirements and training (SMART), as well as building prototype hardware to produce and test a near-final design of the OICW to meet user requirements for the PDRR exit criteria.
- **2QFY02** A major in-process-review is scheduled to review design trade-offs and establish the weapon system architecture.
- **FY05–08** Engineering and manufacturing development.
- **FY09** First unit equipped.

PRIME CONTRACTORS

Alliant Techsystems (Hopkins, MN)

* See appendix for list of subcontractors

MISSION
Provide a modernized, real-time meteorological capability over an extended battlespace; provide vital target-area meteorological information for the employment of "smart" weapons, ensuring proper munition selection and optimal aim point calculations.

DESCRIPTION AND SPECIFICATIONS
The Meteorological Measuring Set (Profiler) (MMS-P), AN/TMQ-52, integrates profiles from ground-based meteorological sensors with meteorological satellite data to provide vertical profiles of the atmosphere. The system incorporates a suite of meteorological sensors and associated software/models that provide artillery forces with current or expected weather conditions, along the projectile trajectory and within the target area. The system's software is capable of providing artillery meteorological messages every 30 minutes based on an atmospheric model. The system will process the meteorological data as it is received and convert it into proper message formats.

The MMS-P is a tactical automated meteorological system, housed in a Standard Integrated Command Post System (SICPS) shelter, mounted on a High Mobility Multipurpose Wheeled Vehicle (HMMWV). The system will interface with:

- Advanced Field Artillery Tactical Data Systems (AFATDS).
- Multiple Launch Rocket System (MLRS) Fire Direction System (FDS).
- Interim Fire Support Automation System (IFSAS).
- the Integrated Meteorological System (IMETS).

The Profiler will use Joint Technical Architecture-Army Defense Information Infrastructure Common Operating Environment hardware and software.

FOREIGN COUNTERPART
No known foreign counterpart

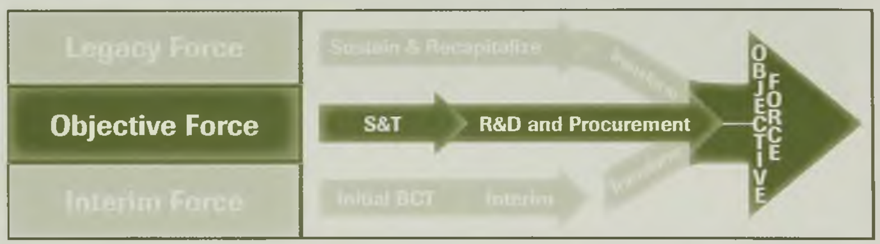
FOREIGN MILITARY SALES
None

PROGRAM STATUS
- Concept exploration phase completed.
- **3QFY00** Milestone I/II, engineering and manufacturing development (EMD) decision obtained; Released request for proposal.
- **4QFY00** Awarded cost plus incentive fee contract for the EMD effort.

PROJECTED ACTIVITIES
- **1QFY01** Post award conference; Preliminary design review.
- **3QFY01** Critical design review.

PRIME CONTRACTORS
Environmental Technologies Group, Inc. (Baltimore, MD)

* See appendix for list of subcontractors



PROVIDING FORCE PROTECTION
- Stationary and OTM DF (Lines of Bearing)
- Tactical Communications Exploitation
- OTM Electronic Attack
- Dismounted Operations

Tactical SIGINT for the 21st Century

Prophet
Modernization

MISSION
Provide enhanced capability for force protection, situational awareness, battlespace visualization, and target development throughout the Brigade, Interim Brigade Combat Team (IBCT), and Armored Cavalry Regiment (ACR) areas of operations.

DESCRIPTION AND SPECIFICATIONS
Prophet is the Division, IBCT, and ACR tactical Signals Intelligence and Electronic Warfare (SIGINT/EW) system designed to support the Army Vision. The vehicular-mounted Prophet is a ground-based SIGINT/EW system on the High Mobility Multipurpose Wheeled Vehicle (HMMWV). Prophet also has a dismounted man-pack SIGINT version. The Prophet man-pack will have the capability for airborne insertion and early entry into the battlespace. The Prophet deploys in the brigade forward areas with force protection as its primary mission, and it will provide message internals exploitation, and emitter Lines-of-Bearing (LOB). When vehicular-mounted, Prophet will also provide on-the-move (OTM) LOBs, collection and reporting capabilities, and an OTM Electronic Attack (EA) capability.

When fielded, Prophet will replace the current SIGINT Legacy systems: which include the AN/TSQ-138 TRAILBLAZER, the AN/TRQ-32 TEAMMATE, the AN/TLQ-17A TRAFFICJAM, and the AN/PRD-12 Lightweight Man-Transportable Radio Direction Finding Set. The Prophet acquisition approach makes use of open systems architecture, modular design, and nonproprietary industry standards. This approach provides for evolutionary growth and expansion via circuit card assemblies and software vice wholesale hardware replacement. The Prophet system will be procured under a five-Block acquisition approach. Prophet supports the Army's vision and will be an integral part of the two IBCTs. It provides standardization, reduced footprint, reduced logistics, smaller and lighter force structure, and improved mobility. Blocks IV and V will apply to Objective Force requirements.

FOREIGN COUNTERPART
The United Kingdom, Australia, Canada and France either have or are actively pursuing a comparable vehicular system.

FOREIGN MILITARY SALES
None

PROGRAM STATUS
- **CY00** Prophet System (PS) program restructured to create two distinct programs: Prophet and the Division Tactical Unmanned Aerial Vehicle (TUAV) SIGINT Program (DTSP).
- Previous PS Operational Requirements Document (ORD) revised.
- **July 24, 2000** New Prophet ORD approved on and only addressed the ground-version.
- Prophet completed Block I initial operational test and evaluation (IOT&E); Block II vehicle-mounted EA engineering and manufacturing development (EMD) contract awarded.

PROJECTED ACTIVITIES
- **CY01** Completed EMD (electronic support [ES] Block I).
- **1QCY01** Final Prophet ES IOT&E Report complete; MS III production, Prophet ES (Block I).
- **2QCY01** Prophet EA technical test (Block II); Contract award for Prophet ES production (Block I).

PRIME CONTRACTOR(S)
Prophet Block I, ES Development: Delfin Systems (Santa Clara, CA)
Prophet Block II, EA Development: Rockwell Collins (Cedar Rapids, IA)

* See appendix for list of subcontractors


HQ-122T

MISSION

Provide critical air surveillance of the forward areas; automatically detect, track, classify, identify, and report targets (cruise missiles, unmanned aerial vehicles, rotary- and fixed-wing aircraft) to air defense weapons systems.

DESCRIPTION AND SPECIFICATIONS

The Sentinel is used with the Army's Forward Area Air Defense Command and Control (FAAD C2) system. The Sentinel accomplishes its primary mission by providing key target data to Short Range Air Defense (SHORAD) weapon systems and battlefield commanders via the FAAD C2 data link or directly from the Sentinel, using Enhanced Position Location Reporting System (EPLRS) or Single Channel Ground and Airborne Radio System (SINCGARS) data radios.

The Sentinel system consists of the High Mobility Multipurpose Wheeled Vehicle (HMMWV) group and the Antenna Transceiver Group (ATG) mounted on a one-ton, wide-track trailer, its identification friend-or-foe (IFF), and FAAD C2 interfaces. The sensor is an advanced three-dimensional battlefield X-band air defense phased-array radar with an acquisition range of 40 km.

The Sentinel is capable of operating both day and night, in adverse weather conditions, and in battlefield environments of dust, smoke, aerosols, and enemy countermeasures. It provides 360-degree azimuth coverage for acquisition and tracking. The Sentinel automatically detects, tracks, classifies, identifies, and reports targets including cruise missiles, unmanned aerial vehicles, rotary-wing aircraft, and fixed-wing aircraft. It can identify targets moving at speeds from hovering to fast-moving and located at positions from nap of the earth to the maximum engagement altitude of SHORAD weapons. Accurate and fast reacting, Sentinel acquires targets sufficiently forward of the forward line of troops to improve air defense weapon reaction time and allow engagement at optimum ranges. The Sentinel-integrated IFF reduces the potential for fratricide of friendly aircraft. The Sentinel is transported by an M1097A1 HMMWV using standard transportation methods.

FOREIGN COUNTERPART

Italy: Contraves LPD-20; Switzerland: Skyguard Improved; Russia: Hot Shot 2S6; Germany: Siemens DR-641; France: Rodeo, RA-20S and El Dorado.

FOREIGN MILITARY SALES

Egypt, Turkey.

PROGRAM STATUS

- In production and deployment phase.
- Completed fielding to First Digitized Division and corps.
- **October 1, 1999** Completed transition to SHORAD U.S. Army armament, munitions and chemical command division support area.
- **2QFY00** Awarded full rate production-5 contract.
- **4QFY00** Fielded 10th LID (2-62 ADA).

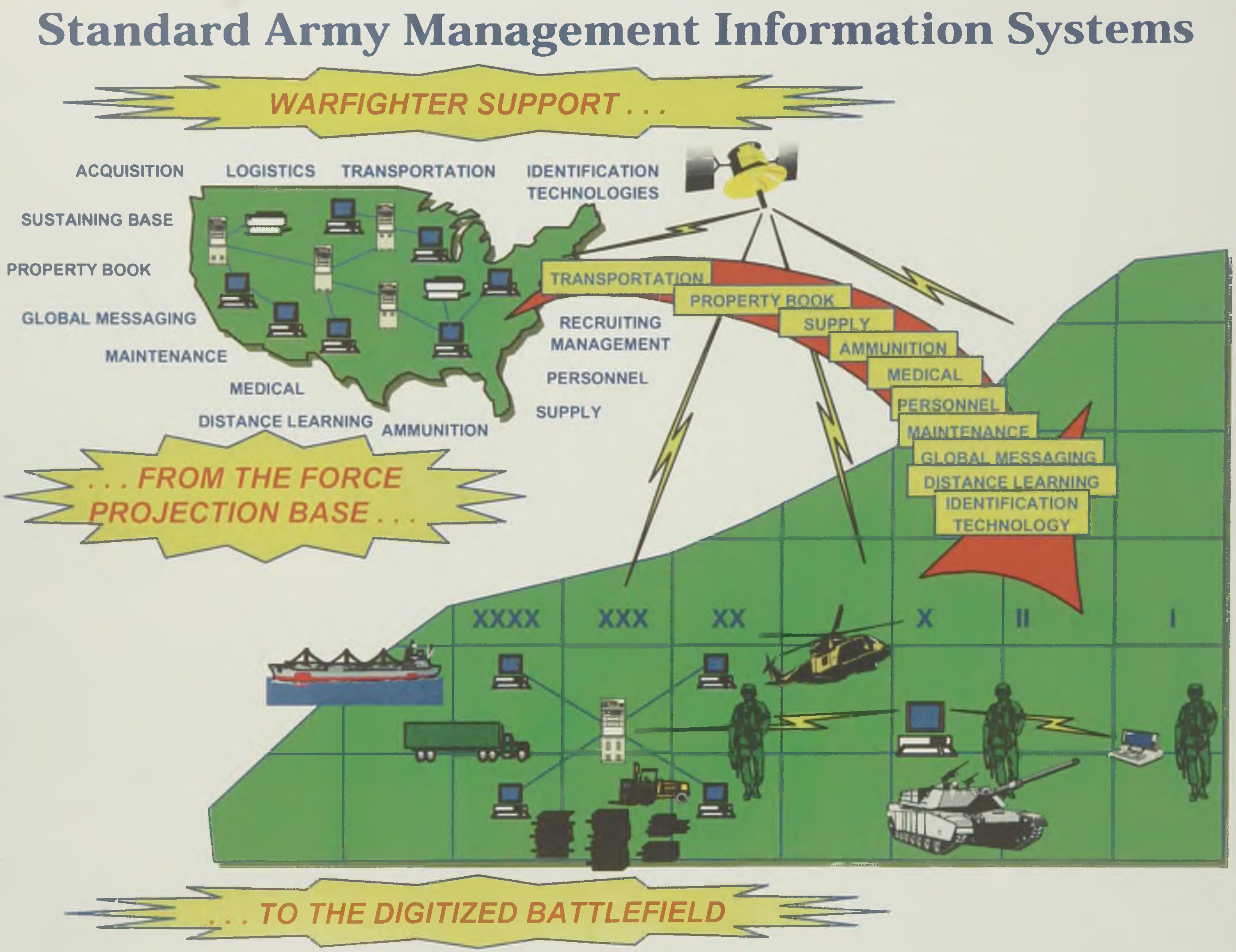
PROJECTED ACTIVITIES

- **2QFY01** Field 2ID (C/5-5 ADA) Ft. Lewis.
- **3QFY01** Field 1-200th ADA; Field 3-200th ADA; Field 2LCR.

PRIME CONTRACTORS

Raytheon (El Segundo, CA; Forest, MS; Largo, FL)

* See appendix for list of subcontractors


Standard Army Management Information Systems
WARFIGHTER SUPPORT . . .
ACQUISITION
LOGISTICS
TRANSPORTATION
IDENTIFICATION TECHNOLOGIES
SUSTAINING BASE
PROPERTY BOOK
GLOBAL MESSAGING
MAINTENANCE
MEDICAL
DISTANCE LEARNING
AMMUNITION
RECRUITING MANAGEMENT
PERSONNEL
SUPPLY
TRANSPORTATION
PROPERTY BOOK
SUPPLY
AMMUNITION
MEDICAL
PERSONNEL
MAINTENANCE
GLOBAL MESSAGING
DISTANCE LEARNING
IDENTIFICATION TECHNOLOGY
. . . FROM THE FORCE PROJECTION BASE . . .
XXXX
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I
. . . TO THE DIGITIZED BATTLEFIELD

Standard Army Management Information Systems (STAMIS)

MISSION
Provide effective, multi-functional, leading edge, global information solutions to guarantee information dominance across the operational spectrum.

DESCRIPTION AND SPECIFICATIONS
The Program Executive Office for Standard Army Management Information Systems (PEO STAMIS) acquires and fields computer hardware and software systems that automate diverse functions based on validated customer requirements. Current Programs include: Joint Computer-aided Acquisition and Logistics Support (JCALS), Transportation Coordinators' Automated Information for Movement System II (TC-AIMS II), The Army Distance Learning Program (TADLP), Medical Communications for Combat Casualty Care (MC4), Army Recruiting Information Support System (ARISS), and the Standard Installation/Division Personnel System-3 (SIDPERS-3).

Legacy logistics automation systems that will migrate into the Global Combat Support System–Army (GCSS-A) system include: Standard Army Ammunition System (SAAS), Standard Army Maintenance System (SAMS), Standard Army Retail Supply System (SARSS), and the Unit Level Logistics Systems (ULLS). The GCSS-A is a key enabler for the Army Vision.

STAMIS also provides infrastructure capabilities in the form of the Defense Messaging System–Army (DMS-A) and the Tactical Messaging System, Secure Electronic Transactions–Devices (SET-D), which provides for the following:

- Public Key Infrastructure (PKI) and Common Access Card (CAC) applications
- Automatic Identification Technologies (AIT)
- Corps Theater ADP Service Center (CTASC-II)
- Combat Service Support Automated Information Systems Interface (CAISI)
- Civilian Personnel Office Regionalization (CPO-R) project
- Installation Support Modules (ISM)
- Hazardous Substance Management System (HSMS)
- Movement Tracking System (MTS)

STAMIS are in various stages of life-cycle management, utilizing commercial off-the-shelf hardware/software technology acquired from various contract vehicles. STAMIS programs meet open-architecture requirements. Government and contractor agencies provide system development, test, deployment and training support.

FOREIGN COUNTERPART
No known foreign counterpart

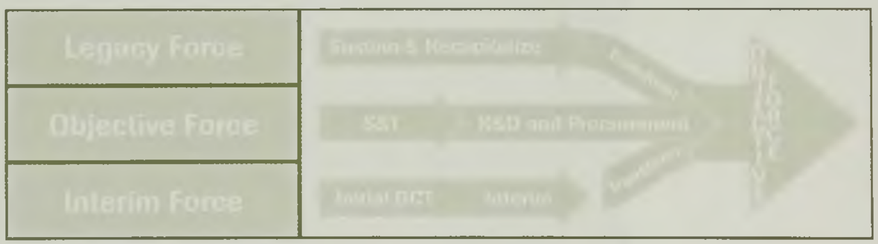
FOREIGN MILITARY SALES
None

PROGRAM STATUS
- SIDPERS-3 completed fielding to active components, which will be followed by reserve component fielding.
- JCALS system fielding continues toward an objective of 400+ Department of Defense sites for the joint technical manual. ARISS fielding of laptop hardware/software is complete to all Army recruiters. Automated Identification Technology (AIT) integration in STAMIS and other programs is ongoing with a recent award of the AIT II contract.

PROJECTED ACTIVITIES
- **FY00–01** GCSS-A to continue development progress toward initial operational testing; ARISS will field software upgrades; and the MC4 program will provide upgrades to legacy systems and acquire high frequency radios for medical units; Soldiers' pay and other human resources functions will be explored.

PRIME CONTRACTORS
JCALS: Computer Sciences Corporation (Morristown, NJ)
DMS-Army: Lockheed Martin (Bethesda, MD)
ARISS: Electronic Data Systems (EDS) (Fort Knox, KY)
GCSS-Army: GRCI (McLean, VA)
MTS: COMTECH Mobile Datacom (Germantown, MD)
SIDPERS-3: EDS (Fort Knox, KY)
AITII/RFID: Symbol Technologies (Holtsville, NY); SAVI Technology (Sunnyvale, CA)
TADLP: ACS (Virginia Beach, VA)

* See appendix for list of subcontractors



Stinger Modernization

MISSION
Provide short-range air defense for brigade, division, and corps area combat units and critical assets against cruise missiles, unmanned aerial vehicles (UAVs), low-flying fixed-wing aircraft, and helicopters.

DESCRIPTION AND SPECIFICATIONS
The Stinger program has been restructured to support the Army Transformation strategy. Stinger, a fire-and-forget infrared/ultraviolet (IR/UV) missile system is mounted on a variety of platforms and is the only air defense weapon in the forward area. Stinger has been fielded on MANPADS, Avenger, Kiowa Warrior (OH-58D), Special Operation Black Hawks (MH-60), Bradley Linebacker, and the U.S. Marine Corps' Light Amphibious Vehicle-Air Defense. This missile homes in on the heat emitted by fixed-wing aircraft, helicopters, and other targets. Stinger uses an eject motor to propel the missile a safe distance away from the gunner; a flight motor then ignites and propels it to the target. A proportional navigation system enables it to fly an intercept course to the target. The Stinger program has evolved from the Redeye, to Stinger Basic, followed by Stinger Post, to the Stinger Reprogrammable Microprocessor (Stinger-RMP). The Block I software and hardware changes to the Stinger-RMP missile provide a greatly improved capability to engage advanced cruise missile and UAV threats.

Guidance: Passive infrared and ultraviolet homing
Speed: Supersonic
Navigation: Proportional with lead bias
Weight: 34.5 lb
Diameter: 2.75 in
Length: 60 in

FOREIGN COUNTERPART
Britain: Blowpipe, Javelin; Russia: SA-7, SA-14, and SA-16; Sweden: RBS-70.

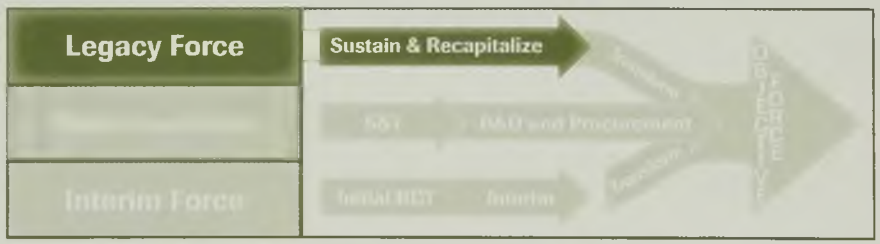
FOREIGN MILITARY SALES
Denmark, Germany, Greece, Israel, Italy, The Netherlands, Pakistan, Portugal, Saudi Arabia, Sweden, Switzerland, Taiwan, Turkey, Egypt, and the United Kingdom.

PROGRAM STATUS
- Block I upgrades to the Stinger-RMP missile will continue through FY10.

PROJECTED ACTIVITIES
- Army plans include funding for extending the service life and continuing the upgrade of missiles to the Block I configuration.

PRIME CONTRACTORS
Raytheon (Tucson, AZ)

* See appendix for list of subcontractors



Striker

MISSION

Perform 24-hour terrain surveillance, target acquisition, target location, and fire support mission execution in heavy and light divisions.

DESCRIPTION AND SPECIFICATIONS

The Striker replaces M981 Fire Support Team Vehicles (FISTVs) used by Combat Observation Lasing Teams (COLTs) in heavy divisions and become a new asset to light divisions. It operates as an integral part of the brigade reconnaissance team, providing COLT and fire support mission planning and execution. The Striker locates and designates targets for laser-guided ordnance.

The Striker is built on a M1025A2 armored High Mobility Multipurpose Wheeled Vehicle (HMMWV). The mission equipment package includes: laser rangefinder/designator; AN/TAS-4B night sight; handheld terminal unit; lightweight computer unit; hosts forward observer software; inertial navigation system; and Enhanced Precision Lightweight Global Positioning System Receiver (EPLGR).

Length: 15.92 ft
Width: 7.2 ft
Height: 8.5 ft
Weight: 10102 lb combat-loaded
Power train: 6.5 liter, 8v 160-hp diesel engine with Turbo Hydra-Matic 4L80-E, four-speed automatic transmission
Cruising range: 320 mi
Road speed: 55 mph
Crew: 3
Vehicle armament: 7.62mm, M240B machine gun
Distribution: Brigade reconnaissance platoons in heavy and light divisions, armor/infantry brigades/battalions; cavalry regiments/squadrons, field artillery battalions
Current models/variants: M707 Striker

FOREIGN COUNTERPART

No known foreign counterpart

FOREIGN MILITARY SALES

None

PROGRAM STATUS

- **Current** In full rate production.

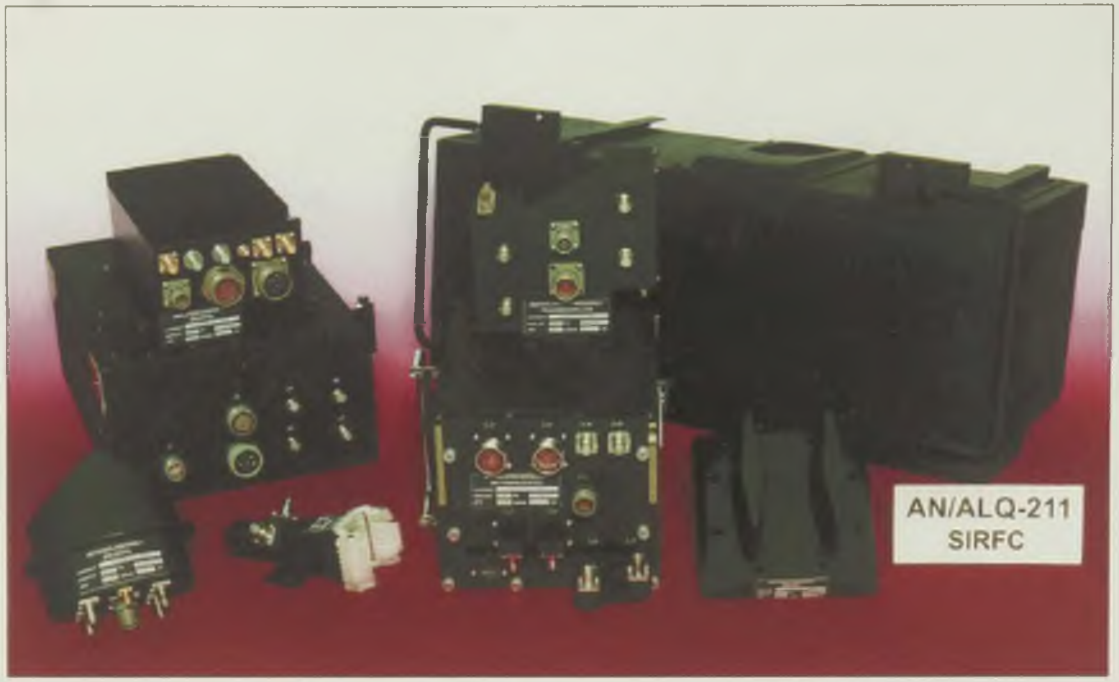
PROJECTED ACTIVITIES

- **2QFY01** First unit equipped.

PRIME CONTRACTORS

Systems & Electronics, Inc. (St. Louis, MO)

* See appendix for list of subcontractors


AN/ALQ-211
SIRFC


SIRFC

MISSION
Provide radar warning and electronic countermeasures against air defense threats.

DESCRIPTION AND SPECIFICATIONS
The Suite of Integrated Radio Frequency Countermeasures (SIRFC)-AN/ALQ-211 detects, identifies, and counters multiple, simultaneous, modern surface, and airborne threat radars. SIRFC combines both radar warning and electronic countermeasures (ECM), and also provides full-threat radar warning frequency coverage including millimeter wave, while countering pulse, pulse doppler, continuous wave, and pulse compression threats.

Additionally, SIRFC provides active ECM including robust techniques against monopulse radars. The AN/ALQ-211 provides the aircrew with angle-of-arrival information and precision-direction finding of radio frequency threats. SIRFC is also capable of multi-sensor fusion and tactical situation assessment, enabling the aircrew to respond to the threat more quickly and appropriately. The AN/ALQ-211 is fully reprogrammable to meet specific mission requirements and can record threat data using Personal Computer Memory Card International Association (PCMCIA) cards. Finally, SIRFC will coordinate ECM responses with expendable countermeasures such as chaff or flares.

The AN/ALQ-211 SIRFC A kit weighs approximately 76 lb and the SIRFC B kit weighs approximately 126 lb in its current engineering and manufacturing development (EMD) configuration. The production model of the AN/ALQ-211 B Kit will weigh approximately 116 lb.

FOREIGN COUNTERPART
No known foreign counterpart

FOREIGN MILITARY SALES
None

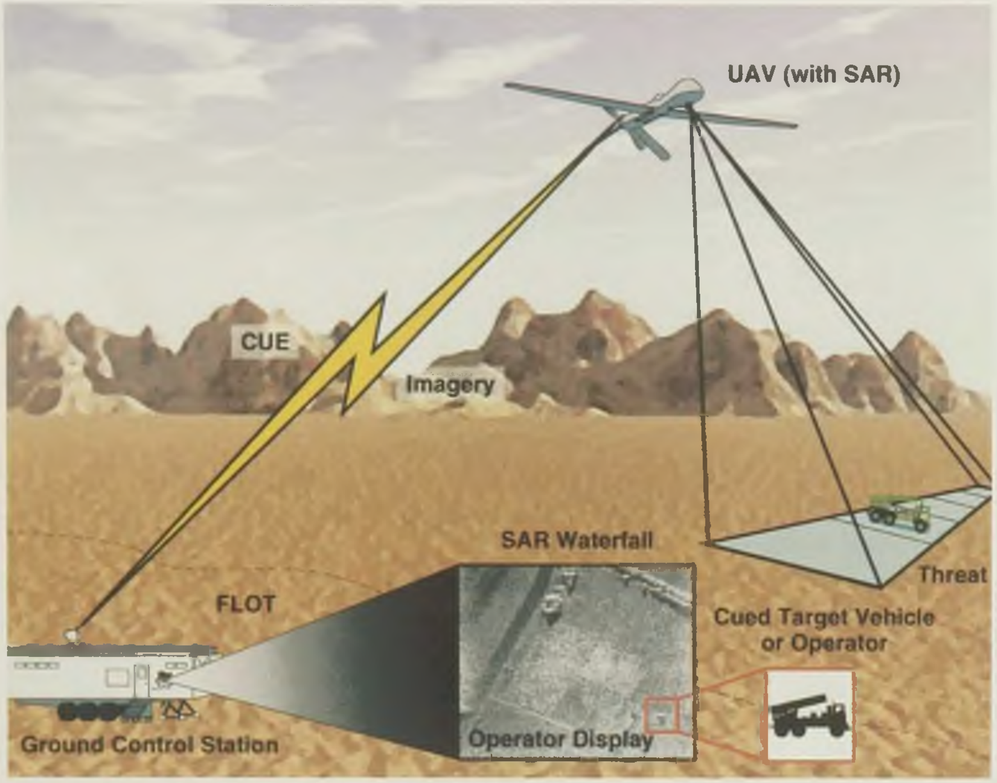
PROGRAM STATUS
- **4QFY98** Delivered first AN/ALQ-211 EMD system.
- **1QFY99** Completed system integration/installation on AH-64D.
- **2QFY99** Accomplished first flight on AH-64D.
- **3QFY99** Completed integrated electronic technical manual validation/verification.
- **4QFY99** Completed initial key personnel training at Mesa, AZ; Completed maintenance and logistics demonstration at Mesa, AZ; Began contractor flight tests at China Lake Electronic Range.

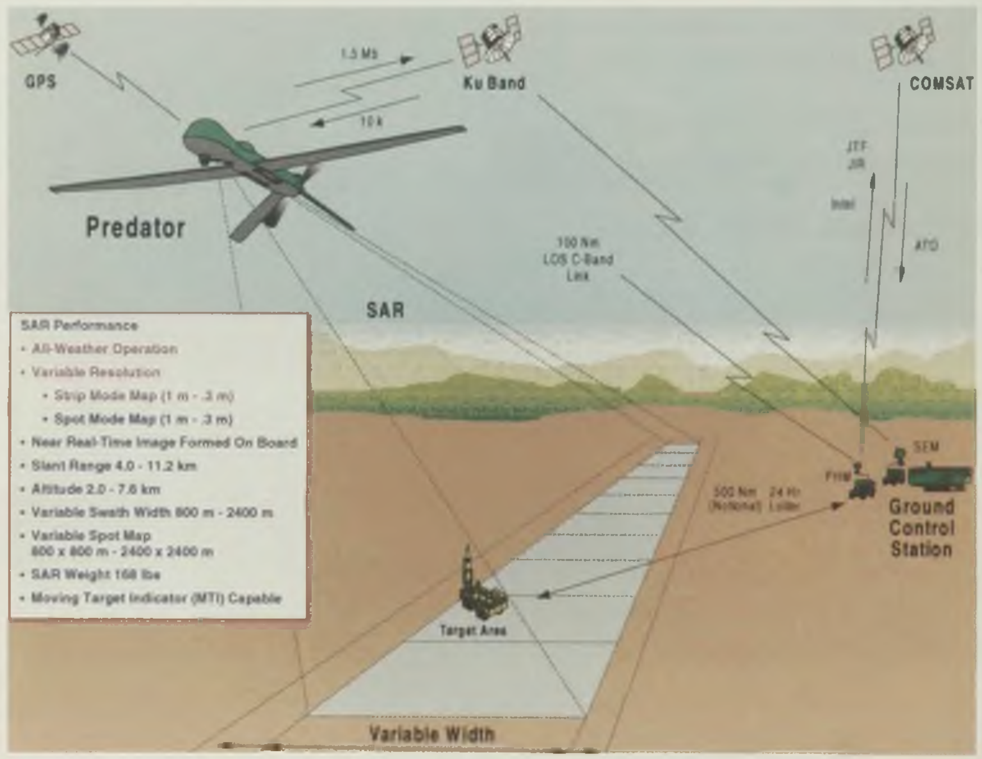
PROJECTED ACTIVITIES
- **4QFY01** EMD Complete.
- **1QFY02** Limited user test complete; SIRFC low rate initial production.
- **4QFY02** Initial operational test and evaluation complete.
- **1QFY03** Milestone III decision scheduled.
- **FY05** First unit equipped.

PRIME CONTRACTORS
International Telephone and Telegraph (ITT) (Clifton, NJ)

* See appendix for list of subcontractors

Tactical Endurance Synthetic Aperture Radar (TESAR)





Tactical Endurance Synthetic Aperture Radar (TESAR)

Modernization

MISSION

Provide the Medium Altitude Endurance Unmanned Aerial Vehicle (MAE UAV) with continuous all-weather coverage of worldwide targets, enabling continuous reconnaissance, surveillance, and target acquisition.

DESCRIPTION AND SPECIFICATIONS

The Tactical Endurance Synthetic Aperture Radar (TESAR) is key to the Office of the Secretary of Defense-sponsored MAE UAV Advanced Concept Technology Demonstration (ACTD) program. This ACTD quickly satisfied the need for long-dwell coverage and reconnaissance of small, mobile, or fixed targets. The program also developed concepts of operation for endurance UAVs. The TESAR sensor weighs 168 lb and provides high-quality 0.3-meter to 1-meter operator-selected variable resolution imagery. This payload performs aerial image formation processing and downlinks continuous high-quality strip map imagery (800 m wide) for analysis and distribution to the user. Collected data is stored in the ground station, and selected images are disseminated via satellite link to various intelligence nodes.

TESAR consists of two subsystems: the SAR payload and the SAR ground control station (GCS) elements. The SAR payload consists of three line-replaceable units: the antenna, the receiver/transmitter, and the processor. The SAR system has three modes of operation. Mode 1 provides mapping parallel to the flight path, even during turns or along curved paths, minimizing gaps in the center of the image. Mode 2 is the classic strip map mode: Mapping occurs over a predetermined scene center irrespective of the aircraft's movement. Mode 3 is the variable resolution pseudo-spot mode: A selected area is continuously mapped as the aircraft moves through the area.

High reliability, modular design, and comprehensive built-in diagnostic capability enable simplified maintenance and support. The TESAR GCS elements provide the primary image display and diagnostics for the SAR payload. TESAR's GCS consists of a single interface/archive rack assembly, featuring a graphics server, a high-resolution color monitor, a power control panel, and other peripherals. This assembly also interfaces from the wide-band satellite to the datalink.

FOREIGN COUNTERPART

No known foreign counterpart

FOREIGN MILITARY SALES

None

PROGRAM STATUS

- Delivered 19 production SAR systems, 4 sets of SAR spares, 6 SAR ground control workstations, and 4 sets of SAR workstation spares.
- Contract delivery pending on 47 SAR systems.

PROJECTED ACTIVITIES

- Continue deliveries of production SAR systems.
- Undertake future enhancements including: Power PC upgrade, enhanced built-in test, and ruggedized PC ground support equipment.

PRIME CONTRACTORS

Northrop Grumman (Baltimore, MD)

* See appendix for list of subcontractors

MISSION
Serve as an interface between national systems and in-theater tactical forces, as well as receive data from selected theater sensor systems.

DESCRIPTION AND SPECIFICATIONS
The Tactical Exploitation System (TES) is the Army's system for the 21st century. It will replace the Advanced Electronic Processing and Dissemination System (AEPDS), Enhanced Tactical Radar Correlator (ETRAC) and the Modernized Imagery Exploitation System (MIES). The system combines existing capabilities of the AEPDS, MIES, and ETRAC into a single integrated, scalable system designed for split-based operations. TES interfaces with numerous satellite and aircraft tactical sensors and processes/exploits their data, imagery, and information. TES is designed for split-based deployment and will consist of forward and main elements. TES Forward is a highly mobile, High Mobility Multipurpose Wheeled Vehicle (HMMWV)-based element configuration; TES Main is housed in vans. Each element has similar operational, communications, and support capabilities.

TES is designed to provide the commander maximum flexibility to satisfy intelligence needs in a wide range of operational scenarios. TES provides multiple configurations, ranging from one C-130 deployable HMMWV early-entry capability to collocated main and forward elements with up to 40 operator workstations. TES operators can perform any imagery intelligence (IMINT), signal intelligence (SIGINT), cross-intelligence, or dissemination function from any system workstation. TES provides quick setup/tear-down and C-130 drive-on/drive-off capability to support rapid deployment.

The TES system is a key part of the emerging Distributed Common Ground Station-Army (DCGS-A) architecture.

FOREIGN COUNTERPART
No known foreign counterpart

FOREIGN MILITARY SALES
None

PROGRAM STATUS
- **1QFY00** Fielding of TES #1 Forward to XVIII Airborne Corps completed.
- **2QFY00** Contract awarded for TES follow-ons (5 TES Forward, 2 TES Main, and 10 Division TES and 12 TES-Lights are currently funded within the Program Objective Memorandum).
- **1QFY01** Fielding of TES Main #1 to Fort Bragg, NC.

PROJECTED ACTIVITIES
- **3QFY01** Participate in Fleet Battle Experiment India.
- **4QFY01** TES Trainer initial operational capability at Fort Huachuca; Field TES-Forward to V CORPS; Field TES-Main initial capability to 513th MI.

PRIME CONTRACTORS
Northrop Grumman (Linthicum, MD)

* See appendix for list of subcontractors

Tactical Operations Centers (TOCs)

Tactical Operations Centers (TOCs)

Modernization

MISSION

Develop and field operationally effective, affordable, and supportable integrated, digitized Tactical Operations Centers (TOCs) that meet the functional information requirements of commanders and staffs at all echelons of command.

DESCRIPTION AND SPECIFICATIONS

TOCs incorporate Army Battle Command Systems (ABCSs), standard vehicles, shelters, and tentage, and are transportable in military aircraft. TOCs are digitized, tactically mobile, and fully integrated. Military off-the-shelf, non-developmental items, commercial off-the-shelf, and emerging technologies are incorporated. The TOCs are Defense Information Infrastructure/Common Operating Environment and Joint Technical Architecture compliant.

TOCs are interoperable across all Army mission areas and joint/allied command and control nodes, and provide a common operational picture to the warfighter. TOCs are also modular and provide a "jump" or split-based capability. Operations are revolutionized through a combination of state-of-the-art data processing, communications, and information transport methods, using the tactical internet and the latest networking capabilities. Information dominance is achieved through the orderly evolution of capabilities that were demonstrated during Advanced Warfighting Experiments. These include collaborative planning, improved large screen displays, new data radios and the tactical internet.

FOREIGN COUNTERPART

No known foreign counterpart

FOREIGN MILITARY SALES

None

PROGRAM STATUS

- **2QFY97** Established TOC program.
- **1QFY00** First TOC delivered to the 4th Infantry Division (First Digitized Division).
- **4QFY00** Completed integration, upgrade, training, and fielding; Concluding Army Warfighter Exercise and recovery re-configuration for Joint Contingency Force.

PROJECTED ACTIVITIES

- **FY01** Complete Fielding to 4th Infantry Division; Start Fielding to 1st Cavalry Division (Second Digitized Division); Integrate Third Army Mobility Module (TRW prime contractor); Complete fielding to 1st Interim Brigade Combat Team.
- **FY02** Complete fielding to 2nd Brigade Combat Team.
- **FY03** Complete fielding to 1st Cavalry Division.
- **FY04** Complete fielding to III Corps.

PRIME CONTRACTORS

Motorola (Huntsville, AL); TRW (Huntsville, AL)

* See appendix for list of subcontractors

Tactical Unmanned Aerial Vehicle (TUAV)

MISSION
Provide reconnaissance, surveillance, and target acquisition (RSTA) to U.S. Army brigades and regiments at an initial range of 50 km, day or night, in limited adverse weather conditions with a future, objective range extending to 200 km.

DESCRIPTION AND SPECIFICATIONS
The Tactical Unmanned Aerial Vehicle (TUAV) is intended for use in environments where real-time information feedback is needed, but manned aircraft are unavailable, or excessive risk or other conditions render use of manned aircraft imprudent. A TUAV system consists of two ground control stations (GCSs), one portable ground control station, one portable ground data terminal, four remote video terminals (RVTs), a minimum of three air vehicles (AVs), modular mission payloads, and launch and recovery equipment.

The GCS collects, processes, analyzes, and distributes digitized battlefield information by interfacing with present and planned service command, control, communications, computers and intelligence (C4I) systems. Flight and mission commands are sent to the AVs from the GCS. RSTA imagery and AV position data are downlinked directly to the GCS or RVTs located in tactical operations centers of the brigade, its subordinate battalions, and/or the direct support artillery or supporting aviation units. The complete TUAV system is transportable by two C-130 aircraft. Mission capability will be enhanced as advanced mission payloads become available, maximizing battlefield digitization to increase the effectiveness of other weapon systems.

FOREIGN COUNTERPART
Several of our allies are operating systems of a similar class, namely the United Kingdom (Phoenix), Israel (Searcher and Searcher II), France (Fox AT) and Sweden (Ugglan). Denmark, Belgium, and the United Kingdom are developing requirements or acquiring systems in the TUAV class. Open literature suggests that many countries have some type of system, but most are experimental.

FOREIGN MILITARY SALES
None

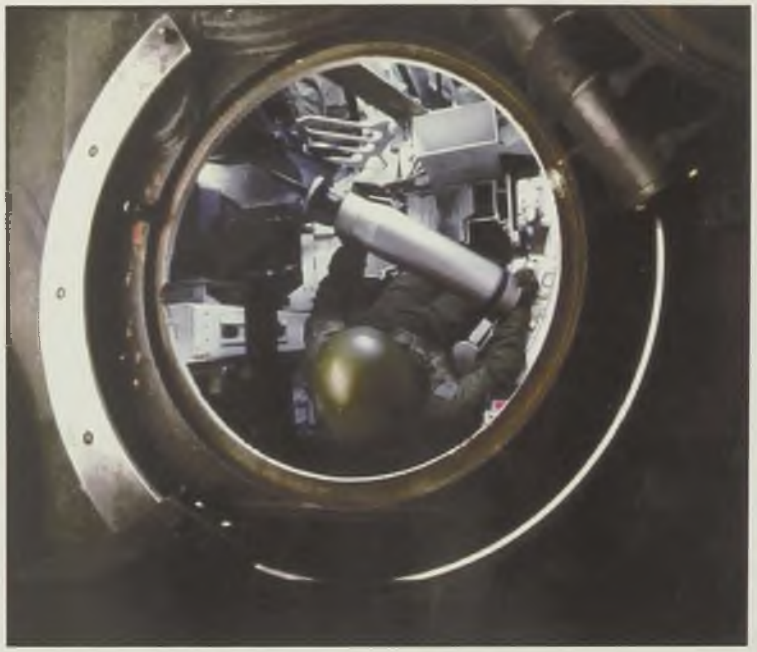
PROGRAM STATUS
- The Shadow 200 TUAV has completed a lengthy and successful developmental flight-test series in preparation for Operational Tempo testing and for risk mitigation. This test series integrated the Tactical Automatic Landing System (TALS) and a new Electro-Optic/Infrared (EO/IR) sensor payload.
- A Hunter UAV system is being used as a TUAV surrogate in the Interim Brigade Combat Teams (IBCT) until the TUAV can be fielded. Its configuration has been modified to mirror the TUAV.
- The TUAV acquisition strategy has been modified to accelerate the program to deliver the system to the field in support of the Army's Transformation. This will result in a fielding 10 months earlier than the previous schedule.
- First low rate initial production (LRIP) systems were scheduled to be delivered to the Army beginning in November 2000.
- The Hunter UAV is at the Joint Readiness Training Center, the U.S. Army Training and Doctrine Command schoolhouse, the 504th Military Intelligence Brigade/III Corps, and at Ft. Lewis with the IBCTs, until the TUAV is fielded. The Hunter is being used to support the continued development of UAV tactics, techniques, and procedures; concept of operations; and light-force UAV spiral development and experimentation.

PROJECTED ACTIVITIES
- **FY01** Operational Tempo exercise; Initial operational test and evaluation; LRIP II decision and also a Milestone III review.
- **FY02** Full-rate production; First unit equipped and initial operational Capability scheduled.

PRIME CONTRACTOR
AAI Corporation (Hunt Valley, MD)

* See appendix for list of subcontractors

Tank Main Gun Ammunition



MISSION
Provide the United States with world-class, direct-fire main armaments for use in ground combat weapons platforms.

DESCRIPTION AND SPECIFICATIONS
The 120mm family of tank ammunition is the most advanced and lethal tank ammunition in the world. Two types of ammunition are fired from the M256 cannon on the M1A1 and M1A2 Abrams tank: kinetic energy (KE) ammunition is used to defeat the heavy frontal armor of main battle tanks; multi-purpose (MP) ammunition is used against lightly-armored vehicles, helicopters, buildings, bunkers, and infantry.

KE lethality is optimized by firing a maximum-weight projectile at the greatest velocity possible. The 120mm series of KE ammunition (M829, M829A1, M829A2, and M829E3) use penetrators of increased mass and length, lighter sabots, and more powerful propulsion systems. Two key components of U.S. KE rounds: are depleted uranium (DU) penetrators that provide extremely dense material with excellent armor penetration capabilities, and aluminum or lightweight graphite composite sabots.

MP rounds use a high explosive, shaped-charge warhead to provide blast, armor penetration, and fragmentation effects. The M830A1's sub-caliber discarding sabot projectile gives it higher velocity, decreased drag, and increased accuracy over the M830 cartridge. Its proximity sensor provides anti-helicopter capability. The XM908 high-explosive obstacle-reduction cartridge reduces large concrete obstacles, buildings, bunkers, and light armors. It is identical to the M830A1 except that the proximity sensor is replaced with a steel nose. It is fielded to U.S. forces in Korea. The XM1002 MPAT Trainer will simulate the M830A1 MPAT configuration and ballistics.

Smart precision munitions enable precision strikes against high-value targets at extended ranges. The XM1007 Tank Extended Range Munition-Kinetic Energy (TERM-KE) is a soft-launch, rocket-boosted, terminally-guided, kinetic-energy munition. TERM will operate to extended ranges in line-of-sight and non-line-of-sight fire modes.

The **Long Range Kinetic Energy (LRKE) Trainer** will replicate tactical KE cartridges with long rod penetrators. The XM1028 Canister Cartridge will provide anti-personnel capability at short ranges. Currently, the LRKE and Canister Cartridges are unfunded requirements, but the PM Office is seeking funding to attain these capabilities.

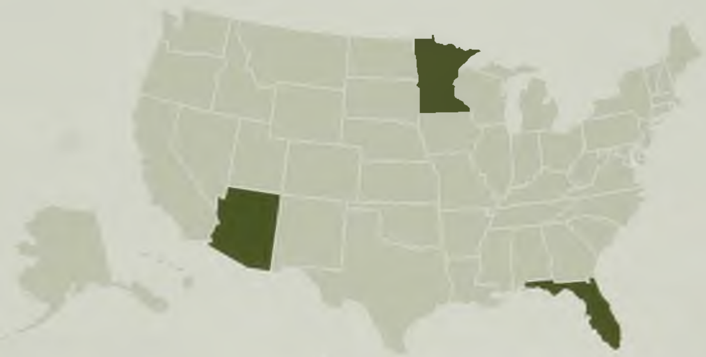
FOREIGN COUNTERPART
NATO tanks employ KE and MP ammunition, but only France and the United Kingdom use DU penetrators. No NATO countries use tank ammunition with composite sabots or proximity switches. The XM1007 has no counterparts worldwide.

FOREIGN MILITARY SALES
M829: Kuwait, Saudi Arabia; M830: Kuwait, Egypt.

PROGRAM STATUS
- **M829, M829A1, M829A2, M830, M830A1, and XM908:** Fielded.
- **M829A2:** In production, completion of deliveries in 3QFY01.
- **M829E3:** In the engineering and manufacturing development (EMD) phase.
- **M830A1:** In production, completion of deliveries in 2QFY02.
- **XM908:** In production with delivery scheduled in 2QFY01.
- **XM1002 MPAT Trainer:** In the EMD phase.
- **XM1007 TERM-KE:** Concept exploration phase; Candidate for TERM science and technology objective.

PROJECTED ACTIVITIES
- **M829E3:** Commence M829E3 initial production in 1QFY02.
- **XM908:** Exercise option for 3,100 cartridges in 3QFY01.
- **XM1002:** Achieve type classification-low rate production in 3QFY03.
- **TERM:** Begin program definition risk reduction in 1QFY02.
- **XM1028:** Begin EMD in FY03.
- **LRKE:** Begin EMD in FY03.

PRIME CONTRACTORS
M829A2 and XM908: Primex Technologies (St. Petersburg, FL)
M829E3, M830A1, and XM1002: Alliant Techsystems (Hopkins, MN)
XM1007: Alliant Techsystems (Clearwater, FL)
TERM: Alliant Techsystems (Hopkins, MN), Raytheon (Tucson, AZ)



* See appendix for list of subcontractors

Theater High Altitude Area Defense (THAAD) System

MISSION

Provide theater-wide area defense of tactical ballistic missile (TBM) threats, including weapons of mass destruction, operating in the endo- and exo-atmosphere and directed against military forces and strategic geopolitical assets.

DESCRIPTION AND SPECIFICATIONS

The Theater High Altitude Area Defense (THAAD) system is a theater missile defense (TMD) weapon system designed to intercept short- and medium-range missile threats that will employ increasingly sophisticated warhead technologies. The THAAD system will augment existing and other planned TMD capabilities by engaging threat missiles at higher altitudes and at longer ranges. This intercept capability negates the use of weapons of mass destruction. THAAD's hit-to-kill guidance approach provides a high degree of lethality compared to existing systems with fragmentation warheads.

The THAAD system consists of missiles; launchers; battle management/command, control, communication, computers, and intelligence (BM/C4I) elements; radars; and support equipment. The missile is a hypervelocity, single-stage, solid propellant booster with a unique endo-/exo-atmospheric kill vehicle (KV). The hit-to-kill technology KV, designed to destroy threat warheads, guides to the target using an infrared homing seeker. The launcher uses the Army standard Palletized Load System (PLS) 16-ton truck with a capacity of at least eight missile rounds on a missile pack. The High Mobility Multipurpose Wheeled Vehicle (HMMWV)-based BM/C4I centers will coordinate with the theater air defense command and control system and will control both the engagement and force operations for THAAD.

The BM/C4I will provide automated acquisition and identification of TBM threats, process and disseminate track data, assign weapons, monitor engagements, and guide sensor operations. The THAAD X-band phased-array radar acquires the target at long ranges, tracks it, and provides in-flight updates to the THAAD interceptor prior to intercept. The radar also performs kill assessment to support the decision to commit additional interceptors or to cue lower tier systems such as the PATRIOT system. The THAAD system will support passive defense and attack operations by providing impact-point predictions and launch point estimations. The THAAD system will be fully transportable by C141/C5/C17 military aircraft. Once in theater, the system will use Army standard movers to be highly mobile on highways and unimproved roads. These system capabilities will enable THAAD to be rapidly deployed to any theater on short notice.

FOREIGN COUNTERPART

France and Italy: SAAM, SAMP/N, SAMP/T. Germany: MSAM.

FOREIGN MILITARY SALES

None

PROGRAM STATUS

- **June 23, 2000** Received program Milestone II approval.
- **August 4, 2000** Began engineering, manufacturing, and development contract.
- The program is in the process of developing and conducting extensive ground tests and risk mitigation efforts to maintain a low risk program.
- Eleven flight tests were flown during program definition and risk reduction with the last two tests being successful intercepts.
- The user-operational evaluation system battalion in Ft. Bliss, TX, supports flight testing and soldier training.

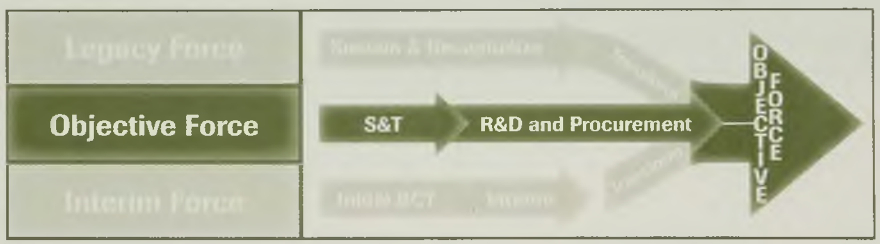
PROJECTED ACTIVITIES

- **3QFY02** System preliminary design review.

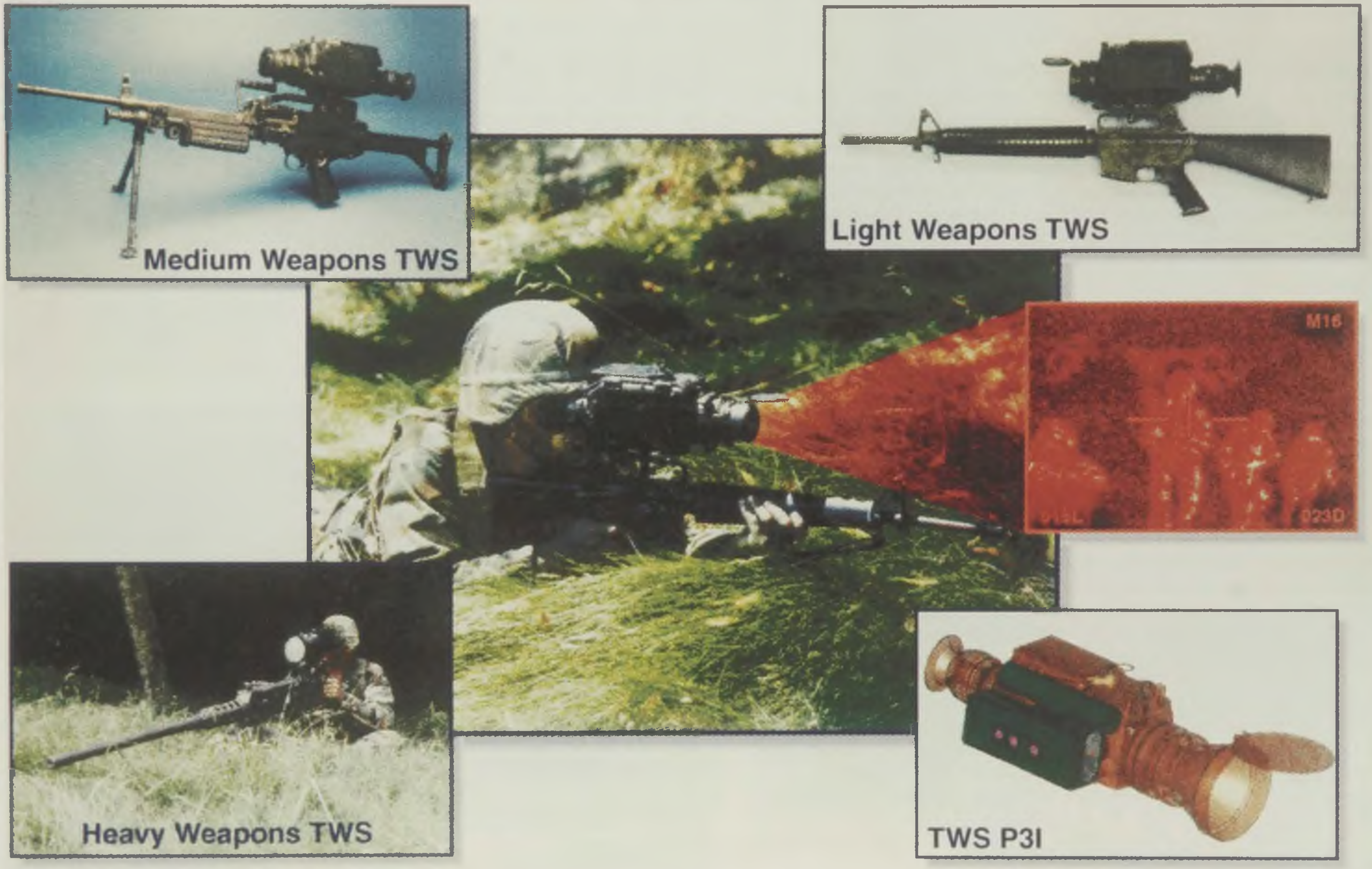
PRIME CONTRACTORS

THAAD System: Lockheed Martin (Sunnyvale, CA)
THAAD Radar: Raytheon (Bedford, MA) (As of FY98, Raytheon has been a prime sub to Lockheed Martin.)

* See appendix for list of subcontractors



Thermal Weapon Sight (TWS)



Medium Weapons TWS

Light Weapons TWS

Heavy Weapons TWS

TWS P3I

MISSION
Provide the U.S. Army infantry with the ability to detect and engage targets day or night during clear or degraded visual conditions caused by smoke, fog, or dust.

DESCRIPTION AND SPECIFICATIONS
The AN/PAS-13 Thermal Weapon Sight (TWS) enables individual and crew-served weapon gunners to see deep into the battlefield; increases surveillance and target acquisition range; and penetrates obscurants, day or night.

The TWS family represents a substantial improvement over the image-intensifier night sights currently in use for small arms. TWS is a Second-Generation Forward Looking Infrared (FLIR), is digital-battlefield compatible, and provides a standard video output for training, image transfer, or remote viewing. The TWS Modular Ballistic Solution (TWS-MBS) will incorporate a laser rangefinder, digital compass, and automatic aimpoint adjustment for improved performance of the M2 heavy machine gun and MK19 grenade machine gun. TWS is in full-rate production.

TWS Family	Range	Weight	Field of View	Weapons Supported
Light TWS**	550m	3.0 lb	15°	M16, M4, M203, M136
Medium TWS	1100m	4.5 lb	9° and 15°	M249, M60, M240B
Heavy TWS	2200m	5.0 lb	3° and 9°	M2, MK19, M24,M16 Squad Ldr

** These weapons are currently supported by the MTWS. LTWS to be qualified in 4QFY01 and fielded by 4QFY02.

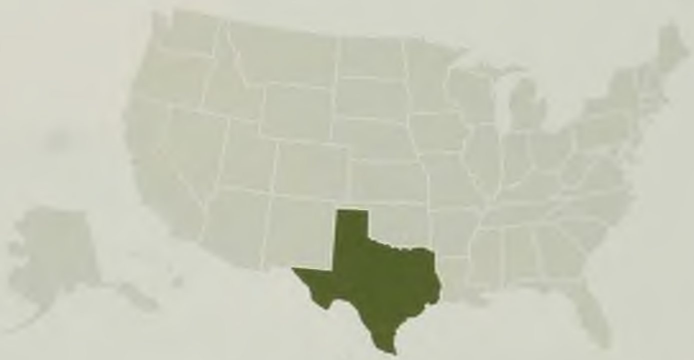
FOREIGN COUNTERPART
Thompson: CSF, BAE Systems.

FOREIGN MILITARY SALES
None

PROGRAM STATUS
- Completed TWS limited production.
- Completing TWS "Bridge" production.
- Initiating Thermal Omnibus full-rate production contract.
- Pursuing TWS-MBS effort for laser rangefinder/digital compass assembly.

PROJECTED ACTIVITIES
- **2QFY01** Final operational test and evaluation Bridge and Thermal Omnibus designs.

PRIME CONTRACTORS
Raytheon (Dallas, TX)



* See appendix for list of subcontractors

MISSION

Provide the next generation missile for light, early entry contingency forces equipped with the TOW Improved Target Acquisition System (ITAS) platforms; defeat threat tanks and armored vehicles equipped with advanced armors and active protective systems at close ranges with minimal U.S. Soldier exposure time.

DESCRIPTION AND SPECIFICATIONS

The TOW Fire and Forget (F&F) missile system is comprised of an encased TOW F&F missile, the shipping and storage container, the ITAS platform applique kits, and upgrades to associated training devices. Key performance parameters, which are not subject to cost as an independent variable trade-offs, include the following:

- Fire and forget mode of operation with an alternate command guidance mode as backup;
- Increased range, lethality, platform survivability;
- Counter-active protection systems threat; and
- Compatibility with TOW ITAS ground platforms.

Future technology insertion and shelf life extension efforts will be accommodated by the TOW F&F modular design and by the transition of applicable technologies from ongoing technology base programs.

FOREIGN COUNTERPART

Euro Missile: TRIGAT.

FOREIGN MILITARY SALES

None

PROGRAM STATUS

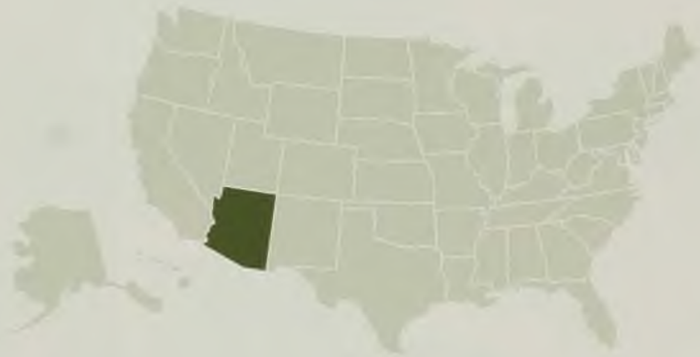
- **4QFY99** TOW F&F operational requirements document approved.
- **3QFY00** PEO for tactical missiles, designated Milestone Decision Authority for TOW F&F; Entry into engineering and manufacturing development (EMD) approved at the Milestone II review.
- **September 15, 2000** The TOW F&F EMD contract awarded to Raytheon.
- **September 27, 2000** Contract kick-off meeting.

PROJECTED ACTIVITIES

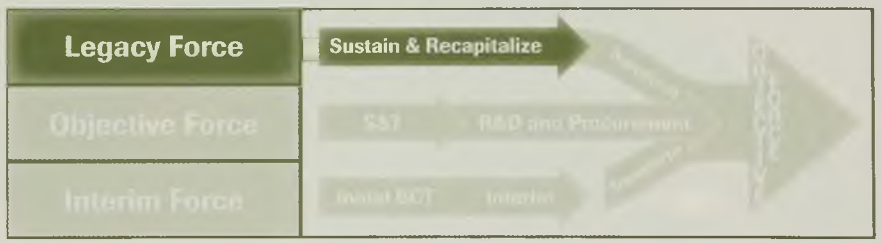
- **1QFY01** Integrated baseline review; Systems requirements review.
- **4QFY01** Preliminary design review.
- **2QFY02** Critical design review.

PRIME CONTRACTORS

Raytheon (Tucson, AZ)



* See appendix for list of subcontractors



TOW Improved Target Acquisition System (ITAS)

MISSION
Defeat threat armored vehicles at extended ranges in all expected battlefield conditions; ensure combat overmatch and dominance at every point on the spectrum of operations.

DESCRIPTION AND SPECIFICATIONS
The TOW Improved Target Acquisition System (ITAS) is a system critical to the Legacy, Interim, and Objective Forces. ITAS is an upgrade to the light infantry's TOW 2 (tube-launched, optically tracked, wire command-link guided) weapon system. The ITAS was chosen as the off-the-shelf Anti-Tank Guided Missile (ATGM) variant readily available to meet the immediate needs of the National Command Authority and the CINCs, in addition to the requirements of the Interim Armored Vehicle (IAV).

ITAS has an improved design with BIT/BITE for increased maintainability and reduced logistics requirements. It also features an improved man-machine interface that improves system engagement performance.

The ITAS will be fielded at battalion level, replacing TOW 2 in light infantry units. The ITAS modification kit consists of an integrated (day/night sight with laser rangefinder) target acquisition subsystem, fire control subsystem, battery power source, and modified traversing unit. The ITAS will operate from the High Mobility Multipurpose Wheeled Vehicle (HMMWV) and the dismount tripod platform.

FOREIGN COUNTERPART
No known direct foreign counterpart. The Hughes Aircraft Company, Spanish-assembled, Light Weight Launcher is a somewhat similar but less capable system.

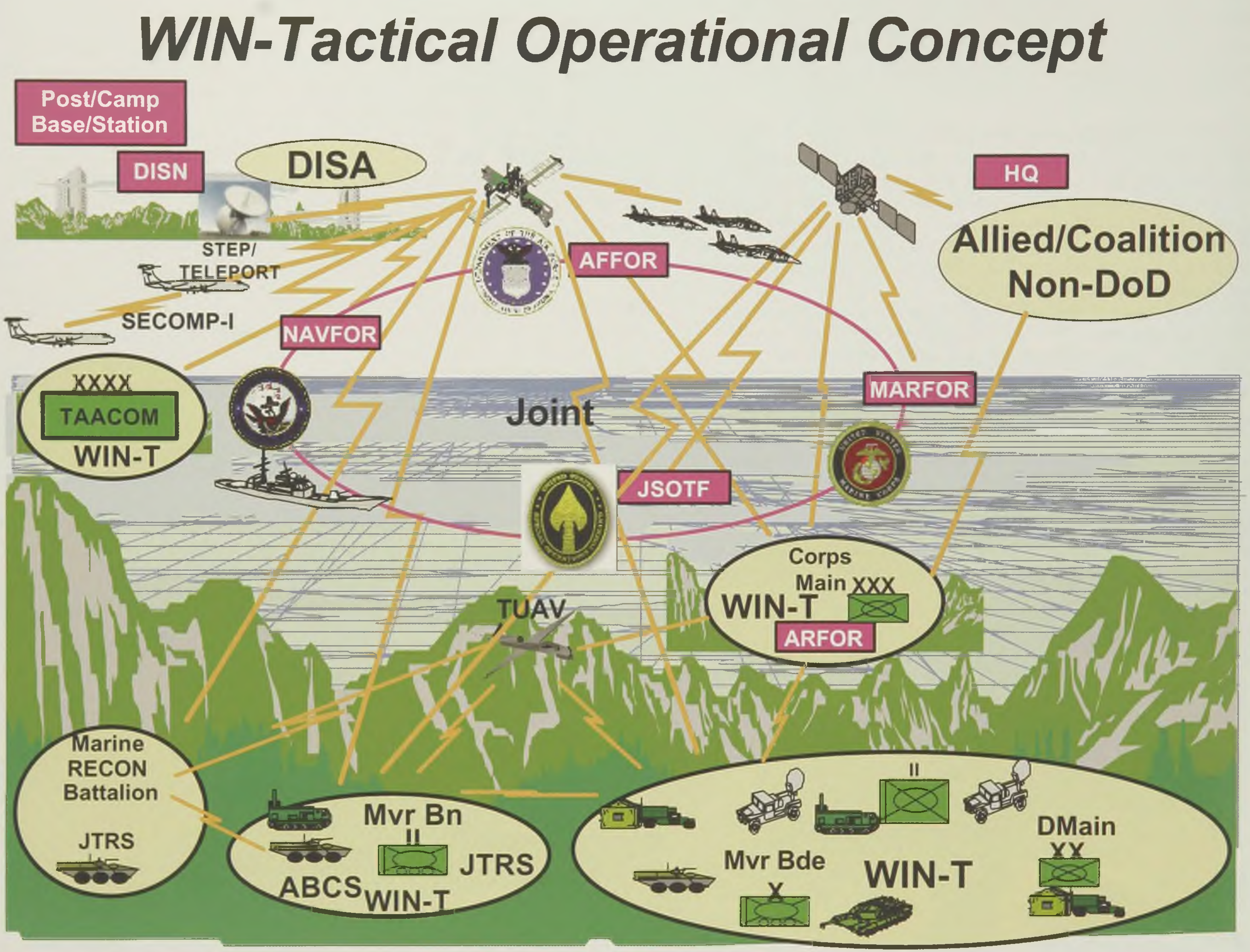
FOREIGN MILITARY SALES
None

PROGRAM STATUS
- **September 30, 1996** ITAS low-rate initial production (LRIP) I contract was awarded, with a production quantity of twenty-five units. LRIP II was awarded March 1998 for a quantity of seventy-four systems.
- **4QFY98** First unit equipped completed to A Troop, 1-17th Cavalry, 82nd Airborne Division.
- **2QFY99** Limited user test II successfully completed.
- **June 2, 1999** Milestone III decision to enter full-rate production (FRP).
- **July 2, 1999** FRP contract was awarded for 102 systems and included priced annual options for FY00–03.
- **1–2QFY00** Fielded to 3rd Brigade, 82nd Airborne Division.
- **3QFY00** Contractor logistics support contract signed.

PROJECTED ACTIVITIES
- **3–4QFY01** Fielding to 1st and 2nd Brigade, 82nd Airborne Division

PRIME CONTRACTORS
Raytheon (McKinney, TX)

* See appendix for list of subcontractors


WIN-Tactical Operational Concept
Post/Camp Base/Station
DISN
DISA
STEP/ TELEPORT
SECOMP-I
HQ
Allied/Coalition Non-DoD
AFFOR
NAVFOR
MARFOR
XXXX
TAACOM
WIN-T
Joint
JSOTF
Corps Main XXX
WIN-T
ARFOR
TUAV
Marine RECON Battalion
JTRS
Mvr Bn
II
JTRS
ABCS
WIN-T
II
Mvr Bde
X
WIN-T
DMain
XX

Warfighter Information Network–Tactical (WIN-T) New Start

Modernization

MISSION

Provide a new tactical networking capability and battlefield communications infrastructure to the warfighter from Theater to Battalion Command Posts/Tactical Operations Centers (CPs/TOCs).

DESCRIPTION AND SPECIFICATIONS

The Warfighter Information Network–Tactical (WIN-T) is the Army's Objective Force "New Start" tactical digital communications system; it will provide advanced commercial-based networking capabilities to the warfighter. WIN-T will replace current Army Mobile Subscriber Equipment (MSE) and Tri-Services Tactical Communications (TRI-TAC) systems, extend a common communication network to the maneuver battalion, and provide a critical part of the Army's Objective Force future networking infrastructure.

The WIN-T network enables command, control, communications, computers, intelligence, surveillance, and reconnaissance capabilities that are mobile, secure, survivable, seamless, and multimedia-based. The network will increase global connectivity; significantly reduce the signal footprint and force structure; provide for command and control on-the-move; and enhance situational awareness. The WIN-T network will enable all Army commanders and other communications network users at all echelons to exchange information internal and external to the theater, from wired or wireless telephones, computers (internet-like capability), video terminals and other multimedia devices.

The WIN-T network comprises the following key elements: switching/routing system, transmission systems, network management system, information assurance, and subscriber services. The network's components will be modular in design, scalable to users' requirements, and capable of adapting to the evolution of the battle.

FOREIGN COUNTERPART

No known foreign counterpart

FOREIGN MILITARY SALES

None

PROGRAM STATUS

- **4QFY00** TRADOC approved the WIN-T Operational Requirements Document (ORD).
- **1QFY01** Joint Requirements Oversight Council ORD approval.

PROJECTED ACTIVITIES

- **3QFY02** Milestone B approval; System integration contract award.
- **2QFY04** In process review; System demonstration contract award.
- **1QFY08** Milestone C approval.
- **2QFY08** Full rate production contract award.
- **FY10** First unit equipped.

PRIME CONTRACTORS

To be determined

MISSION

Provide the heavy brigade combat team with a military-load-class (MLC) 70-ton gap-crossing capability of up to 24 meters with the mobility, survivability, sustainability, and supportability of the maneuver force.

DESCRIPTION AND SPECIFICATIONS

The Wolverine launcher is mounted on a M1A2 Abrams system enhancement program chassis and is operated by a two-man crew. The bridge is 26 meters long and can span gaps up to 24 meters. It supports a MLC, 70-ton crossing at 16 kph. The bridge is launched from under armor in five minutes and retrieved in less than ten minutes.

A critical force modernization item for the engineer regiment, the Wolverine enables heavy force maneuver by allowing units to rapidly transit tank ditches, road craters, and partially damaged bridge sections. This enabler increases the maneuver force's survivability by reducing the time spent in vulnerable areas waiting to cross. The current Armored Vehicle Launched Bridge (AVLB) minimally supports Abrams tank unit crossings at reduced-gap length (15 m) and reduced crossing speeds.

FOREIGN COUNTERPART

China: Type 84; France: AMX (AVLB); Germany: BLG-60, Biber, Leguan Bridge on Leopard I; Russia: MTU-20, MTU-72; Slovakia: MT-55; South Korea: M60A1 AVLB (no K1-based vehicle); United Kingdom: Chieftain.

FOREIGN MILITARY SALES

None

PROGRAM STATUS

- **3QFY98** Awarded low-rate initial production (LRIP) contract.
- **4QFY99** Delivered first vehicle.
- **4QFY99–00** Conducted developmental and live fire testing.
- **1QFY00** Completed extended logistics review.
- **3QFY00** Conducted limited user testing.

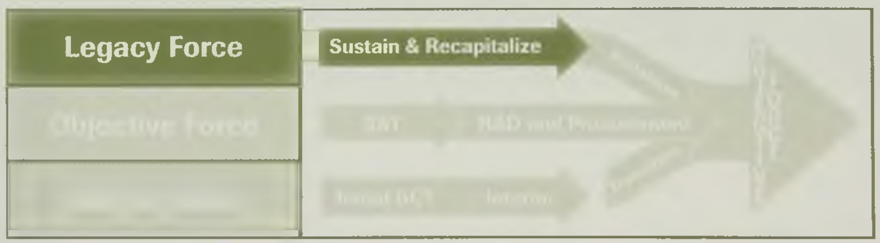
PROJECTED ACTIVITIES

- **2QFY01** Field 12 LRIP vehicles to the First Digitized Division.
- **2Q–3QFY01** Participate in Division Capstone Exercise.
- **4QFY01** Conduct initial operational test and evaluation.

PRIME CONTRACTORS

General Dynamics (Sterling Heights, MI); MAN GHH (Germany)

* See appendix for list of subcontractors



XM777 Joint Lightweight 155mm Howitzer (LW155)

XM777 Joint Lightweight 155mm Howitzer (LW155)

MISSION
Provide close and deep fire support to Army light and Marine Corps maneuver forces.

DESCRIPTION AND SPECIFICATIONS
The XM777 Joint Lightweight 155mm Howitzer (LW155) is a joint Marine Corps/Army program, in which the Marine Corps funds the howitzer research, development, test, and evaluation (RDT&E) and the Army funds the RDT&E for Towed Artillery Digitization (TAD) and other automation enhancements. It will replace the M198 howitzer as a general support system for Army light forces. The Marine Corps will use the weapon in direct support, replacing all existing cannon systems. The XM777 incorporates innovative designs to achieve lighter weight, without sacrificing the range, stability, accuracy, or durability of the current system. The lighter weight is achieved through lower trunnion height and the use of high-strength titanium, a primary component of the lower carriage and cradle assembly. The XM776 cannon tube is a derivative of the U.S. M284 and M199 cannon tubes, ballistically similar to the M199 cannon tube to provide the range of the M198 howitzer. The XM777's lighter weight, smaller footprint, and lower profile provide improved strategic deployment, tactical mobility, and survivability. The automatic primer feeding mechanism, loader-assist, digital fire control, and other automation enhancements provide improved survivability, lethality, and combat reliability, and will provide light artillery with a semi-autonomous capability that is currently found only in self-propelled howitzers.

Weight: 9000 lb or less
Emplace: 3 min or less
Displace: 2 min or less
Maximum range: 30 km (assisted)
Rate-of-fire: 5 rnds/min max, 2 rnds/min sustained
Ground mobility: FMTV, MTVR, current 5-ton trucks
Air mobility: C-5, C-17, C-130, C141, MV-22, CH53D/E, CH47D
155mm compatibility: All fielded and developing NATO munitions
Digital fire control: Self-locating and pointing; on-board firing data computation; digital and voice communications; self-contained power supply. These capabilities are being developed under the TAD Program

FOREIGN COUNTERPART
No known foreign counterpart

FOREIGN MILITARY SALES
The current LW155 engineering and manufacturing development (EMD) phase is a cooperative effort with the United Kingdom and Italy. Future cooperative production agreements with both allies are currently being negotiated.

PROGRAM STATUS
- BAE Systems of the United Kingdom has delivered the first of eight EMD prototype howitzers. The contract with BAE Systems includes options for the first two years of production, starting in FY03. BAE Systems has selected U.S. partners to produce approximately 70 percent of the howitzer.
- The TAD program has completed its Milestone I/II review and General Dynamics Armament Systems (GDAS) has been selected as the prime contractor for the EMD phase of the digital fire control system.

PROJECTED ACTIVITIES
- **1QFY01** Begin Howitzer development testing (DT).
- **1QFY02** Delivery of 8 EMD XM777 completed.
- **3QFY02** Complete Howitzer DT and multi-service operational test and evaluation.
- **4QFY02** Howitzer Milestone III; Conclude Howitzer EMD phase.
- **3QFY04** USMC initial operational capability (IOC).
- **1QFY05** Army IOC.

PRIME CONTRACTORS
Howitzer: BAE Systems (United Kingdom)
TAD: General Dynamics (Burlington, VT)

* See appendix for list of subcontractors

Recapitalization

The Army will rebuild and upgrade currently fielded systems to ensure operational readiness and a zero time/zero miles system. Rebuild refers to the process that restores a system to a like-new condition in appearance, performance, and life expectancy and inserts new technology to improve reliability and maintainability (such as the AH-64A Apache attack helicopter, the M1A1 Abrams tank, the CH-47D Chinook cargo helicopter, the UH-60A Black Hawk utility helicopter, and other items due to undergo rebuild).

Selected upgrade refers to the rebuild of a system and the addition of warfighting capability improvements to address capability shortcomings (such as the M1A2 Abrams, the M2A3 Bradley Fighting Vehicle, the PATRIOT air defense missile system, the AH-64D Apache Longbow helicopter, the CH-47F Chinook/improved cargo helicopter, the Black Hawk UH-60L+, and other items due to undergo qualitative upgrades).

Recapitalization objectives also include reducing operating and support costs, extending useful life, improving reliability, and enhancing capability.


M1A2 System Enhancement Program (SEP)


M1A2


M1A1

MISSION

Provide heavy armor superiority on the battlefield.

DESCRIPTION AND SPECIFICATIONS

The Abrams tank modernization strategy supports the Army Vision. The Abrams tank closes with and destroys enemy forces on the integrated battlefield using mobility, firepower, and shock effect. The 120mm main gun on the M1A1 and M1A2, combined with the powerful 1,500 hp turbine engine and special armor, make the Abrams tank particularly suitable for attacking or defending against large concentrations of heavy armor forces in a highly lethal battlefield.

Features of the M1A1 include increased armor protection; suspension improvements; and a nuclear, biological, and chemical (NBC) protection system that increases survivability in a contaminated environment. The M1A1D modification scheduled for 1535 M1A1s, consists of an M1A1 with integrated Applique+ computer and a far-target-designate capability.

The M1A2 program provides the Abrams tank with the necessary improvements in lethality, survivability, and fightability required to defeat advanced threats. The M1A2 includes a commander's independent thermal viewer, an improved commander's weapon station, position navigation equipment, a distributed data and power architecture, an embedded diagnostic system, and improved fire control system. The M1A2 System Enhancement Program (SEP) adds second-generation thermal sensors and a Thermal Management System (TMS). The SEP includes upgrades to processors/memory that enable the M1A2 to use the Army's common command and control software enabling the rapid transfer of digital situational data and overlays. The Abrams modernization strategy also includes a new engine program, the Abrams Integrated Management (AIM) Overhaul Program, and parts obsolescence program, which will reduce the operational and support costs, and logistical footprint associated with the Abrams.

	M1/IPM1	M1A1	M1A2	M1A2 SEP
Length:	32.04 ft	32.04 ft	32.04 ft	32.04 ft
Width:	12.0 ft	12.0 ft	12.0 ft	12.0 ft
Height:	7.79 ft	8.0 ft	8.0 ft	8.0 ft
Top speed:	45.0/41.5 mph	41.5 mph	41.5 mph	42 mph
Weight:	61.4/62.8 tons	67.6 tons	68.4 tons	69.5 tons
Armament:	105mm	120mm	120mm	120mm
Crew:	4	4	4	4

FOREIGN COUNTERPART

France: Leclerc; Germany: Leopard 2; Israel: Merkava Mk. 3; Italy: C1 Ariete; Russia: T-64, T-72, and T-80; United Kingdom: Challenger 2.

FOREIGN MILITARY SALES

Egypt: 555 M1A1 Kits; Kuwait: 218 M1A2s; Saudi Arabia: 315 M1A2s. A sale of up to 200 more M1A1 kits to Egypt is in process.

PROGRAM STATUS

- Continue upgrade of the M1 to M1A2 SEP until upgrade ends in FY03 with a total of 547 vehicles.
- Beginning in 1999, the AIM program recapitalized the hi-optempo M1A1s. Recapitalization is scheduled to continue until 2012. The modification of 1,535 M1A1s to the M1A1D configuration occurs primarily in the ongoing AIM overhaul program.

PROJECTED ACTIVITIES

- **FY01–12** M1A2 to M1A2 SEP Retrofit Program. The total M1A2 SEP fleet is projected to be 1,174 vehicles.
- **1QFY01** Complete follow-on operational test and evaluation of the M1A2 system SEP at Ft. Hood.
- **2–4QFY01** Participate in the Division Capstone Exercises.
- **2QFY01** M1A2 SEP and M1A1D fully fielded to First Digital Division (4th Infantry Division).

PRIME CONTRACTORS

General Dynamics (Sterling Heights, MI; Warren, MI; Muskegon, MI; Scranton, PA; Lima, OH; Tallahassee, FL)

* See appendix for list of subcontractors

MISSION

Conduct rear, close, and deep operations and deep precision strikes; provide armed reconnaissance and security when required in day, night, and adverse weather conditions.

DESCRIPTION AND SPECIFICATIONS

Apache Longbow is a development and acquisition program for a millimeter-wave radar air/ground targeting system capable of being used day, night, in adverse weather, and through battlefield obscurants. Longbow integrates a mast-mounted millimeter-wave fire control radar (FCR), a radar frequency interferometer, and a radar frequency fire-and-forget HELLFIRE missile on the Apache. Longbow's digitized target acquisition system provides automated detection, location, classification, prioritization, and target handover.

The AH-64D cockpit is redesigned to digitize and multiplex all systems. MANPRINT crew stations have multi-function displays to reduce pilot workload and increase effectiveness. The modernized Apache heavy attack team will now be able to provide a truly coordinated rapid-fire capability (servicing 16 separate targets within one minute) to the maneuver force commander on a 24-hour basis in day, night, and adverse weather conditions.

Apache Longbow will add significant warfighting capability to the combined arms team through increased survivability, lethality, versatility, and long-term reliability improvements.

Combat mission speed: 167 mph
Combat range: 300 miles
Combat endurance: 2.5 hours
Mission weight: 16,600 lb
Armament: Hellfire missiles, 2.75" rockets and 30mm chain gun
Crew: 2 (pilot and co-pilot gunner)

FOREIGN COUNTERPART

No known foreign counterpart

FOREIGN MILITARY SALES

The Netherlands, Singapore; commercial sale: United Kingdom.

PROGRAM STATUS

- **1QFY96** The Apache Longbow system completed full scale development and entered the production and deployment phase in October 1995; Completed full-scale development and began production and deployment.
- **2QFY96** The first production model aircraft was delivered in March 1997. Technical successes during the proof-of-principle phase in 1990, initial operational test and evaluation, and the Army's Warfighting Experiment at the National Training Center in the spring of 1997, proved the AH-64D to be an operationally effective and suitable weapon system, far more effective in defeating threat armored vehicles and more survivable against threat air defense weapons than the AH-64A.
- **2QFY97** Delivered first production model aircraft.
- **FY00** Began Second-Generation Forward-Looking Infrared (FLIR) development.
- **4QFY00** Awarded MYII option FY01 to FY05.
- **1QFY01** Awarded Modernized TADS contract (2nd Gen FLIR).
- **Current** The current program objective calls for the remanufacture of 501 AH-64A Apaches, of which 227 will be equipped with FCR and the upgraded T701C engine.

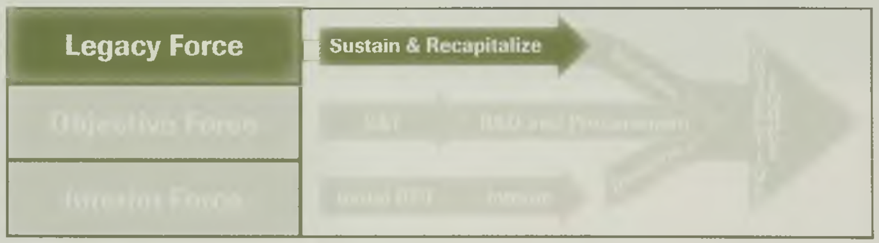
PROJECTED ACTIVITIES

- Continue Apache Longbow fielding.

PRIME CONTRACTORS

Airframe: Boeing (Mesa, AZ)
Fire Control Radar: Lockheed Martin (Orlando, FL); Northrop Grumman (Linthincum, MD)

* See appendix for list of subcontractors



Black Hawk

MISSION
Provide air assault, general support, aeromedical evacuation, command and control, electronic warfare, and special operations support to combat and stability and support operations.

DESCRIPTION AND SPECIFICATIONS
The Black Hawk, along with the Comanche, Apache, and Chinook, is a principal component of the multi-function battalion, the building block of the Aviation Force Structure for the new millennium. The Black Hawk (UH-60) utility tactical transport helicopter has enhanced the overall mobility of the Army, due to dramatic improvements in troop capacity and cargo lift capability, compared to the UH-1 "Huey" it replaces. On the asymmetric battlefield, it provides the commander the agility to get to the fight quicker and to mass effects throughout the battlespace across the full spectrum of conflict. An entire 11-person, fully equipped infantry squad can be lifted in a single Black Hawk, transported faster than in predecessor systems, in most weather conditions. The Black Hawk can reposition a 105mm Howitzer, its crew of six, and up to 30 rounds of ammunition in a single lift. The aircraft's critical components and systems are armored or redundant, and its airframe is designed to progressively crush on impact to protect the crew and passengers.

	UH-60A	UH-60L
Max gross weight:	20,250 lb	22,000 lb, 23,500 lb (external cargo)
Cruise speed:	139 kt	150 kt
Endurance:	2.3 hr	2.1 hr
Max range:	320 nm	306 nm
External load:	8,000 lb	9,000 lb
Internal load:	2,640 lb (or 11 combat equipped troops)	
Crew:	2 pilots, 2 crew chiefs	
Armament:	Two 7.62mm machine guns	

FOREIGN COUNTERPART
French: Puma, NH90; Russia: HIP series aircraft; United Kingdom: Lynx, EH-101.

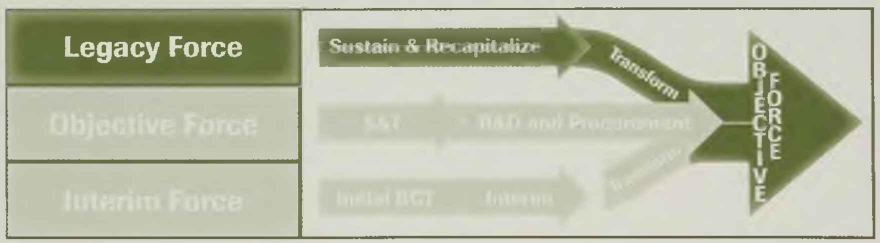
FOREIGN MILITARY SALES
Bahrain, Colombia, Egypt, Israel, Saudi Arabia.
Commercial Sales: Argentina, Australia, Bahrain, Brazil, Brunei, China, Greece, Hong Kong, Japan, Jordan, Malaysia, Mexico, Morocco, Philippines, Spain, Taiwan, Thailand, Turkey.
Co-production: Republic of Korea.

PROGRAM STATUS
- **1989** Initiated fielding of UH-60L model Black Hawks following an upgrade to the power train.
- **FY00** Initiated risk reduction activities under the research, development, test and evaluation program to integrate and qualify the UH-60M; Initiated a program to recapitalize and upgrade the now over twenty-year-old UH-60A model Black Hawks to the UH-60M configuration. The UH-60M will include a digitized cockpit to provide situational awareness, a standardized configuration to include the T701C engine and power train, and a zero-time, zero-mile service life extension.

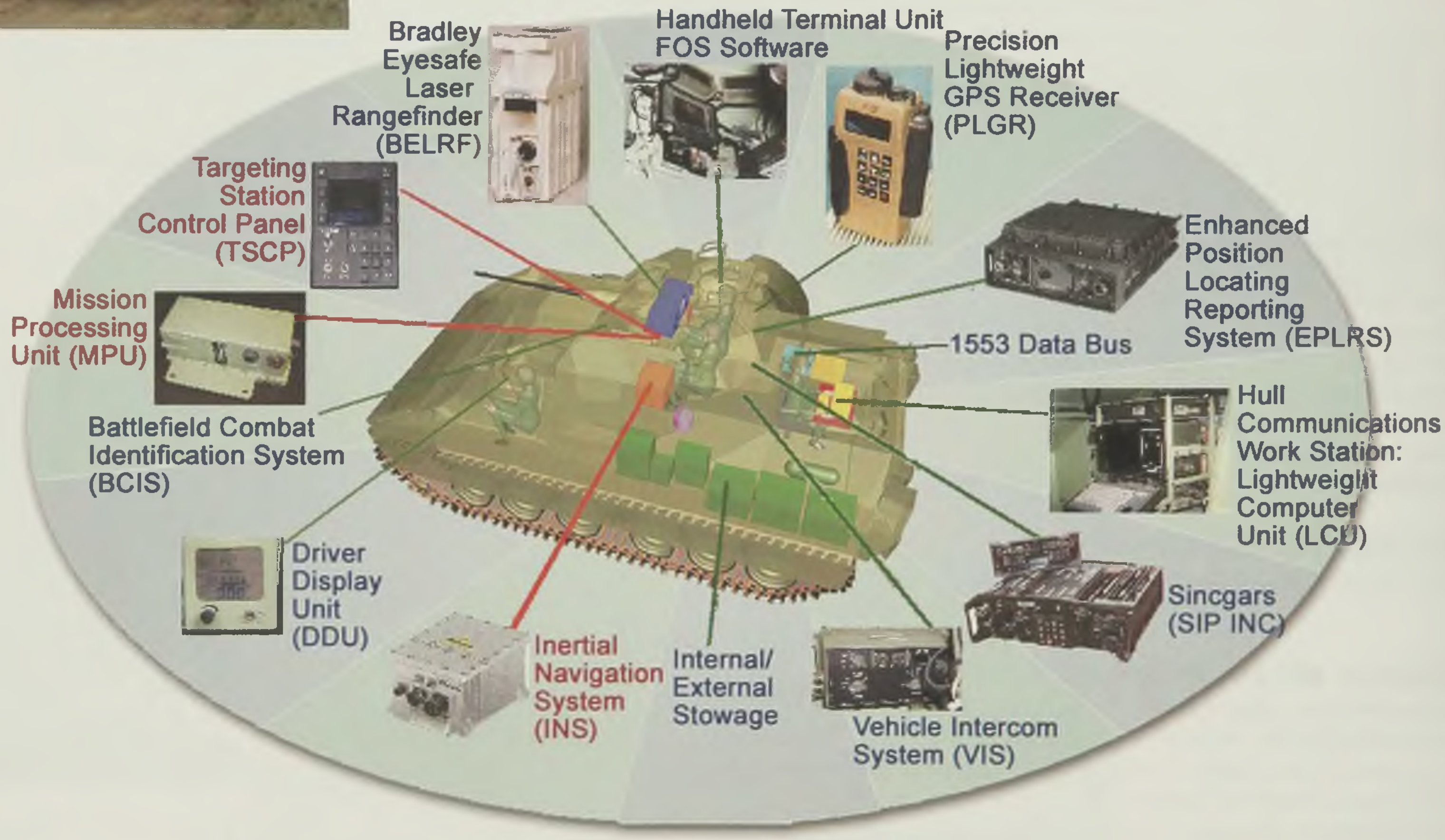
PROJECTED ACTIVITIES
- Continue procurement of UH-60L aircraft through 2007, with 1723 aircraft procured.
- **FY02** Convert first UH-60A MEDEVAC aircraft to UH-60Q modern air ambulance configuration.
- **FY03** Recapitalize and upgrade first UH-60A to UH-60M configuration.

PRIME CONTRACTORS
United Technologies (Stratford, CT); General Electric (Lynn, MA)

* See appendix for list of subcontractors



Bradley Fire Support Team (BFIST) Vehicle



Bradley Fire Support Team (BFIST) Vehicle

Recapitalization

MISSION
Provide an integrated Bradley-based fire-support platform that enables company fire-support teams and battalion/brigade fire-support officers to plan, coordinate, execute, and direct timely, accurate, indirect fires.

DESCRIPTION AND SPECIFICATIONS
Plans for the Bradley Fire Support Team (BFIST) Vehicle production include both Bradley M2A2 Operation Desert Storm-based improvements (M7 BFIST) and M2A3 variants (A3 BFIST). Characteristics include the following:

Length: 30.96 ft
Width: 17.04 ft with armor tiles; 15.48 ft with armor skirts
Height: 14.04 ft
Weight: 60,000 lb combat-loaded
Power train: 600 hp Cummins V093T diesel engine with GM-Allison HMPT-500-3 hydromechanical automatic transmission
Cruising range: 250 mi
Road speed: 38 mph
Crew: 4
Vehicle armament: 25mm Bushmaster cannon; 7.62mm, M240C machine gun
Distribution: Armor/infantry brigades-battalions; cavalry regiments-squadrons, field artillery battalions
Current models/variants: M7 BFIST, A3 BFIST

FOREIGN COUNTERPART
Commonwealth of Independent States: BMP PRP-3, BMP PRP-4; France: AMX-10 PAC-90, AMX VTT/LT; United Kingdom: MCV-80 Warrior MAOV, FV-432 AV.

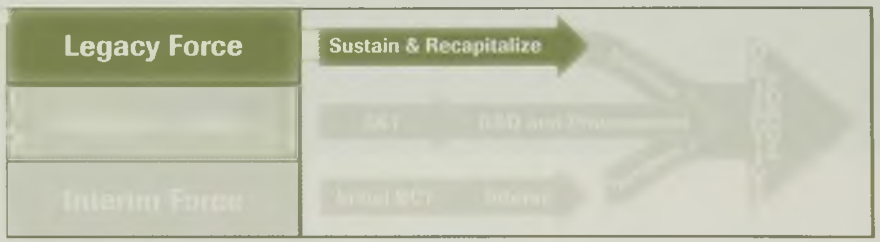
FOREIGN MILITARY SALES
None

PROGRAM STATUS
- M7 BFIST continues in full rate production (FRP).
- A3 BFIST development contract delivered first vehicle 1QFY01 for test validation.

PROJECTED ACTIVITIES
- Continue M7 BFIST FRP.
- Fielding to Third Infantry Division, III Corps, and Second Infantry Division in Korea.

PRIME CONTRACTORS
United Defense, L.P. (York, PA; San Jose, CA); Systems & Electronics, Inc. (St. Louis, MO; Sanford, FL); Honeywell (Clearwater, FL)

* See appendix for list of subcontractors



Bradley M2 Infantry/M3 Cavalry Fighting Vehicle

Bradley M2 Infantry/M3 Cavalry Fighting Vehicle
Recapitalization

MISSION
Provide infantry and cavalry fighting vehicles with digital command and control capabilities, significantly increased situational awareness, enhanced lethality, survivability, and improved sustainability and supportability.

DESCRIPTION AND SPECIFICATIONS
The Bradley M2A3 Infantry/M3A3 Cavalry Fighting Vehicle (IFV/CFV) has the following specifications:

Length: 30.96 ft
Width: 17.04 ft with armor tiles; 15.48 ft with armor skirts
Height: 14.04 ft
Weight: 67,000 lb combat loaded
Power train: 600 hp Cummins VTA-903T diesel engine with GM-Allison HMPT-500-3EC hydro-mechanical automatic transmission
Cruising range: 250 mi
Road speed: 38 mph
Crew: M2A3: 9 (3 crew; 6 dismounts); M3A3: 5 (3 crew; 2 dismounts)
Vehicle armament: 25mm Bushmaster cannon; TOW II missile system; 7.62mm M240C machine gun
Vehicle features: Two Second Generation Forward Looking Infrareds (FLIRs) in the Improved Bradley Acquisition System (IBAS) and Commanders Independent Sight (CIV) provide "Hunter-Killer target hand-off" capability with ballistic fire control system; Embedded diagnostics; Integrated combat command and control digital communications suite hosting Force XXI Battle Command Brigade-and-Below (FBCB2) package with digital maps, messages and friend/foe situational awareness; Position navigation system with GPS and inertial navigation system; Enhanced squad situational awareness with squad leader display integrated into vehicle digital images and IC3
Current models/variants: Bradley M2/M3 A0, A2, A2 ODS (Operation Desert Storm), A3 IFV/CFVs, Bradley Fire Support Team (BFIST) Vehicle, Bradley Linebacker, and MANPADS Under Armor

FOREIGN COUNTERPART
China: Type 90, WZ-503; Commonwealth of Independent States: BMP 1, 2, and 3; France: AMX-10P, AMX VCI; Germany: Marder 1; United Kingdom: MCV-80 Warrior, FV-432.

FOREIGN MILITARY SALES
Bradley M2A2s: Royal Saudi Land Forces, Kingdom of Saudi Arabia.

PROGRAM STATUS
- **FY99** The Bradley Program Office completed upgrading Bradley A1s to the A2 configuration, thereby eliminating Bradley A1s from the American inventory; The Bradley A3 completed its planned digital command and control integration, live fire vulnerability testing.
- **1QFY01** Current Bradley A2 to A2 ODS modification for the Active Army continues, as well as the conversion of Bradley A0 to A2 ODS for the Army National Guard, and the A2 to A3 remanufacture effort; Bradley A3 completed initial operational test and evaluation; Bradley A3 has completed fielding to two A3 Battalions along with one Battalion of A2 ODS-D retrofitted to meet First Digital Division timelines.

PROJECTED ACTIVITIES
- **FY01** Continue modification of Bradley A2s to A2 ODS and fielding; Continue ARNG A0 conversion to A2 ODS.
- **1QFY01** Bradley A3 first unit equipped.
- **2QFY01** Division Capstone Exercise; Bradley A3 full-rate production decision.

PRIME CONTRACTORS
United Defense, L.P. (San Jose, CA; Fayette, PA; York, PA; Arlington, VA)

* See appendix for list of subcontractors

CH-47 Chinook/Improved Cargo Helicopter (CH-47F)

CH-47 Chinook/Improved Cargo Helicopter (CH-47F)
Recapitalization

MISSION
Transport ground forces, supplies, ammunition, and other battle-critical cargo in support of worldwide combat and contingency operations.

DESCRIPTION AND SPECIFICATIONS
As the Army's only heavy-lift cargo helicopter capable of intra-theater cargo movement of payloads greater than 9,000 lb, the CH-47 Chinook/Improved Cargo Helicopter (CH-47F) is an essential component of the Army Vision. The CH-47F program will remanufacture 300 of the current fleet of 431 CH-47D Chinook helicopters, install a new digital cockpit, and make modifications to the airframe to reduce vibration.

The upgraded cockpit will provide future growth potential and will include a digital data bus that permits installation of enhanced communications and navigation equipment for improved situational awareness, mission performance, and survivability. Airframe structural modifications will reduce harmful vibrations, reducing operations and support (O&S) costs and improving crew endurance. Other airframe modifications reduce by approximately 60% the time required for aircraft tear down and build-up after deployment on a C-5 or C-17. These modifications significantly enhance the Chinook's strategic deployment capability.

A separate, but complementary effort, is the installation of more powerful and reliable T55-GA-714A engines that improve fuel efficiency and enhance lift performance by approximately 3,900 pounds. Installation of an improved crashworthy extended range fuel system (ERFS II) will enable Chinook self-deployment and extend the operational radius of all other missions. A program is also underway to reduce O&S costs through the joint development with the United Kingdom of a low-maintenance rotor hub.

Max gross weight: 50,000 lb
Max cruise speed: 170 knots/184 miles per hour
Troop capacity: 36 (33 troops plus 3 crewmembers)
Litter capacity: 24
Sling-load capacity: 26,000 lb center hook, 17,000 lb forward/aft hook, 25,000 lb tandem
Minimum crew: 3 (pilot, co-pilot, and flight engineer)

FOREIGN COUNTERPART
Russia: MI-26; United Kingdom: EH-101.

FOREIGN MILITARY SALES
Australia, Egypt, Greece, Taiwan. Direct Sales: Korea, Netherlands, Singapore, Spain, and United Kingdom.

PROGRAM STATUS
CH-47F program:
- **3QFY98** Awarded the engineering and manufacturing development (EMD) contract, slated for completion FY02.

T55-GA-714A Engine:
- **1QFY98** Commenced low-rate initial production (LRIP).
- **1QFY00** First unit equipped.
- **2QFY00** Currently fielding for the CH-47D/MH-47D/MH-47E.

Extended Range Fuel System (ERFS):
- **4QFY98** Awarded the improved ERFS II production contract. Initial deliveries were deployed in support of operations in Kosovo.
- **2QFY00** ERFS received a full materiel release.

PROJECTED ACTIVITIES
CH-47F:
- **3QFY01** First flight (EMD).
- **3QFY03** First LRIP CH-47F delivery.
- **4QFY04** First unit equipped.

T55-GA-714A Engine:
- **2QFY08** Scheduled completion.

PRIME CONTRACTORS
Engine Upgrade: Boeing (Philadelphia, PA); Honeywell (Greer, SC; Phoenix, AZ)
ERFS II: Robertson Aviation (Tempe, AZ)
Cockpit Upgrade: Rockwell Collins (Cedar Rapids, IA)

* See appendix for list of subcontractors

Field Artillery Ammunition Support Vehicle (FAASV)

Field Artillery Ammunition Support Vehicle (FAASV)
Recapitalization

MISSION
Provide a highly mobile, air transportable, fully tracked, aluminum armored, diesel powered vehicle to accompany self-propelled and other 155mm artillery systems.

DESCRIPTION AND SPECIFICATIONS
The M992 Field Artillery Ammunition Support Vehicle (FAASV) is a fully tracked, self-propelled, diesel powered, Field Artillery support vehicle. It is capable of long range, high-speed operation on unimproved roads. It is also well suited for cross-country operation. The resupply vehicle has increased payload capacity and contains automated conveyer delivery of fuzed artillery cargo. It has excellent ground mobility for improved battlefield responsiveness and a highly improved survivability that allows extended fire support missions. The FAASV is fielded one-for-one with the M109A6 Paladin. The FAASV carries 90 155mm projectiles with 96 propelling charges and 104 fuzes. In addition, it carries 3 Copperhead projectiles. Combat loaded weight is 57,500 pounds, FAASV emptied approximately 45,000 lb. The FAASV incorporates special equipment which improves the overall efficiency of the Field Artillery section. Included are the following:
- Ammunition handling equipment
- Horizontal projectile and propellant storage racks
- Powered conveyor that delivers rounds directly to the howitzer
- General support equipment
- Simplified test equipment/internal combustion engine (STE/ICE)
- Auxiliary Power Unit (APU) to run the hydraulic equipment and charge vehicle batteries
- Ventilation face piece system
- Automatic fire extinguisher system

Maximum speed: 35 mph
Range: 220 miles
Crew: 4 with M109A3/A5, 5 with Paladin

FOREIGN COUNTERPART
No known foreign counterpart

FOREIGN MILITARY SALES
None

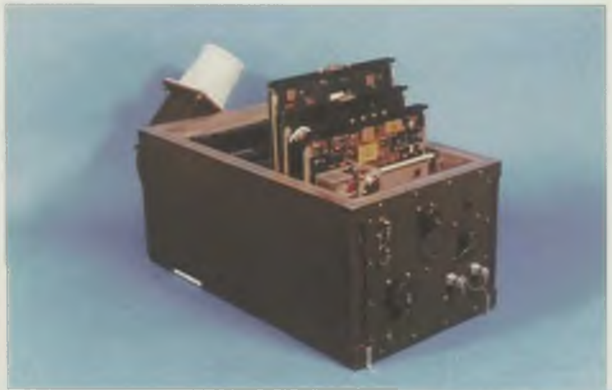
PROGRAM STATUS
- First unit equipped in 1985.
- Completed VIS modification work order to entire fleet.
- Fielded to 3 National Guard Battalions.
- Applied Phase I of Halon.
- Replacement to 579 vehicles.
- Integrate VIS Cordless.
- **Current** Completed fielding to Active Army, currently fielding the remaining eighteen USARNG battalions, to be completed by FY01.

PROJECTED ACTIVITIES
- Integrate Battlefield Combat ID System (BCIS).
- Complete FAASV production program.
- Complete Phase I Halon replacement program.

PRIME CONTRACTORS
United Defense, L.P. (York, PA)

* See appendix for list of subcontractors

Firefinder (AN/TPQ-36 (V)8)



Firefinder (AN/TPQ-36 (V)8)
Recapitalization

MISSION
Locate the firing position of hostile mortars, artillery, and rockets automatically.

DESCRIPTION AND SPECIFICATIONS
AN/TPQ-36 (V)8 Firefinder Radar, electronics upgrade (EU), replaces the existing shelter that was fielded in the early 1980s and utilizes the same antenna. This materiel change greatly improves the operations central shelter through the installation of state-of-the-art electronics, including common hardware systems in the lightweight multipurpose shelter (LMS). EU increases mortar detection range and target throughput and greatly improves the operator environment.

EU is an open systems architecture design and will enable Firefinder to communicate on the digitized battlefield. EU will also incorporate dual environmental control units and a gas particulate filter unit for greater survivability and soldier comfort. Major subsystems of EU include an operator control station, a control display terminal, and a radar processor. The control station is the man-machine interface and is a modern Windows-type display. Using the display terminal, the operator will be able to control system operations from a site up to 100 meters from an LMS. The radar processor performs all system signal processing functions, maximizing performance with over a 90% probability of weapon locations and a 90% correct target classification.

EU and new LMS will enhance the man-machine interfaces and electronics environment by providing over 50% more interior space and improved environmental control. EU will reduce life-cycle costs, prevent obsolescence, and enhance crew survivability.

FOREIGN COUNTERPART
European Consortium-Sponsored EuroArt Cobra; Sweden: Arthur System; Russia: Zoopark; China: BL904.

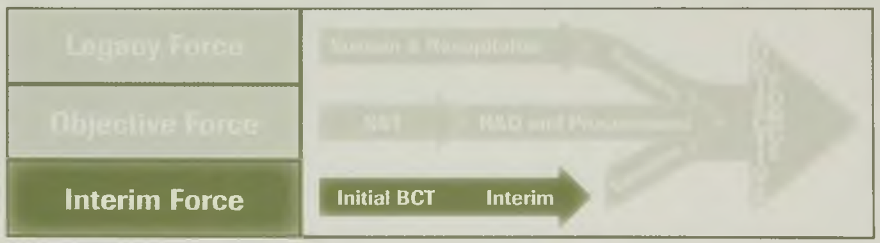
FOREIGN MILITARY SALES
AN/TPQ-36 (V)8: Turkey: 4 systems in production; Portugal: 2 systems in production.

PROGRAM STATUS
- **4QFY96** Awarded initial production contract. A total of 44 systems have been delivered: 22 for the U.S. Army and 22 for the United States Marine Corps (USMC).
- **FY99** Commenced fielding to Army and USMC units; currently ongoing.
- **4QFY99** Awarded follow-on production contract for additional U.S. and foreign military sales systems.
- **Current** Continue fieldings.

PROJECTED ACTIVITIES
- **FY01–04** Procure additional systems.
- **FY02–05** Complete fielding.

PRIME CONTRACTORS
Northrop Grumman (Rolling Meadows, IL; Baltimore, MD)

* See appendix for list of subcontractors



Heavy Expanded Mobility Tactical Truck–Load Handling System (HEMTT-LHS)

MISSION
Perform line and local haul, unit resupply, and related missions in a tactical environment (brigade/battalion areas of operation) in support of legacy equipped, digitized, and transformation force combat units.

DESCRIPTION AND SPECIFICATIONS
The Heavy Expanded Mobility Tactical Truck–Load Handling System (HEMTT-LHS) consists of a standard HEMTT (M977/M978 or M985 chassis) prime mover (8 x 8-foot configuration) equipped with an integral load-handling system providing self-load/unload capability and capable of transporting an 11.0-ton payload. LHS carries equipment/ammunition/supply loads on demountable "flatrack" cargo beds and is able to tow an 11.0-ton payload trailer also capable of carrying flatracks. The Containerized Roll-in/out Platform (CROP), an A-frame type flatrack that fits inside a 20-foot International Standards Organization container, gives LHS added cargo carrying flexibility. Flatracks and CROPs are interchangeable between HEMTT-LHS and PLS. HEMTT-LHS provides the soldier with an efficient and economic system with capabilities similar to that of PLS and is a major enabler in the Army's drive to achieve a distribution-based logistics system.

Truck payload: 11.0 tons
Trailer payload: 11.0 tons
Flatrack dimensions: 8 x 20 ft
Engine type: Diesel
Transmission: Automatic
Number of driven wheels: 8
Range: 300 miles
Air transportability: C-130, C-17, C-5

FOREIGN COUNTERPART
United Kingdom: Demountable Rack Off-Loading and Pick-Up System

FOREIGN MILITARY SALES
None

PROGRAM STATUS
- **November 3, 2000** First unit equipped (FUE) was delivered to units of the First Digitized Division (4th Infantry Division, Ft. Hood).
- **Current** In production; PM-THAAD, PM-HTV, and Oshkosh Truck are conducting an engineer analysis on the feasibility of an LHS-based THAAD missile launcher.

PROJECTED ACTIVITIES
- Development and delivery of a Container Handling Unit (CHU) for use with the LHS in the Interim Brigade Combat Team (IBCT). While not 100 percent common with the PLS CHU, the LHS CHU will have a high degree of commonality.
- **2QFY01** FUE to units of the first IBCT (2nd Infantry Division) being assembled at Ft. Lewis,

PRIME CONTRACTORS
Oshkosh Truck (Oshkosh, WI)

* See appendix for list of subcontractors


R04

MISSION
Provide towing, winching, and hoisting operations to support battlefield recovery operations and evacuation of heavy tanks and other tracked combat vehicles.

DESCRIPTION AND SPECIFICATIONS
The Hercules has been type-classified as the M88A2. It is a full-tracked, armored vehicle that uses the existing M88A1 chassis but significantly improves towing, winching, lifting, and braking characteristics. The Hercules is the primary recovery support to the Abrams tank fleet, and future heavy systems such as the Grizzly (M1 Breacher), Wolverine (Heavy Assault Bridge), and heavy self-propelled artillery.

Length: 338 in
Height: 123 in
Weight: 70 ton
Speed: 29 mph w/o load, 20 mph w/load
Boom capacity: 35 ton
Winch capacity: 70 ton/300 ft
Auxiliary winch capacity: 3-ton/670 ft
Armament: One .50-caliber machine gun
Power train: 12 cylinder, 1,050 hp air-cooled diesel engine with 3-speed automatic transmission
Width: 144 in
Cruising range: 200 miles
Draw bar pull: 70 ton

FOREIGN COUNTERPART
There is no foreign counterpart that provides the combined weight, towing, winch, and hoist capacities of the Hercules. Many foreign nations, however, incorporate recovery systems with existing recovery chassis or main battle tank chassis.

FOREIGN MILITARY SALES
Kuwait; Egypt (co-production).

PROGRAM STATUS
- **FY97** Type-classified standard.
- **4QFY97** First unit equipped.
- **FY94–99** Procured 102 vehicles.
- **FY99–00** Fielded to 1st Cavalry Division.
- **Current** The Hercules program was restored in the FY01 President's Budget as a recapitalization effort in support of the Army Vision.

PROJECTED ACTIVITIES
- Fielding to 4th Infantry Division and U.S. Army Training and Doctrine Command.

PRIME CONTRACTORS
United Defense, L.P. (York, PA)

* See appendix for list of subcontractors

High Mobility Multipurpose Wheeled Vehicle (HMMWV)

MISSION
Provide a common light tactical vehicle capability.

DESCRIPTION AND SPECIFICATIONS
The High Mobility Multipurpose Wheeled Vehicle (HMMWV) is a light, highly mobile, diesel-powered, four-wheel-drive vehicle that uses a common chassis. Using common components and kits, the HMMWV can be configured to become a troop carrier, armament carrier, S250 shelter carrier, ambulance, TOW missile carrier, and a Scout vehicle. The heavy variant, with a payload of 4,400 lb, was developed as the prime mover for the light howitzer, towed VULCAN system, and heavier shelter carriers. It is a tri-service program that also provides vehicles to satisfy Marine Corps and Air Force requirements. The HMMWV replaced the .25 ton jeep, the M718A1 ambulance, .5-ton mule, 1.25-ton Gamma Goat, and M792 ambulance. Since its inception, the HMMWV has undergone numerous design and configuration updates and changes. These changes have included technological, environmental, operational, and safety improvements, such as higher payload capability, radial tires, 1994 Environmental Protection Agency emissions update, commercial bucket seats, three-point seat belts, four-speed transmissions, and, in some cases, turbo charged engines and air conditioning.

An up-armored HMMWV was developed to provide increased ballistic (up to 7.62mm NATO AP) and blast protection (12-lb mine, front; 4-lb mine, rear) primarily for the Military Police (MP) and contingency force use. In 1995, the Program Manager introduced the A2 configuration and the expanded capacity vehicle (ECV) HMMWV. The A2 incorporates the four-speed, electronic transmission; the 6.5 liter diesel engine; and improvements in transportability. The A2 serves as a platform for other Army systems such as the ground-based common sensor. The ECV vehicle also went into production in 1995. The payload of this vehicle is 5,100 lb, including the crew. The ECV chassis is used for the M1114 up-armored HMMWV and serves as a platform for mission payloads and for systems that exceed 4,400 lb.

FOREIGN COUNTERPART
Certain models of the HMMWV have counterparts such as the Swiss MOWAG, the French PANHARD, and the German UNIMOG.

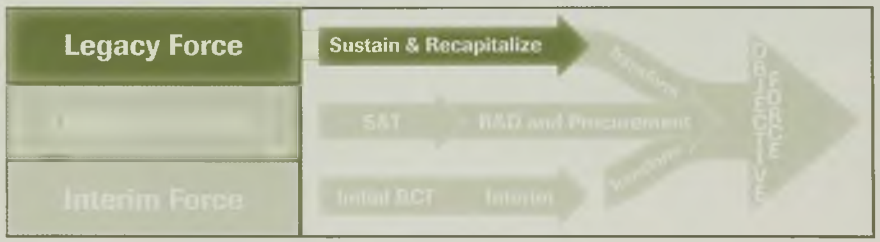
FOREIGN MILITARY SALES
Argentina, Bahrain, Bolivia, Chad, Columbia, Djibouti, Ecuador, Egypt, Ethiopia, Honduras, Israel, Kuwait, Luxembourg, Mexico, Oman, Philippines, Saudi Arabia, Sudan, Taiwan, Tanzania, Tunisia, and Uganda.

PROGRAM STATUS
- **2QFY99** Completed analysis of alternatives, the basis of the HMMWV spiral modernization strategy through FY23.
- **FY00** Continue production under a five-year requirements contract. Current production supports Army, Air Force, Marine Corps, and foreign military sales requirements.
- **4QFY00** Awarded research, development, test and evaluation contract for development of the A4 block upgrade.

PROJECTED ACTIVITIES
- Award contract for follow-on HMMWV A2 production.

PRIME CONTRACTORS
AM General (South Bend, IN); O'Gara-Hess & Eisenhardt (Fairfield, OH)

* See appendix for list of subcontractors




U.S. ARMY
U.S. ARMY

MISSION
Provide an adverse weather, fire-and-forget, heavy anti-armor capability for the Army's AH-64D Longbow Apache attack helicopter.

DESCRIPTION AND SPECIFICATIONS
The Longbow HELLFIRE missile is a fire-and-forget version of the HELLFIRE missile which uses inertial guidance. It is part of the AH-64D Longbow Apache attack helicopter (AH-64D) system that includes a mast-mounted fire control radar (FCR) and launcher. The Longbow FCR will locate, classify, and prioritize targets for the Longbow HELLFIRE missile. The Longbow HELLFIRE missile incorporates a millimeter-wave radar seeker on a HELLFIRE II missile aft-section bus.

The primary advantages of the Longbow missile include the following:
- Adverse weather capability (rain, snow, fog, smoke, and battlefield obscurants)
- Millimeter-wave countermeasures survivability
- Fire-and-forget guidance, which allows the Apache to launch and then immediately remask, thus minimizing exposure to enemy fire
- An advanced warhead capable of defeating all projected armor threats into the 21st century
- Reprogrammability to adapt to changing threats and mission requirements

The combination of Longbow HELLFIRE's fire-and-forget capability and HELLFIRE II's precision guidance will provide the battlefield commander with flexibility across a wide range of mission scenarios. This permits fast battlefield response and high mobility not afforded by other anti-armor weapons.

Diameter: 7 in
Weight: 108 lb
Length: 68 in

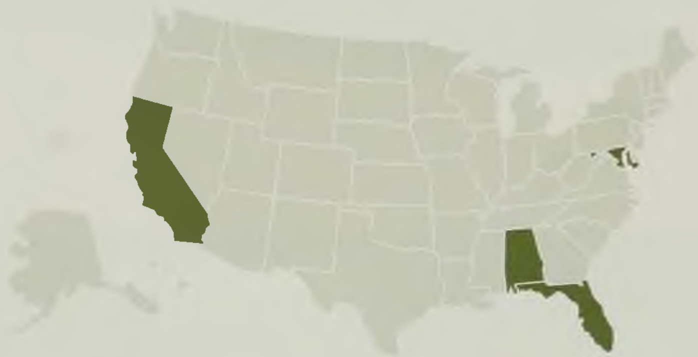
FOREIGN COUNTERPART
No known foreign counterpart

FOREIGN MILITARY SALES
Singapore and Israel (foreign military sale); United Kingdom (direct commercial sale).

PROGRAM STATUS
- **1QFY99** Received authorization for FY99–03 multiyear contract.
- **April 30, 1999** Awarded multiyear contract.
- **November 23, 1999** Multiyear Program Year 2 funded.
- **4QFY00** Delivered 1861 cumulative Longbow Hellfire missiles into inventory.

PROJECTED ACTIVITIES
- Continue fielding.
- Complete low rate initial production II.
- Complete lock-on-before-launch inhibit test.
- Complete full rate production.
- Fund multiyear program years 3, 4, and 5.

PRIME CONTRACTORS
Lockheed Martin (Orlando, FL); Northrop Grumman (Huntsville, AL; Bethesda, MD)



* See appendix for list of subcontractors

M113 Family of Vehicles (FOV)

M113 Family of Vehicles (FOV) Recapitalization

MISSION

Provide a highly mobile, survivable, and reliable tracked-vehicle platform.

DESCRIPTION AND SPECIFICATIONS

The M113 Family of Vehicles (FOV) is designed to maintain pace with Abrams and Bradley-equipped units and to adapt to a wide range of current and future battlefield tasks through the integration of specialized mission modules at minimum operational and support cost. Current models include the following: M58 Mechanized Smoke Obscurant System, M548A1/A3 Cargo Carrier, M577A2/A3 Command Post Carrier, M901A1 Improved TOW Vehicle, M981 Fire Support Team Vehicle, M1059/A3 Smoke Generator Carrier, M1064/A3 Mortar Carrier, M1068/A3 Standard Integrated Command Post System Carrier, and OPFOR Surrogate Vehicle (OSV).

FOREIGN COUNTERPART

China: Type 577, Type YW-534; Commonwealth of Independent States: BTR-50P, MTLB; France: AMX VCI; United Kingdom: FV-432, FV-4333

FOREIGN MILITARY SALES

Argentina, Australia, Bahrain, Brazil, Botswana, Cambodia, Canada, Columbia, Denmark, Egypt, Germany, Greece, Iran, Israel, Italy, Jordan, Korea, Kuwait, Lebanon, Morocco, Norway, Pakistan, Peru, Philippines, Portugal, Saudi Arabia, Spain, Taiwan, Thailand, Turkey, and Yemen.

PROGRAM STATUS

- **FY00** Continued the procurement and application of upgrade kits—Government furnished material for the conversion of older M113 variants to new configurations. A total of 185 vehicles were upgraded.

PROJECTED ACTIVITIES

- Continue upgrade of all remaining M113A2 variants in Force Package 1-4 to the A3 configuration.
- Continue to incorporate new features to sustain the effectiveness and relevance of the FOV.

PRIME CONTRACTORS

Anniston Army Depot (Anniston, AL); United Defense, L.P. (Anniston, AL)

* See appendix for list of subcontractors

Multiple Launch Rocket System (MLRS)

MISSION

Provide counterbattery fire and suppression of enemy air defenses, light materiel, and personnel targets.

DESCRIPTION AND SPECIFICATIONS

The Multiple Launch Rocket System (MLRS) is an artillery weapon system that supplements cannon artillery fires by delivering large volumes of firepower in a short time against critical, time-sensitive targets. The MLRS is capable of supporting and delivering all freeflight basic and Extended Range (ER-MLRS) rockets and Army Tactical Missile System (ATACMS) Block I missiles. The basic warhead carries improved conventional submunitions. Growth programs are underway to extend the range and accuracy of the rockets and to upgrade the launcher to fire precision guided rockets and missiles to include Guided MLRS (GMLRS) and ATACMS/Brilliant Anti-Armor Submunition (BAT) Block II weapons.

The M270A1 upgrade starts with rebuilding the carrier and launcher loader module. The rebuilt M270 is then upgraded by adding the Improved Fire Control System (IFCS) and the Improved Launcher Mechanical System (ILMS) modifications. The IFCS will mitigate electronic obsolescence and will provide growth for future weapon systems. The ILMS will provide rapid response to time-sensitive targets by reducing the aiming time by seventy percent and reducing the reload time by forty percent. The M270A1 upgrade launcher supports the Army Transformation by providing overmatch capabilities to the Counterattack Corps through 2020.

Length: 6,832mm
Width: 2,972mm
Weight: 24,756 kg
Range: 483 km
Average speed: 40 kph
Max speed: 56 kph
Crew: 3

FOREIGN COUNTERPART

Iraq: ABABEL 50, 100 (262mm, 400mm); Brazil: AVIBRAS/TECTRAN ASTROS II (127mm, 180mm, 300mm); Yugoslavia: ORKAN M87 (262mm); Israel: LAR-60 (160mm), MAR-350 (300mm) (350mm); Egypt: SAKR-80 (325mm); Russia (Union of Fed States): BM-22 (220mm), 9A52 (300mm); North Korea: M-1985 (240mm), M-1978 (170mm), M-1991 (240mm): China: WM-80 (273mm), WS-1 (320mm); Chile: RAYO (160mm).

FOREIGN MILITARY SALES

Bahrain, Denmark, France, Germany, Greece, Israel, Italy, Japan, Korea, The Netherlands, Norway, Turkey, and the United Kingdom (M270 launcher and M26 basic rocket); Norway and Korea (M270A1 upgrade launcher and ER-MLRS rocket).

PROGRAM STATUS

- **FY89** Beginning this year, MLRS has been co-produced by the United States, Germany, France, Italy, and the United Kingdom. A total of 857 launchers have been procured for the United States.
- **3QFY98** Initial procurement of the planned system improvement–M270A1 upgrade.
- **4QFY99** M270A1 program was restructured to add additional capability and to mature software prior to initial operational test and evaluation.
- **3QFY00** Delivered the first M270A1 low rate production launcher.
- **4QFY00** Completed the first M270A1 launcher live fire test.

PROJECTED ACTIVITIES

- **4QFY01** M270A1 initial operational test.
- **2QFY02** M270A1 Milestone III, full-rate production decision; M270A1 first unit equipped.

PRIME CONTRACTORS

Lockheed Martin (Dallas, TX)

* See appendix for list of subcontractors


"HIT-TO-KILL"

MISSION

Provide defense of critical assets and maneuver forces belonging to the corps and to echelons above corps against aircraft, cruise missiles, and tactical ballistic missiles (TBMs).

DESCRIPTION AND SPECIFICATIONS

The combat element of the PATRIOT missile system is the fire unit, which consists of a phased array radar set (RS), an engagement control station (ECS), an electric power plant, an antenna mast group, a Communications Relay Group (CRG), and up to eight launching stations (LS).

The RS provides all tactical functions of airspace surveillance, target detection and tracking, and missile guidance and engagement support. The ECS provides the human interface for command control of operations. Each LS contains four ready-to-fire missiles sealed in canisters that serve dual purposes as shipping containers and launch tubes. PATRIOT's fast-reaction capability, high firepower, ability to track numerous targets simultaneously, and ability to operate in a severe electronic countermeasure environment are significant improvements over previous air defense systems.

The PATRIOT Advanced Capability-3 (PAC-3) upgrade program will incorporate significant upgrades to the RS and ECS, and will add the new PAC-3 missile, which utilizes hit-to-kill technology for greater lethality against TBMs armed with weapons of mass destruction. Additionally, it will be possible to have up to 16 PAC-3 missiles per launcher, increasing firepower and missile defense capabilities. The primary mission of the PAC-3 missile is to kill maneuvering and non-maneuvering TBMs, and the system will also be able to counter advanced cruise missiles and aircraft. The PAC-3 upgrade program will comprise system improvements to increase performance against an evolving threat, meet user needs, and enhance joint interoperability.

FOREIGN COUNTERPART

Russia: a combination of the SA-10 and SA-12.

FOREIGN MILITARY SALES

The Netherlands, Germany, Japan, Saudi Arabia, Israel, Kuwait, and Greece are currently participating in PATRIOT acquisition programs. Discussions are ongoing with several other interested allies for acquisition of the PATRIOT system.

PROGRAM STATUS

- Fielding of the basic PATRIOT system to U.S. forces is complete. The system is deployed in the Continental United States, Europe, Korea, and Southwest Asia. U.S. missile production deliveries include PATRIOT Anti-tactical Ballistic Missile Capability-2 (PAC-2), and the Guidance Enhanced Missile (GEM).
- The PAC-3 program consists of major upgrades to the radar, launcher, CRG, ECS, software, and other elements of the system in addition to a new missile (PAC-3 Missile). The major radar upgrade portion of the PAC-3 program is already in full-rate production. The PAC-3 missile is in the flight test phase of engineering and manufacturing development and has successfully conducted six intercepts of TBM and cruise missile targets. The PAC-3 missile and associated ground components have entered low-rate initial production.

PROJECTED ACTIVITIES

- Continue low-rate initial production of the PAC-3 missile.
- Continue developmental testing.

PRIME CONTRACTORS

Raytheon (Bedford, MA); Lockheed Martin (Grand Prairie, TX)

* See appendix for list of subcontractors

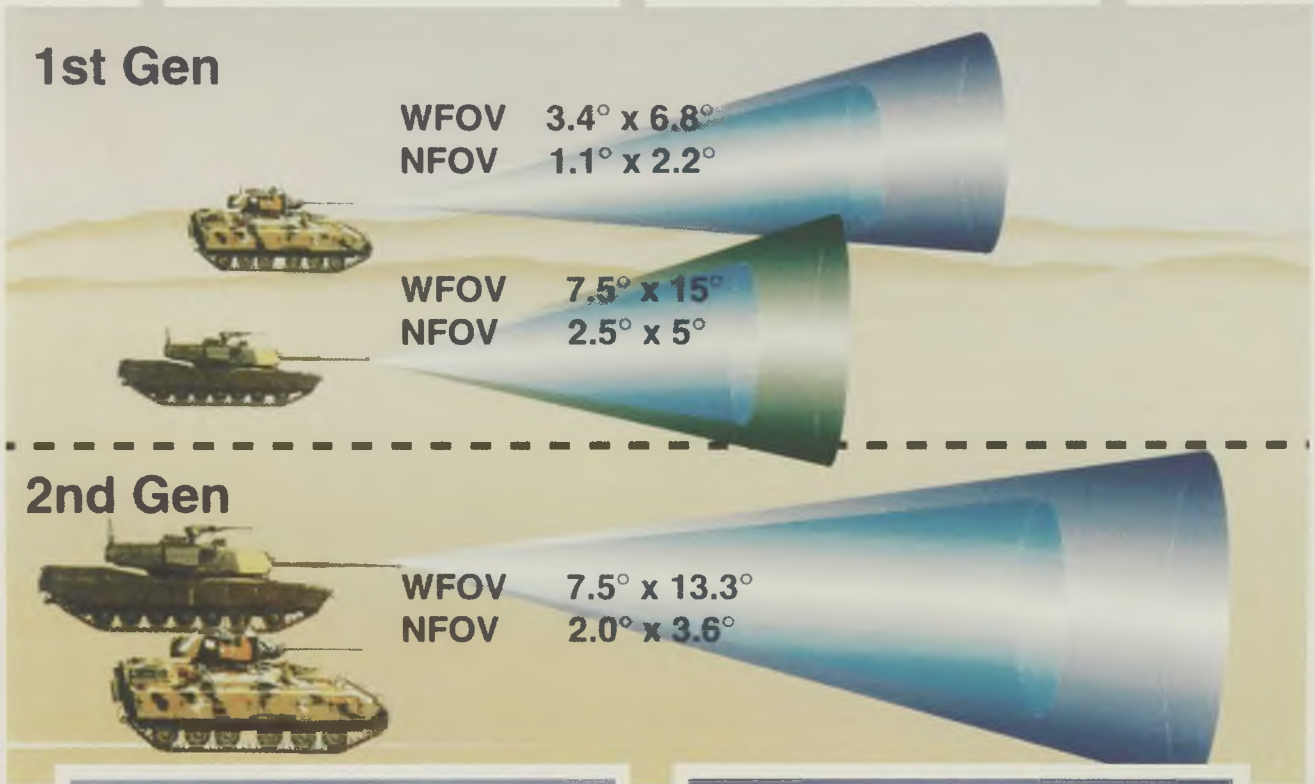
Second Generation Forward Looking Infrared (FLIR)

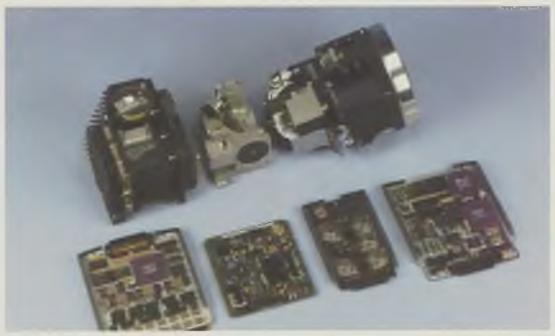
BRADLEY M2A3/M3A3

ABRAMS M1A2 SEP

LRAS3

LOSAT





SENSOR UNIT

ELECTRONIC UNIT

Second Generation Forward Looking Infrared (FLIR)

Recapitalization

MISSION
Provide the M1A2 Abrams Main Battle Tank, M2A3 Bradley Fighting Vehicle, and Long Range Advanced Scout Surveillance System with a leap-ahead target acquisition capability during all atmospheric and obscurant conditions, as well as the capability of seeing the same battlespace.

DESCRIPTION AND SPECIFICATIONS
The Second Generation Forward Looking Infrared (FLIR) is the Army's first major horizontal technology integration (HTI) program. It supports one of the Army's key objectives in its quest to "own the night" by integrating Second Generation FLIR (SGF) technology into a number of new and existing platforms. One goal of this program is to develop and produce a common FLIR to maximize economies of scale during production and to minimize life cycle costs.

By using a common thermal sensor known as a B-Kit which can be integrated into any candidate platform, the user community will be able to see the same battlespace and achieve a broad overmatch to potential adversary capabilities. The linkage between the B-Kit and the perspective sights will be system-specific platform links called A-Kits.

The program initially upgraded two candidate platforms selected by Army leadership: the M1A2 and M2A3. The current platform sight applications include: M1A2 Gunner's Primary Sight, M1A2 Commander's Independent Thermal Viewer, M2A3 Improved Bradley Acquisition system, M2A3 Commander's Independent Viewer, the Long Range Advanced Scout Surveillance System (LRAS3), and the Line-of-Sight Anti-Tank (LOSAT) System. The HTI concept can also benefit other Army programs, such as the Apache and future armored vehicles.

The present system concept will allow adaptation of this common sensor to any new platform application desired by Army leadership. In addition, this system will provide a battlespace observation edge for U.S. forces well into the next century. Commonality of FLIRs in multiple platforms facilitates development and fielding of future upgrades, such as image fusion, automatic target recognizers, and target trackers.

FOREIGN COUNTERPART
No known foreign counterpart

FOREIGN MILITARY SALES
None

PROGRAM STATUS
- **1QFY97** Approved to begin low-rate initial production (LRIP).
- **3QFY97** Awarded LRIP contracts.
- **1QFY98** Conduct Bradley limited user test (LUT) I.
- **3QFY98** First LRIP deliveries.
- **1QFY99** Conduct Bradley LUT II; First M2A3 deliveries.
- **1QFY00** Successfully completed HTI SGF Milestone III.
- **2QFY00** Awarded HTI SGF full-rate production contract.
- **4QFY00** Conducted M2A3 initial operational test and evaluation.

PROJECTED ACTIVITIES
- Conduct M1A2 system enhancement program force development test and evaluation.

PRIME CONTRACTORS
Raytheon (McKinney, TX); DRS Technology, Inc. (El Segundo, CA; Palm Bay, FL)

* See appendix for list of subcontractors

The Army will maintain the systems already in place through repair or replacement of end items, parts, assemblies, and subassemblies that wear out or break. This category includes such items as the OH-58 Kiowa helicopter, the Palletized Load System (PLS), and other equipment whose useful life is being extended through continued maintenance, though not receiving further upgrades or recapitalization.

Maintenance

Airborne Reconnaissance Low (ARL)

MISSION
Detect, locate, and report threat activities, using a variety of imagery, communications intercept, and moving target indicator (MTI) sensor payloads.

DESCRIPTION AND SPECIFICATIONS
The Airborne Reconnaissance Low (ARL) is a multi-function, day/night, all-weather reconnaissance intelligence asset. It consists of a modified DeHavilland DHC-7 fixed-wing aircraft equipped with communications intelligence (COMINT), imagery intelligence (IMINT), and Moving Target Indicator/Synthetic Aperture Radar (MTI/SAR) mission payloads. The payloads are controlled and operated via onboard open-architecture, multi-function workstations. Intelligence collected on the ARL can be analyzed and recorded on the aircraft workstations in real-time or stored on-board for post-mission processing. During multi-aircraft missions, data can be shared between cooperating aircraft via ultra high frequency (UHF) air-to-air data link to allow multi-platform COMINT geolocation operations. The ARL system includes a variety of communications subsystems to support near-real-time dissemination of intelligence and dynamic retasking of the aircraft. There are currently two configurations of the ARL system:
- The ARL-COMINT (ARL-C) configuration with a conventional communications intercept and direction finding (location) payload; and
- The ARL-Multifunction (ARL-M) configuration equipped with a combination of IMINT, COMINT, and MTI/SAR payload.

FOREIGN COUNTERPART
Numerous countries possess airborne SIGINT and/or IMINT systems, but none provide the robust multi-intelligence capability of ARL.

FOREIGN MILITARY SALES
None

PROGRAM STATUS
- Seven ARL systems have been fielded to date.*
- Two ARL-Cs and one ARL-M are stationed at Ft. Bliss, Texas and primarily support SOUTHCOM requirements; three ARL-Ms provide support to PACOM (Korea).
- One ARL-M is currently in production.

**ARL-I crashed in 4QFY99.*

PROJECTED ACTIVITIES
- **3QFY01** Complete and field ARL-M #5 (Ft. Bliss).
- **FY01** Upgrade Second Generation Forward Looking Infrared (FLIR); Upgrade MTI/SAR performance; Procure ARL-M6 (Congressional plus-up to replace ARL-I); Evaluate Measurement and Signature Intelligence (MASINT) sensors for integration into ARL-Ms.

PRIME CONTRACTORS
California Microwave (Belcamp, MD)

* See appendix for list of subcontractors

Armored Security Vehicle (ASV)

MISSION

Support the military police (MP) missions of law enforcement, area security, battlefield circulation, and enemy prisoner-of-war operations in war and for operations other than war.

DESCRIPTION AND SPECIFICATIONS

The Armored Security Vehicle (ASV) will be fielded to combat-support MP companies engaged in the above missions, as well as to heavy division MP companies. It is a turreted, light-armored, all-wheeled drive vehicle that provides increased ballistic and landmine protection to the MPs. Its primary weapons are the 40mm MK-19 grenade machine gun and the M-2 .50 caliber machine gun. The fully enclosed turret includes a day/night sight for target acquisition. The vehicle provides all-around 7.62mm ball protection and 12.7mm armor piercing for the crew compartment, weapons station, and ammunition storage areas. Crew size for the ASV is three MPs, with a jump seat for a fourth soldier. The ASV carries up to 3,360 lb of payload and can be transported by a C-130.

The ASV provides overhead protection against 155mm at fifteen meters and 12 lb TNT mines in the wheel wells. Other survivability enhancements include gas particulate-ventilated face pieces, a multi-salvo smoke grenade launcher, engine fire-suppression system, an intercom with radio interface, transparent armor, and blackout capability.

FOREIGN COUNTERPART

Germany: Theissen-Henschel; The Netherlands: DAF; France: Panhard.

FOREIGN MILITARY SALES

None

PROGRAM STATUS

- **4QFY00** First unit equipped.

PROJECTED ACTIVITIES

- Call-up of 3rd program year.

PRIME CONTRACTORS

Textron (New Orleans, LA)

* See appendix for list of subcontractors

MISSION
Provide mobile, short-range, air defense protection against cruise missiles, unmanned aerial vehicles, low-flying fixed-wing aircraft, and helicopters to divisions, armored cavalry regiments, separate brigades, and corps/theater air defense brigades.

DESCRIPTION AND SPECIFICATIONS
The Avenger system is a lightweight, highly mobile, and transportable surface-to-air missile/gun weapon system mounted on a High Mobility Multipurpose Wheeled Vehicle (HMMWV). It has a two-man crew and can operate in day or night and in clear or adverse weather conditions. The system incorporates a fully rotatable turret, operator's position with displays, fire control electronics, and standard vehicle-mounted launchers which support and launch multiple Stinger missiles. Avenger can be operated remotely up to 50 meters from the fire unit and can shoot on the move. A notable upgrade is the slew-to-cue (STC), which is embedded into a new Avenger fire control computer (AFCC). The STC accepts digital radar track data from external sources, then automatically slews the turret to place an aerial target into the gunner's sighting field of view. The AFCC, an approved Warfighting Rapid Acquisition Program (WRAP), corrects significant system obsolescence issues and allows for additional system growth at minimal cost.

Armament: Eight ready-to-fire Stinger missiles/.50-caliber machine gun
Sensors: Forward-looking infrared (FLIR) sensor/laser range finder/optical sight
Chassis: Modified heavy HMMWV
Fire control: Digital fire control computer/gyro-stabilized electronic turret

FOREIGN COUNTERPART
Russia: SA-9.

FOREIGN MILITARY SALES
Taiwan.

PROGRAM STATUS
- Awarded production contract for 35 additional slew-to-cue retrofit kits; field retrofit began 4QFY00 to the First Digitized Division.
- Awarded production contract for 30 Avenger fire units with STC for active Army upgunning of heavy battalions from 24 to 36 fire units.
- STC Avenger fire units participated in the Joint Contingency Force Advanced Warfighting Experiment (JCF-AWE) in September 2000.

PROJECTED ACTIVITIES
- **FY01** Procurement of 6 fire units (w/STC) to complete active Army upgunning; Procurement of 40 additional STC retrofit kits scheduled.
- **FY02** Integration of a new FLIR and Laser Range Finder (LRF) to mitigate system non-developmental item obsolescence begins.

PRIME CONTRACTORS
Boeing (Huntsville, AL); AM General (South Bend, IN)

* See appendix for list of subcontractors

Bradley Linebacker

MISSION
Provide dedicated forward-area air defense for heavy-maneuver forces; engage and defeat a variety of threat platforms including rotary-wing aircraft, unmanned aerial vehicles, cruise missiles, and fixed-wing aircraft.

DESCRIPTION AND SPECIFICATIONS
The M6 Bradley Linebacker is a Bradley M2A2 Operation Desert Storm vehicle, modified by replacing the TOW missile launcher with a four-missile STINGER launcher (Standard Vehicle Mounted Launcher [SVML]). With this modification, the crew can conduct a ground-to-air engagement while remaining under armor protection. The linebacker also incorporates the Forward Area Air Defense Command and Control (FAAD C2) software on a handheld terminal unit. By integrating Global Positioning System (GPS) and FAAD C2, the Linebacker provides an automated slew-to-cue function.

Length: 30.96 ft
Width: 17.04 ft with armor tiles; 15.48 ft with armor skirts
Height: 14.04 ft
Weight: 60,000 lb combat-loaded
Power train: 600 hp Cummins V093T diesel engine with GM-Allison HMPT-500-3 hydromechanical automatic transmission
Cruising range: 250 mi
Road speed: 38 mph
Crew: 4
Vehicle armament: 4 pod STINGER missile launcher; 25mm Bushmaster cannon; 7.62mm, M240C machine gun
Distribution: Air defense artillery battalions

FOREIGN COUNTERPART
No known foreign counterpart

FOREIGN MILITARY SALES
None

PROGRAM STATUS
- Linebacker production completed.

PROJECTED ACTIVITIES
- System sustainment.

PRIME CONTRACTORS
Bradley M2A2ODS Chassis: United Defense, L.P. (York, PA; San Jose, CA)
Stinger Mission Equipment Package: Boeing (Huntsville, AL)

* See appendix for list of subcontractors

Enhanced Position Location Reporting System (EPLRS)

MISSION
Provide a mobile wireless data communications backbone for the Army's Tactical Internet; embedded situational awareness/position navigation; and a common system for Army, Air Force, Navy, and Marine Corps warfighters.

DESCRIPTION AND SPECIFICATIONS
The Enhanced Position Location Reporting System (EPLRS) supports the Army's Brigade Combat Team. EPLRS provides data distribution and position/navigation services in near real time for the warfighter at brigade and below level, in support of Battlefield Functional Area hosts and the Force XXI Battle Command Brigade-and-Below (FBCB2) program. EPLRS consists of a Network Control Station and the EPLRS radio that can be configured as a Manpack Unit, a Surface Vehicle Unit, and an Airborne Vehicle Unit. EPLRS uses a time-division, multiple-access communications architecture to avoid transmission contention along with frequency hopping, error detection, and correction with interleaving. It also uses spread spectrum technology to provide jamming resistance.

EPLRS is interoperable with U.S. Air Force, Marine Corps and Navy. It is the Tactical Internet Backbone and is used by ABCS and FBCB2 for situational awareness and Command and Control. Improvements to EPLRS include: message reliability, more efficient available bandwidth, and field programmable software.

Weight of the radio
Vehicular: 40 lb (as shown)
Manpack: 25 lb

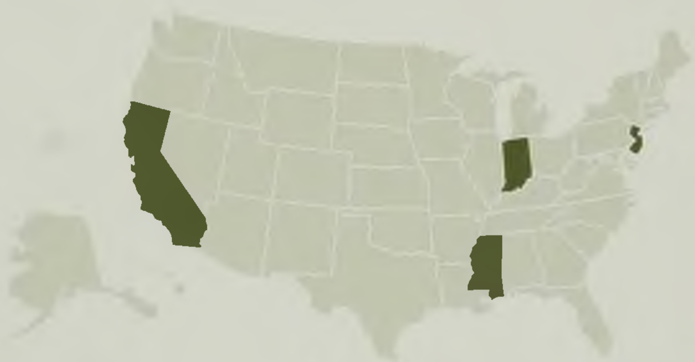
FOREIGN COUNTERPART
No known foreign counterpart

FOREIGN MILITARY SALES
None

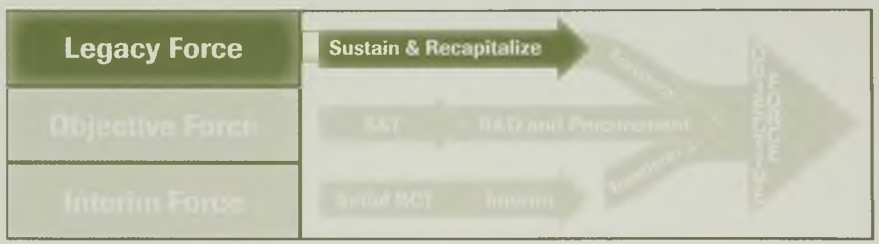
PROGRAM STATUS
- **May 30, 2000** Contract award for 625 EPLRS radios (200 Army/425 Other Service).
- **3QFY00** Contract award for an effort to transition the EPLRS Net Control Station(NCS) currently utilizing a SICPS shelter to the EPLRS Network Manager (ENM), a laptop computer configuration. An economic analysis was validated showing a total cost savings/avoidance of over $65M thru FY13.
- **Current** EPLRS is being fielded to the Brigade Combat Team (BCT) at Fort Lewis, WA. House and Senate conferees authorized an increase of $37.5M for Army's Transformation Brigade, S/W enhancements and National Guard.

PROJECTED ACTIVITIES
- **1QFY01** EPLRS will participate in FBCB2's field test 3.
- **2QFY01** Participate in FBCB2 limited user test 3.
- **3QFY01** Planning completion of fielding of the Interim BCT.
- **3Q–4QFY01** Will participate in the Division Capstone Exercise (DCX)-1 and DCX-2.
- **4QFY01** Will participate in FBCB2 FT4.

PRIME CONTRACTORS
Raytheon (Fullerton, CA; Forest, MS; Fort Wayne, IN)



* See appendix for list of subcontractors



Kiowa Warrior

MISSION

Conduct armed reconnaissance, security, target acquisition and designation, command and control, light attack, and defensive air combat (defensive) missions in support of combat and contingency operations.

DESCRIPTION AND SPECIFICATIONS

The Kiowa Warrior is the Army's rapidly deployable, lightly armed reconnaissance helicopter. The Kiowa Warrior includes advanced visionics, navigation, communication, weapons, and cockpit integration systems. The Mast-Mounted Sight (MMS) houses a thermal imaging system, low-light television, and a laser rangefinder/designator. These systems allow target acquisition and engagement at stand-off ranges and in adverse weather conditions. The Kiowa Warrior's highly accurate navigation system provides precise target location that can be sent digitally to other aircraft or artillery via its advanced communications system. Battlefield imagery can be transmitted to provide near-real-time situational awareness to command and control elements.

The Kiowa Warrior is rapidly deployable by air and can be fully operational within minutes of arrival. The armament systems combine to provide anti-armor, anti-personnel, and anti-aircraft capabilities at standoff ranges. Although Kiowa Warrior fielding is complete, the Army is currently installing a series of safety and performance modifications to keep the aircraft safe and mission effective until it is retired.

Max gross weight: 5,500 lb
Max speed: 118 kt, clean; 113 kt, armed
Crew: 2
Armament: Air-to-Air Stinger (ATAS) (2 round launcher); .50 caliber machine gun; HYDRA 70 (2.75 in) rockets (7-shot pod); HELLFIRE missiles (2-round launcher)

FOREIGN COUNTERPART

France: Gazelle, Allouette; Germany: BO-105; Russia: Hind, Hip, Hoplite.

FOREIGN MILITARY SALES

Taiwan: Delivery of 26 Kiowa Warriors completed. Thirteen additional aircraft requested as amendment to the existing foreign military sales case.

PROGRAM STATUS

- **2QFY97** Initiated Safety Enhancement Program (SEP) (installation of safety and performance enhancements).
- **2QFY99** Completed OH-58D retrofit program.
- **1QFY00** Completed initial Kiowa Warrior fielding.
- **1QFY01** Awarded contract for SEP Lot IV (22 aircraft)

PROJECTED ACTIVITIES

- **1QFY02** Award SEP lot V contract (22 aircraft).
- **2QFY06** Begin retirement of Kiowa Warriors as the Army fields RAH-66 Comanche.
- **1QFY09** Return last SEP-modified aircraft to the field.

PRIME CONTRACTORS

Rolls Royce/Allison Engines (Indianapolis, IN); Honeywell (Albuquerque, NM); Textron (Fort Worth, TX); Boeing (Anaheim, CA); Simula (Tempe, AZ)

* See appendix for list of subcontractors

MISSION

Detect, identify, and mark areas of nuclear and chemical contamination; sample for nuclear, biological, and chemical (NBC) contamination; and report accurate information to supported commanders in real time.

DESCRIPTION AND SPECIFICATIONS

The Nuclear, Biological and Chemical Reconnaissance System (NBCRS)-Fox Block I Modification (M93A1) contains an enhanced NBC sensor suite consisting of the M21 Remote Sensing Chemical Agent Alarm (RSCAAL), MM1 Mobile Mass Spectrometer, Chemical Agent Monitor/Improved Chemical Agent Monitor (CAM/ICAM), AN/VDR-2 Beta Radiac, and M22 Automatic Chemical Agent Detector/Alarm (ACADA). The NBC sensor suite has been digitally linked with the communications and navigation subsystems by a dual-purpose central processor system known as the Multipurpose Integrated Chemical Agent Detector (MICAD). The MICAD processor fully automates NBC warning and reporting functions and provides the crew commander with full situational awareness of the Fox's NBC sensors, navigation, and communications systems. The M93A1 Fox is also equipped with an advanced navigation system Global Positioning System (GPS) and Autonomous Navigation System (ANAV) that enables the system to accurately locate and report agent contamination. The mobility platform is a six-wheeled, all-wheel-drive armored vehicle capable of cross-country operation at speeds up to sixty-five mph.

The Fox System is fully amphibious with swimming speeds up to six mph. As a reconnaissance vehicle, it can locate, identify, and mark chemical/biological agents on the battlefield. The Fox usually accompanies the scouts or motorized reconnaissance forces when performing its NBC mission. It has an over-pressure filtration system that permits the crew to operate the system in a shirt-sleeve environment that is fully protected from the effects of NBC agents and contamination.

The M93A1 system is operated by a three-person crew (legacy systems require a four-person crew). The M93A1 will be one of the few systems fielded with a fully interactive class 4/5 electronic technical manual (IETM). The IETM is a single multimedia CD that contains the twelve-manual library and is structured to incorporate advanced diagnostics that support the system.

The Block II Modification to the M93A1 Fox NBCRS will incorporate enhanced technologies that will enable on-the-move standoff chemical agent detection. The sensor suite's Chemical Biological Mass Spectrometer (CBMS) will improve the detection and identification of liquid chemical agents while providing a first-time biological agent detection capability to the reconnaissance platform. An open architecture approach for sensor suite integration will enable expansion/upgrade of sensors and on-board computers at minimal cost as well as significant improvements in NBC reconnaissance reporting and situational awareness for commanders.

FOREIGN COUNTERPART

China: NBC reconnaissance vehicle; Russia: BRDM-ZRKH, MTLB, RKHM, UAZ-469RKH; Germany: ABC Reconnaissance System.

FOREIGN MILITARY SALES

None

PROGRAM STATUS

Block I:
- **3QFY96** Awarded production contract for the Block I modification.
- **1QFY99** First unit equipped.
- **1QFY00** Fielding of 54 systems complete.

Block II: 2QFY00 System development and demonstration phase initiated.

PROJECTED ACTIVITIES

Block I:
- **FY96–02** Continue production of NBCRS Block 1 modification (M93A1); Approximately 87 legacy Fox systems planned in this conversion.
- **3QFY03** Complete fielding of the last Block I modification.

Block II:
- **3QFY01** Demonstration of the sensor suite.
- **FY02** Engineering design test and limited user test.

PRIME CONTRACTORS

Block I: General Dynamics (Detroit, MI; Anniston, AL); Henschel Wehrtechnik (Kassel, Germany)
Block II: To be determined

* See appendix for list of subcontractors

Paladin
Maintenance

MISSION
Provide the primary artillery support for armored and mechanized infantry divisions.

DESCRIPTION AND SPECIFICATIONS
The M109A6 (Paladin) Howitzer is the most technologically-advanced self-propelled cannon system in the U.S. Army. The "A6" designation identifies several changes to the standard model that provide improvements to weapon survivability, responsiveness, RAM, armament, and terminal effects.

The fire control system is fully automated, providing accurate position location and azimuth reference, and on-board ballistic solutions of fire missions. The howitzer has a computer-controlled gun drive through servos with manual backup. Paladin uses state-of-the-art components to achieve dramatic improvements in the following:

Survivability: "shoot and scoot" tactics; improved ballistic and nuclear, biological, and chemical protection.
Responsive fires: capable of firing within 45 seconds from a complete stop with on-board communications, remote travel lock, and automated cannon slew capability.
Accurate fires: on-board POSNAV and technical fire control.
Extended range: 30 km with HE RAP and M203 propellant.
Increased reliability: improved engine, track, and diagnostics
Upgrades include: Global positioning system-aided self-location, M93 Muzzle Velocity System, and commercial off-the-shelf-based computer processor.

Other Paladin specifications include the following:
Max unassisted range: 22,000 m
Max assisted range: 30,000 m
Min range: 4000 m
Max rate of fire: 4 rds/min for three min
Sustained ROF: 1 rd/min (dependent on thermal warning device)
Max speed: 38 mph (61.1 Kph) (highway)
Crew size: 4 (accompanying M992 FAASV-5)
Weight empty (approx.): 56,400 lb (25,605.6 Kg)
Weight combat loaded (approx.): 63,615 lb (28,881.21 Kg)

FOREIGN COUNTERPART
No known foreign counterpart

FOREIGN MILITARY SALES
None

PROGRAM STATUS
- **1994** First unit equipped; Completed fielding to Active Army, currently fielding four USARNG battalions, to be completed by FY01.
- **FY00** Production contract awarded to United Defense, L.P., York, PA in June 2000; Completed Enhanced Display System (EDS) integration for the First Digitized Division; Completed V.11 S/W Upgrade; Completed V.11 System MWO Applications.

PROJECTED ACTIVITIES
- Award Paladin EDS contract in support of First Digitized Corps.
- Plan for V.7 software improvements.
- Integrate VIS Cordless.
- Integrate Battlefield Combat ID System (BCIS).
- Field to 4 National Guard Bureau Battalions.

PRIME CONTRACTORS
United Defense, L.P. (York, PA)

* See appendix for list of subcontractors

Palletized Load System (PLS)

Palletized Load System (PLS)

Maintenance

MISSION
Perform line and local haul, unit resupply, and related missions in both operational and tactical environments (Corps-Brigade areas of operation) in support of legacy equipped, digitized, and transformation force combat units.

DESCRIPTION AND SPECIFICATIONS
The Palletized Load System (PLS) consists of a prime mover (10 x 10 ft configuration), equipped with an integral load-handling system providing self-load/unload capability, and capable of transporting a 16.5-ton payload. PLS carries equipment/ammunition/supply loads on demountable "flatrack" cargo beds, 8 x 8 x 20 ft International Standards Organization (ISO) containers, or shelters, and is able to tow a 16.5-ton payload trailer that is also capable of carrying flatracks. Two additional pieces of equipment enhance PLS flexibility.

The Containerized Roll-in/out Platform (CROP) is an A-frame type flatrack which fits inside a 20-ft ISO container. A Container Handling Unit (CHU) enables PLS to pick up and transport ISO containers without using a flatrack. Flatracks and CROP are interchangeable between PLS and the HEMTT-LHS. The PLS prime mover features a central tire inflation system that significantly improves off-road mobility. Current NATO agreements require PLS to maintain interoperability with comparable British, German, and French systems through the use of a common flatrack. PLS is a major enabler in the Army's drive to achieve a distribution-based logistics system.

Truck payload: 16.5 tons
Trailer payload: 16.5 tons
Flatrack dimensions: 8 x 20 ft
Engine type: Diesel
Transmission: Automatic
Number of driven wheels: 10
Range: 300 miles
Air transportability: C-17, C-5

FOREIGN COUNTERPART
United Kingdom: Demountable Rack Off-Loading and Pick-Up System.

FOREIGN MILITARY SALES
None

PROGRAM STATUS
- Approximately 3,234 PLS trucks, 2,029 PLS trailers, 15,633 flatracks, 5,000 common flatracks, 5,409 CROP, and 56 CHU have been fielded to date.
- **2QFY00** PLS was fielded to the First Digitized Division (4th Infantry Division, Ft. Hood) for the new Truck Motor Transport Company.

PROJECTED ACTIVITIES
Alternate missions for PLS currently under development or in initial production include the following:
- Engineer mission modules (including dump body, bituminous distributor, and concrete mobile) for combat engineers.
- Petroleum distribution support (3,000–3,500 gallon fuel racks for retail supply and quartermaster fuel farm).

PRIME CONTRACTORS
Truck and CHU: Oshkosh Truck (Oshkosh, WI)
Trailer: Oshkosh Truck (Bradenton, FL)
CROP: Summa Technologies (Huntsville, AL); Hyundai Precision America (San Diego, CA)
Flatrack: Oshkosh Truck (Bradenton, FL)

* See appendix for list of subcontractors

Single Channel Ground and Airborne Radio System (SINCGARS)

Single Channel Ground and Airborne Radio System (SINCGARS)

Maintenance

MISSION
Provide commanders with a highly reliable, secure, easily maintained combat net radio (CNR) with voice and data handling capability, in support of command and control operations.

DESCRIPTION AND SPECIFICATIONS
The Single Channel Ground and Airborne Radio System (SINCGARS), with its internet controller, provides the communications link for the digitized force. SINCGARS configurations include manpack, vehicular (both low and high power), and airborne models. Communications security is integrated into currently produced versions of the ground and airborne radios. System improvement program models provide upgrades to enhance operational capability in the tactical internet environment. The advanced system improvement program (ASIP) models (of a reduced size and weight) provide further enhancements to operational capability in the tactical internet environment.

ASIP Dimensions
Weight: 8.1 lb
Height: 3.4 in
Length: 10 in
Width: 5.4 in

FOREIGN COUNTERPART
United Kingdom: Racal; France: Thomson CSF; Belgium: Marconi; Sweden: Ericsson.

FOREIGN MILITARY SALES
Bahrain, Finland, Georgia, Greece, Hungary, Italy, Kuwait, Morocco, Saudi Arabia, SHAPE Tech Center NATO, Spain, Special Defense Acquisition Fund (for foreign military sites), Taiwan, Ukraine, and Uzbekistan.

PROGRAM STATUS
- **3QFY00** Program Year 14 production option awarded; The Army acquisition objective was revised to 242,480 ground and 9,248 airborne radios. A total of 235,900 radios have been procured to date. Approximately 211,700 radios have been fielded; Development began on a Warfighter Rapid Acquisition Program (WRAP) initiative to integrate Global Positioning System (GPS) into the ASIP radio.

PROJECTED ACTIVITIES
- **FY02–07** Budget estimate submission contains funding to complete fielding of the ASIP model SINCGARS radios currently on contract and procure assets for Brigade Combat Teams.
- **FY01** ASIP radios delivered will be fielded to the Interim Brigade Combat Teams at Fort Lewis and to the Army National Guard Enhanced Brigades, facilitating retirement of the VRC-12 series radio.
- **2QFY01** Award production option for ground and airborne radios.

PRIME CONTRACTORS
International Telephone and Telegraph (ITT) (Fort Wayne, IN)

* See appendix for list of subcontractors

MK19-3

M16

M4

M249

M240B

MISSION

Reassure, deter, and if necessary, compel adversaries by enabling individuals and small units to engage targets with accurate, lethal, direct fire.

DESCRIPTION AND SPECIFICATIONS

M16A2 Rifle: A lightweight, air-cooled, gas-operated rifle. An improved version of the M16A1, the M16A2 incorporates improvements in iron sight, pistol grip, stock, and overall combat effectiveness. Accuracy is enhanced by incorporating an improved muzzle compensator, three-round burst control, and a heavier barrel; and by using the heavier NATO-standard ammunition, which is also fired by the squad automatic weapon.

M16A4 Rifle: An M16A2 rifle with a flat-top upper receiver accessory rail and a detachable handle/rear aperture sight assembly.

M4 Carbine: A compact version of the M16A2 rifle, with a collapsible stock, a flat-top upper receiver accessory rail, and a detachable handle/rear aperture sight assembly. The M4 enables a soldier operating in close quarters to engage targets at extended range with accurate, lethal fire. It achieves over 85% commonality with the M16A2 rifle and will replace all .45 caliber M3 submachine guns, selected M9 pistols, and M16 series rifles.

Modular Weapon System (MWS): The MWS is a system of accessory rails mounted in place of the forward hand guards on M16A4 rifles and M4 carbines. These permit the no-tools, field attachment of day or night sights, aiming lights, flashlights, ancillary weapons, and other accessories, based upon mission specific requirements.

M249 Squad Automatic Weapon (SAW): The M249 is a lightweight, gas-operated, one-man-portable automatic weapon capable of delivering a large volume of effective fire at ranges up to 800 meters. Two M249s are issued per infantry squad. It is scheduled to replace the M60 7.62mm medium machine gun in certain units.

M240B Medium Machine Gun: The M240B is a ground-mounted, gas-operated, crew-served machine gun. This reliable 7.62mm machine gun delivers more energy to the target than the smaller caliber M249 SAW. It will be issued to infantry, armor, combat engineer, and special force units that require medium support fires and will replace the ground-mounted M60 series machine guns currently in use.

MK19-3 40mm Grenade Machine Gun: A self-powered, air-cooled, belt-fed, blowback-operated weapon, the MK19-3 is designed to deliver decisive firepower against enemy personnel and lightly armored vehicles. It is scheduled to replace selected M2 heavy machine guns in selected units and will be the primary suppressive weapon for combat support and combat service support units. The MK19-3 is mounted on the HMMWV, M113 FOV, 5-ton trucks, and selected M88A1 recovery vehicles.

	M4	M16A2/A4	M249	M240B	MK19-3
Caliber:	5.56mm	5.56mm	5.56mm	7.62mm	40mm
Weight:	*7.5 lb	*8.8 lb	16.5 lb	27.6 lb	72.5 lb
Max Effective Range:	600 m at 500 m pt	800 m/600 m at 550 m pt	1000 m at 600 m pt	1,800 m at 800 m pt	2,200 m at

(at: area target, pt: point target) *Loaded weight with sling and one magazine only.

FOREIGN MILITARY SALES

Numerous foreign countries purchase U.S. small arms.

PROGRAM STATUS

MWS:
- **FY98** Materiel release.
- **1QFY99** First unit equipped.

M16A2:
- **FY98** Completed Army procurement.

M16A4: In production to fulfill modular rifle requirements.
M4: In production.

PROJECTED ACTIVITIES

- **FY01** Last funded year of M249 SAW production; Army Procurement Objective (APO) will be achieved; M4 Carbine is in the final year of funded production. Unfunded Quantity is 37,781 short of APO; does not include increases for Brigade Combat Team (BCT); Final year of funded production for the MK19; quantity of 609 MK19's short of the APO. This does not include BCT Requirements (up to 1734 guns).

PRIME CONTRACTORS

M4 Carbine: Colt's Manufacturing (Hartford, CT)
M16A4, M249 Squad Automatic Weapon, and M240B Medium Machine Gun: FN Manufacturing (Columbia, SC)
MK19-3 Grenade Machine Gun: General Dynamics (Saco, ME)

* See appendix for list of subcontractors

Smoke Generator (M56 Coyote)

MISSION

Deny information to the enemy , protect our forces, and dominate the maneuver battle by generating large-area obscuration in the visual-through-infrared regions of the electromagnetic spectrum.

DESCRIPTION AND SPECIFICATIONS

The Mechanical Smoke Generator (M56) is a large-area smoke generator system that is mounted on the M1113 High Mobility Multipurpose Wheeled Vehicle (HMMWV). The M56 can obscure high-priority stationary targets such as airfields, bridges, and ammunition depots, as well as mobile targets such as convoys and troop movements. The system is modular and uses a gas turbine engine as a power source to disseminate the obscurants. The visual screening module is capable of vaporizing fog oil for up to 90 minutes. Dissemination of graphite is provided for 30 minutes to blind infrared sensors. A program to add obscuration capability in the millimeter wave region has been initiated.

Turbine engine-powered visual screening (fog oil): 0–1.33 gal/min
Infrared screening (graphite): 1–10 lb/min
Millimeter wave screening: to be added in FY05

FOREIGN COUNTERPART

Countries that use former Soviet doctrine emphasize extensive use of obscurants during tactical exercises. Many nations, especially those in the Middle East, are beginning developmental programs in this area.

FOREIGN MILITARY SALES

Taiwan.

PROGRAM STATUS

- **4QFY94** Type-classified M56 as standard.
- **FY95** Commenced production.
- **1QFY99** First unit equipped at Ft. Bragg.
- **4QFY99** Finished fielding 25% of the Army's required M56 Smoke Generator Systems.

PROJECTED ACTIVITIES

- **FY01** Award new contract to continue M56 production; Commence retrofitting driver's vision enhancer to fielded systems.
- **FY01–04** Conduct millimeter wave obscurant preplanned product improvement development effort, followed by production and integration.

PRIME CONTRACTORS

Production: General Dynamics (Westminster, MD)
FY01–05 Production: To be selected

* See appendix for list of subcontractors

The Army will pursue technologies that support the Objective Force as a whole, concentrating in major areas of investment to achieve Future Combat Systems (FCS) system-of-systems capabilities. The FCS will be an ensemble of fighting capabilities that meet the weight and volume constraints necessary for C-130 transportability, consisting of land combat systems tailored to address the ground combat and mobility requirements reflected in the Army vision. C4ISR platforms will include advanced sensors and sensor processing, intelligence and electronic warfare systems and techniques, militarized and special-purpose electronics, and C4 System technologies.

Personnel technologies will combine advanced training tools and methods to enhance warfighter and commander abilities and performance; advanced human engineering concepts to ensure human-system physical compatibility and cognitive engineering concepts to avoid information overload and optimize task allocation to enhance warfighting effectiveness. Simulation tools will provide increasingly realistic environments and systems to support acquisition, requirements, and training. This includes technologies for networked simulations, embedded training, constructive simulations, virtual environments, and range systems for live use. Other S&T programs will focus on survivability, logistics reduction, medical, lethality, and future warrior technologies.

For additional information on the Army Science and Technology Program, please see the Army Science and Technology Master Plan (ASTMP), accessible on the web through the home page for the Assistant Secretary of the Army for Acquisition, Logistics, and Technology, at http://www.sarda.army.mil (select "Links," then "Research and Technology," to find a link to the ASTMP).

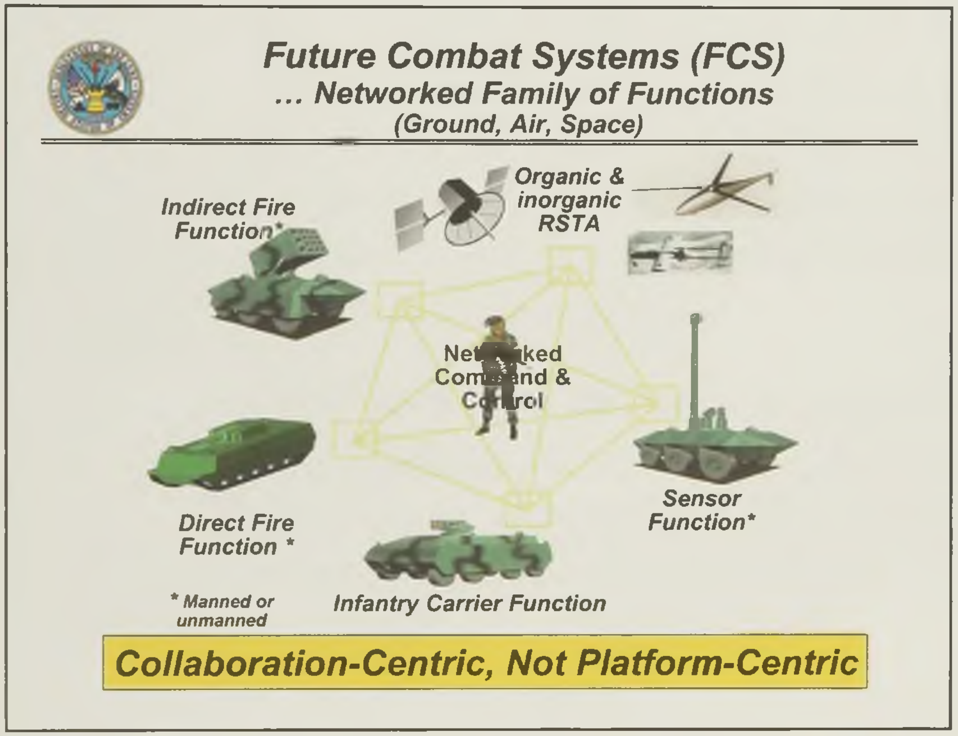
Science and Technology

Future Combat Systems (FCS)

FCS is the Army's top priority S&T program to achieve the Objective Force. It is a collaborative effort among the Army and the Defense Advanced Research Projects Agency (DARPA) in response to a draft Mission Need Statement (MNS) issued by the U.S. Army Training and Doctrine Command (TRADOC). The MNS calls for a multi-function/multi-role system-of-systems that will meet the future ground force requirements of the Army. Desired functions include:

- Direct fire;
- Indirect fire;
- Air defense;
- Non-lethal firepower;
- Reconnaissance;
- Command and control on-the-move; and
- The ability to transport troops, all in systems that can be transported by C-130-like aircraft.

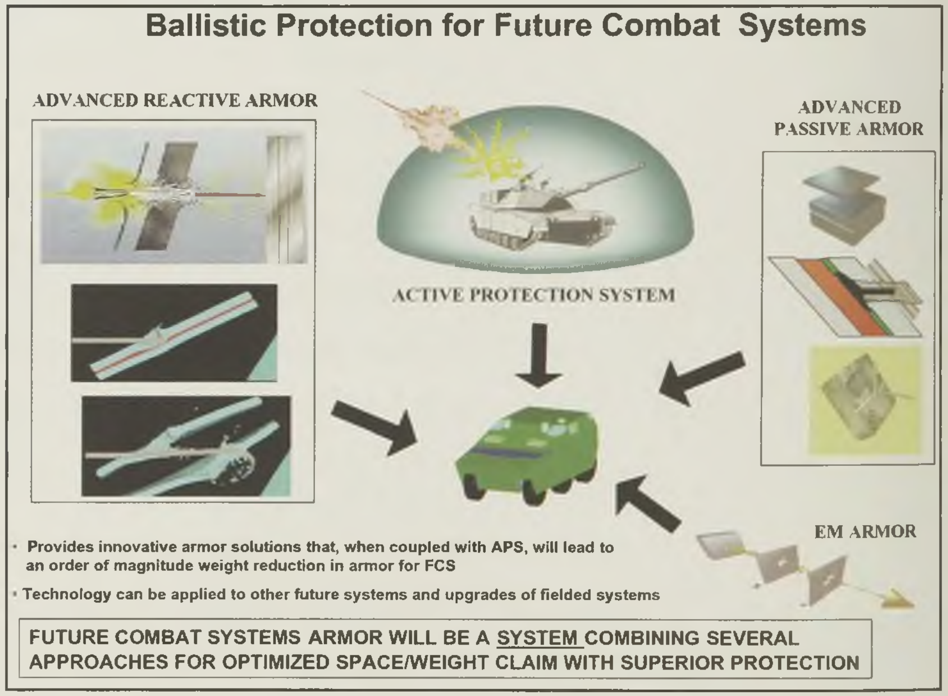
The FCS-equipped force will be able to respond to a military situation, with overwhelming capabilities, within 96 hours anywhere in the world. The Army and DARPA have partnered to seek the widest range of technological and conceptual options. The collaborative program will define and validate FCS designs and operational concepts using modeling, simulation and surrogate exercises; develop innovative, high-payoff, enabling technologies; and fabricate and test an FCS demonstrator.



Key collaboration technology investments focus on command and control on-the-move; networked fires; ground/air robotics; and 3-D/adverse weather targeting. The Army and DARPA have agreed to provide $510M and $406M, respectively, for the collaborative program activities over FY00–05. Four contracts for the FCS design/concept definition phase were awarded by DARPA on May 9, 2000. In FY03, the Army will decide if the envisioned FCS design, and accompanying enabling technologies, can meet the required capabilities for the Objective Force such that FCS can enter the Systems Development and Demonstration phase in FY06. The Army plans to field FCS in FY10. Key Army-funded supporting and enabling technologies for FCS are highlighted in the following entries.

Ballistic Protection for FCS

The Army's transformation to future combat systems that are significantly more deployable and sustainable than current heavy forces will require much lighter ground platforms that still provide the survivability that soldiers need to perform their missions with confidence.



Two primary armors, frontal and structural, are needed for FCS to make it survivable, yet small and light enough to be strategically deployable. Advanced frontal armors are needed to protect against large caliber kinetic-energy (KE) penetrators conditioned by active protection systems (APS), medium-caliber kinetic energy penetrators and hand-held infantry weapons that cannot be countered by APS.

Structural armor is needed to protect against heavy machine guns and overhead artillery. The objectives for entry into the system development and demonstration phase of FCS are a weight of 80 lb per square foot for frontal armor, and 20 lb per square foot for structural armor.

This program addresses these challenges by combining several passive and energetic armor technologies, including the use of advanced ceramics, composite materials, lightweight high-strength metals, and possibly energetic materials and electromagnetic defeat mechanisms.

Projected Activities

The first phase of this effort, FY00–02, explores the key armor technologies and critical research areas for each technology. In FY02, technology down-selects occur and breadboard integration begins. In FY03, second-generation armor technologies will be demonstrated at Technology Readiness Level (TRL) 5, confirming armor/structural capability at FCS weights. By FY05, prototype demonstrations of fully integrated armor systems will be conducted in a surrogate vehicle at TRL 7.

Compact Kinetic Energy Missile (CKEM)

The CKEM will provide Future Combat Systems and the Objective Force with a revolutionary hypervelocity kinetic energy weapon to deliver overwhelming lethality against present and future threats. The CKEM weapon system will supplant the Line-of-Sight Anti-Tank system to significantly improve warfighting capabilities. CKEM will enable implementation of future fighting vehicle concepts. CKEM will also defeat explosive reactive armor (ERA) 1-3 and threat active protection systems by using a lighter, smaller, faster, kinetic energy missile and will significantly increase kinetic energy stowed kills.

CKEM system-level performance goals include the following:

- Total missile length: 4 ft;
- Total missile weight: 50 lb;
- Range: 0.4–5 km, with growth potential for close-in engagements of 200 meters and extended range of 5–8 km;
- Velocity: 6.5+ Mach; and
- Penetrator energy: ≥10 MJ at all ranges.

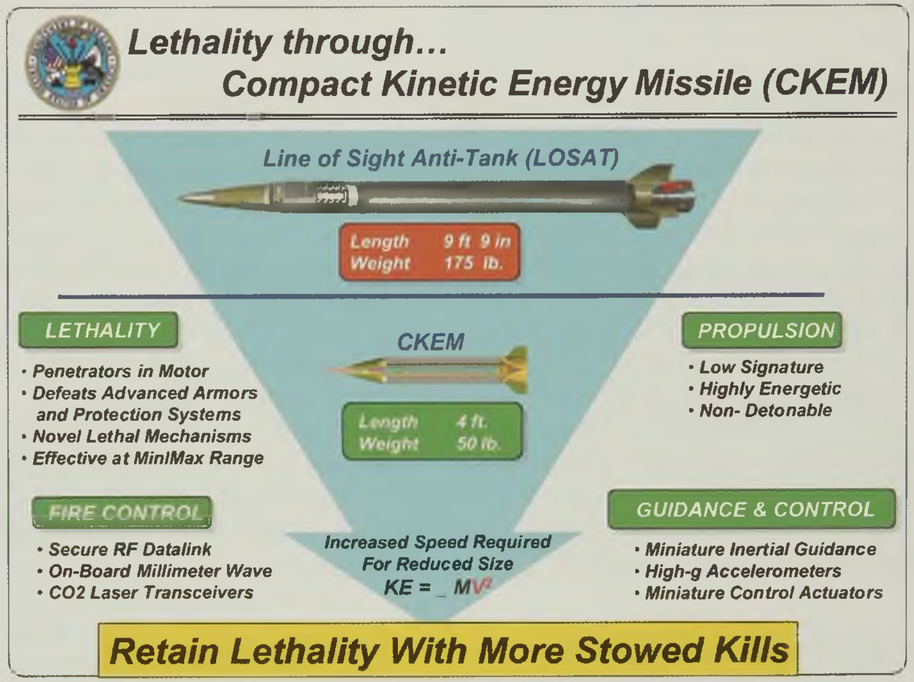
The following technologies are critical to successfully accomplish the system performance goals and objectives: high-energy density, insensitive propulsion, enhanced lethality, and hypervelocity guidance technology.

Program Status

- **FY00:** Awarded four contracts for system concept definition; Awarded multiple contracts for CKEM component and technology development in the areas of high-G guidance components and advanced propulsion; Performed lethality testing to quantify secondary lethality effects and to demonstrate 25% increase in missile lethality with novel penetrators; Performed aerodynamic testing and modeling.

Projected Activities

- **FY01:** Award contract(s) for system design and analysis to mature the system design concepts and validate component technology; Continue multiple contracts for component and technology development.
- **FY02:** Perform component testing and simulation (propulsion, guidance and control, and lethality) to demonstrate performance of critical requirements.



FCS Mine Detection and Neutralization

The FCS mine detection and neutralization effort will provide the warfighter with enhanced operational tempo (rates-of-advance) during route clearance and mine avoidance missions, increased vehicle survivability, and enhanced soldier survivability.

The objective of this effort is to investigate, develop, and evaluate forward-looking sensor technologies, signal processing techniques, and mine neutralization techniques applicable to detecting and neutralizing on/off-route surface and buried antitank mines. Forward-looking mine detection goals involve detecting and locating mines at distances of 10–30 meters in front of the host vehicle, at a speed of 15–20 kph. Mine neutralization goals include the following:

- Pk = 90–95%;
- Standoff: 10–50 meters; and
- Rate of advance: 10–20 kph with low-order detonation.

FCS mine detection and neutralization will be designed as a modular system for bolt-on integration onto FCS vehicle platforms, avoiding the need for specialized overpass vehicles and following confirmation sensors.

This program will also pay particular attention to total life-cycle costs, sustainability, and maintainability. Sensor and neutralization technology will transition to advanced development and insertion into demonstration and acquisition programs. The program supports FCS, the Mounted Battle Lab, the Maneuver Support Battle Lab, and the Engineer School and Center.

Full Spectrum Active Protection System (FSAP)

The purpose of an active protection system is to intercept an incoming threat munition and degrade or destroy it before impact, or to cause it to miss its intended target. The objective of the FSAP program is to demonstrate a single universal countermeasure for protection against smart top-attack, hit-to-kill (e.g., anti-tank guided missiles), and especially large-caliber-gun, tube-launched Kinetic Energy (KE) and High Explosive Anti-Tank (HEAT) threats. FSAP component technologies will be matured to Technology Readiness Level 6 in FY05. This is a joint program between the Tank Automotive Research, Development and Engineering Center, the Armaments Research, Development, and Engineering Center, and the Army Research Laboratory. The FSAP uses a balanced approach including development of armor systems to capture the residual debris of a successful APS engagement. FSAP is a key enabling technology to provide protection for the lighter weight FCS that cannot afford the weight burden of armor alone to meet its ballistic protection requirements.

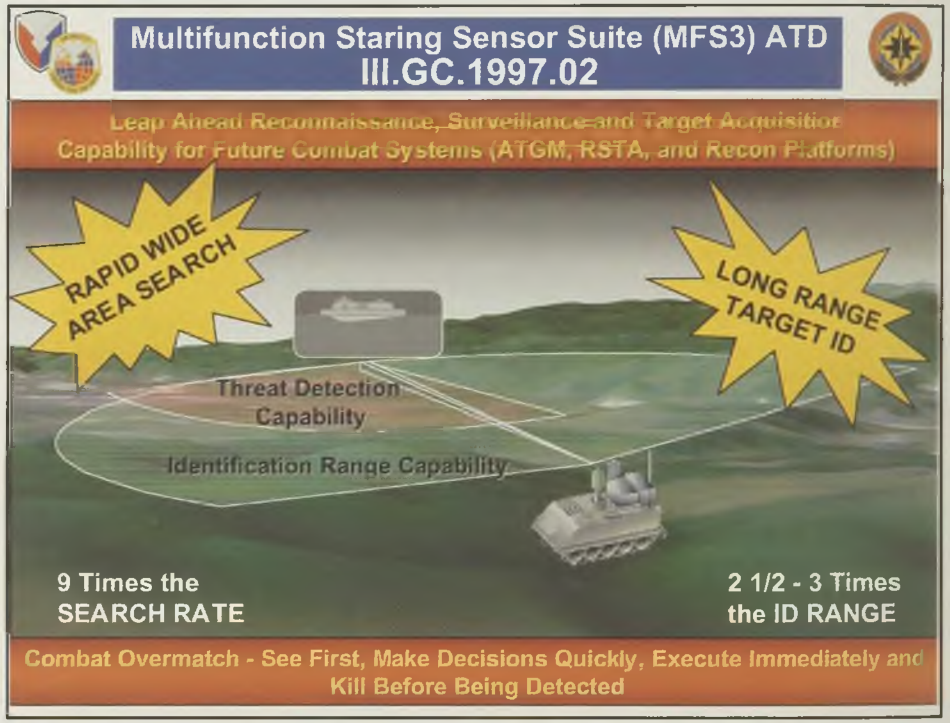
Future Scout and Cavalry System (FSCS) Advanced Technology Demonstration (ATD)

The FSCS ATD is a cooperative U.S./U.K. program that will demonstrate the affordable application of advanced, multi-spectral sensor, communication, survivability, mobility, supportability, and lethality technologies in a manned, ground-reconnaissance system sized for C-130 transport. The ATD will demonstrate several capabilities. First, a sensor overmatch capability will enable FSCS to detect and identify threat systems before they can detect the FSCS. Second, a sensor fusion and communications package will provide clearer situational awareness and the ability to send that picture throughout the battlefield. Third, a survivability suite will decrease the detectability of the FSCS and increase its ability to survive and complete its missions. Finally, advanced hybrid electric and conventional mobility technologies will be matured to increase agility, decrease the logistical burden, and reduce thermal and acoustic signatures.

In 2QFY99, the United Kingdom awarded two $146M contracts to: Team Lancer, led by GEC-Marconi as the prime contractor with Raytheon, United Defense, and Alvis as the major sub-contractors; and Team SIKA International, a joint venture of Lockheed Martin and British Aerospace, with General Dynamics Land Systems and Vickers Defence Systems as the major sub-contractors. The United States and the United Kingdom have a 50/50 cost share for the ATD. There are no plans to develop FSCS beyond the ATD or to procure it; however, the ATD provides options for transitioning advanced technologies to the Future Combat Systems and/or to the Interim Force.

Multi-Function Staring Sensor Suite (MFS3) ATD

This ATD will demonstrate a modular, re-configurable MFS3 that integrates multiple advanced-sensor components, including staring infrared imager, eyesafe laser rangefinder, and acoustic arrays. The MFS3 will provide ground vehicles, amphibious assault vehicles, and surface ships with a compact, affordable sensor suite for long-range non-cooperative target identification, mortar/sniper fire location, and air defense against low signature targets.

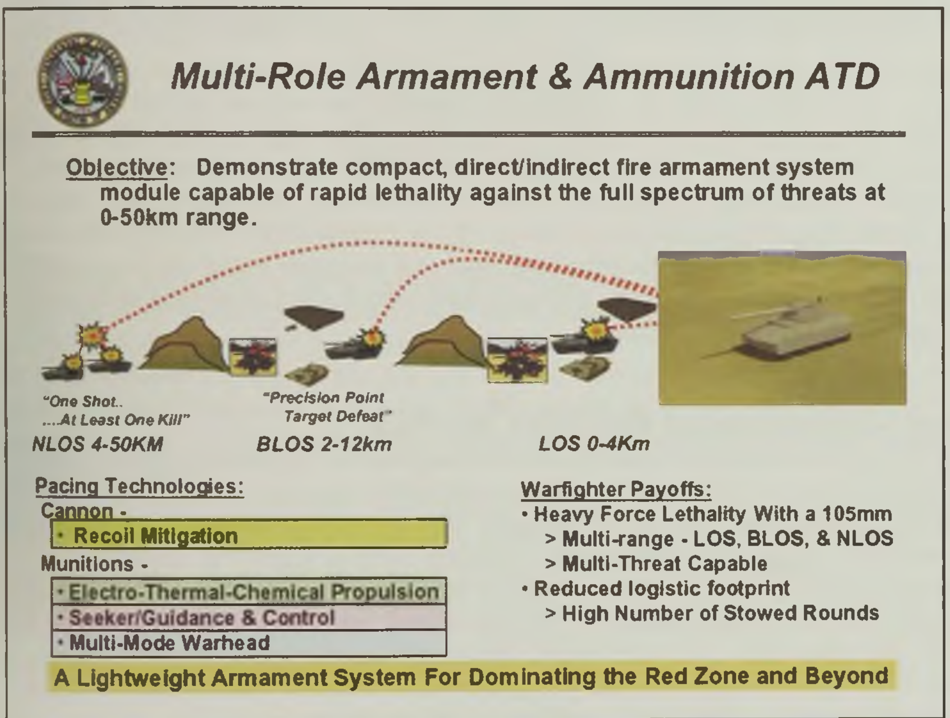


MFS3 uses a broadband Mercury Cadmium Telluride staring focal plane array to provide multiple infrared bands to a multi-spectral-aided target-detection algorithm for rapid wide-area search. The increased resolution from the mid-wave infrared band allows the operator to manually identify threat targets beyond the threat detection range—enhancing combat overmatch. The integrated eyesafe laser rangefinder provides range-to-target and target-mapping capabilities. An acoustic array will provide target cuing, location, and assist in automated targeting functions. MFS3 supports Future Combat Systems.

Multi-Role Armament and Ammunition

Developing and fielding an FCS Multi-Role Electro-Thermal Chemical (ETC) armament system with complementing ammunition suite will give the joint warfighter a diverse lethality system capable of defeating the full spectrum of threats. It will enable rapid engagement of ground and high-elevation targets and maximize mission flexibility via a common cartridge-based munition family while simplifying the overall armament system and munition logistics.

The munition's enhanced hit-and-kill probability will result in an increase of first round effects on target, thereby increasing the number of stowed kills. In addition, dynamic re-targeting will take advantage of information from the digitized battlefield. Multi-purpose warhead development will provide a defeat capability against the full spectrum of threats, both moving and stationary, and a robust direct-fire defeat mechanism will provide superior lethality against a full spectrum of future threat armor.



Currently fielded armament systems lack the firepower and self-protection capabilities necessary to defeat all threats that will be encountered on the future battlefield out to 50 km. In addition, the time required to deploy these systems onto the battlefield and their maneuver capability is inadequate to keep pace with the battle. The technologies being advanced under this Defense Technology Objective will address and meet these challenges.

ETC technology, composite materials, and propellant optimizations will result in a low-impulse/lightweight launcher that will provide an increase in energy on target and a versatile propulsion system for various munition packages. Recoil mitigation techniques such as fire-out-of-battery will enable greater muzzle energy and increased ranges without detrimental effects to the vehicle or crew. Integral swing breech/autoloader interface will allow for rapid rates of fire and resupply.

Novel kinetic energy (KE) penetrator technologies will provide defeat capability of heavy armors at 0-4 km. Dynamic re-targeting via in-flight updates will take advantage of reduced Target Location Error while maintaining affordability, high precision kill and high-G capability. Advanced composite structures and smart materials will provide extended range capabilities while reducing cartridge volume and weight. Smaller warheads that retain or increase lethality against all targets will result from advances in munition design, liner materials, and alternate explosives and fuzing.

Projected Activities

- **FY01:** Complete review of mission requirements; Complete design of lightweight cannon, autoloader, fire control, gun propulsion, and turreted armament system design; Complete Advanced KE projectile design and initial Multi-Purpose Extended Range Munition (MP-ERM) and Smart Cargo projectile designs; Complete development of a compact shaped-charge (SC) warhead and GENII/Collinear explosively formed penetrator (EFP).
- **FY02:** Complete fabrication of lightweight cannon, autoloader, fire control, gun propulsion, and detailed turreted armament system design; Conduct laboratory, limited gun and armor testing of KE composite sabot; Complete Smart Cargo and MP-ERM projectile design and laboratory demonstrations of SC multi-purpose and EFP warheads.
- **FY03:** Conduct system component critical demonstrations; Complete system integration laboratory demonstration of fire control functionality; Complete functional demonstration of integral launcher and autoloader concepts and turret; Demonstrate composite sabot; initiate integration of novel penetrator; conduct MP-ERM armor and high-G tests; conduct Smart Cargo component high-G tests; initiate multi-purpose SC and EFP warhead optimization in prototype FCS configurations including hardened low-firing energy fuzing.
- **FY04:** Conduct full-up integrated turret system functioning (turret slewing, gun elevation and autoloader feed rate) and firing demonstration of ETC propulsion capability for KE projectile and future multi-role munition family; Demonstrate Advanced KE Projectile flight and armor defeat capabilities against a 4km-distant target; Conduct FCS MP-ERM seeker high-G tests and guide-to-hit demonstration; Complete Smart Cargo (SC) component high-G testing; Complete optimization of multi-purpose SC and EFP warheads; Demonstrate a higher energy, less sensitive explosive.
- **FY05:** Complete limited safety release of cannon supporting the Defense Advanced Research Projects Agency demonstration; Demonstrate company-level Distributive Interactive Fire Mission algorithms in systems integration lab; Complete S&T with an integrated armament system fired from a vehicle; Conduct

warhead demonstrations against multiple targets; Conduct full-up cartridge demonstration of Advanced KE and MP-ERM cartridges; Conduct initial FCS Smart Cargo projectile testing.

- **FY06:** Fabricate Smart Cargo Projectiles.
- **FY07:** Conduct full-up demonstration of Smart Cargo Cartridge.

Robotic Follower ATD

The Robotic Follower ATD is designed to speed the incorporation of robotics into the next generation of land systems through the coupling of advanced perception technology with human sensing and reasoning. This is accomplished by coupling one or more unmanned follower vehicles to a manned leader vehicle. Potential applications might include logistics vehicles or non-line-of-sight weapon platforms. In each instance the soldier operating the lead vehicle will naturally choose paths that avoid serious obstacles to forward mobility, use terrain to provide cover and concealment and avoid paths that would compromise RF communications capabilities, thereby providing much of the intelligence required for subsequent autonomous unmanned follower vehicle mobility.

The lead vehicle will automatically transmit its path to the unmanned follower vehicles, as a series of waypoints or closely spaced grid coordinates, over tactical command and control data networks. The followers, incorporating limited perceptual capabilities to detect any new obstacles (e.g., vehicles, civilians, or bomb craters) that have appeared since the passage of the leader, will then follow the path defined by these "breadcrumbs," potentially with significant physical or temporal separation. Of course, soldiers will still have the ability to take direct control of the vehicles, if necessary.

The program's technical goals were developed in conjunction with the Army Training and Doctrine Command (TRADOC), focusing upon four potential missions for the unmanned follower deemed critical to future military operations: non-line-of-sight/beyond-line-of-sight weapons platforms, rear security for vehicle columns, supply operations, and a "mule" for dismounted troops. Each of these proposed missions places differing demands upon the system, in terms of vehicle speed, mobility and inherent intelligence. In support of dismounted troops, vehicles will typically maneuver at relatively low speeds, but require the ability to maneuver through highly complex terrain. During logistics operations, the vehicles may operate primarily on-road at high speed, but might initiate missions as much as 24 hours after the passage of the manned lead vehicle, placing significant demands upon perception and intelligence capabilities. To achieve these technical goals, the program is phased from FY01 through FY05 to demonstrate increasing capabilities.

In October 2001, the ATD will demonstrate a baseline follower with the capability to maneuver on primary roads at speeds of up to 30kph and off-road at speeds of up to 15kph with a range of up to 160km. The follower vehicles will be able to detect obstacles above the ground plane that are 0.5m high or obstacles below the ground plane, such as ditches or gullies, that are 1m wide, while following lead vehicles at a distance from 50m to 500m or traverse the same path with a delay of up to one hour. At the conclusion of the ATD in October 2005, the ATD will demonstrate the advanced robotics capability, ready for inclusion in the coming generation of military vehicle systems, through collaborative demonstrations to be conducted with the FCS contractors.

Semi-Autonomous Robotics for FCS

The Army is increasingly focusing on the integration of unmanned systems into future forces to enhance deployability, survivability and provide significantly greater situation awareness. Current concepts for FCS rely upon the use of highly capable unmanned ground vehicle elements to project tactical operations forward into enemy terrain, beyond the reach of manned FCS elements. Robotic systems based upon current technology lack the robustness and flexibility required to take on this role. There are three technical roadblocks to overcoming these deficiencies: the lack of robust, adaptive perceptual capabilities; intelligent, adaptive vehicle behaviors; and modular, non-intrusive soldier-robot interfaces.

To overcome these barriers, the Semi-Autonomous Robotics for FCS Program will focus on the development of robust autonomous mobility technology. The program will develop the perception and intelligence required to permit vehicles to roam throughout the maneuver battlespace without requiring substantial operator intervention, creating a tool optimized for FCS "net-centric" command and control concepts.

This effort will begin by using the ongoing Army/OSD Demo III program to look at an array of active and passive sensor models across the electromagnetic spectrum (including radar, laser radar [ladar], visible E-O and IR imaging) for the detection and classification of objects that may impact upon vehicle mobility. The development of methodologies to gain rapid, distant detection of obstacles below the ground plane (e.g., holes and ruts), including foliage-penetrating radar and ladar will be emphasized.

In October 2001, the program will demonstrate baseline cross-country mobility at speeds of up to 20 mph (day) in rolling terrain with obstacles above and below the ground plane. The focus will be upon development of reliable day/night autonomous mobility capabilities that will enable an unmanned vehicle (XUV) to maneuver at speeds of up to 50% of the speed attained by a manned High Mobility Multipurpose Wheeled Vehicle (HMMWV) in similar terrain. By conclusion of this effort in October 2005, the Army will have developed highly advanced technology for the effective operation of unmanned systems in a tactical environment.

Sensors for the Objective Force Science and Technology Objective (STO)

The objective of the Sensors for the Objective Force STO is to develop and optimize sensors packages for small unmanned platforms, such as unattended ground vehicles (UGVs), mini-unmanned aerial vehicles (UAVs), and unattended ground sensors (UGSs). These packages will incorporate robust (secure, jam-resistant, stealthy) communications products, developed under the Smart Sensor Communications Network STO (2001-2005). The communications products will network the systems throughout complex terrain (including Military Operations in Urban Terrain [MOUT]), and demonstrate a system-of-systems capability when fusing information from these various unmanned sensors systems.

This capability will provide the commander with organic unmanned sensor network assets to complete his situational awareness (SA) picture for direct and indirect fire weapons and threat avoidance. The networked sensors will:

- Provide remote monitoring of areas of interest out to ~10km without placing soldiers in harm's way;
- Increase a unit's area of coverage (a force multiplier); and
- Provide near-real-time SA data for early warning to speed decision making and reaction time.

Low-cost sensor technology such as uncooled infrared imaging, flash laser with short-wave infrared focal planes, and acoustic, seismic, and magnetic sensors will be integrated on small unmanned platforms to demonstrate the day/night capability of these platforms to provide faster target identification and reaction time with reduced false alarms. The use of intelligence reach back and tools to aid in sensor deployment along with smart data management will also be developed. Mounted and dismounted virtual simulations and live experiments with TRADOC Battlelabs in warfighter operational environments will be used to address hardware and operational integration issues, establish solutions, investigate new operational concepts, tactics, techniques, and procedures (TTPs), and validate component and system technology readiness levels (TRLs). The program supports Army Transformation, FCS concepts, and the Objective Force.

Smart Sensor Communications Networks (SSCN)

The SSCN Science and Technology Objective will develop communications network solutions for forward-deployed, unmanned, clustered entities such as smart munitions, sensors, and robotic systems that will be deployed with the Objective Force on the digitized battlefield of the future. To survive, a lightweight force requires sensor technology that allows tracking and identification of enemy units. However, energy-efficient networked communications capabilities for miniature microsensors do not exist.

These solutions will enable adaptive, self-healing, multi-hop communications networks with optimal routing algorithms that are secure and simultaneously exchange imagery and data traffic among the clustered entities and rearward to all echelons, including those beyond-line-of-sight. Specific technological challenges include developing and adapting network protocols; low-cost/power radio technologies; high-efficiency, low-profile antennas; near-earth propagation effect on antennas; and resolution of security issues associated with linking forward unmanned entities with the (secure) Tactical Internet. This is a joint effort with the Army Research Lab and it supports the Army Vision and the Anti-Personnel Landmine Alternative project.

Smart Sensor Communications Network (SSCN)

Objective: Develop a robust secure jam resistant, reduced RF Signature communications network for unattended devices in support of Sensors for the Objective Force STO III.IS.2001.02

Pacing Technologies:
- Low-power, small efficient fast signal correlators
- Jam-resistant, LPI/LPD waveforms
- Energy-efficient networking protocols and channel access

Warfighter Payoffs:
- Enhanced Communication
- Improved Situational Awareness --- quicker reaction, broader coverage, better identification

A Secure Stealthy, Robust, Power Efficient Miniature Brassboard Radio and Network

National Automotive Center (NAC)

The National Automotive Center (NAC) leverages commercial industry's large investment in automotive technology R&D, and initiates shared-technology programs focused on benefiting military ground vehicle systems. Located at the Tank Automotive and Armaments Command (TACOM), the NAC is part of the Tank-automotive Research and Development Engineering Center (TARDEC).

The NAC serves as a clearinghouse for the development and exchange of automotive technologies by linking industry, academia, and government agencies. Two-way technology transfer is pursued under the Department of Defense's Dual Use Science and Technology (DUS&T) program as well as through cooperative research and development agreements (CRADA). These capitalize on commercial industry's investment in well defined, high return-on-investment areas, tied to key Army science and technology objectives related to advanced land combat. The NAC focuses collaborative R&D contracts on military automotive technology thrust areas that include mobility, electronics, logistics, safety, and environmental protection.

Future Warrior

Military Operations in Urban Terrain (MOUT) Advanced Concept Technology Demonstration (ACTD)

The joint Army/Marine Corps MOUT ACTD experimented with technologies to address 32 tactical requirements in areas including:
- Command, Control, Communications, Computers and Intelligence (C4I);
- Engagement (lethal and non-lethal);
- Force protection; and
- Mobility.

The program began in FY97 to evaluate commercial off-the-shelf (COTS)/government off-the-shelf (GOTS) solutions to tactical urban warfighting deficiencies, battalion and below. The program evaluated more than 600 products, experimented with 128 products, and is preparing support for 25 products as a leave-behind capability for a two-year interim operational capability.

The core capability of the ACTD is a state-of-the-art MOUT "kit" comprised of relatively mature products ranging from individual equipment to battalion-level assets. These assets include: wall and door breaching, mapping and mission rehearsal, intelligence collection, small unit communications, and personal protection capabilities.

Tactics, techniques, and procedures (TTPs) were developed for individual through battalion-level collective tasks and for the training and use of the products to fully exploit the technologies. Ten squad/platoon level experiments were conducted to identify the most tactically viable candidates for each of the 32 requirements. Two joint experiments were conducted to evaluate the collective utility of the MOUT Kit. The MOUT attack yielded the following significant results:

Case	Red casualties	Blue casualties
Base case	55%	28%
Experimental case	100%	17%

In September 2000, the culminating demonstration was conducted at the Joint Readiness Training Center to demonstrate the collective military utility of the kit at the battalion level in the free-play environment of a combat training center. Soldiers and Marines from the 10th Mountain Division and 2nd Marine Division effectively used the kit to gain tactical advantage in the MOUT live fire and MOUT attack events. The kit gave blue forces an upper hand and played an essential role in the urban battle. The units that participated as experimental forces during the program will receive the ACTD residual/interim operational capability, and will receive support for extended user evaluation in FY01-02.

Currently, three capabilities have been transitioned into follow-on acquisition programs, and five more are currently under consideration for transition to FY02 program starts. Program data, TTPs, and other outputs are actively disseminated to appropriate Army, USMC, and other DoD organizations for their use, maximizing return on investment.

An FY01 extension of MOUT ACTD experimentation will continue to assess technology/TTP solutions to pressing tactical MOUT requirements not fully met in the ACTD, including stand-off wall breaching, real-time map updates, intelligence collection and dissemination, and through-wall sensing of enemy activity.

Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR)

Advanced Night Vision Goggles (ANVG) ATD

The ANVG ATD is responsible for developing the Air Warrior Operational Requirements Document requirement for integrated 100-degree field-of-view (FOV), helmet-mounted night vision goggles. The ANVG will significantly improve the aviator's flight safety, situational awareness, and night piloting capabilities under adverse weather and conditions during military operations in urban terrain (MOUT). The ANVG will provide an ultra-wide, 40-by-100-degree field of view, with better than a 50% resolution improvement over current averages. The ANVG will feature an integrated heads-up display for aircraft symbology.

Low-halo image intensifier (I2) tube technology will provide more effective navigation and improved safety in MOUT operations. The ANVG will be a modular horizontal technology integration design that can also meet requirements for Mounted Warrior and Land Warrior, enabling head mounting for night driving, navigation, or hand-held weapon usage. In addition, for the dismounted application, an uncooled or shortwave infrared FLIR camera will be added to the helmet-mounted assembly. This will provide thermal image data to the image intensifier to enhance target detection and complement the I2 performance.

Agile Commander ATD

The Agile Commander ATD will develop and demonstrate command-and-control applications for a functionally and physically agile, rapidly deployable, split-based headquarters. This will enable the commander to execute distributed operations across the spectrum of military activity from high-intensity combat to humanitarian assistance.

The goals of the Agile Commander ATD include:

- Command and control (C2) tools for very rapid development of courses of action (COA) analysis, war gaming, and execution monitoring; and
- Enterprise information and mobile, adaptive computing capabilities enabling the commander and staff to conduct operations while on the move.

The Agile Commander ATD supports the PM, Army Tactical Command and Control Systems; the PM, Field Artillery Tactical Data Systems; and the PM, Common Software.

Air/Land Enhanced Reconnaissance and Targeting (ALERT) ATD

The ALERT ATD demonstrates on-the-move and passive moving-target-indicator, automatic-aided target acquisition through a second-generation forward-looking infrared sensor (FLIR)/multi-mode laser sensor suite. Second-generation FLIR and multi-function laser data will be fused to enable large search areas to be covered with high-targeting accuracy during flight or mobile ground operations.

This technology will provide an increase in performance over current automatic target cues (ATC), such as the Comanche ATC, that rely on a single infrared sensor and are unable to passively detect moving targets, limited by false alarms, and severely degraded in on-the-move operations. The ALERT ATD supports battlefield digitization.

Anti-Personnel Landmine (APL) Alternative Program

On September 17, 1997, President Clinton announced a new anti-personnel landmine (APL) policy that allowed the United States to keep its mixed self-destructing mine systems. The APL policy directed the Department of Defense (DoD) to develop and field alternatives to pure APL systems throughout the force by 2003, except for Korea, and established a goal of fielding them in Korea by 2006. The Deputy Secretary for Defense tasked the Office of the Under Secretary of Defense for Acquisition, Technology and Logistics to develop and oversee a two-track APL Alternatives program.

Two-Track APL Alternatives Program

The Secretary of the Army was directed to execute Track 1, an effort to develop alternatives to non-self-destructing APLs for Korea, and to develop and field the Remote Area Denial Artillery Munition (ADAM). This single mixed system combines the Remote Anti-Armor Artillery Munition and the ADAM 155mm artillery shells. The long-term Track 2 effort was tasked to the Defense Advanced Research Projects Agency (DARPA). Their exploratory efforts include the Self-Healing Minefield and Tags/Minimally Guided Munitions.

Presidential Decision Directive 64 formally directed the DoD to aggressively search for alternatives to the anti-personnel submunitions used in our mixed anti-tank systems, as well as to actively explore potential replacements for all mixed munitions. The directive emphasized that alternatives must be militarily advantageous, cost-effective, and safe.

Because employing alternatives to mixed munitions is complex, the Presidential Decision Directive did not establish a timeline for identifying and fielding these alternatives. The directive compels the United States to sign the Ottawa Convention by 2006 if we successfully identify and field suitable alternatives to our anti-personnel landmines and mixed anti-tank systems.

In response to Presidential Decision Directive 64 and the above, the Deputy Secretary's March 23, 1999 memorandum provided additional direction to guide the DoD effort. It stated that the Office of the Under Secretary of Defense for Acquisition, Technology and Logistics should expand the concept exploration efforts to identify additional APL alternatives. The effort should include lethal and non-lethal alternatives, or a combination of the two. The effort should provide a range of system activation and target discrimination capabilities appropriate to the military requirements and humanitarian concerns of the combatant commanders.

Track 3 Program

The Deputy Secretary's memorandum also stated that a Track 3 program would be established to explore a wide range of operational concepts as alternatives to AP submunitions within mixed systems. The program would also address doctrine, tactics, force structure options, use of combat systems currently fielded or under development, Track 1 and Track 2 alternatives, materiel and non-materiel alternatives, and alternatives recommended by the combatant commanders. The concept exploration phase would address alternatives that could be developed and fielded within the following time periods: near term (by 2006); mid term (2006–2012); and far term (beyond 2012). Emphasis will be placed on the near term.

A Landmine Alternatives Concept Exploration Team was formed to conduct the first phase of the Track 3 effort. Led by the Office of the Under Secretary of Defense for Acquisition, Technology and Logistics, it consists of five primary groups:

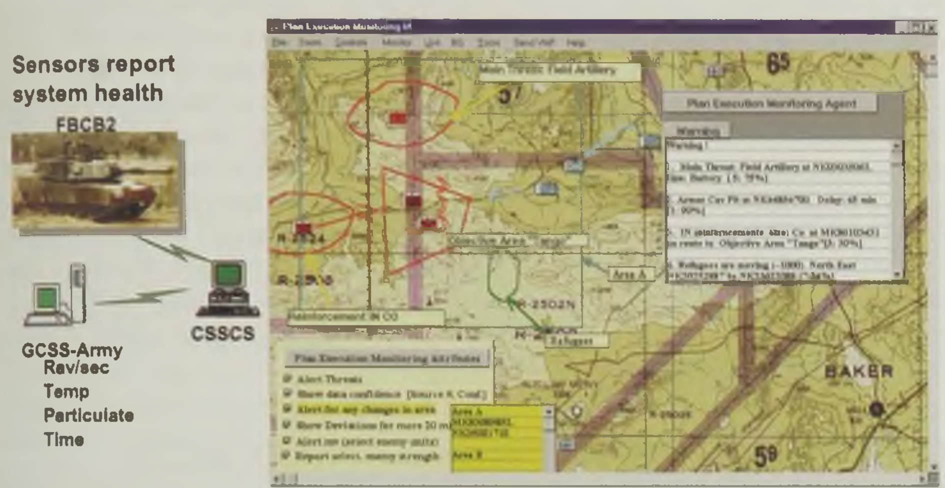
- Warfighter/User Group: responsible for identifying non-materiel concepts and providing them to the modelers.
- Materiel Concepts Group: responsible for identifying materiel concepts, performing preliminary evaluations, down selecting to the best concepts, and providing them to the modelers.
- Technical Assessment Group: provides an analysis, via modeling and simulation, of the benefits and risks associated with the materiel concepts.
- Battlefield Utility Group: assesses, via modeling and simulation, the operational utility of non-materiel and materiel concepts.
- Modeling and Simulation Working Group: ensures that the other groups are efficiently and effectively integrated.

After modeling, assessment, and analysis are completed, the Warfighter/User Group and Materiel Concepts Group will develop costs and constraints for the non-materiel and materiel concepts, respectively. A final ranking of the concepts will be performed, and a recommendation on future investments forwarded to the Deputy Secretary of Defense.

Logistics Command and Control (Log C2) ATD

The Log C2 ATD will revolutionize the tactical decision-making process for Army logisticians, by developing, demonstrating, and transitioning software products that enhance combat service support (CSS) decision-making capabilities. The Log C2 ATD will attain real-time planning and situation-data visualization by interfacing with current and emerging CSS systems.

In addition, the Log C2 ATD will enable cross-echelon and cross-battlefield functional area collaborative planning. The Log C2 ATD will provide data to commanders that enhances the planning of future operations and the execution of current operations. These enhancements will cut planning times and enable CSS information to be an enabler in a one-hour decision cycle. Complete access to automated CSS data will be available, down to the unit level. The Log C2 ATD supports the Combat Service Support Control System.



Real Time C2 for CSS Events

Multi-Functional On-The-Move Secure Adaptive Integrated Communications (MOSAIC) ATD

The goal of the MOSAIC ATD is to provide mobile communications that support Objective Force/Future Combat Systems and battle command infrastructure mobility (e.g., support a dispersed command post to include jump tactical operations center scenarios and isolated enclaves).

This ATD will focus on integrating a highly adaptive communications infrastructure to support the seamless flow of multimedia services across terrestrial and space-based platforms. MOSAIC will leverage leading-edge technology developed by government and commercial research programs. Its wireless communications architecture will support:

- Multimedia applications;
- Quality of service for streamed services;
- Ad-hoc networking; and
- Bandwidth management.

The MOSAIC ATD will demonstrate a networked communication system architecture that will enable a commander to disperse command post elements quickly, support dispersed operations, and provide a mobile reach-back capability linked through airborne relay or space-based platforms. The MOSAIC ATD also supports battlefield digitization efforts.

Multi-Mission Common Modular Unmanned Aerial Vehicle (MMCMUAV) Sensor ATD

The MMCMUAV Sensor ATD will demonstrate modular and interchangeable Electro-optic/Infrared (EO/IR) and integrated moving-target-indicator (MTI)/synthetic aperture radar (SAR) payloads for future tactical and short-range Unmanned Aerial Vehicles (UAVs). The advanced, modular payloads will enhance moving and stationary target detection and location under adverse weather conditions, battlefield obscurants, and cover of night. They will be form/fit/interface-compatible, and share common electronics, data link, and data compression.

The common modular approach will include common downlink data protocols for delivering image intelligence products to tactical control stations and common ground stations. These advanced sensor payloads, coupled with ground station automated processing, will enhance reconnaissance, surveillance, battle damage assessment, and target cuing of non-line-of-sight weapons for brigade and below-maneuver forces.

The SAR/MTI payload is managed by the Intelligence and Information Directorate (I2WD) of the U.S. Army Communications–Electronics Command (CECOM) and weighs 63 lb. Range and target location accuracy are 3–10 km/3–14 km and 50 m/100 m, respectively. SAR resolution is 0.3 m. The EO/IR payload is managed by Night Vision and Electronic Systems Directorate (NVESD) and weighs 50 lb. Range and target location accuracy are 4 km and 80 m, respectively.

Rapid Terrain Visualization ACTD

The objective of the Rapid Terrain Visualization (RTV) ACTD is to demonstrate technologies and infrastructure that meet the Army requirement for rapid generation of digital topographic data (DTD) to support emerging crises or contingencies. DTD includes digital terrain elevation data, feature data, and imagery. The area coverage and timeliness requirements for DTD are:

- 20 x 20 kilometer area in 18 hours;
- 90 x 90 kilometer area in 72 hours; and
- 300 x 300 kilometer area in 12 days.

The resolution requirement for elevation data is Level III (10-meter grid spacing) over the entire area of interest with several smaller inserts containing higher resolution data with a grid spacing of three meters (Level IV) or one meter (Level V). The resolution requirement for feature data is that the data are sufficient in content and detail to accomplish specific, user-defined tasks (terrain analysis, visualization, and simulation).

The RTV ACTD will demonstrate a contingency capability for rapid collection of high-resolution digital topographic elevation data using Interferometric Synthetic Aperture Radar (IFSAR) and Light Distance and Ranging (LIDAR) sensors on a DeHavilland DHC-7 aircraft. Rapid processing of the IFSAR sensor data will be accomplished in real time onboard the aircraft. A fine-resolution SAR image, orthorectified using the elevation data, will provide a 3-D image map with very high geo-spatial accuracy. In a parallel effort using ground-based workstations, feature data will be generated from multi-spectral imagery collected by commercial and government sensor systems and from IFSAR data. An integrated software package for rapid, semi-automated extraction and attribution of a minimum set of key topographic features will be developed.

Sensor Performance Technologies

Current and future weapons and intelligence-collection systems rely heavily on sensors. Each sensor has its strengths and weaknesses in various terrain and weather conditions. Terrain and weather effects (including cold temperatures, snow, ice, and frozen ground) dramatically affect weapon systems that contain infrared and passive/active millimeter wave sensors. Physics-based modeling capabilities and 3D terrain visualization tools are merging under the 3D Dynamic Multi-Spectral Synthetic Scene Visualization Science and Technology Objective, to create terrain and weather-dependent infrared and millimeter wave terrestrial backgrounds for synthetic environments and sensor performance templates.

This mission planning and rehearsal tool will provide commanders and staff with unparalleled situational awareness to conduct detailed intelligence preparation of the battlefield, greatly enhance development of courses of action, and increase target acquisition by determining sensor performance in various weather conditions, times of day, and attack angles and directions. This tool will also provide materiel developers with physics-generated models of winter backgrounds in support of their RDT&E efforts.

Tactical Command and Control (C2) Protect ATD

The objective of the Tactical C2 Protect ATD is to develop, integrate, and validate hardware/software tools, tactics, and procedures that will secure the systems and networks of the first digitized division and Objective Force/Future Combat Systems from modern network attacks. This ATD will focus on protecting the Army's modern, commercial-based tactical information networks, components, and data.

The Tactical C2 Protect ATD will leverage current commercial off-the-shelf (COTS) technology to the maximum extent, as well as DoD programs that target network security technology. Tools will be developed in cases where COTS technology does not satisfy tactical constraints. The approach will involve developing tactical network protection and attack/assessment capabilities, then use the attack/assessment techniques against the protection mechanism to determine the effectiveness of both. The seamless security architecture developed will be an integrated solution, providing advanced network-access control, intrusion detection, and response mechanisms within tactical communications networks. The Tactical C2 Protect ATD supports battlefield digitization.

Theater Precision Strike Operations (TPSO) ACTD

The TPSO ACTD will address the CINC United Nations Command/Combined Forces Command's requirement for a significantly improved capability to plan and direct theater-level counterfire and precision engagement operations. This will be accomplished by providing enhanced real time synchronization of U.S. and Korean assets between the Forward Line of Own Troops and the Forward Boundary, which is under the control of the CFC Ground Component Commander.

Specific TPSO ACTD objectives are to provide enhanced:

- Command and control, and strike planning processes;
- Joint and coalition interoperability; and
- Capability to transition from the current deployed force structure to a reinforced structure.

To accomplish the mission and fulfill the objectives, the TPSO ACTD will develop and leave behind automated and streamlined Deep Operations Coordination Cell (DOCC) processes; integrated Joint Command, Control, Communications, Computers and Intelligence (C4I); new tactics, techniques and procedures; and an organic training infrastructure. These capabilities will allow the Ground Component Commander (GCC) to coordinate with other component commanders, visualize the battlefield, and direct operations.

TPSO will participate in three theater exercises each year—Foal Eagle, RSO&I, and SummerEx—integrating prototype capabilities during each. Ulchi Focus Lens will be the major demonstration each year in which all prototypes are integrated and a warfighter evaluation is conducted. Other services will participate to the level they determine is appropriate for the scenario. TPSO will participate in other experiments and activities, such as Joint EFX and AWEs, as appropriate.

The Director, Joint Precision Strike Demonstration (JPSD) Project Office, Fort Belvoir, VA, is responsible for the overall conduct of the ACTD. The Deputy Director, Depth and Simultaneous Attack Battle Lab, Ft. Sill, OK, is responsible for the detailed planning and integration of the demonstrations. The Operations Officer, Eighth Army, will provide manpower and other theater resources and be the recipient of the ACTD leave-behinds. TPSO was the Army's number one priority FY98-start ACTD. It is a six-year program with approximately $92M budgeted through FY03.

Rotorcraft

Future Transport Rotorcraft (FTR)

The mission of the FTR effort is to develop and demonstrate enabling technologies for an affordable, long-range, heavy-lift transport platform that includes Vertical Take-Off-and-Landing (VTOL) capability for the Objective Force and a means to accomplish vertical envelopment.

The Future Transport Rotorcraft (FTR) is envisioned as the next generation, heavy-lift transport platform for both troop and cargo missions. The FTR would provide a true heavy lift capability well beyond current tactical and operational lift capabilities. A potential joint service program, it could meet other services' and international requirements for a heavy lift VTOL.

The FTR would provide both operational and tactical mobility to the Objective Force commander. In its current conceptual form, the FTR is envisioned to transport Future Combat Systems. In addition, it would transport weapons, ammunition, equipment, troops and other cargo in support of combat unit operations across the spectrum of conflict. Although it will have a strategic deployment capability up to 2,100 nautical miles, FTR would primarily be a tactical rotorcraft providing VTOL logistics delivery of C-130-size loads. Based on the technology of today through 2010, FTR could either be a helicopter, a tiltrotor, a quad-tiltrotor, or other advanced rotorcraft configuration.

Future Transport Rotorcraft Enabling Technologies

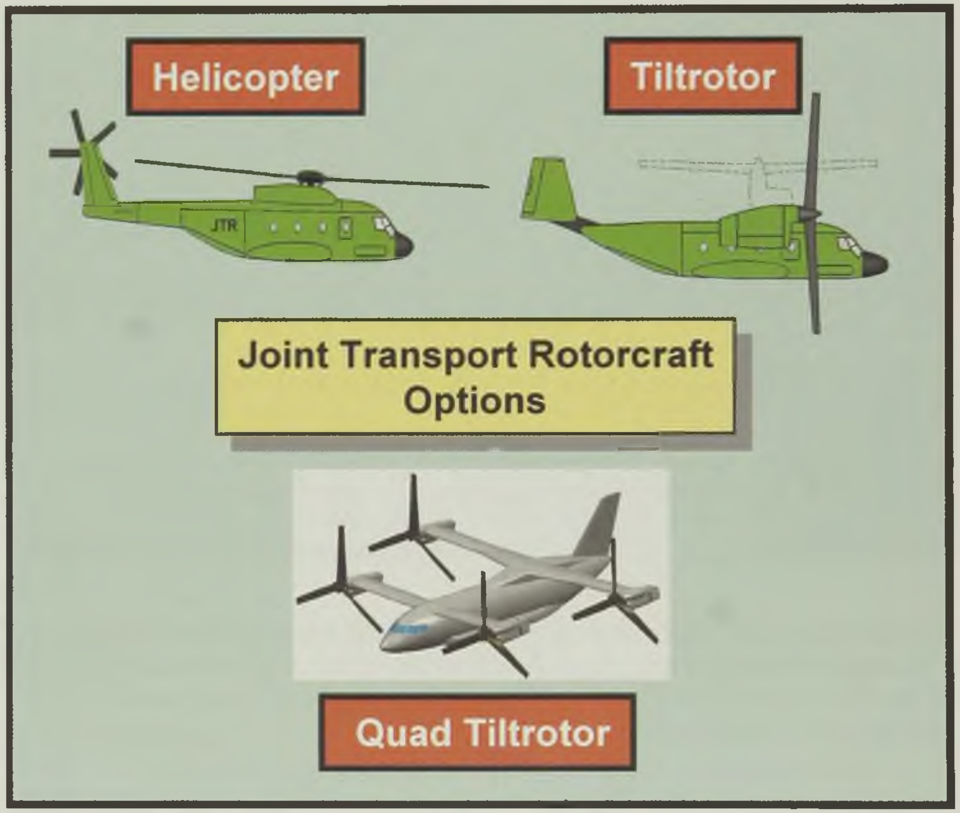
FTR's key enabling technology programs address a majority of DoD requirements, and are supported by the other Services. Science and Technology (S&T) efforts are ongoing or planned in the following areas:

- High-torque, lightweight, low-maintenance drive systems;
- High-lift, efficient, low-vibration rotors with active flight controls;
- Aerodynamically-efficient airframe and propulsion concepts;
- Lightweight, affordable structures, based on innovative structural concepts, materials and processes; and
- Diagnostics, prognostics, self-repair concepts and technology, including:
  - Lightweight, automated/semi-automated onboard cargo handling equipment;
  - Market-driven, open-systems electronics architecture;
  - Advanced crew-station and decision-aiding tools; and
  - Integrated signature management, active and passive countermeasures.

Currently, FTR is an FY00–07 Army S&T program. It is a key part of the larger DoD FY00–10 Rotorcraft S&T program, structured to provide affordable rotor, flight control, airframe, propulsion, drivetrain, crew station and survivability technologies required to meet DoD needs and FTR capabilities. As delineated in the DoD Rotary Wing Vehicle Technology Development Approach, these advanced technologies focus on the following goals (as compared to 1994 technology baseline):

- Reduce structural weight by 20–25%;
- Reduce drivetrain weight by 35–40%;
- Reduce engine-specific fuel consumption by 35–40%;
- Increase engine power-to-weight ratio by 100%;
- Increase cruise efficiency by 20–25%;
- Increase maneuverability/agility by 100%;
- Reduce aircraft signature by 60%;
- Improve aircraft survivability by 30%; and
- Reduce life-cycle costs by 25–50%.

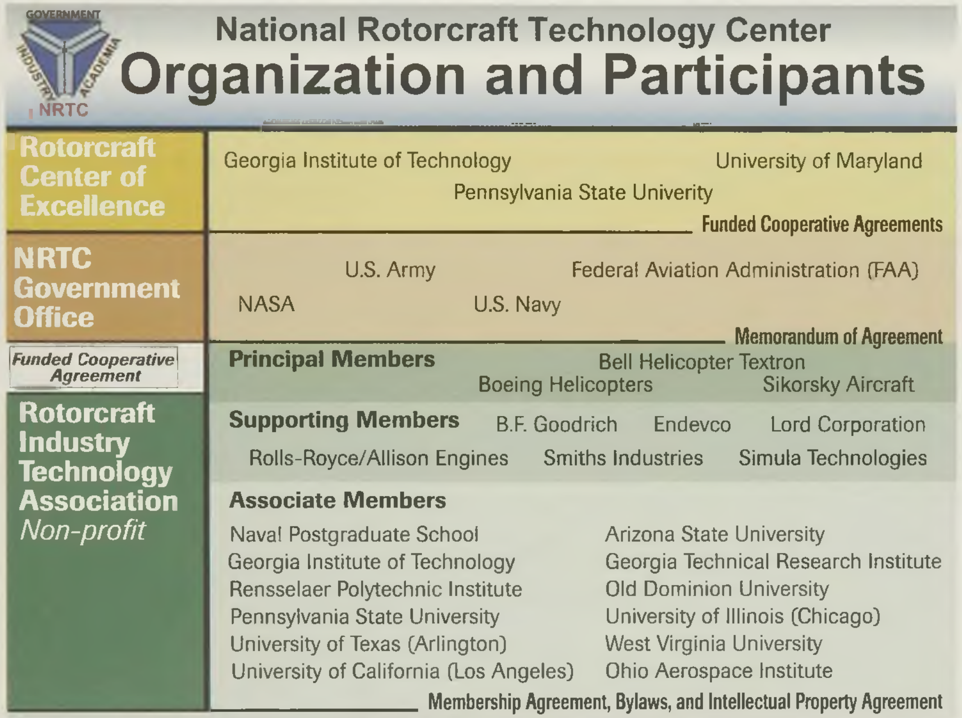
Successful demonstration of FTR technologies will result in providing a two-fold increase in payload, four-fold increase in range, and a 25% reduction in life-cycle costs over current CH-47 Chinook capabilities.



National Rotorcraft Technology Center (NRTC)

The NRTC is an innovative partnership of government, industry, and academia to maintain U.S. preeminence in rotorcraft technology. Its strategic goal is to ensure the continued superiority of U.S. military rotorcraft, while expanding the world rotorcraft market and U.S. industry's share of that market. To achieve this goal, the NRTC manages a collaborative research and development program that focuses on the following technology thrusts:

- Process and product improvement for affordability, quality and environmental compliance;
- Enhanced rotorcraft performance;
- Passenger and community acceptance;
- Expanded rotorcraft operations; and
- Technologies to support harmonized military qualification and civil certification.



The principal participants in the government element of NRTC are the Army and the National Aeronautics and Space Administration (NASA). The Navy and Federal Aviation Administration (FAA) also play important roles; a memorandum of agreement joins these organizations.

Rotorcraft Industry Technology Association (RITA)

The rotorcraft industry formed the Rotorcraft Industry Technology Association (RITA), a non-profit corporation, to serve as its focal point. RITA's membership comprises principal members, supporting members, and associate members. Principal members include all three major U.S. rotorcraft manufacturers: Bell Helicopter Textron; Boeing Helicopters (including the former McDonnell Douglas Helicopter Systems); and Sikorsky Aircraft.

Supporting members include an expanding list of subsystem manufacturers, including Rolls-Royce/Allison Engines, B.F. Goodrich, ENDEVCO, Simula Technologies, Lord Corporation, and Smiths Industries.

Associate members from academia include the Naval Postgraduate School, Arizona State University, Georgia Institute of Technology, Georgia Technical Research Institute, Rensselaer Polytechnic Institute, Old Dominion University, Pennsylvania State University, University of Illinois (Chicago), University of Texas (Arlington), West Virginia University, University of California (Los Angeles), and the Ohio Aerospace Institute. Academia also participates through the integration of the Rotorcraft Center of Excellence (RCOE) Program into NRTC. The current RCOEs include Georgia Institute of Technology, Pennsylvania State University, and University of Maryland.

Guidance for the NRTC's technology thrusts has been established by executive leadership from the rotorcraft community (which includes government, industry, operators, and academia), and is refined as the need arises. Annually, industry—through RITA—then plays the principal role in identifying the projects it will undertake, provides funds that match or exceed NRTC government funding, and agrees to share the resulting technology with other program participants.

Government funding for RITA projects comes in equal portions from the Army and NASA. The government has established cooperative agreements with RITA and with each of the RCOE universities. These serve as the mechanism for collaborating on the definition and execution of the technical programs, and for providing government funds. The government office of the NRTC is located in existing facilities at Ames Research Center, Moffett Field, California. This office is building to the maximum staff of seven people.

Lethality

Direct Fire Lethality (DFL) ATD

The DFL ATD focuses on enhancing the anti-armor lethality of the Abrams tank by maximizing warhead/penetrator effectiveness and increasing tank gun accuracy. The DFL ATD major effort is an advanced 120mm kinetic energy (KE) cartridge. It will use a novel penetrator and micro-electro-mechanical systems accelerometers and miniature radial thrusters to significantly improve hit and kill capability against future threats, especially those protected by explosive reactive armor (ERA) appliqué arrays. This effort is driven by advancements in threat ERA which will diminish the performance of existing KE tank ammo, threatening the Abrams lethality overmatch.

In FY00, the ATD demonstrated novel penetrator lethality up to 70% greater than existing M829A2 KE tank rounds. In FY01, it will demonstrate radial thruster capability to correct for multiple-jump errors in achieving 30–70% increase in system accuracy. In FY01, the ATD exit criteria require conducting integrated 120mm KE cartridge ballistic tests to demonstrate:

- Defeat of 2005 ERA-protected threats, with up to 70% increase in lethality over the M829A2; and
- Increase in system accuracy between 30–70% under stationary conditions over the M829A2, fired from an M1A2 Abrams tank.

The DFL ATD will provide the Army with state-of-the-art gun armament for fielding in FY07+.

Loiter Attack Munition—Aviation

The mission of the Loiter Attack Munition–Aviation is to provide the Objective Force with a beyond-line-of-sight networked missile with a helicopter-launched capability.

This effort will demonstrate, through flight simulations and component developments, technologies for long-range (> 50 km) weapon systems for airborne forces. The effort will provide the following:

- Enhanced sensor-shooter connectivity;
- Continuous in-flight autonomous feedback of target coordinates to local field commanders;
- Minimized timelines for placing weapons on target;
- Battlefield damage assessment with last images before impact; and
- Demonstration of automatic and man-in-the-loop target acquisition and engagement concepts.

This effort will also provide a rail interface and boost motor design capable of achieving stable helicopter rail launch in the presence of rotor downwash.

Program Status

- **FY00:** Performed evaluation and simulation to determine the objective data link requirements, motor performance requirements; Initiated detailed design.

Projected Activities

- **FY01:** Design flexible data link; Quantify improvements to turbojet propulsion subsystems; Select most economical technology/approach for helicopter launched loiter attack munitions; Fabricate bench test prototype hardware.
- **FY02:** Complete breadboard data link testing demonstrating key system capabilities; Complete testing of rail launch system.

Low Cost Precision Kill/Advanced Precision Kill (LCPK) ATD

The goal of the LCPK ATD is to provide a mid-range, air-to-ground weapon capable of defeating non-tank targets such as selected personnel carriers, air defense emplacements, small watercraft, military operations on urbanized terrain targets, and lightly armored vehicles. The weapon will provide increased stowed kills and will be capable of point target accuracy while producing minimal collateral damage. The Army has identified and documented a requirement for Advanced Precision Kill Weapon Systems (APKWS) to fill the weapon gap between the current unguided 2.75-inch rocket system and the HELLFIRE anti-armor missile.

The LCPK ATD program addresses key features of the APKWS operational requirement by developing, demonstrating, and integrating a low-cost (less than $10K), accurate (~1 m CEP), 2.75-inch guided rocket onto the AH-64D Apache. The LCPK will provide a standoff range of greater than 6 km with a surgical strike capability against specified point targets. The LCPK will use a small, strap-down laser seeker, off-the-shelf inertial devices and low-cost control mechanization. A high single-shot probability of kill will be achieved, reducing cost-per-kill by 5x, minimizing collateral damage, and increasing the number of stowed kills by 4–20x.

Low Cost Precision Kill Missile

Program exit criteria	Threshold	Goal
Accuracy (CEP, meters)	2	1
Maximum range (km)	5	> 6
Minimum range (km)	1.5	1
Per unit production costs ($)	< 10,000	< 8,000
Weight (lb)	< 35	< 30
Length (in)	< 75	< 70

Program Status

- **FY99:** Completed source selection evaluation board for initiation of ATD.
- **FY00:** Awarded two cost-share contracts, Raytheon Missile Systems and BAE Systems; Completed hardware-in-the-loop testing of breadboard prototypes.

Projected Activities

- **FY01:** Conduct ground launched control test vehicle flight tests; Conduct ground launched guided flight tests.
- **FY02:** Conduct air-launched guided flight tests from AH-64D Apache.

Objective Crew Served Weapon (OCSW) ATD

The OCSW ATD will demonstrate the technological maturity and operational utility of a highly lethal, lightweight, two-man portable, crew-served weapon. This system will provide a full solution, day/night, target acquisition and fire control system. The OCSW will significantly reduce the dismounted soldier's load by providing a greater than 60% reduction in weapon system weight, and a 75% reduction in ammunition on a weight-per-kill basis, compared to current crew-served weapon systems. With its high-explosive, precision, airbursting munitions, the OCSW system will provide revolutionary overmatch lethality. The OCSW will defeat body-armor-protected threat personnel in defilade, out to a maximum effective range of two kilometers.

The OCSW 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/role, and will also be a fully interoperable, lethality component block upgrade to Land Warrior. In accordance with the strategy of the Army and Joint Service Small Arms Master Plans, the OCSW will provide the 21st century warfighter with dramatic improvements in lethality, survivability, reduced soldier load, and sustainability. In addition to the impressive capabilities it affords to dismounted warriors, the OCSW also has significant potential for vehicle mounted operation such as filling the role of the Crusader Defensive Armament System and the secondary armament for the Future Combat Systems.

Precision Guided Mortar Munition (PGMM) ATD

The PGMM is an affordable, 120mm, laser-guided mortar munition with an extended-range glide capability that will significantly improve accuracy and double the current mortar range. The PGMM will provide the maneuver commander with a weapon capable of providing responsive, precise, standoff defeat of threats behind protective cover. This will improve U.S. Infantry survivability, reduce collateral damage, minimize non-combatant casualties, and decrease the logistics burden.

The Maneuver Battalion Commander's target set includes threats such as crew-served weapons, command posts, observers, and so on, behind protective cover, or in fortified positions such as bunkers and buildings. This new capability will improve U.S. Infantry survivability by enabling the defeat of fortified and urban targets, without requiring close-range infantry attack. A precision round with an optimal burst radius will defeat targets, reduce damage to surrounding structures, and minimize noncombatant casualties.

Survivability

Integrated Situation Awareness and Targeting (ISAT) ATD

The ISAT program develops integrated system concepts that will enhance the warfighting effectiveness and efficiency of the weapon system/team. ISAT will demonstrate an airborne multi-spectral warning suite with precision location capabilities. ISAT will also demonstrate tactical electronic warfare's role in information and intelligence warfare and how it can assist the crew and commander on the modern battlefield. By increasing the number of information-gathering sensors in the tactical-level battlespace—via the networking of platforms equipped with passive detection systems and accurate space/time reference systems—the warfighter will be provided with an unambiguous picture of the electronic battlefield. This picture will be produced by the cooperative integration of the radar, missile, and laser warning spectrums, enabling reduced decision timelines for defensive/offensive actions, rerouting/threat avoidance, target acquisition/identification, and anti-fratricide.

ISAT will give our warfighters at the crew level and at higher echelons an operationally significant advantage: an increased awareness of the environment around the aircraft, which will enable better decision-making, more rapidly, while on the move. This awareness will reduce risks to warfighters, whether dispersed or in close proximity. The multi-spectral warning suite will enhance the detection of targets across the battlespace, improve engagement ranges, and provide other options for enemy suppression. The precision emitter location capability will increase the effectiveness and efficiency of the warfighter. These advances will also aid the warfighter in the areas of combat identification and system/team survivability.

Advanced Large Area Tonedown (ALAT)

A new innovative camouflage technique known as ALAT has been developed to camouflage and conceal earthwork and construction on the battlefield. ALAT is a water-based, spray-on mixture of natural fiber (wood or paper), tackifiers (binders), and coloring agents. ALAT techniques involve using commercial mixing machinery to combine the various additives with water into a sprayable slurry. Currently, ALAT provides tailored visual camouflage to site-specific background conditions. Future R&D in ALAT will address development of additives for infrared and radar signature manipulation.

ALAT will also provide camouflage treatment for large critical facilities, such as logistics nodes/supply points, command posts, tactical assembly areas, and other forward-deployed bases. ALAT is well suited to the rapid camouflage treatment of protective berm(s), construction scars, vehicle/equipment tracks, and any other distinct signature cues associated with critical assets/facilities. In addition, this technology can be used to support deception operations by producing decoy operating surfaces, decoy lines of communication, decoy berms, and signature cues to enhance threat detectability of materiel deception(s).

Mobile Ballistic Research System (MBRS)

An MBRS has been developed to allow researchers to investigate the penetrability of in-situ rock targets around the world. The system consists of a 153mm ballistic powder gun capable of launching 55 kg penetrators, as large as 125mm, up to 1 km/s. The gun can launch penetrators at angles ranging from 0 (horizontal) to 90 degrees (fully upright) through a complex system of hydraulic positioning rams. Self-contained, the MBRS is capable of supplying all the necessary services and utilities required to operate at remote sites. Results of recent experiments demonstrated that developmental projectiles could penetrate granite five to six body lengths deep.

Simplified Survivability Assessment (SSA)

A computerized SSA procedure under development will aid engineer officers in planning and implementing the survivability mission. The SSA has four functional areas:

- Survivability planning;
- Survivability measures;
- Design procedures; and
- Weapons effects calculations.

Survivability planning provides the resources and timeline required to achieve a quantified level of survivability. Survivability measures provide construction details and instructions, with bills of materials for survivability positions. The design procedure and weapons effects calculations allow the engineer to design a new overhead cover position, or evaluate the safety and effectiveness of existing positions. Significant time savings will result from using the SSA in planning survivability missions, and the engineer officer will have readily available information on weapons effects and design procedures.

Survivability and Protective Structures

The Army's survivability and protective structures' science and technology program performs research that enhances force protection, from the foxhole to fixed facilities, against weapons threats ranging from small arms and terrorist weapons to advanced conventional weapons equipped with multi-spectral sensors. The program has three focus areas: force protection against terrorist threats; force protection on the battlefield; and force protection against advanced conventional weapons. The research produces technologies that provide force protection through:

- Blast load prediction (blast shielding effects from barriers and buildings);
- Structural response (including progressive structural collapse for a wide variety of structural types);
- Personnel hazards prediction; and
- Expedient design/retrofit methods for increased survivability, including structural hardening and camouflage, concealment, and deception.

Integral to force protection research is the use of high-performance computing to simulate blast loading and structural response, apply indigenous and/or lightweight advanced composite materials, and develop expedient survivability procedures.

Anti-Terrorist Planner software is under development to assist the military commander and his staff in assessing the vulnerability of installations to vehicle bombs and in developing protective measures. The software has a graphical-based interface for calculating and viewing the effects of vehicle bombs and estimating the expected hazards to personnel due to airblast, structural damage, and window breakage. The software assists in developing adequate perimeter standoff distances and provides detailed information on methods of retrofitting walls and windows for increased blast resistance.

Conventional building components such as windows and masonry walls are highly vulnerable to terrorist vehicle bomb attack. They fail catastrophically and produce hazardous flying debris. When sufficient standoff is not available to reduce the blast effect, other means of mitigating the debris hazard may be needed.

Recently, methods have been developed to retrofit the windows and walls of existing buildings. The window retrofit involves applying a window film to hold the glass fragments together, in conjunction with a horizontal bar to catch the filmed window and stop it just inside the opening. The wall retrofit uses a high-strength fabric located behind the wall and anchored to the floor and roof of the structure. The fabric catches the hazardous masonry block debris and prevents it from entering the building. Both of these methods have been successfully validated in recent joint U.S./Israeli full-scale vehicle bomb experiments on a five-story building.

To understand the detailed cause and effect relationships associated with blast-induced loading in complex geometries, structural motion, deformation, and damage, researchers use high-performance computing simulations of the shock physics and dynamic structural responses of conventional and hardened facilities. The research has pioneered the exploitation of parallel computing. More than 500 processors at the DoD Major-Shared Resource Center in Vicksburg, MS, compute explosive detonations, airblast and ground-shock propagation, and the loads on and responses of structural models.

Revetment concepts suitable for rapid construction have been developed and demonstrated to protect U.S. Army aviation assets against the blast and fragmentation effects of conventional weapons. The revetments were constructed using Hesco Bastion "Concertainer" material, a geocomposite that consists of galvanized wire mesh panels lined with a geotextile fabric. Analytical studies and field experiments were used to determine the increased survivability of the protected aviation assets and to optimize the height of the revetments. The revetment concepts significantly increased the survivability of aviation assets.

Logistics Reduction

Corps of Engineers Research and Development (R&D)

The spectrum of likely operations for the U.S. Army spans a variety of missions, including humanitarian assistance, disaster relief, peacekeeping and peacemaking, and major theater wars. Recent history indicates that the number of deployments is potentially extensive; the Army was deployed to over 60 different countries at any point in time during FY99. Given the world's current and emerging geopolitical relationships, this trend is likely to continue.

The U.S. Army Corps of Engineers (USACE) R&D program is prepared to support the Nation's warfighters across this spectrum of conflict in all environmental conditions. The goal of USACE's R&D efforts is to provide America's warfighters with the best equipment, planning tools, and information possible.

Engineer Research and Development Center (ERDC)

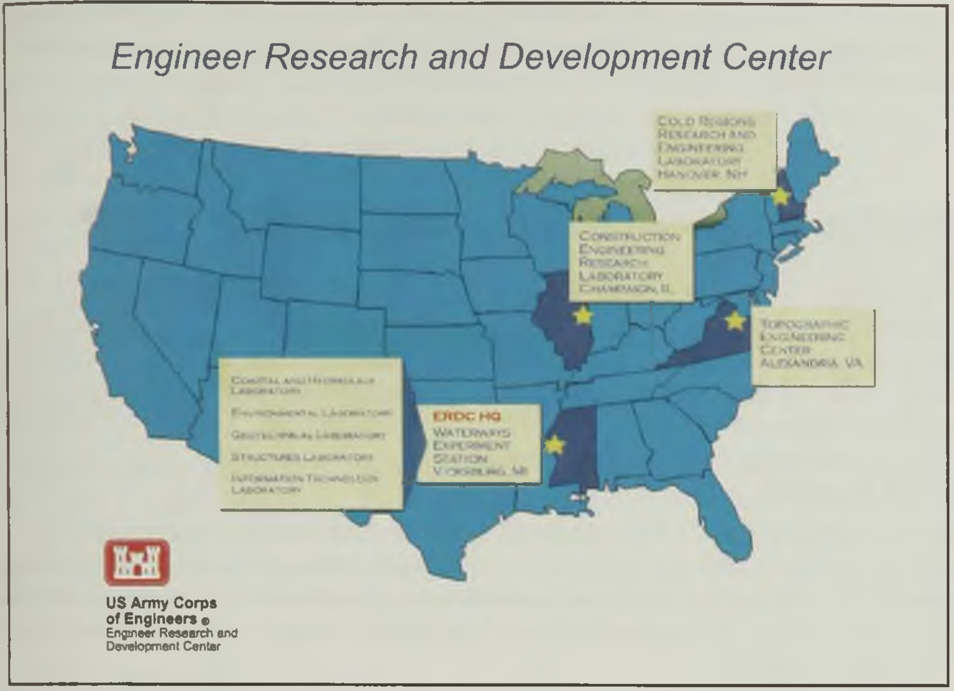
As part of the USACE re-engineering program, the USACE R&D laboratory system has recently formed the ERDC (http://www.erdc.usace.army.mil). The ERDC's mission is to provide integrated research, development, and engineering services in the fields of civil engineering and environmental quality to support the programs of USACE, Army, DoD, and the Nation.

Within the ERDC, research and engineering studies are conducted on a variety of topics related to combat engineering, infrastructure support and maintenance, and environmental quality and stewardship. The R&D scientific and engineering investigations include basic and applied research, problem identification, as well as final implementation of the R&D product.

The combined ERDC staff numbers 2,500, with an annual research program of over $430 million. Shown in the figure below are the four geographic sites and eight laboratories that make up the ERDC.

The ERDC will benefit the Army in the following ways:

- Reduce the cost of doing business;
- Improve the coordination and teamwork among technical experts at the four sites; and
- Provide "one-door" access and increased customer responsiveness.



Airfields and Pavements to Support Force Projection

This USACE program addresses the warfighters' need for more reliable force-projection platforms to support strategic force deployment from the continental United States (CONUS) and operational employment within the theater of operations. Improved reliability will be achieved by developing advanced design, analysis, and evaluation procedures for airfields and pavements, as well as improving construction, maintenance, and repair systems. Advanced analytical pavements models will be developed. These realistically depict the effects of the following factors on the predicted performance of permanent and expedient airfields and pavements:

- Current and future-generation aircraft loads;
- New and/or indigenous construction material properties; and
- Impact of severe temperature and moisture conditions, including permafrost.

Research products will also include new construction, maintenance, and repair materials and methods. These aim to reduce construction effort, improve the readiness of permanent airfields, and enable the use of indigenous low-quality materials for expedient airfields.

Enhanced Coastal Trafficability and Sea State Mitigation (ECT/SSM) ATD

This ATD is a critical component of the DoD effort to meet CINC requirements for a robust Sea State 3 logistics-over-the-shore (LOTS) capability. The ECT/SSM ATD will demonstrate the impact of recently developed technology for joint logistics-over-the-shore (JLOTS) operations. It includes:

- A rapidly installed breakwater (RIB) that enables Sea State 3 operability at off-shore anchorages used during JLOTS operations; and
- A sand-fiber stabilization system, plastic hex mat, and fiberglass mat for rapid beach preparation and sustained trafficability during JLOTS operations.

A primary limit to throughput in JLOTS operations is the exchange of Army pre-positioned stocks (APS) to lighters during Sea State 3 conditions. A RIB provides relatively calm areas in which these operations could be safely conducted during such conditions. The primary goals of the ATD are the following:

- Successfully deploy an ocean-scale RIB. The RIB would create a sheltered area within its lee in which Sea State 3 conditions are reduced to Sea State 2 or lower; and
- Demonstrate improved techniques for rapidly stabilizing beach soils from off-load sites to inland road networks.

To accomplish this, a RIB will be deployed during a scheduled JLOTS exercise in 2002, to demonstrate the capability of the system for sea state mitigation and rapid set-up time. The impact of rapid beach stabilization technology will also be demonstrated by comparing construction times, material requirements, and the durability of existing and new capabilities.

Joint Modular Lighterage System (JMLS)

The Army also participates in developing the JMLS, which is managed by the U.S. Navy. This program will develop and test improved causeway and lighterage systems to accelerate cargo offload speed under normal sea states and allow for successful offload under challenging sea state conditions. These efforts will significantly improve operational capability and flexibility, truly integrating LOTS capabilities. JMLS equipment will allow the Army to conduct LOTS exercises under adverse sea state conditions. The extended capabilities of the joint Army/Navy LOTS program allow the Army to proceed with deployment of forces under less than ideal sea and weather conditions in support of the Army Vision.

Sustainment Engineering

The USACE R&D community is currently developing analytical civil engineering methodologies and innovative construction materials. These provide the following:

- Assessment and repair of roadways to support military-unique loadings;
- Rapid, remote classification/repair of existing bridges;

- Tactical military hydrologic forecasting of streamflow conditions, including icing;
- Advanced mobility modeling for all-season rapid maneuver operations; and
- Innovative procedures for conducting Logistics Over The Shore (LOTS) operations over remote beaches or through tidal areas.

With current technology and engineering capabilities, engineers require weeks to evaluate lines of communications (LOC) road and bridge segments, assess LOC segments' capacity to support military-unique loadings, and determine the engineers' ability to establish, repair, or rehabilitate the transportation infrastructure to support the required mobility operations.

An RDT&E effort focused on this issue will enable the force to rapidly generate and select the optimal structural/functional options for LOC stabilization, repair, or upgrade. This effort will enable the force to use innovative methods and procedures using indigenous construction materials to rapidly establish the network of LOCs required to support force projection and deployed force sustainment.

Theater bridges are critical nodes within this LOC network. Technologies will be developed to enable rapid assessment of bridge military load class, and determine retrofit and upgrade options to support military traffic. Engineers will be able to predict road deterioration caused by military traffic and determine the engineering effort required to repair and maintain LOCs necessary to support sustainment operations.

Terrain

The ERDC is the DoD Center of Expertise for research in the topographic sciences. Research initiatives involve technologies that will help those who move, shoot, and communicate on the battlefield to "fight smarter," through superior knowledge of the entire battlefield terrain and environment. Development efforts will enable the commander to:

- Locate and position enemy and friendly forces in day/night all-weather conditions;
- Provide crucial terrain data for command and control systems (C2) as well as modeling and simulation systems; and
- Enhance the speed and accuracy of maneuver and weapon systems.

The technology under development will enhance the tactical commander's ability to exploit his knowledge of combat-relevant intelligence as a force multiplier to conduct and win operations. Using tactical/strategic/space sensor data, together with terrain databases as input, the technology program emphasizes the following:

- Automating the process of detecting change on the battlefield;
- Identifying battle-significant features;
- Exploiting space-based/remote-sensing information (especially for deep operations and over denied areas); and
- Integrating the impacts of the battlefield environment to significantly improve combat planning and operations.

Current work will significantly enhance the geospatial data management and dissemination capabilities of storing, formatting, transforming, and distributing extremely large volumes of terrain data at real- or near-real times. Current research focuses on developing automated feature-extraction techniques that exploit spectral (hyper- and multi-), interferometric synthetic aperture radar, light detection and ranging, electro-optical and other sources to produce high-resolution geospatial databases rapidly.

Medical Research and Development

The Commander, U.S. Army Medical Research and Materiel Command (USAMRMC), is the Army Medical Command's chief technology officer. He is responsible for enhancing battlefield medical care by adapting new technologies that will significantly reduce deaths on the battlefield. The major goals of the Army combat health support (CHS) science and technology (S&T) program are to:

- Prevent illness and injury;
- Sustain optimum military effectiveness; and
- Treat casualties.

The greatest payoff from the investment in medical S&T comes from identifying medical countermeasures (materiel and information) that eliminate and treat health hazards. These hazards include endemic infectious diseases, chemical and biological warfare agents, environmental injury, operational stress, and trauma resulting from enemy weapons.

Combat Casualty Care

Field Medical Monitoring and Therapeutic Devices for Casualty Care

The Army is developing smaller, lighter diagnostic, life support and surgical systems that are compatible with far-forward field operations, in which factors such as high noise, vibration, and electromagnetic interference can render many medical devices unusable. These systems will fill a current gap in far-forward treatment capability and enable effective casualty care to be provided in the logistically constrained, highly mobile battlefield of the Objective Force.

Systems being developed include the **Mini-STAT**, a 20-pound life support system that integrates commercial device technologies with improvements in power and oxygen delivery. Other efforts will exploit penetrating radar to develop a lightweight vital signs monitor for medic use, and will use ceramic oxygen-generator technology to provide medical-grade oxygen without relying on logistically burdensome compressed gas cylinders.

Still other efforts focus on enhancing the current military field anesthesia delivery system to provide more reproducible drug delivery and greater patient safety. This will enable U.S. Food and Drug Administration (FDA) approval of the system; due to lack of such approval, the system cannot presently be used for peacetime operations or training. Together, these systems will enhance the capability of medics and far-forward surgeons to initiate and sustain essential critical care at the front lines and during evacuation.

Hemorrhage Control.

Army medical researchers are working on a variety of products that can save lives by quickly stopping blood loss from severe wounds on the battlefield. Excessive bleeding is the most common cause of death for wounded soldiers. Even in the hospital, the major causes of early death among those who die of wounds are central nervous system injury and uncontrolled bleeding. The Army is pursuing drugs, devices, and techniques that slow or control bleeding and are usable far forward on the battlefield, since these have the greatest potential to save lives. Army researchers have worked in coordination with Israeli investigators to explore the use of recombinant-activated human clotting factor VII (rFVIIa) in stopping internal bleeding. rFVIIa is a protein that binds to injured tissue and stimulates the blood coagulation cascade in the vicinity of the injury. The protein has been used successfully to treat bleeding episodes in hemophiliacs.

Army medical researchers are also developing expandable foams derived from fibrinogen, a protein involved in the human blood clotting pathway that is converted into fibrin, the major constituent of clots. These foams could be injected as a liquid into an inaccessible deep cavity wound of a casualty(e.g., chest, abdomen), where they would be activated and expand to contact injured internal organs and limit bleeding.

Fibrin Bandage.

Army medical researchers and clinicians working in conjunction with the American Red Cross have developed a dry fibrin sealant bandage. The new bandage is made from the last two proteins in the human blood coagulation cascade, freeze-dried on a backing. The bandage is applied with direct pressure, crushing the proteins into the wound where they quickly dissolve and promote coagulation. The pressure slows bleeding and maintains high local concentrations of the active ingredients. The clot sets within two to three minutes. Animal research demonstrates that the bandage can reduce blood loss by 50% to 85% and prevent the shock normally associated with blood loss from battlefield wounds. The bandage is now in advanced development and is expected to undergo human testing in 2001–2002.

Extended Blood Shelf-life.

Army scientists and contractors at the University of Cincinnati have developed and demonstrated a 10-week storage system for liquid red blood cells. The system extends the current shelf life of liquid red blood cells by four weeks, and is fully compatible with current military and civilian blood bank and transfusion medicine practice. The Army and the University have received a patent allowance for this system that suspends the blood cells in a specially buffered solution. The extended shelf life will enable the military to maintain supplies of blood in forward locations longer, reducing the logistics burden of replacing outdated blood.

Dental Field Treatment and Operating System (DEFTOS).

DEFTOS is designed to be a small (less than four cubic feet), lightweight (less than 50 pounds) replacement for the current Dental Operating and Treatment Unit. It will increase the mobility and reduce the footprint of the Field Dental Treatment Team (FDTT) by eliminating the need for the 5-kilowatt generator and trailer employed in the current system. DEFTOS is designed to operate through the use of either a small 2-kilowatt generator, rechargeable batteries, or a 24–28 volt DC military vehicle power system. This system is expected to result in a total reduction of approximately 2,700 pounds and 315 cubic feet per FDTT. Weight reduction is accomplished through miniaturization of the operating components, including an electric handpiece (drill) intended to replace the current power-intensive, air turbine system. Besides the drill, other standard dental equipment includes a three-way syringe for delivery of air, water, or mist and a high- and low-volume (saliva) evacuator. Many of the individual components used in this system are already approved by the FDA, but the integrated system will require FDA approval prior to final fielding.

Military Operational Medicine

Head-Supported Mass Tolerance Limits.

Army investigators are completing studies to develop a predictive computer model of neck injury risk and human performance decrements associated with excessive or unbalanced head-supported mass. The Army is dependent on head-supported devices (ranging from basic ballistic and impact protective helmets to advanced weapon sighting and communication systems) that can cause acute and chronic neck injury and degraded performance. The Army research will provide criteria to assess health and performance risks and guide system designers in the development of future head-supported devices that preserve soldier health and optimize military performance. Retrospective epidemiological studies will be performed in 2001, with an integrated predictive model completed by the end of 2005.

Rapid Analysis of Water for Microbial Contamination. Army researchers are working with extramural performers to evaluate and improve five different molecular biology and spectroscopy technologies, resulting in one best system to detect pathogen contamination of drinking water within four hours. This is expected to transition to a rapid detection system for field use by FY04.

Fusion of Soldier Performance, Environmental, and Physiologic Models. Army field and laboratory research data on physiological and cognitive performance of soldiers in extreme environments is being assembled into algorithms and models that will be useful to military commanders as predictors of performance limits, as planning tools, and as guides to the use of interventions. Current models are being matured to include more complete prediction of cardiovascular and fluid-balance routines. These models are integrated with larger Army models such as IUSS and JANUS to provide the biomedical performance data needed in operational planning tools for unit performance and logistical support.

Pharmacological Strategies to Enhance Mental Performance in Fatigued Soldiers. Army researchers are conducting controlled field aviation and laboratory studies to evaluate performance benefits and risks of various fatigue countermeasures that are currently available as accepted supplements (e.g., caffeine) or as FDA-approved drugs (e.g., modafinil, amphetamines). Specific studies are being conducted to evaluate militarily relevant performance benefits in sleep-deprived subjects, potential side effects, and tradeoffs with other strategies, such as short naps and exercise. Promising drug strategies will transition to use after secondary use approval by the FDA.

Physiological Status Monitoring of Soldier Health and Performance. A major research effort is being conducted in Army laboratories and field studies with soldiers and Marines to determine how to interpret measurements obtained from a minimal sensor set of noninvasive devices worn by soldiers to provide commanders with useful information on individual soldier readiness. These measurements will be obtained from signals already present in soldier equipment (e.g., accelerometry from a dead reckoning module) or combined with capabilities of planned soldier systems such as Land Warrior. They will be transmitted on request or automatically in emergencies, through the soldier's existing communications system. The earliest predictors will be impending heat or cold-casualty risk; later predictive capabilities will include detection of fatigue and neurotoxic threat-related mental lapses.

Advanced Technology/Telemedicine

USAMRMC recently entered into a contract with InformaTech, Inc. to produce a limited number of personal information carriers or PICs. The PIC is a small, portable data storage device with 8–64-megabyte capacity. It will be used for recording, storing, and transmitting part or all of an individual's computer-based patient record, and can be worn in much the same manner as a dogtag. The PIC can be accessed with any computer containing a PC card drive. It will be able to link with computers located in fixed-facility hospitals and smaller laptops in field medical units located forward on the battlefield.

Currently, the PIC will store pre-deployment demographic data, records of all treatment provided during a field deployment, and any post-deployment surveys. This project has been a model of acquisition reform, using commercial off-the-shelf technologies and submitting them to military-unique tests to determine applicability and functionality. The PIC underwent a proof of concept test in December 1999 at Ft. Hood, Texas, and it was tested in the September 2000 Joint Contingency Strike Force Advanced Warfighting Experiment. The official testing of the PIC is linked with the software under development by the Tri-Service Medical Informatics Program (TMIP). The timeframe for testing has not been determined at this time.

Infectious Disease Research

The Military Infectious Diseases Research Program is an Army funded and directed program that involves Army and Navy scientists deployed in a worldwide Army-Navy network of laboratories and field sites in the United States and overseas. The program has been highly successful in discovering, testing, and fielding products intended to protect military personnel against infectious diseases, the most common cause of military casualties during combat deployments. In recent years, vaccines have been licensed to prevent Japanese encephalitis, a disabling infection of the brain that occurs throughout Asia, and hepatitis A, a worldwide cause of infectious hepatitis. Drugs for treatment or prevention of malaria, including mefloquine, doxycycline (a new labeling indication), and halofantrine have been developed at the Walter Reed Army Institute of Research.

In 2000, malarone (atovaquone-proguanil), a new drug for prevention and treatment of malaria, completed development and licensure in a co-development project conducted by the Army and Glaxo-Wellcome, Inc. In ground-breaking studies conducted in The Gambia in Africa in 1999, a vaccine co-developed by the Army and SmithKline Beecham, Inc. demonstrated limited protection against naturally transmitted malaria for the first time. This study is an important step toward fielding an effective vaccine to protect deployed U.S. Forces from the most important infectious disease affecting combat operations. Other current S&T and development efforts are focused on completing research and development of vaccines to prevent dengue, diarrhea, Korean hemorrhagic fever, scrub typhus, HIV, hepatitis E, and Group B meningococcal infection.

Medical Chemical and Biological Defense

Technology base efforts for medical chemical and biological defense focus on identifying, evaluating, and developing medical products to protect the warfighter from injury or death if exposed to chemical or biological warfare agents. Medical chemical defense efforts include the following:

- Identification of pathophysiological mechanisms involved in toxic processes.
- Development and evaluation of products to prevent or counter the effects of chemical warfare agents.
- Development of assays and equipment for diagnosing chemical warfare agent exposure.
- Development of methods to measure effectiveness in animal models that are predictive of the human response.

Technology base efforts for medical biological defense focus on the following:

- Identification of mechanisms involved in the disease processes and development of an understanding of the generation and control of the immune response.
- Development and evaluation of prophylactics (vaccine and pretreatment candidates) and therapeutic concepts and technologies.
- Development of methods to measure the effectiveness of products in animal models that are predictive of the human response.
- Development and evaluation of diagnostic technologies and systems.

Current medical chemical defense research focuses on the development of:

- Drugs for treatment of vesicant injury (blisters).
- A chemical agent prophylactic (pretreatment) drug that provides broad spectrum protection against nerve agents.
- A chemical agent inactivating component for inclusion in the Skin Exposure Reduction Paste Against Chemical Warfare Agents (SERPACWA; a topical skin protectant cream).

These efforts support future goals of improved topical skin protectants, skin injury treatments, cyanide pre-treatments, phosgene therapeutics, wound decontaminants, anticonvulsants and other neuroprotectants, and nerve agent prophylaxes, therapeutics, and antidotes.

Medical biological defense research is currently focusing on the development of vaccines against the following:

- Bacterial threats (anthrax, plague, and Brucellae species).
- Viral threats (Venezuelan, eastern, and western equine encephalitis viruses; orthopox viruses; and filoviruses).
- Toxin threats (staphylococcal enterotoxins and botulinum).

In addition, efforts are directed toward a common diagnostic system for identifying biological warfare threats and endemic infectious disease organisms, and toward a multi-agent vaccine capable of providing protection against at least three biological threat agents in a single vaccine. Programs planned for transition to Concept Exploration in FY 2001 include a multivalent equine encephalitis vaccine; a Marburg virus vaccine; the common diagnostic system; a Brucellosis vaccine; and the multi-agent vaccine. Programs planned for transition to Program Definition and Risk Reduction in FY 2001 are vaccines for plague and ricin, and a next-generation anthrax vaccine.

For the far-term, the medical biological defense technology base plans to continued research on a vaccine protective against the Ebola virus, development of advanced therapeutics against validated biological threats and advanced diagnostics to aid in applying such treatments, alternate methods for delivering vaccines and therapeutics, and exploiting genomics, proteomics, and immunomodulation for generation-after-next medical countermeasures.

Congressionally Directed Medical Research

The USAMRMC, through the Office of Congressionally Directed Medical Research Programs (CDMRP), continues to manage DoD medical research programs mandated by Congress. The mission of the CDMRP is to control and ultimately eradicate specified diseases by fostering an environment that encourages innovation in research, multi-disciplinary approaches, and pursuit of novel ideas. Through FY 2000, more than $870 million has been applied to peer-reviewed research in breast, prostate, and ovarian cancers, neurofibromatosis, osteoporosis, and Defense women's health, among other areas. Through FY 1999, the CDMRP has awarded and managed more than 2,700 contracts and grants in these research areas. The USAMRMC will continue to manage peer-reviewed research programs in breast, ovarian, and prostate cancers, neurofibromatosis, and other areas as specified by Congress.

Gulf War Illness

The USAMRMC is currently managing approximately 120 projects worth over $100 million, in addition to in-house efforts, on Gulf War illness research. The emphasis of research solicitations and peer-reviewed projects funded since 1994 includes the following:

- Epidemiological studies of symptoms and health outcomes in Gulf War veterans.
- Long-term or delayed clinical effects of low-level exposures to chemical warfare agents.
- Health effects associated with possible exposures to combinations of chemical warfare agents, psychological stress, environmental stressors, inoculations, insecticides, and pyridostigmine bromide.
- Neurobiology of stress including prevention and treatment of chronic, nonspecific symptoms.
- Safety of medical material in operational environments.
- Leishmania diagnostics tests and treatments.
- Heavy metal toxicity including depleted uranium and tungsten alloys such as those currently used or contemplated for use in armor-penetrating munitions.

Advanced Simulation

Institute for Creative Technologies (ICT)

ICT, at the University of Southern California (USC), is an innovative partnership with the private sector to exploit advances in the entertainment and game industries to enhance Army training and design. It is a Department of the Army-sponsored University-Affiliated Research Center for research, application and education in modeling and simulation technologies. Advances in modeling and simulation will revolutionize how the Army develops doctrine and requirements, designs equipment, trains soldiers and rehearses missions. The ICT represents an unprecedented collaboration between the Army and the entertainment industry.

The idea to use the entertainment industry's technological know-how for military application arose several years ago when the defense officials realized that video games and special effects could be helpful for military applications. The agreement with USC was finalized on August 18, 1999, and the Institute is now fully staffed, actively pursuing three application projects, three basic research thrusts and is working with two gaming companies to collaborate on dual-use games.

Supporting Technologies

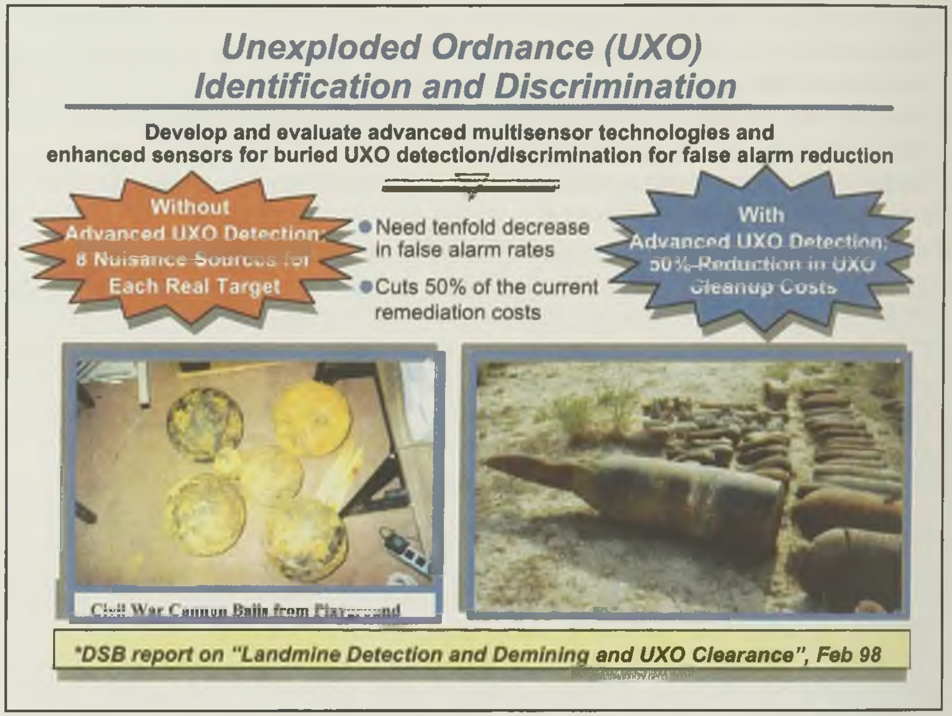
Environmental Quality: Subsurface Detection of Buried Unexploded Ordnance (UXO)

The 1997 UXO Clearance Report to Congress estimates that millions of acres throughout the United States potentially contain buried UXO contamination. These sites included 1,900 formerly used defense sites, and 130 base realignment and closure (BRAC) installations. Current methods used to detect buried UXO result in the determination that nominally 95% of the excavated objects are non-hazardous.

Approximately 75% of the costs of remediating a UXO site are spent on excavating these false targets. These costs effectively reduce the resources available to the warfighter for combat operations and development. The February 1998 Defense Science Board (DSB) Task Force report titled "Landmine Detection and Demining and Unexploded Ordnance (UXO) Clearance" recommends a short-term (3–5 year), 10-fold false-alarm reduction as the goal of the UXO environmental remediation R&D program.

The Army has initiated this technology development program to achieve the DSB goals while maintaining probabilities of detection at or above current levels (90–95%). This will be accomplished by thoroughly defining the impact of site conditions on sensing and discrimination of UXO, to provide a foundation for more robust sensing and physics-based multi-sensor fusion approaches.

By FY04, the Army plans to develop and field-demonstrate UXO sensing and analysis that will reduce nuisance alarm rates by 90% over a wide variety of conditions, while maintaining or improving the current probability of detection (Pd) levels (90–95%). This program will be coordinated directly with the Army Joint UXO Coordination Office as part of the DoD UXO Center of Excellence. This will ensure that the research supports and complements the total landmine, demining, and UXO detection program.



Hazardous Waste Remediation of Army Sites

Explosives, organics, and heavy metals-contaminated soils and groundwater exist at a large number of Army installations. The cost to complete the Army's restoration program at its active and BRAC installations is currently estimated at $7 billion. This reduces resources available to the warfighter. In some cases, training-range activities must be substantially altered or stopped completely, due to off-site migration of lead from expended bullets. Current processes to remediate these hazardous wastes typically involve digging, hauling, and treating soils; and pumping and treating groundwater. The Army believes in-situ technologies can reduce treatment costs by as much as an order of magnitude.

The Army conducts research, development, test, and evaluation (RDT&E) to address these requirements, emphasizing the development of passive-treatment technologies. For explosives and organics, technologies include natural attenuation, bio-augmentation, indigenous and enhanced biological transformations, reactive barriers (such as zero valent ion barriers), and integrated processes that couple chemical transformations of the contaminants with microbial mineralization of the transformation products. For heavy metals, technologies include phytoremediation, chemical treatment, electrokinetic treatment, advanced contaminated extracts treatment, and an in-process analysis method for treating soils.

Risk/Hazard Assessment Tools for Military Unique Compounds

The Army uses risk assessment procedures to determine hazardous waste cleanup target levels and to evaluate remediation alternatives that provide the most cost-effective approach to reach these levels. The Army has 90 sites that require determination of the risk or hazard associated with site contamination, with costs for these assessments estimated to exceed $55M. Currently, site-specific data on both exposure potential and effects are often unavailable, causing high levels of uncertainty in the risk analysis process. These uncertainties result in overly conservative levels of cleanup and excessive cost for remediation.

To reduce this uncertainty, an Army RDT&E program will develop a risk assessment modeling system (RAMS). The RAMS would link models of fate and transport to the exposure and effects of explosives and their degradation by-products at the genetic, individual, and population levels within an ecosystem. A suite of numerical models will provide both human and ecosystem risk assessment of bioavailability and the potential for trophic transfer, and allow reduced uncertainty in contaminant fate and transport needed to determine exposure potential.

To develop more accurate methods of exposure and effects assessment, currently accepted dose-response effects assays on specific endpoint organisms will be refined. Genosensors for major classes of organisms will also reduce the uncertainty by providing site-specific assessments of uptake potential and toxic effect. The RAMS is planned to reduce the time required to conduct a quantitative risk assessment from years to months, saving an estimated 25% of the cost of risk assessment. Substantial cleanup cost savings are also expected by reducing the influence of uncertainty in setting cleanup targets. This will enable the use of less costly contaminant treatment methods.

Training Lands

Training land management research will lead to an improved knowledge base of cause-effect relationships and mitigation techniques related to the interaction of training and testing actions and environmental processes. Research results will include an approach to simulating impacts of military operations on the natural resource base and predicting thresholds for sustainable use. These results will identify technologies to manage resources to achieve sustainable use.

The work will take advantage of existing and emerging modeling and mitigation technologies in erosion control, community ecological dynamics, and noise propagation and management. The effort will incorporate information on training and testing land use distribution; it will define the interaction between this use and environmental processes in different environments with different model inputs, outputs, and data resolution. This will provide a simulation and prediction capability for decision support. The cause-effect and mitigation knowledge, and the integrated set of models will support training and testing through understanding of the following:

- The ability of land to recover from impacts;
- Erosion and deposition processes;
- Avoidance of impacts on protected species and sites; and
- Alternative techniques to mitigate impacts.

The increased knowledge base and advanced decision-support capabilities will enable proactive and cost-effective management of lands for sustainable use, and up to 50% reduction of current land use constraints. These efforts will enhance the condition of land to support Army readiness. The knowledge and decision-support capability will ensure that:

- Constraints on land use are warranted;
- Improvements are made in measuring carrying capacity; and
- Improvements are made in the ability to plan, schedule and execute training and testing missions, and to manage lands with the least constraint, and in a way that provides for the most realistic conditions.

APPENDICES

ARMY COMBAT ORGANIZATIONS

Army organizations are inherently built around people and the tasks they must perform. Major combat organizations are composed of smaller forces as shown here.

SQUAD

Leader is a sergeant
Smallest unit in Army organization
Size varies depending on type—Infantry (9 men), Armor (4 men), Engineer (10 men)
Three or four squads make up a platoon

PLATOON

Leader is a lieutenant
Size varies—Infantry (40 men), Armor (4 tanks, 16 men)
Three or four platoons make up a company

COMPANY

Commander is a captain
Usually 150–220 men
Artillery unit of this size is called a battery
Armored Cavalry or Air Cavalry unit is called a troop
Basic tactical element of the maneuver battalion or cavalry squadron
Normally five companies make up a battalion

BATTALION

Commanded by a lieutenant colonel
Tactically and administratively self-sufficient
Armored Cavalry and Air Cavalry equivalents called squadrons
Two or more combat battalions make up a brigade

BRIGADE

Commanded by a colonel
May be employed on independent or semi-independent operations
Combat, combat support or service support elements may be attached to perform specific missions
Normally three combat brigades are in a division

DIVISION

Commanded by a major general
Fully structured division has own brigade-size artillery, aviation, engineer, combat support and service elements
Two or more divisions make up a corps commanded by a lieutenant general

Acquisition Categories (ACAT): ACAT I programs are Milestone Decision Authority Programs (MDAPs) or programs designated ACAT I by the Milestone Decision Authority (MDA). ACAT I programs have two sub-categories:

1. ACAT ID, for which the MDA is USD (A&T). The "D" refers to the Defense Acquisition Board (DAB), which advises the USD (A&T) at major decision points.

2. ACAT IC, for which the MDA is the DoD Component Head or, if delegated, the DoD Component Acquisition Executive (CAE). The "C"refers to Component. The USD (A&T) designates programs as **ACAT ID** or **ACAT IC**.

ACAT IA programs are MAISs or programs designated by the Assistant Secretary of Defense for Command, Control, Communications, and Intelligence (ASD [C3I]) to be ACAT IA. A MAIS is an AIS acquisition program that is:

1. Designated by the ASD (C3I) as a MAIS, or
2. Estimated to require program costs in any single year in excess of 30 million in FY96 constant dollars, total program costs in excess of 120 million in FY96 constant dollars, or total life-cycle costs in excess of 360 million in FY96 constant dollars.

ACAT IA programs have two sub-categories:

1. **ACAT IAM**, for which the MDA is the Chief Information Officer (CIO) of the Department of Defense (DoD), the ASD (C3I). The "M" (in ACAT IAM) refers to Major Automated Information System Review Council (MAISRC). (Change 4, 5000.2-R)
2. **ACAT IAC**, for which the DoD CIO has delegated milestone decision authority to the CAE or Component CIO. The "C" (in ACAT IAC) refers to Component.

ACAT II programs are defined as those acquisition programs that do not meet the criteria for an ACAT I program, but do meet the criteria for a major system, or are programs designated ACAT II by the MDA.

ACAT III programs are defined as those acquisition programs that do not meet the criteria for an ACAT I, an ACAT IA, or an ACAT II. The MDA is designated by the CAE and shall be at the lowest appropriate level. This category includes less-than-major AISs.

ACAT IV Programs not designated as ACAT I, II, III and used to differentiate these non-major program managed by a systems manager within a materiel command rather than by a Program, Project, Product Manager (PM). These programs receive an In Progress Review (IPR) and require a decision by the materiel command commander (or appointed designee) at the milestone review. (AR 70-1, 4-1f)

Acquisition Phase: All the tasks and activities needed to bring a program to the next major milestone occur during an acquisition phase. Phases provide a logical means of progressively translating broadly-stated mission needs into well-defined system-specific requirements and ultimately into operationally effective, suitable, and survivable systems. The acquisition phases for the systems described in this handbook are defined below:

Concept and Technology Development: Concept and Technology Development refers to the development of a materiel solution to an identified, validated need. During this phase, the Mission Needs Statement (MNS) is approved, technology issues are considered, and possible alternatives are identified. In this phase, the initiation concept is approved, a lead Component is designated, and exit criteria are established. The leader of the concept development team will work with the integrated test team to develop an evaluation strategy that describes how the capabilities will be evaluated once the system is developed.

Major components of this phase are Concept Exploration, Decision Review, and Component Advanced Development. Concept Exploration evaluates the feasibility of alternative concepts and assesses the merits of these concepts. This phase ends with a Decision Review, at which the preferred concept for which technologies are available is selected. The Decision Review may also determine whether additional component development is necessary before key technologies can enter System Development and Demonstration. Component Advance Development occurs when the project leader has a concept for the needed capability, but does not yet know the system architecture. The project exits Component Advanced Development when a system architecture has been developed and the component technology has been demonstrated in the relevant environment or the Milestone Decision Authority (MDA) decides to end this effort. This effort is intended to reduce risk on components that have only been demonstrated in a laboratory environment and to determine the appropriate set of subsystems to be integrated into a full system.

System Development and Demonstration: System development and demonstration is the process of developing concepts into producible and deployable products that provide capability to the user. The purpose of this phase is to develop a system, reduce program risk, ensure operational supportability, design for producibility, ensure affordability, and demonstrate system integration, interoperability, and utility. The major components of this phase are System Integration, System Demonstration, and Interim Progress Review. Development is aided by the use of simulation-based acquisition and guided by a system acquisition strategy and test and evaluation master plan (TEMP). System modeling, simulation, and test and evaluation activities are integrated into an efficient continuum planned and executed by a test and evaluation integrated product team (T&E IPT).

The independent planning, execution, and evaluation of dedicated Initial Operation Test and Evaluation (IOT&E), as required by law, and Follow-on Operational Test and Evaluation (FOT&E), if required, are the responsibility of the appropriate operational test activity (OTA). The program enters System Integration when the Project Manager has an architecture for the system, but has not yet integrated the subsystems into a complete system. This effort is intended to integrate the subsystems and reduce system-level risk. The purpose of the Interim Progress Review is to confirm that the program is progressing as planned or to adjust the plan to better accommodate progress made to date, changed circumstances, or both. The program enters System Demonstration when the Project Manager has demonstrated the system in prototype articles.

Production and Deployment: The purpose of the Production and Deployment phase is to achieve an operational capability that satisfies mission needs. In this phase, software has to prove its maturity level prior to deploying to the operational environment. Once maturity has been proven the system or block is baselined and a methodical and synchronized deployment plan is implemented to all applicable locations. A system must be demonstrated before DoD will commit to production and deployment. For DOT&E Oversight programs, a system can not be produced at full-rate until a Beyond Low-Rate Initial Production Report has been completed and sent to Congress, the Secretary of Defense, and the USD(AT&L).

The components of this phase include Low-Rate Initial Production (LRIP), the Full-Rate Production Decision Review, and Full-Rate Production and Deployment. LRIP is intended to result in completion of manufacturing development to ensure adequate manufacturing capability and to produce the minimum quantity necessary for initial operational test and evaluation. The Full-Rate Production Decision Review considers the cost estimate, manpower, results of test and evaluation, compliance and interoperability certification. Following the completion of a Full-Rate Production Decision Review, the program enters Full-Rate Production and Deployment.

Operations and Support: The objective of the Operations and Support phase is the execution of a support program that meets operational support performance requirements and sustainment of systems in the most cost-effective manner throughout their life-cycle. The sustainment program includes all elements necessary to maintain the readiness and operational capability of deployed systems. The scope of support varies among programs but generally includes supply, maintenance, transportation, sustaining engineering, data management, configuration management, manpower, personnel, training, habitability, survivability, safety, IT supportability, and environmental management functions. This activity also includes the execution of operational support plans.

Programs with software components must be capable of responding to emerging requirements that will require software modification or periodic enhancements after a system is deployed. A follow-on operational test and evaluation program that evaluates operational effectiveness, survivability, suitability, and interoperability, and that identifies deficiencies is conducted, as appropriate.

At the end of its useful life, a system must be demilitarized and disposed of. Disposal must be carried out according to all legal and regulatory requirements relating to safety, security, and the environment.

Acquisition Program: A directed, funded effort designed to provide a new, improved or continuing weapons system or AIS capability in response to a validated operational need. Acquisition programs are divided into different categories that are established to facilitate decentralized decision-making, and execution and compliance with statutory requirements.

Advanced Concept Technology Demonstrations (ACTDs): ACTDs are a means of demonstrating the use of emerging or mature technology to address critical military needs. ACTDs themselves are not acquisition programs, although they are designed to provide a residual, usable capability upon completion. If the user determines that additional units are needed beyond the residual capability and that these units can be funded, the additional buys shall constitute an acquisition program with an acquisition category generally commensurate with the dollar value and risk of the additional buy.

Automated Information System (AIS): A combination of computer hardware and software, data, or telecommunications, that performs functions such as collecting, processing, transmitting, and displaying information. Excluded are computer resources, both hardware and software, that are physically part of, dedicated to, or essential in real time to the mission performance of weapon systems.

Commercial and Non-Developmental Items: Market research and analysis shall be conducted to determine the availability and suitability of existing commercial and non-developmental items prior to the commencement of a development effort, during the development effort, and prior to the preparation of any product description. For ACAT I and IA programs, while few commercial items meet requirements at a system level, numerous commercial components, processes, and practices have application to DoD systems.

Demilitarization and Disposal: At the end of its useful life, a system must be demilitarized and disposed. During demilitarization and disposal, the PM shall ensure materiel determined to require demilitarization is controlled and shall ensure disposal is carried out in a way that minimizes DoD's liability due to environmental, safety, security, and health issues.

Developmental Test and Evaluation (DT&E): DT&E shall identify potential operational and technological capabilities and limitations of the alternative concepts and design options being pursued; support the identification and description of design technical risks; and provide data and analysis in support of the decision to certify the system ready for operational test and evaluation.

Integrated Product and Process Development (IPPD): A management technique that simultaneously integrates all essential acquisition activities through the use of multidisciplinary teams to optimize the design, manufacturing and supportability processes. IPPD facilitates meeting cost and performance objectives from product concept through production, including field support. One of the key IPPD tenets is multidisciplinary teamwork through Integrated Product Teams (IPTs).

Integrated Product Teams: The Secretary of Defense has directed that the Department perform as many acquisition functions as possible, including oversight and review, using IPTs. These IPTs shall function in a spirit of teamwork with participants empowered and authorized, to the maximum extent possible, to make commitments for the organization or the functional area they represent. IPTs are composed of representatives from all appropriate functional disciplines working together to build successful programs and enabling decision-makers to make the right decisions at the right time.

Interim Force: The Interim Force units will be highly mobile at the strategic, operational and tactical levels. They will be C-130-like transportable and equipped with a family of interim armored vehicles, lightweight artillery and other available technology designed to ensure maximum lethality and survivability while increasing tactical, operational, and strategic maneuver. The Interim Force will be organized as a rapidly deployable, full-spectrum force, providing the warfighting CINCs with increased options for Small Scale Contingencies (SSCs) while not compromising readiness for Major Theater Wars (MTWs). Its design also supports rapid integration of multinational and interagency capabilities for peace keeping/peace enforcement and warfighting missions.

Joint Program Management: Any acquisition system, subsystem, component, or technology program that involves a strategy that includes funding by more than one DoD Component during any phase of a system's life cycle shall be defined as a joint program. Joint programs shall be consolidated and collocated at the location of the lead Component's program office, to the maximum extent practicable.

Legacy Force: Throughout Army Transformation, we will maintain a core Legacy Force that is recapitalized and/or fielded with modernized equipment. Digitization and other initiatives instituted previously during the Force XXI process will ensure the Army retains the capability to dominate in major theater war. The Army will maintain the decisive capabilities of today's warfighting organizations by the modernization and recapitalization of selected legacy forces and fielding of new, already-programmed equipment. The Legacy Force, complemented by the Interim Force as it is fielded, will be the primary means by which the Army fulfills its readiness responsibilities to the Nation.

Live Fire Test and Evaluation (LFT&E): LFT&E must be conducted on a covered system, major munition program, missile program, or product improvement to a covered system, major munition program, or missile program before it can proceed beyond low-rate initial production. A covered system is any vehicle, weapon platform, or conventional weapon system that includes features designed to provide some degree of protection to users in combat and that is an ACAT I or II program. Depending upon its intended use, a commercial or non-developmental item may be a covered system, or a part of a covered system. (Change 4, 5000.2-R) Systems requiring LFT&E may not proceed beyond low-rate initial production until realistic survivability or lethality testing is completed and the report required by statute is submitted to the prescribed congressional committees.

Low-Rate Initial Production (LRIP): The objective of this activity is to produce the minimum quantity necessary to: provide production configured or representative articles for operational tests, establish an initial production base for the system; and permit an orderly increase in the production rate for the system, sufficient to lead to full-rate production upon successful completion of operational testing.

Major Automated Information System (MAIS) Acquisition Program: An AIS acquisition program that is (1) designated by ASD (C3I) as a MAIS, or (2) estimated to require program costs in any single year in excess of 30 million in FY96 constant dollars, total program costs in excess of 120 million in FY96 constant dollars, or total life-cycle costs in excess of 360 million in FY96 constant dollars. MAISs do not include highly sensitive classified programs.

Major Defense Acquisition Program (MDAP): An acquisition program that is not a highly sensitive classified program (as determined by the Secretary of Defense) and that is: (1) designated by the Under Secretary of Defense (Acquisition and Technology) (USD [A&T]) as an MDAP, or (2) estimated by the USD (A&T) to require an eventual total expenditure for research, development, test and evaluation of more than 355 million in FY96 constant dollars or, for procurement, of more than 2.135 billion in FY96 constant dollars.

Major Milestone: A major milestone is the decision point that separates the phases of an acquisition program. MDAP milestones include, for example, the decisions to authorize entry into the engineering and manufacturing development phase or full rate production. MAIS milestones may include, for example, the decision to begin program definition and risk reduction.

Major System: A combination of elements that shall function together to produce the capabilities required to fulfill a mission need, including hardware, equipment, software, or any combination thereof, but excluding construction or other improvements to real property. A system shall be considered a major system if it is estimated by the DoD Component Head to require an eventual total expenditure for RDT&E of more than 135 million in FY96 constant dollars, or for procurement of more than 640 million in FY96 constant dollars, or if designated as major by the DoD Component Head.

Milestone Decision Authority (MDA): The individual designated in accordance with criteria established by the USD (A&T), or by the ASD (C3I) for AIS acquisition programs, to approve entry of an acquisition program into the next phase.

Modifications: Any modification that is of sufficient cost and complexity that it could itself qualify as an ACAT I or ACAT IA program shall be considered for management purposes as a separate acquisition effort. Modifications that do not cross the ACAT I or IA threshold shall be considered part of the program being modified, unless the program is no longer in production. In that case, the modification shall be considered a separate acquisition effort. (Added from 5000.2-R)

Objective Force: The Objective Force will be equipped with significantly advanced systems centered around the Future Combat Systems (FCS). It will be networked internally and externally through a responsive, reliable, mobile, non-line-of-sight, and commander-and-execution-centric command and control capability. It will leverage joint/interagency reachback and Army direct downlink capabilities for intelligence, personnel and force planning, administration, technical engineering, information operations and logistical support.

Operational Support: The objectives of this activity are the execution of a support program that meets the threshold values of all support performance requirements and sustainment of them in the most life-cycle cost-effective manner. A follow-on operational testing program that assesses performance and quality, compatibility, and interoperability, and identifies deficiencies shall be conducted, as appropriate. This activity shall also include the execution of operational support plans, to include the transition from contractor to organic support, if appropriate. (Added from 5000.2-R)

Operational Test and Evaluation (OT&E): OT&E shall be structured to determine the operational effectiveness and suitability of a system under realistic conditions (e.g., combat) and to determine if the operational performance requirements have been satisfied. The following procedures are mandatory: threat or threat representative forces, targets, and threat countermeasures, validated in coordination with DIA, shall be used; typical users shall operate and maintain the system or item under conditions simulating combat stress and peacetime conditions; the independent operational test activities shall use production or production representative articles for the dedicated phase of OT&E that supports the full-rate production decision, or for ACAT IA or other acquisition programs, the deployment decision; and the use of modeling and simulation shall be considered during test planning. There are more mandatory procedures (9 total) in 5000.2-R. Either include all mandatory procedures or rewrite the definition.

For additional information on acquisition terms, or terms not defined, please refer to:
AR 70-1, Army Acquisition Policy, or
DA PAM 70-3, Army Acquisition Procedures.

TOP FIFTY CONTRACTORS—FY99 RANKING

1. Raytheon
Advanced Field Artillery Tactical Data System (AFATDS)
Advanced Threat Infrared Countermeasures (ATIRCM)/ Common Missile Warning System (CMWS)
Army Tactical Missile System–BAT (ATACMS-BAT) Block II
Battlefield Combat Identification System (BCIS)
Bradley M2 Infantry/M3 Cavalry Fighting Vehicle (IFV/CFV)
Driver's Vision Enhancer (DVE)
Enhanced Position Location Reporting System (EPLRS)
Excalibur 155mm Precision-Guided Extended Range Artillery Projectile Family
Firefinder (AN/TPQ-47)
Force XXI Battle Command Brigade-and-Below (FBCB2)
Guardrail/Common Sensor (GR/CS)
Javelin
Joint LACMD Elevated Netted Sensors Systems (JLENS)
Joint Tactical Terminal (JTT)
Line-of-Sight Anti-Tank (LOSAT)
Long Range Advanced Scout Surveillance System (LRAS3)
Medium Extended Air Defense System (MEADS)
MILSATCOM–EHF
MILSATCOM–UHF/SHF/TACSAT
National Missile Defense (NMD)
PATRIOT
Second Generation Forward Looking Infrared (FLIR)
Sentinel
Stinger
Tactical Unmanned Aerial Vehicle (TUAV)
Theater High Altitude Area Defense (THAAD) System
Thermal Weapon Sight (TWS)
TOW Fire and Forget
TOW Improved Target Acquisition System (ITAS)

2. Lockheed Martin
Advanced Threat Infrared Countermeasures (ATIRCM)/ Common Missile Warning System (CMWS)
All Source Analysis System (ASAS)
Apache Longbow
Army Tactical Missile System (ATACMS) Blocks I and IA
Army Tactical Missile System–BAT (ATACMS-BAT) Block II
Close Combat Tactical Trainer (CCTT)
Combat Identification for the Dismounted Soldier (CIDDS)
Combat Service Support Control System (CSSCS)
Global Command and Control System–Army (GCCS-A)
Guardrail/Common Sensor (GR/CS)
Guided Multiple Launch Rocket System (GMLRS)
High Mobility Artillery Rocket System (HIMARS)
Javelin
Joint LACMD Elevated Netted Sensors Systems (JLENS)
Joint Tactical Ground Station (JTAGS)
Line-of-Sight Anti-Tank (LOSAT)
Longbow HELLFIRE
Maneuver Control System (MCS)
Medium Extended Air Defense System (MEADS)
Mortar (120mm)
Multiple Launch Rocket System (MLRS)
National Missile Defense (NMD)
Night Vision (NV) Image Intensification (I2)
PATRIOT
Standard Army Management Information Systems (STAMIS)
Theater High Altitude Area Defense (THAAD) System

3. Boeing
Apache Longbow
Avenger
Bradley Linebacker
CH-47 Chinook/Improved Cargo Helicopter (CH-47F)
Comanche
Kiowa Warrior
National Missile Defense (NMD)

4. General Dynamics
Abrams
Advanced Field Artillery Tactical Data System (AFATDS)
Area Common User System Modernization Program (ACUS MOD)
Battlefield Combat Identification System (BCIS)
Common Hardware Systems (CHS)
Forward Area Air Defense Command and Control (FAAD C2)
Integrated System Control (ISYSCON)
Lightweight Forward Entry Device (LFED)/Forward Entry Device (FED)
Maneuver Control System (MCS)
Nuclear, Biological and Chemical Reconnaissance System (NBCRS)-Fox
Small Arms (MK 19-3)
Smoke Generator (M56 Coyote)
Wolverine
XM777 Joint Lightweight 155mm Howitzer (LW155)

5. The Carlyle Group (United Defense, L.P.)
Battlefield Combat Identification System (BCIS)
Bradley M2 Infantry/M3 Cavalry Fighting Vehicle (IFV/CFV)
Bradley Fire Support Team (BFIST) Vehicle
Bradley Linebacker
Crusader
Field Artillery Ammunition Support Vehicle (FAASV)
Grizzly
Hercules
M113 Family of Vehicles (FOV)
Multiple Launch Rocket System (MLRS)
Paladin
XM777 Joint Lightweight 155mm Howitzer (LW155)

6. Halliburton

7. Science Applications International Corporation (SAIC)

8. TRW
Air/Missile Defense Planning and Control System (AMDPCS)
Battlefield Combat Identification System (BCIS)
Combat Service Support Control System (CSSCS)
Firefinder (AN/TPQ-47)
Force XXI Battle Command Brigade-and-Below (FBCB2)
Forward Area Air Defense Command and Control (FAAD C2)
Guardrail/Common Sensor (GR/CS)
Joint Service Lightweight Nuclear, Biological, Chemical Reconnaissance System (JSLNBCRS)
National Missile Defense (NMD)
Tactical Operations Centers (TOCs)

9. Longbow Limited Liability Corporation (Lockheed Martin and Northrop Grumman)
Longbow HELLFIRE

10. Northrop Grumman
Apache Longbow
Army Common Ground Station (ACGS)
Army Tactical Missile System–BAT (ATACMS-BAT) Block II
Firefinder (AN/TPQ-36 (V)8)
Longbow HELLFIRE
Tactical Endurance Synthetic Aperture Radar (TESAR)
Tactical Exploitation System (TES)

11. Texas Instruments/ Lockheed Martin Joint Venture
Javelin

12. United Technologies Corporation
Black Hawk

13. Alliant Techsystems
Line-of-Sight Anti-Tank (LOSAT)
Objective Individual Combat Weapon (OICW)
Tank Main Gun Ammunition

14. Stewart and Stevenson Services
Family of Medium Tactical Vehicles (FMTV)
High Mobility Artillery Rocket System (HIMARS)

15. Boeing Sikorsky Team
Comanche

16. ITT Industries
Near Term Digital Radio System (NTDRS)
Night Vision (NV) Image Intensification (I2)
Single Channel Ground and Airborne Radio System (SINCGARS)
Suite of Integrated Radio Frequency Countermeasures (SIRFC)–AN/ALQ-211

17. Oshkosh Truck
Heavy Equipment Transporter System (HETS)
Heavy Expanded Mobility Tactical Truck–Load Handling System (HEMTT-LHS)
Palletized Load System (PLS)

18. Computer Sciences Corporation
Land Warrior (LW)
Standard Army Management Information System (STAMIS)

19. Federal Republic of Germany

20. Primex Technologies
Excalibur 155mm Precision-Guided Extended Range Artillery Projectile Family
Medium Caliber Armaments
Mortar (120mm)
Tank Main Gun Ammunition

21. Litton
Advanced Threat Infrared Countermeasures (ATIRCM)/ Common Missile Warning System (CMWS)
Common Hardware Systems (CHS)
Digital Topographic Support System (DTSS)
Force XXI Battle Command Brigade-and-Below (FBCB2)
Lightweight Laser Designator Rangefinder (LLDR)
Night Vision (NV) Image Intensification (I2)

22. The IT Group

23. AlliedSignal

24. Wallenius Holdings

25. Mitre

26. The Renco Group

27. Textron
Armored Security Vehicle (ASV)
Hornet
Kiowa Warrior

28. Dyncorp

29. Bechtel Group

30. Bell Atlantic

31. Motorola
Army Common Ground Station (ACGS)
Combat Identification for the Dismounted Soldier (CIDDS)
Tactical Operations Centers (TOCs)

32. Nichols Research

33. Hensel Phelps Construction

34. General Electric

35. ARINC

36. Booz•Allen & Hamilton

37. Federal Prison Industries

38. Government Technology Services
Standard Army Management Information System (STAMIS)

39. Harris
Joint Tactical Ground Station (JTAGS)
Multiple Launch Rocket System (MLRS)

40. Johnson Controls

41. URS

42. General Electric
Black Hawk

43. Day & Zimmermann

44. Electronic Data Systems
Standard Army Management Information System (STAMIS)

45. Philipp Holzmann AG

46. ManTech International

47. GenCorp
Joint Tactical Ground Station (JTAGS)

48. Foster Wheeler

49. L-3 Communications Holding
Guardrail/Common Sensor (GR/CS)
Multiple Launch Rocket System (MLRS)

50. Unisys

CONTRACTORS WITH ≥ 5% OF CONTRACT VALUE

Abrams
General Dynamics: Lima, OH; Muskegon, MI; Scranton, PA; Sterling Heights, MI; Tallahassee, FL; Warren, MI

Advanced Field Artillery Tactical Data System (AFATDS)
General Dynamics: Taunton, MA
Raytheon: Fort Wayne, IN

Advanced Threat Infrared Countermeasures (ATIRCM)/Common Missile Warning System (CMWS)
Agility: Ayer, MA
Composite Optics: San Diego, CA
Crystal Associates: East Hanover, NJ
Fairview Machine: Topsfield, MA
Hughes: Goleta, CA
Litton: Apopka, FL
LM Fairchild: Milpitas, CA
BAE Systems: Nashua, NH
Raytheon: Ontario, Canada
Tracor: Mojave, CA

Air/Missile Defense Planning and Control System (AMDPCS)
APC: Austin, TX
Brown International: Huntsville, AL
TRW: Huntsville, AL

Airborne Reconnaissance Low (ARL)
California Microwave: Belcamp, MD

All Source Analysis System (ASAS)
Austin Information Systems: Austin, TX
Electronic Warfare Associates: Fairmont, WV; Herndon, VA
GTE: Taunton, MA
Lockheed Martin: Littleton, CO

Apache Longbow
Boeing: Mesa, AZ
Lockheed Martin: Orlando, FL
Northrop Grumman: Linthincum, MD

Area Common User System Modernization Program (ACUS MOD)
BAE Systems: Quebec, Canada
CECOM: Ft. Monmouth, NJ
General Dynamics: Taunton, MA
GD/CRYPTEK: Taunton, MA
Laguna Industries: Laguna, NM

Armored Security Vehicle (ASV)
Textron: New Orleans, LA

Army Airborne Command and Control System (A2C2S)
A2C2S development is a collaboration of government agencies including U.S. Army Communications-Electronics Command (CECOM), Army Armament Munitions Chemical Command (AMCOM), and Applied Aviation Technology Directorate (AATD) with the bulk of prototype development being completed by AATD in Ft. Eustis, VA.

Army Battle Command System (ABCS)
ABCS is a system of systems, not a formal program.

Army Common Ground Station (ACGS)
Cubic Defense Systems: San Diego, CA
Motorola: Scottsdale, AZ
Northrop Grumman: Melbourne, FL

Army Key Management System (AKMS)
Group Technology Corporation: Tampa, FL

Army Tactical Missile System (ATACMS) Blocks I and IA
Atlantic Research Corporation: Camden, AR
B.F. Goodrich: Vergennes, VT
Honeywell: Clearwater, FL
Lockheed Martin: Dallas, TX; Horizon City, TX

Army Tactical Missile System-BAT (ATACMS-BAT) Block II
Condor Pacific: Cheshire, CT
Lockheed Martin: Dallas, TX; Horizon City, TX
Northrop Grumman: Baltimore, MD; Huntsville, AL
Raytheon: Tucson, AZ

Automatic Chemical Agent Detector/Alarm (ACADA)
Graseby Dynamics, Ltd: Watford, U.K.

Avenger
AM General: South Bend, IN
Boeing: Huntsville, AL; Oak Ridge, TN

Battlefield Combat Identification System (BCIS)
EMS: Atlanta, GA
General Dynamics: Sterling Heights, MI
Raytheon: Fort Wayne, IN
TRW: Dominguez Hills, CA
United Defense, L.P.: San Jose, CA

Biological Vaccine Program/Joint Vaccine Acquisition Program (JVAP)
DynPort, LLC: Reston, VA

Black Hawk
General Electric: Lynn, MA
GNK Westland: Tallassee, AL
United Technologies: Stratford, CT

Bradley Fire Support Team (BFIST) Vehicle
Honeywell: Clearwater, FL
Systems & Electronics, Inc.: St. Louis, MO; Sanford, FL
United Defense, L.P.: York, PA; San Jose, CA

Bradley Linebacker
Boeing: Huntsville, AL
United Defense, L.P.: York, PA

Bradley M2 Infantry/M3 Cavalry Fighting Vehicle
United Defense, L.P.: Arlington, VA; Fayette, PA; San Jose, CA; York, PA

CH-47 Chinook/Improved Cargo Helicopter (CH-47F)
Boeing: Philadelphia, PA
Honeywell: Greer, SC; Phoenix, AZ
Robertson Aviation: Tempe, AZ
Rockwell Collins: Cedar Rapids, IA

Close Combat Tactical Trainer (CCTT)
Lockheed Martin: Orlando, FL

Comanche
Boeing and Sikorsky Team: Philadelphia, PA; Stratford, CT
Light Helicopter Turbine Engine Company (LHTEC), Honeywell/Rolls-Royce Team: Indianapolis, IN

Combat Identification for the Dismounted Soldier (CIDDS)
Lockheed Martin: Orlando, FL
Motorola: Scottsdale, AZ

Combat Service Support Control System (CSSCS)
General Dynamics: Taunton, MA
Lockheed Martin: Tinton Falls, NJ
TRW: Carson, CA

Common Hardware Systems (CHS)
General Dynamics: Taunton, MA
Litton: San Diego, CA

Common Missile
To be determined

Crusader
Electronic Data Systems: Herndon, VA
General Dynamics: Burlington, VT; Sterling Heights, MI
Honeywell: Albuquerque, NM
Raytheon: El Segundo, CA
Technovative Applications: Brea, CA
United Defense, L.P.: Minneapolis, MN; York, PA

Digital Topographic Support System (DTSS)
Litton/TASC: Reston, VA
Sechan Electronics: Lititz, PA
SFA: Frederick, MD

Division TUAV SIGINT Program (DTSP)
To be determined

Driver's Vision Enhancer (DVE)
Raytheon: Dallas, TX

Enhanced Position Location Reporting System (EPLRS)
Raytheon: Forest, MS; Fort Wayne, IN; Fullerton, CA

Excalibur 155mm Precision-Guided Extended Range Artillery Projectile Family
Primex Technologies: St. Petersburg, FL
Raytheon: Tucson, AZ

Family of Medium Tactical Vehicles (FMTV)
Stewart & Stevenson Services, Inc.: Sealy, TX

Field Artillery Ammunition Support Vehicle (FAASV)
United Defense, L.P.: York, PA

Firefinder (AN/TPQ-36 (V)8)
Northrop Grumman: Baltimore, MD; Rolling Meadows, IL

Firefinder (AN/TPQ-47)
Raytheon: El Segundo, CA; Forest, MS; Fort Wayne, IN
TRW: Carson, CA

Force XXI Battle Command Brigade-and-Below (FBCB2)
Litton: San Diego, CA
Paravant: Melbourne, FL
Raytheon: El Segundo, CA
TRW: Carson, CA

Forward Area Air Defense Command and Control (FAAD C2)
General Dynamics: Taunton, MA
TRW: Huntsville, AL; Redondo Beach, CA

Global Command and Control System-Army (GCCS-A)
Lockheed Martin: Springfield, VA

Global Positioning System (GPS)
Rockwell Collins: Cedar Rapids, IA
Trimble Navigation: Austin, TX; Sunnyvale, CA

Grizzly
United Defense, L.P.: York, PA

Guardrail/Common Sensor (GR/CS)
L-3 Communications: Salt Lake City, UT
Lockheed Martin: Owego, NY
Raytheon: Wichita: KS
TRW: Sunnyvale, CA

Guided Multiple Launch Rocket System (GMLRS)
Lockheed Martin: Dallas, TX

Heavy Equipment Transporter System (HETS)
Oshkosh Truck: Oshkosh, WI
Systems & Electronics, Inc.: St. Louis, MO

Heavy Expanded Mobility Tactical Truck–Load Handling System (HEMTT-LHS)
Oshkosh Truck: Oshkosh, WI

Hercules
United Defense, L.P.: York, PA

High Mobility Artillery Rocket System (HIMARS)
Lockheed Martin: Camden, AR; Dallas, TX
O'Gara-Hess & Eisenhardt: Fairfield, OH
Stewart & Stevenson Services, Inc.: Sealy, TX

High Mobility Multipurpose Wheeled Vehicle (HMMWV)
AM General: South Bend, IN
O'Gara-Hess & Eisenhardt: Fairfield, OH

Hornet
Textron: Wilmington, MA

Integrated Meteorological System (IMETS)
Logicon: Tacoma, WA
New Mexico State University: Las Cruces, NM

Integrated System Control (ISYSCON)
General Dynamics: Raleigh, NC; Taunton, MA
Laguna Industries: Laguna, NM

Interim Armored Vehicle (IAV)
To be determined

Javelin
Lockheed Martin: Orlando, FL
Raytheon: Tucson, AZ

Joint Biological Point Detection System (JBPDS)
Battelle: Columbus, OH
Intellitec: Deland, FL
MIT Lincoln Laboratories: Lexington, MA

Joint Chemical Agent Detector (JCAD)
BAE Systems: Austin, TX

Joint Land Attack Cruise Missile Defense Elevated Netted Sensors Systems (JLENS)
Raytheon: Bedford, MA

Joint Network Management System (JNMS)
To be determined

Joint Service Lightweight Integrated Suit Technology (JSLIST)
Battelle: Stafford, VA
Creative Apparel: Belfast, ME
Group Home Foundation: Belfast, ME
NCED: El Paso, TX

Joint Service Lightweight Nuclear, Biological and Chemical Reconnaissance System (JSLNBCRS)
TRW: Dominguez Hills, CA

Joint Service Lightweight Stand-off Chemical Agent Detector (JSLSCAD)
Intellitec: Deland, FL

Joint Tactical Ground Station (JTAGS)
GenCorp: Azusa, CA; Colorado Springs, CO
Gischner: Dallas Town, PA
Harris Corporation: Melbourne, FL
Lockheed Martin: Sunnyvale, CA; Boulder, CO

Joint Tactical Information Distribution System/Multifunctional Information Distribution System (JTIDS/MIDS)
BAE Systems: Wayne, NJ
MIDSCO: Fairfield, NJ–consisting of BAE Systems (USA), Thomson (France), MID (Italy), DASA (Germany), INDRA (Spain)
ViaSat: Carlsbad, CA

Joint Tactical Terminal (JTT)
Raytheon: St. Petersburg, FL

Joint Warning and Reporting Network (JWARN)
Bruhn NewTech, Inc.: Columbia, MD

Kiowa Warrior
Boeing: Anaheim, CA
EER Systems, Orlando, FL
Honeywell: Albuquerque, NM
Rolls Royce/Allison Engines: Indianapolis, IN
Simula: Tempe, AZ
Textron: Fort Worth, TX

Land Warrior (LW)
Computer Science Corporation: Eatontown, NJ; Falls Church, VA
Exponent: Menlo Park, CA; Phoenix, AZ
Modern Tech: Alexandria, VA
Omega Training Group: Columbus, GA
Pacific Consultants: San Jose, CA
PEMSTAR: Rochester, MN
Sytech: Arlington, VA
Wexford Group: Vienna, VA

Lightweight Forward Entry Device (LFED)/Forward Entry Device (FED)

General Dynamics: Taunton, MA
TELOS: Lawton, OK
Talla-Tech: Tallahassee, FL

Lightweight Laser Designator Rangefinder (LLDR)

Litton: Apopka, FL

Line-of-Sight Anti-Tank (LOSAT)

Alliant Tech: Rocket Center, WV
Lockheed Martin: Dallas, TX
Raytheon: Plano, TX

Long Range Advanced Scout Surveillance System (LRAS3)

DRS Optronics: Palm Bay, FL
Raytheon: McKinney, TX

Longbow HELLFIRE

Lockheed Martin: Orlando, FL
Northrop Grumman: Bethesda, MD; Huntsville, AL
Packard Hughes: Irvine, CA
Special Devices: Moorpark, CA
Stellex: Palo Alto, CA

M113 Family of Vehicles (FOV)

Anniston Army Depot: Anniston, AL
United Defense, L.P.: Anniston, AL

Maneuver Control System (MCS)

General Dynamics: Taunton, MA
Lockheed Martin: Tinton Falls, NJ

Medium Caliber Armaments

Primex Technologies: St. Petersburg, FL

Medium Extended Air Defense System (MEADS)

Lockheed Martin: Agura Hills, CA; Dallas, TX; Egan, MN; Huntsville, AL; Moorestown, NJ; Sunnyvale, CA; Syracuse, NY; Tucson, AZ
MEADS International was selected as the prime contractor to continue MEADS development during the risk reduction effort. This consortium comprises Lockheed Martin (Orlando, FL), Alenia-Marconi (Italy) and DaimlerChrysler Aerospace (Germany).

Military Satellite Communications (MILSATCOM)–EHF

Lincoln Labs: Lexington, MA
Raytheon: Largo, FL; Marlborough, MA; Virginia Beach, VA
Rockwell Collins: Richardson, TX

Military Satellite Communications (MILSATCOM)–UHF/SHF/TACSAT

Raytheon: Fort Wayne, IN; Largo, FL; Marlborough/Sudbury, MA; Reston, VA

Mortar (120mm)

Armtec: Coachella, CA
Brockway Standard: Atlanta, GA
Chamberlain Manufacturing Corporation: Scranton, PA
Crane AAA: Crane, IN
Hitech: Camden, AR
Junghans: FRG
KDI: Cincinnati, OH
Lockheed Martin: Orlando, FL; Archbald, PA
Matech: Hebron, MD
Mills Manufacturing: Ashville, NC
Pine Bluff Arsenal: Pine Bluff, AR
Pocal Industries: Scranton, PA
Primex Technologies: St. Petersburg, FL
SNC-TEC: Quebec, Canada
United Ammo Container: Milan, TN

Multiple Launch Rocket System (MLRS)

Harris: Melbourne, FL
L-3 Communications: Teterboro, NJ
Lockheed Martin: Dallas, TX
Teledyne: Lewisburg, TN
United Defense, L.P.: York, PA
Vickers: Jackson, MS

National Missile Defense (NMD)

Boeing: Huntsville, AL
Lockheed Martin: Sunnyvale, CA
Raytheon: Bedford, MA; Tucson, AZ
TRW: Colorado Springs, CO Huntsville, AL;

Near Term Digital Radio System (NTDRS)

GTE: Cambridge, MA
International Telephone and Telegraph (ITT): Clifton, NJ; Fort Wayne, IN

Night Vision (NV) Image Intensification (I2) System

BAE Systems: Austin, TX
International Telephone and Telegraph (ITT): Roanoke, VA
Litton: Garland, TX; Tempe, AZ
Lockheed Martin: Nashua NH; Orlando, FL

Nuclear, Biological and Chemical Reconnaissance System (NBCRS)-Fox

General Dynamics: Anniston, AL; Detroit, MI
Henschel Wehrtechnik: Kassel, Germany

Objective Individual Combat Weapon (OICW)

Alliant Techsystems: Hopkins, MN

Paladin

United Defense, L.P.: York, PA

Palletized Load System (PLS)

Hyundai Precision America: San Diego, CA
Oshkosh Truck: Bradenton, FL; Oshkosh, WI
Summa Technologies: Huntsville, AL

PATRIOT

Lockheed Martin: Grand Prairie, TX
Raytheon: Bedford, MA

Profiler

Environmental Technologies Group, Inc.: Baltimore, MD
National Center for Atmospheric Research (NCAR) University Center for Atmospheric Research (UCAR): Boulder, CO
Pennsylvania State University: University Park, PA
Vaisala, Inc.: Woburn, MA
ViaSat, Inc.: Carlsbad, CA

Prophet

CACI: Wall, NJ
Delfin Systems: Santa Clara, CA
Rockwell Collins: Cedar Rapids, IA
Sytex: Tinton Falls, NJ

Second Generation Forward Looking Infrared (FLIR)

DRS Technology: El Segundo, CA; Palm Bay, FL
Raytheon: McKinney, TX

Sentinel

Raytheon: El Segundo, CA; Forest, MS; Largo, FL

Single Channel Ground and Airborne Radio System (SINCGARS)

International Telephone and Telegraph (ITT): Fort Wayne, IN

Small Arms

Colt's Manufacturing: Hartford, CT
FN Manufacturing: Columbia, SC
General Dynamics: Saco, ME

Smoke Generator (M56 Coyote)

General Dynamics: Westminster, MD

Standard Army Management Information Systems (STAMIS)

Computer Sciences Corporation: Morristown, NJ
COMTECH Mobile Datacom: Germantown, MD
EDS: Fort Knox, KY
GRCI: McLean, VA
GTSI: Chantilly, VA
Lockheed Martin: Bethesda, MD
SAVI Technology: Sunnyvale, CA
Symbol Technologies: Holtsville, NY

Stinger

Honeywell: Minneapolis, MN
Raytheon: Tucson, AZ

Striker

Systems & Electronics, Inc.: St. Louis, MO

Suite of Integrated Radio Frequency Countermeasures (SIRFC)–AN/ALQ-211

International Telephone and Telegraph (ITT): Clifton, NJ

Tactical Endurance Synthetic Aperture Radar (TESAR)
Northrop Grumman: Baltimore, MD

Tactical Exploitation System (TES)
General Dynamics: Linthicum, MD
Northrop Grumman: Linthicum, MD

Tactical Operations Centers (TOCs)
Motorola: Huntsville, AL
TRW: Huntsville, AL

Tactical Unmanned Aerial Vehicle (TUAV)
AAI Corporation: Hunt Valley, MD
Inframetrics: North Billerica, MA
Raytheon: Arlington, VA
Sierra Nevada Corp.: Sparks, NV

Tank Main Gun Ammunition
Alliant Techsystems: Clearwater, FL; Hopkins, MN
Primex Technologies: St. Petersburg, FL
Raytheon: Tucson, AZ

Theater High Altitude Area Defense (THAAD) System
Lockheed Martin: Sunnyvale, CA
Raytheon: Bedford, MA

Thermal Weapon Sight (TWS)
Aeroflex Laboratories: Farmingdale, NY
Elcan Optical Technologies: Ontario, Canada
Raytheon: Dallas, TX; Goleta, CA
SMTEK International: Thousand Oaks, CA

TOW Fire and Forget
Raytheon: Tucson, AZ

TOW Improved Target Acquisition System (ITAS)
Raytheon: McKinney, TX

Warfighter Information Network–Tactical (WIN-T) New Start
To be determined

Wolverine
General Dynamics: Sterling Heights, MI
Lima Army Tank Plant: Lima, OH
MAN GHH: Germany

XM777 Joint Lightweight 155mm Howitzer (LW155)
BAE Systems: United Kingdom
Benet Laboratory/Watervliet Arsenal: Watervliet, NY
Computing Devices Corporation: Ottawa, Canada
General Dynamics: Burlington, VT
Hydro-Mill: Chatsworth, CA
Kara Aerospace, Inc.: Bedford, PA
Major Tool and Machining: Indianapolis, IN
Rock Island Arsenal: Rock Island, IL
RTI International Metals: Niles, OH
United Defense, L.P.: Pascagoula, MI

CONTRACTORS WITH ≥ 5% OF CONTRACT VALUE

ALABAMA

Air/Missile Defense Planning and Control System (AMDPCS)
Brown International: Huntsville, AL
TRW: Huntsville, AL

Army Tactical Missile System–BAT (ATACMS-BAT) Block II
Northrop Grumman: Huntsville, AL

Avenger
Boeing: Huntsville, AL

Black Hawk
GNK Westland: Tallassee, AL

Bradley Linebacker
Boeing: Huntsville, AL

Forward Area Air Defense Command and Control (FAAD C2)
TRW: Huntsville, AL

Longbow HELLFIRE
Northrop Grumman: Huntsville, AL

M113 Family of Vehicles (FOV)
Anniston Army Depot: Anniston, AL
United Defense, L.P.: Anniston, AL

Medium Extended Air Defense System (MEADS)
Lockheed Martin: Huntsville, AL

National Missile Defense (NMD)
Boeing: Huntsville, AL
TRW: Huntsville, AL

Nuclear, Biological and Chemical Reconnaissance System (NBCRS)–Fox
General Dynamics: Anniston, AL

Palletized Load System (PLS)
Summa Technologies: Huntsville, AL

Tactical Operations Centers (TOCs)
Motorola: Huntsville, AL
TRW: Huntsville, AL

ARIZONA

Apache Longbow
Boeing: Mesa, AZ

Army Common Ground Station (ACGS)
Motorola: Scottsdale, AZ

Army Tactical Missile System-BAT (ATACMS-BAT) Block II
Raytheon: Tucson, AZ

CH-47 Chinook/Improved Cargo Helicopter (CH-47F)
Honeywell: Phoenix, AZ
Robertson Aviation: Tempe, AZ

Combat Identification for the Dismounted Soldier (CIDDS)
Motorola: Scottsdale, AZ

Excalibur 155mm Precision-Guided Extended Range Artillery Projectile Family
Raytheon: Tucson, AZ

Javelin
Raytheon: Tucson, AZ

Kiowa Warrior
Simula: Tempe, AZ

Land Warrior (LW)
Exponent: Phoenix, AZ

Medium Extended Air Defense System (MEADS)
Lockheed Martin: Tucson, AZ

National Missile Defense (NMD)
Raytheon: Tucson, AZ

Night Vision (NV) Image Intensification (I2) System
Litton: Tempe, AZ

Stinger
Raytheon: Tucson, AZ

Tank Main Gun Ammunition
Raytheon: Tucson, AZ

TOW Fire and Forget
Raytheon: Tucson, AZ

ARKANSAS

Army Tactical Missile System (ATACMS) Blocks I and IA
Atlantic Research Corporation: Camden, AR

High Mobility Artillery Rocket System (HIMARS)
Lockheed Martin: Camden, AR

Mortar (120mm)
Hitech: Camden, AR
Pine Bluff Arsenal: Pine Bluff, AR

CALIFORNIA

Advanced Threat Infrared Countermeasures (ATIRCM)/Common Missile Warning System (CMWS)
Composite Optics: San Diego, CA
Hughes: Goleta, CA
LM Fairchild: Milpitas, CA
Tracor: Mojave, CA

Army Common Ground Station (ACGS)
Cubic Defense Systems: San Diego, CA

Battlefield Combat Identification System (BCIS)
TRW: Dominguez Hills, CA
United Defense, L.P.: San Jose, CA

Bradley Fire Support Team (BFIST) Vehicle
United Defense, L.P.: San Jose, CA

Bradley M2 Infantry/M3 Cavalry Fighting Vehicle
United Defense, L.P.: San Jose, CA

Combat Service Support Control System (CSSCS)
TRW: Carson, CA

Common Hardware Systems (CHS)
Litton: San Diego, CA

Crusader
Raytheon: El Segundo, CA
Technovative Applications: Brea, CA

Enhanced Position Location Reporting System (EPLRS)
Raytheon: Fullerton, CA

Firefinder (AN/TPQ-47)
Raytheon: El Segundo, CA
TRW: Carson, CA

Force XXI Battle Command Brigade-and-Below (FBCB2)
Litton: San Diego, CA
Raytheon: El Segundo, CA
TRW: Carson, CA

Forward Area Air Defense Command and Control (FAAD C2)
TRW: Redondo Beach, CA

Global Positioning System (GPS)
Trimble Navigation: Sunnyvale, CA

Guardrail/Common Sensor (GR/CS)
TRW: Sunnyvale, CA

Joint Service Lightweight Nuclear, Biological and Chemical Reconnaissance System (JSLNBCRS)
TRW: Dominguez Hills, CA

Joint Tactical Ground Station (JTAGS)
GenCorp: Azusa, CA
Lockheed Martin: Sunnyvale, CA

Joint Tactical Information Distribution System/ Multifunctional Information Distribution System (JTIDS/MIDS)
ViaSat: Carlsbad, CA

Kiowa Warrior
Boeing: Anaheim, CA

Land Warrior (LW)
Exponent: Menlo Park, CA
Pacific Consultants: San Jose, CA

Longbow HELLFIRE
Packard Hughes: Irvine, CA
Special Devices: Moorpark, CA
Stellex: Palo Alto, CA

Medium Extended Air Defense System (MEADS)
Lockheed Martin: Agura Hills, CA; Sunnyvale, CA

Mortar (120mm)
Armtec: Coachella, CA

National Missile Defense (NMD)
Lockheed Martin: Sunnyvale, CA

Palletized Load System (PLS)
Hyundai Precision America: San Diego, CA

Profiler
ViaSat, Inc.: Carlsbad, CA

Prophet
Delfin Systems: Santa Clara, CA

Second Generation Forward Looking Infrared (FLIR)
DRS Technology: El Segundo, CA

Sentinel
Raytheon: El Segundo, CA

Standard Army Management Information Systems (STAMIS)
SAVI Technology: Sunnyvale, CA

Theater High Altitude Area Defense (THAAD) System
Lockheed Martin: Sunnyvale, CA

Thermal Weapon Sight (TWS)
Raytheon: Goleta, CA
SMTEK International: Thousand Oaks, CA

XM777 Joint Lightweight 155mm Howitzer (LW155)
Hydro-Mill: Chatsworth, CA

COLORADO

All Source Analysis System (ASAS)
Lockheed Martin: Littleton, CO

Joint Tactical Ground Station (JTAGS)
GenCorp: Colorado Springs, CO
Lockheed Martin: Boulder, CO

National Missile Defense (NMD)
TRW: Colorado Springs, CO

Profiler
National Center for Atmospheric Research (NCAR) University Center for Atmospheric Research (UCAR): Boulder, CO

CONNECTICUT

Army Tactical Missile System– BAT (ATACMS-BAT) Block II
Condor Pacific: Cheshire, CT

Black Hawk
United Technologies: Stratford, CT

Comanche
Boeing and Sikorsky Team: Stratford, CT

Small Arms
Colt's Manufacturing: Hartford, CT

FLORIDA

Abrams
General Dynamics: Tallahassee, FL

Advanced Threat Infrared Countermeasures (ATIRCM)/Common Missile Warning System (CMWS)
Litton: Apopka, FL

Apache Longbow
Lockheed Martin: Orlando, FL

Army Common Ground Station (ACGS)
Northrop Grumman: Melbourne, FL

Army Key Management System (AKMS)
Group Technology Corporation: Tampa, FL

Army Tactical Missile System (ATACMS) Blocks I and IA
Honeywell: Clearwater, FL

Bradley Fire Support Team (BFIST) Vehicle
Honeywell: Clearwater, FL
Systems & Electronics, Inc.: Sanford, FL

Close Combat Tactical Trainer (CCTT)
Lockheed Martin: Orlando, FL

Combat Identification for the Dismounted Soldier (CIDDS)
Lockheed Martin: Orlando, FL

Excalibur 155mm Precision-Guided Extended Range Artillery Projectile Family
Primex Technologies: St. Petersburg, FL

Force XXI Battle Command Brigade-and-Below (FBCB2)
Paravant: Melbourne, FL

Javelin
Lockheed Martin: Orlando, FL

Joint Biological Point Detection System (JBPDS)
Intellitec: Deland, FL

Joint Service Lightweight Stand-off Chemical Agent Detector (JSLSCAD)
Intellitec: Deland, FL

Joint Tactical Ground Station (JTAGS)
Harris Corporation: Melbourne, FL

Joint Tactical Terminal (JTT)
Raytheon: St. Petersburg, FL

Kiowa Warrior
EER Systems, Orlando, FL

Lightweight Forward Entry Device (LFED)/Forward Entry Device (FED)
Talla-Tech: Tallahassee, FL

Lightweight Laser Designator Rangefinder (LLDR)
Litton: Apopka, FL

Long Range Advanced Scout Surveillance System (LRAS3)
DRS Optronics: Palm Bay, FL

Longbow HELLFIRE
Lockheed Martin: Orlando, FL

Medium Caliber Armaments
Primex Technologies: St. Petersburg, FL

Medium Extended Air Defense System (MEADS)
MEADS International consortium comprises Lockheed Martin (Orlando, FL), Alenia-Marconi (Italy) and DaimlerChrysler Aerospace (Germany).

Military Satellite Communications (MILSATCOM)–EHF
Raytheon: Largo, FL

Military Satellite Communications (MILSATCOM)–UHF/SHF/TACSAT
Raytheon: Largo, FL

Mortar (120mm)
Lockheed Martin: Orlando, FL
Primex Technologies: St. Petersburg, FL

Multiple Launch Rocket System (MLRS)
Harris: Melbourne, FL

Night Vision (NV) Image Intensification (I2) System
Lockheed Martin: Orlando, FL

Palletized Load System (PLS)
Oshkosh Truck: Bradenton, FL

Second Generation Forward Looking Infrared (FLIR)
DRS Technology: Palm Bay, FL

Sentinel
Raytheon: Largo, FL

Tank Main Gun Ammunition
Alliant Techsystems: Clearwater, FL
Primex Technologies: St. Petersburg, FL

GEORGIA

Battlefield Combat Identification System (BCIS)
EMS: Atlanta, GA

Land Warrior (LW)
Omega Training Group: Columbus, GA

Mortar (120mm)
Brockway Standard: Atlanta, GA

ILLINOIS

Firefinder (AN/TPQ-36 (V)8)
Northrop Grumman: Rolling Meadows, IL

XM777 Joint Lightweight 155mm Howitzer (LW155)
Rock Island Arsenal: Rock Island, IL

INDIANA

Advanced Field Artillery Tactical Data System (AFATDS)
Raytheon: Fort Wayne, IN

Avenger
AM General: South Bend, IN

Battlefield Combat Identification System (BCIS)
Raytheon: Fort Wayne, IN

Comanche
Light Helicopter Turbine Engine Company (LHTEC), Honeywell/Rolls-Royce Team: Indianapolis, IN

Enhanced Position Location Reporting System (EPLRS)
Raytheon: Fort Wayne, IN

Firefinder (AN/TPQ-47)
Raytheon: Fort Wayne, IN

High Mobility Multipurpose Wheeled Vehicle (HMMWV)
AM General: South Bend, IN

Kiowa Warrior
Rolls Royce/Allison Engines: Indianapolis, IN

Military Satellite Communications (MILSATCOM)–UHF/SHF/TACSAT
Raytheon: Fort Wayne, IN

Mortar (120mm)
Crane AAA: Crane, IN

Near Term Digital Radio System (NTDRS)
International Telephone and Telegraph (ITT): Fort Wayne, IN

Single Channel Ground and Airborne Radio System (SINCGARS)
International Telephone and Telegraph (ITT): Fort Wayne, IN

XM777 Joint Lightweight 155mm Howitzer (LW155)
Major Tool and Machining: Indianapolis, IN

IOWA

CH-47 Chinook/Improved Cargo Helicopter (CH-47F)
Rockwell Collins: Cedar Rapids, IA

Global Positioning System (GPS)
Rockwell Collins: Cedar Rapids, IA

Prophet
Rockwell Collins: Cedar Rapids, IA

KANSAS

Guardrail/Common Sensor (GR/CS)
Raytheon: Wichita: KS

KENTUCKY

Standard Army Management Information Systems (STAMIS)
EDS: Fort Knox, KY

LOUISIANA

Armored Security Vehicle (ASV)
Textron: New Orleans, LA

MAINE

Joint Service Lightweight Integrated Suit Technology (JSLIST)
Creative Apparel: Belfast, ME
Group Home Foundation: Belfast, ME

Small Arms
General Dynamics: Saco, ME

MARYLAND

Airborne Reconnaissance Low (ARL)
California Microwave: Belcamp, MD

Apache Longbow
Northrop Grumman: Linthincum, MD

Army Tactical Missile System–BAT (ATACMS-BAT) Block II
Northrop Grumman: Baltimore, MD

Digital Topographic Support System (DTSS)
SFA: Frederick, MD

Firefinder (AN/TPQ-36 (V)8)
Northrop Grumman: Baltimore, MD

Joint Warning and Reporting Network (JWARN)
Bruhn NewTech, Inc.: Columbia, MD

Longbow HELLFIRE
Northrop Grumman: Bethesda, MD

Mortar (120mm)
Matech: Hebron, MD

Profiler
Environmental Technologies Group, Inc.: Baltimore, MD

Smoke Generator (M56 Coyote)
General Dynamics: Westminster, MD

Standard Army Management Information Systems (STAMIS)
COMTECH Mobile Datacom: Germantown, MD
Lockheed Martin: Bethesda, MD

Tactical Endurance Synthetic Aperture Radar (TESAR)
Northrop Grumman: Baltimore, MD

Tactical Exploitation System (TES)
General Dynamics: Linthicum, MD
Northrop Grumman: Linthicum, MD

Tactical Unmanned Aerial Vehicle (TUAV)
AAI Corporation: Hunt Valley, MD

MASSACHUSETTS

Advanced Field Artillery Tactical Data System (AFATDS)
General Dynamics: Taunton, MA

Advanced Threat Infrared Countermeasures (ATIRCM)/Common Missile Warning System (CMWS)
Agility: Ayer, MA
Fairview Machine: Topsfield, MA

All Source Analysis System (ASAS)
GTE: Taunton, MA

Area Common User System Modernization Program (ACUS MOD)
GD/CRYPTEK: Taunton, MA
General Dynamics: Taunton, MA

Black Hawk
General Electric: Lynn, MA

Combat Service Support Control System (CSSCS)
General Dynamics: Taunton, MA

Common Hardware Systems (CHS)
General Dynamics: Taunton, MA

Forward Area Air Defense Command and Control (FAAD C2)
General Dynamics: Taunton, MA

Hornet
Textron: Wilmington, MA

Integrated System Control (ISYSCON)
General Dynamics: Taunton, MA

Joint Biological Point Detection System (JBPDS)
MIT Lincoln Laboratories: Lexington, MA

Joint Land Attack Cruise Missile Defense Elevated Netted Sensors Systems (JLENS)
Raytheon: Bedford, MA

Lightweight Forward Entry Device (LFED)/Forward Entry Device (FED)
General Dynamics: Taunton, MA

Maneuver Control System (MCS)
General Dynamics: Taunton, MA

Military Satellite Communications (MILSATCOM)–EHF
Lincoln Labs: Lexington, MA
Raytheon: Marlborough, MA

Military Satellite Communications (MILSATCOM)–UHF/SHF/TACSAT
Raytheon: Marlborough/Sudbury, MA

National Missile Defense (NMD)
Raytheon: Bedford, MA

Near Term Digital Radio System (NTDRS)
GTE: Cambridge, MA

PATRIOT
Raytheon: Bedford, MA

Profiler
Vaisala, Inc.: Woburn, MA

Tactical Unmanned Aerial Vehicle (TUAV)
Inframetrics: North Billerica, MA

Theater High Altitude Area Defense (THAAD) System
Raytheon: Bedford, MA

MICHIGAN

Abrams
General Dynamics: Muskegon, MI; Sterling Heights, MI; Warren, MI

Battlefield Combat Identification System (BCIS)
General Dynamics: Sterling Heights, MI

Crusader
General Dynamics: Sterling Heights, MI

Nuclear, Biological and Chemical Reconnaissance System (NBCRS)-Fox
General Dynamics: Detroit, MI

Wolverine
General Dynamics: Sterling Heights, MI

XM777 Joint Lightweight 155mm Howitzer (LW155)
United Defense, L.P.: Pascagoula, MI

MINNESOTA

Crusader
United Defense, L.P.: Minneapolis, MN

Land Warrior (LW)
PEMSTAR: Rochester, MN

Medium Extended Air Defense System (MEADS)
Lockheed Martin: Egan, MN

Objective Individual Combat Weapon (OICW)
Alliant Techsystems: Hopkins, MN

Stinger
Honeywell: Minneapolis, MN

Tank Main Gun Ammunition
Alliant Techsystems: Hopkins, MN

MISSISSIPPI

Enhanced Position Location Reporting System (EPLRS)
Raytheon: Forest, MS

Firefinder (AN/TPQ-47)
Raytheon: Forest, MS

Multiple Launch Rocket System (MLRS)
Vickers: Jackson, MS

Sentinel
Raytheon: Forest, MS

MISSOURI

Bradley Fire Support Team (BFIST) Vehicle
Systems & Electronics, Inc.: St. Louis, MO

Heavy Equipment Transporter System (HETS)
Systems & Electronics, Inc.: St. Louis, MO

Striker
Systems & Electronics, Inc.: St. Louis, MO

NEVADA

Tactical Unmanned Aerial Vehicle (TUAV)
Sierra Nevada Corp.: Sparks, NV

NEW HAMPSHIRE

Advanced Threat Infrared Countermeasures (ATIRCM)/Common Missile Warning System (CMWS)
BAE Systems: Nashua, NH

Night Vision (NV) Image Intensification (I2) System
Lockheed Martin: Nashua, NH

NEW JERSEY

Advanced Threat Infrared Countermeasures (ATIRCM)/Common Missile Warning System (CMWS)
Crystal Associates: East Hanover, NJ

Area Common User System Modernization Program (ACUS MOD)
CECOM: Ft. Monmouth, NJ

Combat Service Support Control System (CSSCS)
Lockheed Martin: Tinton Falls, NJ

Joint Tactical Information Distribution System/Multifunctional Information Distribution System (JTIDS/MIDS)
BAE Systems: Wayne, NJ
MIDSCO: Fairfield, NJ

Land Warrior (LW)
Computer Science Corporation: Eatontown, NJ

Maneuver Control System (MCS)
Lockheed Martin: Tinton Falls, NJ

Medium Extended Air Defense System (MEADS)
Lockheed Martin: Moorestown, NJ

Multiple Launch Rocket System (MLRS)
L-3 Communications: Teterboro, NJ

Near Term Digital Radio System (NTDRS)
International Telephone and Telegraph (ITT): Clifton, NJ

Prophet
CACI: Wall, NJ
Sytex: Tinton Falls, NJ

Standard Army Management Information Systems (STAMIS)
Computer Sciences Corporation: Morristown, NJ

Suite of Integrated Radio Frequency Countermeasures (SIRFC)–AN/ALQ-211
International Telephone and Telegraph (ITT): Clifton, NJ

NEW MEXICO

Area Common User System Modernization Program (ACUS MOD)
Laguna Industries: Laguna, NM

Crusader
Honeywell: Albuquerque, NM

Integrated Meteorological System (IMETS)
New Mexico State University: Las Cruces, NM

Integrated System Control (ISYSCON)
Laguna Industries: Laguna, NM

Kiowa Warrior
Honeywell: Albuquerque, NM

NEW YORK

Guardrail/Common Sensor (GR/CS)
Lockheed Martin: Owego, NY

Medium Extended Air Defense System (MEADS)
Lockheed Martin: Syracuse, NY

Standard Army Management Information Systems (STAMIS)
Symbol Technologies: Holtsville, NY

Thermal Weapon Sight (TWS)
Aeroflex Laboratories: Farmingdale, NY

XM777 Joint Lightweight 155mm Howitzer (LW155)
Benet Laboratory/Watervliet Arsenal: Watervliet, NY

NORTH CAROLINA

Integrated System Control (ISYSCON)
General Dynamics: Raleigh, NC

Mortar (120mm)
Mills Manufacturing: Ashville, NC

OHIO

Abrams
General Dynamics: Lima, OH

High Mobility Artillery Rocket System (HIMARS)
O'Gara-Hess & Eisenhardt: Fairfield, OH

High Mobility Multipurpose Wheeled Vehicle (HMMWV)
O'Gara-Hess & Eisenhardt: Fairfield, OH

Joint Biological Point Detection System (JBPDS)
Battelle: Columbus, OH

Mortar (120mm)
KDI: Cincinnati, OH

Wolverine
Lima Army Tank Plant: Lima, OH

XM777 Joint Lightweight 155mm Howitzer (LW155)
RTI International Metals: Niles, OH

OKLAHOMA

Lightweight Forward Entry Device (LFED)/Forward Entry Device (FED)
TELOS: Lawton, OK

PENNSYLVANIA

Abrams
General Dynamics: Scranton, PA

Bradley Fire Support Team (BFIST) Vehicle
United Defense, L.P.: York, PA

Bradley Linebacker
United Defense, L.P.: York, PA

Bradley M2 Infantry/M3 Cavalry Fighting Vehicle
United Defense, L.P.: Fayette, PA; York, PA

CH-47 Chinook/Improved Cargo Helicopter (CH-47F)
Boeing: Philadelphia, PA

Comanche
Boeing and Sikorsky Team: Philadelphia, PA

Crusader
United Defense, L.P.: York, PA

Digital Topographic Support System (DTSS)
Sechan Electronics: Lititz, PA

Field Artillery Ammunition Support Vehicle (FAASV)
United Defense, L.P.: York, PA

Grizzly
United Defense, L.P.: York, PA

Hercules
United Defense, L.P.: York, PA

Joint Tactical Ground Station (JTAGS)
Gischner: Dallas Town, PA

Mortar (120mm)
Chamberlain Manufacturing Corporation: Scranton, PA
Lockheed Martin: Archbald, PA
Pocal Industries: Scranton, PA

Multiple Launch Rocket System (MLRS)
United Defense, L.P.: York, PA

Paladin
United Defense, L.P.: York, PA

Profiler
Pennsylvania State University: University Park, PA

XM777 Joint Lightweight 155mm Howitzer (LW155)
Kara Aerospace, Inc.: Bedford, PA

SOUTH CAROLINA

CH-47 Chinook/Improved Cargo Helicopter (CH-47F)
Honeywell: Greer, SC

Small Arms
FN Manufacturing: Columbia, SC

TENNESSEE

Avenger
Boeing: Oak Ridge, TN

Mortar (120mm)
United Ammo Container: Milan, TN

Multiple Launch Rocket System (MLRS)
Teledyne: Lewisburg, TN

TEXAS

Air/Missile Defense Planning and Control System (AMDPCS)
APC: Austin, TX

All Source Analysis System (ASAS)
Austin Information Systems: Austin, TX

Army Tactical Missile System (ATACMS) Blocks I and IA
Lockheed Martin: Dallas, TX; Horizon City, TX

Army Tactical Missile System-BAT (ATACMS-BAT) Block II
Lockheed Martin: Dallas, TX; Horizon City, TX

Driver's Vision Enhancer (DVE)
Raytheon: Dallas, TX

Family of Medium Tactical Vehicles (FMTV)
Stewart & Stevenson Services, Inc.: Sealy, TX

Global Positioning System (GPS)
Trimble Navigation: Austin, TX

Guided Multiple Launch Rocket System (GMLRS)
Lockheed Martin: Dallas, TX

High Mobility Artillery Rocket System (HIMARS)
Lockheed Martin: Dallas, TX
Stewart & Stevenson, Inc.: Sealy, TX

Joint Chemical Agent Detector (JCAD)
BAE Systems: Austin, TX

Joint Service Lightweight Integrated Suit Technology (JSLIST)
NCED: El Paso, TX

Kiowa Warrior
Textron: Fort Worth, TX

Line-of-Sight Anti-Tank (LOSAT)
Lockheed Martin: Dallas, TX
Raytheon: Plano, TX

Long Range Advanced Scout Surveillance System (LRAS3)
Raytheon: McKinney, TX

Medium Extended Air Defense System (MEADS)
Lockheed Martin: Dallas, TX

Military Satellite Communications (MILSATCOM)–EHF
Rockwell Collins: Richardson, TX

Multiple Launch Rocket System (MLRS)
Lockheed Martin: Dallas, TX

Night Vision (NV) Image Intensification (I2) System
BAE Systems: Austin, TX
Litton: Garland, TX

PATRIOT
Lockheed Martin: Grand Prairie, TX

Second Generation Forward Looking Infrared (FLIR)
Raytheon: McKinney, TX

Thermal Weapon Sight (TWS)
Raytheon: Dallas, TX

TOW Improved Target Acquisition System (ITAS)
Raytheon: McKinney, TX

UTAH

Guardrail/Common Sensor (GR/CS)
L-3 Communications: Salt Lake City, UT

VERMONT

Army Tactical Missile System (ATACMS) Blocks I and IA
B.F. Goodrich: Vergennes, VT

Crusader
General Dynamics: Burlington, VT

XM777 Joint Lightweight 155mm Howitzer (LW155)
General Dynamics: Burlington, VT

VIRGINIA

All Source Analysis System (ASAS)
Electronic Warfare Associates: Herndon, VA

Army Airborne Command and Control System (A2C2S)
A2C2S development is a collaboration of government agencies including U.S. Army Communications–Electronics Command (CECOM), Army Armament Munitions Chemical Command (AMCOM), and Applied Aviation Technology Directorate (AATD) with the bulk of prototype development being completed by AATD in Ft. Eustis, VA.

Biological Vaccine Program/Joint Vaccine Acquisition Program (JVAP)
DynPort, LLC: Reston, VA

Bradley M2 Infantry/M3 Cavalry Fighting Vehicle
United Defense, L.P.: Arlington, VA

Digital Topographic Support System (DTSS)
Litton/TASC: Reston, VA

Global Command and Control System-Army (GCCS-A)
Lockheed Martin: Springfield, VA

Joint Service Lightweight Integrated Suit Technology (JSLIST)
Battelle: Stafford, VA

Land Warrior (LW)
Computer Science Corporation: Falls Church, VA
Modern Tech: Alexandria, VA
Sytech: Arlington, VA
Wexford Group: Vienna, VA

Crusader
Electronic Data Systems: Herndon, VA

Military Satellite Communications (MILSATCOM)–EHF
Raytheon: Virginia Beach, VA

Military Satellite Communications (MILSATCOM)–UHF/SHF/TACSAT
Raytheon: Reston, VA

Night Vision (NV) Image Intensification (I2) System
International Telephone and Telegraph (ITT): Roanoke, VA

Standard Army Management Information Systems (STAMIS)
GRCI: McLean, VA
GTSI: Chantilly, VA

Tactical Unmanned Aerial Vehicle (TUAV)
Raytheon: Arlington, VA

WASHINGTON

Integrated Meteorological System (IMETS)
Logicon: Tacoma, WA

WEST VIRGINIA

All Source Analysis System (ASAS)
Electronic Warfare Associates: Fairmont, WV

Line-of-Sight Anti-Tank (LOSAT)
Alliant Tech: Rocket Center, WV

WISCONSIN

Heavy Equipment Transporter System (HETS)
Oshkosh Truck: Oshkosh, WI

Heavy Expanded Mobility Tactical Truck–Load Handling System (HEMTT-LHS)
Oshkosh Truck: Oshkosh, WI

Palletized Load System (PLS)
Oshkosh Truck: Oshkosh, WI

OTHER COUNTRIES

CANADA

Advanced Threat Infrared Countermeasures (ATIRCM)/Common Missile Warning System (CMWS)
Raytheon: Ontario, Canada

Area Common User System Modernization Program (ACUS MOD)
BAE Systems: Quebec, Canada

Mortar (120mm)
SNC-TEC: Quebec, Canada

Thermal Weapon Sight (TWS)
Elcan Optical Technologies: Ontario, Canada

XM777 Joint Lightweight 155mm Howitzer (LW155)
Computing Devices Corporation: Ottawa, Canada

FRANCE

Joint Tactical Information Distribution System/Multifunctional Information Distribution System (JTIDS/MIDS)
MIDSCO: Fairfield, NJ–consisting of BAE Systems (USA), Thomson (France), MID (Italy), DASA (Germany), INDRA (Spain)

GERMANY

Joint Tactical Information Distribution System/Multifunctional Information Distribution System (JTIDS/MIDS)
MIDSCO: Fairfield, NJ–consisting of BAE Systems (USA), Thomson (France), MID (Italy), DASA (Germany), INDRA (Spain)

Medium Extended Air Defense System (MEADS)
MEADS International consortium comprises Lockheed Martin (Orlando, FL), Alenia-Marconi (Italy) and DaimlerChrysler Aerospace (Germany).

Mortar (120mm)
Junghans: FRG

Nuclear, Biological and Chemical Reconnaissance System (NBCRS)-Fox
Henschel Wehrtechnik: Kassel, Germany

Wolverine
MAN GHH: Germany

ITALY

Joint Tactical Information Distribution System/Multifunctional Information Distribution System (JTIDS/MIDS)
MIDSCO: Fairfield, NJ–consisting of BAE Systems (USA), Thomson (France), MID (Italy), DASA (Germany), INDRA (Spain)

Medium Extended Air Defense System (MEADS)
MEADS International consortium comprises Lockheed Martin (Orlando, FL), Alenia-Marconi (Italy) and DaimlerChrysler Aerospace (Germany).

SPAIN

Joint Tactical Information Distribution System/Multifunctional Information Distribution System (JTIDS/MIDS)
MIDSCO: Fairfield, NJ–consisting of BAE Systems (USA), Thomson (France), MID (Italy), DASA (Germany), INDRA (Spain)

UNITED KINGDOM

Automatic Chemical Agent Detector/Alarm (ACADA)
Graseby Dynamics, Ltd: Watford, U.K.

XM777 Joint Lightweight 155mm Howitzer (LW155)
BAE Systems: United Kingdom

2001 WEAPON SYSTEMS POINTS-OF-CONTACT

Abrams
Abrams Tank System
Project Manager
ATTN: SFAE-GCSS-AB
Warren, MI 48397-5000

Advanced Field Artillery Tactical Data System (AFATDS)
AFATDS
Project Manager
ATTN: SFAE-C3-FS
Fort Monmouth, NJ 07703

Advanced Threat Infrared Countermeasures (ATIRCM)/Common Missile Warning System (CMWS)
Project Manager
Advanced Threat Infrared Countermeasures (ATIRCM)/Common Missile Warning System (CMWS)/ASE
ATTN: SFAE-AV-IR
Wood Road
Redstone Arsenal, AL 35898

Air/Missile Defense Planning and Control System (AMDPCS)
Air Defense Command and Control Systems (PM ADCCS)
Project Manager
ATTN: SFAE-C3S-AD
Redstone Arsenal, AL 35898-5600

Airborne Reconnaissance Low (ARL)
Signals Warfare
Project Manager
SFAE-C3S-INT
Building 296, Main Post
Fort Monmouth, NJ 07703-5040

All Source Analysis System (ASAS)
Product Manager
Project Manager
ATTN: SFAE-C3S-INT
1616 Anderson Road

Apache Longbow
Longbow Apache
Product Manager
ATTN: SFAE-AV-AAH
Building 5681
Redstone Arsenal, AL 35898

Area Common User System Modernization Program (ACUS MOD)
Project Manager, Warfighter Information Network–Terresterial (PM WIN-T)
ATTN: SFAE-C3S-WIN
Bldg 744
Ft Monmouth, NJ 07703-5506

Armored Security Vehicle (ASV)
Light Tactical Vehicles
Project Manager
ATTN: AMSTA-DSA-LV
Warren, MI, 48397-5000

Army Airborne Command and Control System (A2C2S)
Project Manager, Tactical Operations Centers/Air and Missile Defense Command and Control Systems (PM TOCs/AMDCCS)
ATTN: SFAE-C3S-AD
4920 University Square
Huntsville, AL 35816

Army Battle Command System (ABCS)
Program Executive Office for Command, Control and Communications Systems (PEO C3S)
ATTN: SFAE-C3S
Bldg 2700 Albert J Meyer Ctr
Fort Monmouth, NJ 07703-5401

Army Common Ground Station (ACGS)
Joint STARS
Project Manager
SFAE-IEW&S-JS
Fort Monmouth, NJ 07703-5304

Army Key Management System (AKMS)
Warfighter Information Network (Terrestrial) (PM WIN-T)
Project Manager
ATTN: SFAE-C3S-WIN
Building 744
Fort Monmouth, NJ 07703-5506

Army Tactical Missile System (ATACMS) Blocks I and IA
Army TACMS
Project Manager
ATTN: SFAE-MSL-AB
Redstone Arsenal, AL 35898-5650

Army Tactical Missile System-BAT (ATACMS-BAT) Block II
Army TACMS-BAT
Project Manager
ATTN: SFAE-MSL-AB
Redstone Arsenal, AL 35898-5650

Automatic Chemical Agent Detector/Alarm (ACADA)
NBC Defense Systems
Project Manager
ATTN: AMSSB-PM-RNN
Aberdeen, MD 21010-5423

Avenger
U.S. Army Aviation and Missile Command
Attn: AMSAM-DSA-SH
Redstone Arsenal, AL 35898-5000

Battlefield Combat Identification System (BCIS)
Combat Identification
Product Manager
ATTN: SFAE-IEW-CI
Building 563 Avenue of Memories
Fort Monmouth, NJ 07703

Biological Vaccine Program/Joint Vaccine Acquisition Program (JVAP)
Joint Program Office for Biological Defense Systems
ATTN: SFAE-BD/Skyline
35201 Leesburg Pike
Falls Church, VA 22041-3203

Black Hawk
Utility Helicopters
Project Manager
U.S. Army Aviation and Missile Command
ATTN: AMSAM-DSA-UH
Building 5308
Redstone Arsenal, AL 35898

Bradley Fire Support Team (BFIST) Vehicle
Bradley Fire Support Team
Product Manager
ATTN: SFAE-GCSS-BV
Warren, MI 48397-5000

Bradley Linebacker
Bradley Linebacker
Product Manager
ATTN: SFAE-GCSS-BV
Warren, MI 48397-5000

Bradley M2 Infantry/M3 Cavalry Fighting Vehicle
Bradley Fighting Vehicle System
Product Manager
ATTN: SFAE-GCSS-W-BV
Warren, MI 48397-5000

CH-47 Chinook/Improved Cargo Helicopter (CH-47F)
Cargo Helicopters
Project Manager
ATTN: SFAE-AV-CH
Building 5681
Redstone Arsenal, AL 35898

Close Combat Tactical Trainer (CCTT)
Combined Arms Tactical Trainer
Project Manager
ATTN: AMSTI-CCTT
12350 Research Parkway
Orlando, FL 32826-3276

Comanche
Comanche
Project Manager
ATTN: SFAE-AV-RAH
Building 5681
Redstone Arsenal, AL 35898

Combat Identification for the Dismounted Soldier (CIDDS)
Combat Identification
Product Manager
ATTN: SFAE-IEW-CI
Building 563 Avenue of Memories
Fort Monmouth, NJ 07703

Combat Service Support Control System (CSSCS)
CSSCS
Product Manager
ATTN: SFAE-C3S-STR
6052 Meade Road, Suite 103
Fort Belvoir, VA 22060

Common Hardware Systems (CHS)
ATCCS
Project Manager
SFAE-C3S-AT
Fort Monmouth, NJ 07703-5402

Common Missile
Common Missile
Program Executive Officer, Tactical Missiles
ATTN: SFAE-MSL
Redstone Arsenal, AL 35898-8000

Crusader
Crusader
Project Manager
ATTN: SFAE-GCSS-CR
Picatinny Arsenal, NJ 07806-5000

Digital Topographic Support System (DTSS)
Combat Terrain Information Systems U.S. Army Topographic
Project Director
ATTN: CETEC-PD-T
7701 Telegraph Road
Alexandria, VA 22310-3864

Division TUAV SIGINT Program (DTSP)
Signals Warfare
Project Manager
ATTN: SFAE-IEWS-SG
Fort Monmouth, NJ 07703-5303

Driver's Vision Enhancer (DVE)
NV/RSTA
Project Manager
10221 Burbeck Road, Suite 430
Fort Belvoir, VA 22310-3864

Enhanced Position Location Reporting System (EPLRS)
Project Manager, Tactical Radio Communications Systems (PM TRCS)
ATTN: SFAE-C3S-TRC
Bldg 456
Ft Monmouth, NJ 07703-5505

Excalibur 155mm Precision-Guided Extended Range Artillery Projectile Family
Artillery Munition Systems
Project Manager
ATTN: SFAE-GCCS-ARMS
Picatinny Arsenal, NJ 07806-5000

Family of Medium Tactical Vehicles (FMTV)
FMTV
Project Manager
ATTN: SFAE-GCSS-W-MTV
Warren, MI 48397-5000

Field Artillery Ammunition Support Vehicle (FAASV)
Paladin/FAASV
Product Manager
ATTN: AMSTA-DSA-PF
Picatinny Arsenal, NJ 07806-5000

Firefinder (AN/TPQ-36 (V)8)
Firefinder
Project Manager
ATTN: AMSEL-DSA-FF
Fort Monmouth, NJ 07703

Firefinder (AN/TPQ-47)
Firefinder
Project Manager
AMSEL-DSA-FF
Fort Monmouth, NJ 07703

Force XXI Battle Command Brigade-and-Below (FBCB2)
Force XXI Battle Command Brigade and Below
Project Manager
ATTN: SFAE-C3S-FB
Building 2525
Fort Monmouth, NJ 07703-5408

Forward Area Air Defense Comman, and Control (FAAD C2)
ADCCS
Project Manager
ATTN: SFAE-C3S-AD
Redstone Arsenal, AL 35898

Global Command and Control System–Army (GCCS-A)
GCCS-A
Product Manager
ATTN: SFAE-C3S-STR
Fort Monmouth, NJ 07703

Global Positioning System (GPS)
GPS
Product Manager
ATTN: AMSEL-DSA-GPS
CECOM SMC
Fort Monmouth, NJ 07703

Grizzly
Grizzly
Product Manager
ATTN: AMSTA-DSA-CM
Warren, MI 48397-5000

Guardrail/Common Sensor (GR/CS)
Signals Warfare
Project Manager
ATTN: SFAE-IEW&S-SG
Building 296, Main Post
Fort Monmouth, NJ 07703-5040

Guided Multiple Launch Rocket System (GMLRS)
Multiple Launch Rocket System
Project Manager
ATTN: SFAE-MSL-ML
Redstone Arsenal, AL 35898

Heavy Equipment Transporter System (HETS)
Heavy Tactical Vehicles
Project Manager
ATTN: AMSTA-DSA-HT
Warren, MI 48397-5000

Heavy Expanded Mobility Tactical Truck–Load Handling System (HEMTT-LHS)

Hercules
Hercules
Project Manager
ATTN: AMSTA-DSA-CM
Warren, MI 48397-5000

High Mobility Artillery Rocket System (HIMARS)
MLRS
Project Manager
ATTN: SFAE-MSL-ML
Redstone Arsenal, AL 35898

High Mobility Multipurpose Wheeled Vehicle (HMMWV)
Light Tactical Vehicles
Project Manager
AMSTA-DSA-LT
Warren, MI 48397-5000

Hornet
Mines, Countermine and Demolitions
Project Manager
ATTN: AMSTA-DA-ME
Picatinny Arsenal, NJ 07806-5000

Integrated Meteorological System (IMETS)

Army Research Laboratory
Director
ATTN: SFAE-C3S-MET
WSMR, NM 88002

Integrated System Control (ISYSCON)

Warfighter Information Network-Terrestrial (WIN-T)
Product Manager
ATTN: SFAE-C3S-WIN
Fort Monmouth, NJ 07703

Interim Armored Vehicle (IAV)

Brigade Combat Team
Project Manager
ATTN: SFAE-GCSS-W-BCT
Warren, MI 48397-5000

Javelin

Javelin
Project Manager
ATTN: SFAE-MSL-AM
Redstone Arsenal, AL 35898-5720

Joint Biological Point Detection System (JBPDS)

NBC Defense
Joint Program Office for Biological Defense Systems
ATTN: SFAE-BD/Skyline #3
Falls Church, VA 22041-3203

Joint Chemical Agent Detector (JCAD)

PM Air Force NBC Defense Systems
Brooks Air Force Base, TX 78235

Joint Land Attack Cruise Missile Defense Elevated Netted Sensors Systems (JLENS)

U.S. Army Space and Missile Defense Command
Project Manager
P.O. Box 1500
Huntsville, AL 35807

Joint Network Management System (JNMS)

Project Manager, Warfighter Information Network-Terresterial (PM WIN-T)
ATTN: SFAE-C3S-WIN
Bldg 744
Ft Monmouth, NJ 07703-5506

Joint Service Lightweight Integrated Suit Technology (JSLIST)

JSLIST
Project Manager
10401 Totten Road
Suite 121
Fort Belvoir, VA 22060

Joint Service Lightweight Nuclear Biological Chemical Reconnaissance System (JSLNBCRS)

PM for Marine Corps NBC Defense Equipment Division
Marine Corps Systems Command

Joint Service Lightweight Stand-off Chemical Agent Detector (JSLSCAD)

NBC Defense Systems
Project Manager
ATTN: AMSSB-PM-RNN
Aberdeen Proving Ground, MD 21010-5423

Joint Tactical Information Distribution System/ Multifunctional Information Distribution System (JTIDS/MIDS)

TRCS
Project Manager
ATTN: SFAE-C3S-TRC
Fort Monmouth, NJ 07703

Joint Tactical Ground Station (JTAGS)

Missile Defense
Program Executive Office
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P.O. Box 1500
Huntsville, AL 35807-3801

Joint Tactical Terminal (JTT)

JTT/CIBSM
Product Manager
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Fort Monmouth, NJ 07703-5304

Joint Warning and Reporting Network (JWARN)

NBC Defense
Project Manager
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Quantico, MD 22134-5010

U.S. Marine Corps Systems Command (MARCORSYSCOM)
Project Manager
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2033 Barnett Avenue, Suite 315
Quantico, MD 22134-5010

Kiowa Warrior

Kiowa Warrior
Product Manager
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Redstone Arsenal, AL 35898

Land Warrior (LW)

Land Warrior
Project Manager Soldier Systems
U.S. Army Soldier and Biological Chemical Command
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Fort Belvoir, VA 22060

Lightweight Forward Entry Device (LFED)/Forward Entry Device (FED)

Project Manager, Field Artillery Tactical Data Systems (PM FATDS)
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Lightweight Laser Designator Rangefinder (LLDR)

LLDR
PM NV/RSTA
10221 Burbeck Road
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Ft. Belvoir, VA 22060-5806

Line-of-Sight Anti-Tank (LOSAT)

LOSAT
Project Manager
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Redstone Arsenal, AL 35898-8051

Long Range Advanced Scout Surveillance System (LRAS3)

GENIIFUR
Project Manager
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Fort Belvoir, VA 22060-5806

Longbow HELLFIRE

Longbow HELLFIRE Missile Systems
Product Manager
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Redstone Arsenal, AL 35898-5610

M113 Family of Vehicles (FOV)

U.S. Army Tank, Automotive and Armaments Command
Product Manager
ATTN: AMSTA-DSA-TA-CV
Warren, MI 48397-5000

Maneuver Control System (MCS)

MCS
Product Manager
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Fort Monmouth, NJ 07703-5405

Medium Caliber Armaments

Medium Extended Air Defense System (MEADS)

MEADS
Product Manager
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Military Satellite Communications (MILSATCOM)-EHF

MILSATCOM
Project Manager
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Fort Monmouth, NJ 07703

Military Satellite Communications (MILSATCOM)–UHF/SHF/TACSAT
MILSATCOM
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Mortar (120mm)
U.S. Armament Research, Development, and Engineering Center
Product Manager
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Picatinny Arsenal, NJ 07806-5000

Multiple Launch Rocket System (MLRS)
MLRS
Project Manager
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Redstone Arsenal, AL 35898

National Missile Defense (NMD)
NMD
Program Manager
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Redstone Arsenal, AL 35807-3801

Near Term Digital Radio System (NTDRS)
Project Manager, Tactical Radio Communications Systems (PM TRCS)
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Night Vision (NV) Image Intensification (I2) System
NV/RSTA
Project Manager
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Nuclear, Biological and Chemical Reconnaissance System (NBCRS)–Fox
NBC Defense Team
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Aberdeen Proving Ground, MD 21010-5423

Objective Individual Combat Weapon (OICW)

Paladin
Paladin/FAASV
Product Manager
ATTN: AMSTA-DSA-PF
Picatinny Arsenal, NJ 07806-5000

Palletized Load System (PLS)
Heavy Tactical Vehicles
Project Manager
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PATRIOT
Project Manager
ATTN: SFAE-AMD-PA
P.O. Box 1500
Huntsville, AL 35807-3801

Profiler
PM TESAR
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Bldg 2525, Bay 2
Charles Wood Area
Ft. Monmouth, NJ 07703-5303

Prophet
Signals Warfare
Project Manager
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Fort Monmouth, NJ 07703-5303

Second Generation Forward Looking Infrared (FLIR)
GEN II FLIR
Product Manager
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Fort Belvoir, VA 22060-5806

Sentinel
Sentinel
Product Manager
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Redstone Arsenal, AL 35898

Single Channel Ground and Airborne Radio System (SINCGARS)
SINCGARS
Product Manager
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Fort Monmouth, NJ 07703

Small Arms (M4 Carbine, M16A4 Rifle, M24B Medium Machine Gun, MK19-3
Small Arms U.S. Army Armament Research, Development and Product Manager
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Picatinny Arsenal, NJ 07806-5000

Smoke Generator (M56 Coyote)
Smoke/Obscurants
Product Manager
ATTN: AMSSB-PM-RSM
Aberdeen Proving Ground, MD 21010-5423

Standard Army Management Information Systems (STAMIS)
STAMIS
Program Executive Office
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Fort Belvoir, VA 22060

Stinger
U.S. Army Aviation and Missile Command
ATTN: AMSAM-DSA-SH
Redstone Arsenal, AL 35898-5000

Striker
Striker
Product Manager
ATTN: SFAE-GCSS-BV
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Suite of Integrated Radio Frequency Countermeasures (SIRFC)–AN/ALQ-211
Product Manager
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Tactical Endurance Synthetic Aperture Radar (TESAR)
TESAR
Product Manager
ATTN: SFAE-IEW&S-NV
Fort Monmouth, NJ 07703-5000

Tactical Exploitation System (TES)
U.S. Army Space Program Office Director
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Alexandria, VA 22315

Tactical Operations Centers (TOCs)
Air Defense Command and Control Systems (ADCCS)
Project Manager
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Tactical Unmanned Aerial Vehicle (TUAV)
Joint Tactical Unmanned Aerial Vehicle
Project Manager
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Tank Main Gun Ammunition
Tank Main Armament Systems
Project Manager
ATTN: SFAE-GCSS-TMA
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Theater High Altitude Area Defense (THAAD) System
Project Manager
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Thermal Weapon Sight (TWS)
NV/RSTA
Project Manager
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TOW Fire and Forget

TOW Improved Target Acquisition System (ITAS)
ITAS
Product Manager
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Redstone Arsenal, AL
35898-5710

Warfighter Information Network–Tactical (WIN-T) New Start
Project Manager, Warfighter Information Network-Terresterial (PM WIN-T)
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Wolverine
Wolverine
Product Manager
ATTN: AMSTA-DSA-CM
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XM777 Joint Lightweight 155mm Howitzer (LW155)
Joint Lightweight 155mm Howitzer
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