

A collage of various military vehicles and aircraft in a desert environment. In the foreground, there's a dark armored vehicle with a large gun barrel. Behind it, a large transport aircraft is shown from a low angle, with its landing gear deployed. To the right, a tank is visible, and further back, another aircraft is flying through a cloudy sky.

# *Weapon Systems*

UNITED STATES ARMY 1999





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## TO THE READER:

Today's Army is operating at an unprecedented pace, with active deployments throughout the world. In the last several years, the Army has been called on with increasing frequency to defend U.S. interests across the globe while its overall resources have declined. The Army's ability to put an American presence on the ground and to interact with the local populace make it an essential tool for U.S. policy now and in the future. In order to maintain the military capabilities that the nation demands and to modernize to meet future national security requirements, the Army is following a path to build both mental and physical agility. This path, the Force XXI process, is designed to spearhead the development of Army XXI, a product-improved force that will see the Army into the next century. Army XXI is primarily concerned with enhancing our current systems with information age technology. In addition, Force XXI is directing our explorations into the Army After Next (AAN). AAN is a future force designed specifically to meet the national security requirements of the 21st century. It will include organizations and systems that do not yet exist. The objective of Force XXI is to synchronize modern equipment, quality people, doctrine, force mix, training, and leader and soldier development—the six Army imperatives—ensuring that the U.S. Army can conduct a variety of missions in diverse environments, from today until well into the next century.

This handbook outlines the major programs that we are pursuing to equip the Army of the 21st century and should be used as a companion to the *Army Development, Acquisition and Fielding Master Plan* (DAFMP). The DAFMP articulates how the Army plans, manages, and executes the development, acquisition, and fielding activities necessary to realize the materiel components of the force envisioned by *Joint Vision 2010* (JV2010) and *Army Vision 2010* (AV2010). The DAFMP is a capstone document that unites the *Army Modernization Plan* and the *Army Science and Technology Master Plan* with Acquisition Reform to provide a holistic process and framework for equipping the soldier with the requisite tools at an affordable price.

We hope that you find this book a valuable and informative reference source.



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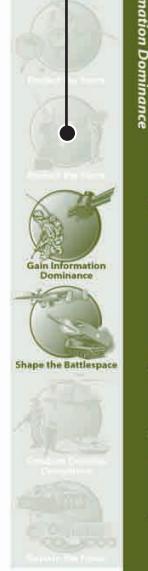
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The U.S. Outline highlights the states in which system contractors with  $\geq 5\%$  of total program value for FY99 are located. In the electronic version, clicking on any map will take you to the Contractors by State Appendix.

The Prime Contractor(s) for the system is displayed. The major subcontractors can be found listed in the Appendices.

The system's acquisition phase is highlighted. The terms are explained on the facing page. In the electronic version, clicking anywhere on this bar will take you to the patterns of operation definitions in the glossary.

Advanced Field Artillery Tactical Data System (AFATDS)		Concepts of Operations	Management Configuration	Development	Production, Fielding/Deployment, and Operational Support	
	UNITED STATES ARMY	Mission	Provide the warfighter with a battlefield management and decision support tool that automates all twenty-seven of the fire support battlefield functions.	MISSION	Provide the warfighter with a battlefield management and decision support tool that automates all twenty-seven of the fire support battlefield functions.	FOREIGN COUNTERPART
		DESCRIPTION AND SPECIFICATIONS	The Advanced Field Artillery Tactical Data System (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, target acquisition, and target damage assessment operations. AFATDS uses non-developmental, ruggedized, common hardware/software used by the other ABCS BFA. AFATDS uses the results of its target-value analysis to establish target priorities, to select the best weapon system from all fire support assets available, and to coordinate target acquisition and sensor assets to provide target information to the target damage assessment data. Through interoperability with JMCIS, 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-JMCIS interface allows for the exchange of friendly and enemy unit information and battlefield geometry messages. The AFATDS software is being developed incrementally, fielding new features and functionality as evolving technology, doctrine, tactics, weapons capabilities, and procedures. Each version adds capability and functionality, with AFATDS '94 currently projected as the objective system. AFATDS follows the Deputy Chief of Staff, Operations (DCSOPS) approved "First to Fight" fielding schedule which prioritizes fieldings to units to be deployed into combat first.	FOREIGN MILITARY SALES	Letters of Offer/Acceptance to sell AFATDS have been issued to Kuwait, Portugal, Saudi Arabia, and Turkey.	PROGRAM STATUS
				FOREIGN MILITARY SALES	Letters of Offer/Acceptance to sell AFATDS have been issued to Kuwait, Portugal, Saudi Arabia, and Turkey.	PROGRAM STATUS
				PROJECTED ACTIVITIES	AFATDS '97 Limited user test (LUT); September–October 1997; AFATDS '97 Material Release; July 22, 1998; AFATDS '98 Test Readiness review; September 29, 1998; AFATDS '98 LUT; October–November 1998.	PRIME CONTRACTOR(S)
				PROJECTED ACTIVITIES	AFATDS '97 Limited user test (LUT); September–October 1997; AFATDS '97 Material Release; July 22, 1998; AFATDS '98 Test Readiness review; September 29, 1998; AFATDS '98 LUT; October–November 1998.	PRIME CONTRACTOR(S)
				PRIME CONTRACTOR(S)	Software: Raytheon Systems Company (Fort Wayne, IN) Hardware: GTE (Taunton, MA) (CHS 2); Litton Systems (San Diego, CA) (LCU)	Advanced Field Artillery Tactical Data System (AFATDS) Information Dominance
						
						* See appendix for list of subcontractors
						WEAPON SYSTEMS 1999

## ACQUISITION PHASES

### Concept Exploration

This phase typically consists of competitive, parallel short-term concept studies. The focus of these efforts is to define and evaluate the feasibility of alternative concepts and to provide a basis for assessing relative merits of these concepts at the next milestone decision point. Analysis of alternatives are used as appropriate to facilitate comparisons of alternative concepts. The most promising system concepts are defined in terms of initial, broad objectives for cost, schedule, performance, software requirements, opportunities for tradeoffs, overall acquisition strategy and test and evaluation strategy.

### Program Definition and Risk Reduction

During this phase, the program is defined as one or more concepts, design approaches, and/or parallel technologies are pursued as warranted. Assessments of the advantages and disadvantages of alternative concepts are refined. Prototyping, demonstrations and early operational assessments are considered and included as necessary to reduce risk so that technology, manufacturing, and support risks are well in hand before the next decision point. Cost drivers, life-cycle cost estimates, cost performance trades, interoperability, and acquisition strategy alternatives are considered to include evolutionary and incremental software development.

### Engineering and Manufacturing Development

The primary objectives of this phase are to: translate the most promising design approach into a stable, interoperable, producible, supportable, and cost-effective design; validate the manufacturing or production process; and demonstrate system capabilities through testing. Low-rate initial production (LRIP) occurs while the engineering and manufacturing development phase is still continuing as test results and design fixes or upgrades are incorporated.

### Production, Fielding/Deployment, and Operational Support

The objectives of this phase are to achieve an operational capability that satisfies mission needs. Deficiencies encountered in developmental test and evaluation (DT&E) and initial operational test and evaluation (IOTE) are resolved and fixes verified. During fielding/deployment and throughout operational support, the potential for modifications to the fielded/deployed systems continues.



## INTRODUCTION

Today's Army is operating at an unprecedented pace, with active deployments in Bosnia, Haiti, Korea, Kuwait, the Sinai and over seventy other countries. In the past seven years, the Army has been called on with increasing frequency to defend U.S. interests across the globe. The Army's ability to put an American presence on the ground and to interact with the local populace make it an essential tool for U.S. policy now and in the future.

The Army is responding to changes in the nature of warfare and how it executes its core missions. *Joint Vision 2010 (JV2010)* lays out the U.S. military's vision of the future of conflict and how the services must operate to win. *JV2010* describes a future U.S. military that is based on the control of information, that possesses Information Dominance, and that can dominate its adversaries across the spectrum of military operations.

Since 1994, the Army has worked ceaselessly to transform itself into a 21st Century force. Changes in technology, particularly the proliferation of information technologies, have led to changes in the nature of warfare, presenting new risks and new opportunities. The Army intends to maintain its dominance as the best-trained, best-equipped, and most ready force in the world.

The Army will do this through the Force XXI process, the Army's strategic change process. The Force XXI process begins with an understanding of the Revolution in Military Affairs (along with the associated Revolution in Business Affairs and the Revolution in Military Logistics). Simply put, new technologies and the increased pace of technological change are rapidly changing the nature of military conflict. For the Army to remain the dominant force that it is, the Army must keep pace with changes by incorporating new technologies and reorganizing itself to best exploit new capabilities.

The Force XXI process has two objective forces: Army XXI and Army After Next (AAN). Army XXI is an intermediate force that will be largely a "product improved" version of today's force. The Army will enhance the capabilities of its current systems rather than buy a new generation of platforms for the interim force. The hallmark of Army XXI will be mental agility. Army XXI platforms and soldiers will be equipped with advanced command, control, communications, computers and intelligence (C4I) systems that provide a new level of

situational awareness. This is mental agility and it will allow Army XXI to achieve the full-spectrum dominance called for in *Joint Vision 2010* and *Army Vision 2010 (AV2010)*. By 2010, the Army will have outfitted most of its active component divisions with these C4I systems. Guard and reserve units will be outfitted in subsequent years.

The culmination of the Force XXI process is the Army After Next, the revolutionary force of 2025. Once the Army achieves mental agility with Army XXI, it will need to acquire platforms and weapons that can fully exploit the knowledge provided by the C4I network. Greater lethality, greater strategic and operational mobility, greater versatility (less distinction between heavy and light forces; ability to use both lethal and non-lethal force), logistically unencumbered, and greater integration of the reserve component are the critical require-



ments for AAN. The AAN force must be able to concentrate its maneuver elements and supporting fires anywhere in the theater of conflict in a short period of time to take advantage of its superior situational awareness. The AAN force must also be able to conduct operations across the spectrum of conflict, using varying levels of force in different environments. This is physical agility. Not all of the Army will be equipped with AAN systems. The rest of the Army, using Army XXI systems, will serve as the anvil to the AAN force's hammer. This is the Army's vision for the future. *Army Weapon Systems 1999* describes what the Army acquisition community is doing to make that vision a reality.

#### NEAR TERM FOCUS (ACQUIRING MENTAL AGILITY)

The cover of this book offers a vision of the power of mental agility in the force. On the front cover, the soldier forms the focal point of the network links represented by rays of light. This depiction is no accident, for the health and success of the individual soldier is the entire reason for pursuing mental agility. The situational information flows across the network, directing the firepower of the combat platforms and directing the delivery of support assets and materiel. Every system and every information link supports the individual soldier.



The core of mental agility is the Army Battle Command System (ABCS), the network of C4I systems that links the Army XXI force. ABCS has three major components: Force XXI Battle Command Brigade and Below (FBCB2), the Army Tactical Command and Control System (ATCCS) and the Global Command and Control System-Army (GCCS-A). ABCS is a system of systems that will seamlessly command and control from the individual soldier up to the theater ground force component commander and beyond.

ABCS starts at the tactical level with FBCB2, which, in its applique and embedded configurations, provides each warfighter with the ability to know their location, the location of their friends and the location of their enemies. FBCB2 provides the warfighter with situational awareness by integrating information from GPS and weapons sensors aboard the host platform and from external updates via its digital radio link to the tactical internet. The knowledge gleaned from these sources is a powerful force multiplier, turning disparate force elements into a united and lethally aware entity. FBCB2 will be found on every platform from the Land Warrior individual soldier system to the Abrams tank to the Bradley Linebacker air defense platform.

The power of FBCB2 has already been tested as part of the Army Warfighting Experiments (AWEs). In 1997, the Army equipped a brigade task force with FBCB2 and other digital systems and sent it out against the opposition force (OPFOR) at the National Training Center at Ft. Irwin, CA. With their superior training and knowledge of the terrain, the OPFOR routinely defeats in mock battle the Army units that come through the NTC. However, the digitized task force had tremendous success against the OPFOR, forcing them to alter their operations and focus on force protection in ways no other unit ever had. The Task Force AWE and the November 1997 Division AWE offer powerful evidence that digitization will have a major impact on the battlefield.

At the operational level, ATCCS is the system of systems that will integrate forces from the battalion level to the theater level. ATCCS is composed of five elements. First, the Advanced Field Artillery Tactical Data System (AFATDS) provides automated command and



control for artillery assets such as Crusader, Paladin and MLRS, allowing the commander to allocate his firepower efficiently and to maximum effect. Second, the Forward Area Air Defense Command, Control and Intelligence System (FAADC2I) provides the means to cue air defense weapons, like the Bradley Linebacker, protect friendly aircraft, like the Longbow Apache and Comanche helicopters, and provide better management of the air defense battle. Third, the Combat Service Support Control System (CSSCS) will automate the collection and analysis of logistics, medical, financial and personnel data, increasing the efficiency of CSS units performing these tasks. Fourth, the All Source Analysis System (ASAS) provides intelligence asset management and intelligence data analysis capabilities to give the commander a better picture of the battlefield sooner. ASAS integrates the information from diverse systems such as JSTARS, UAVs and Guardrail. Finally, the Maneuver Control System (MCS) automates the creation and distribution of the common tactical picture of the battlefield integrating battle information from other Battlefield Functional Area (BFA) C2 systems to provide timely, accurate status information, as well as situational awareness.

The final piece of ABCS is GCCS-A, which links the Army at the theater level into the joint command and control network. GCCS-A is a C2 system that links ATCCS and FBCB2 to the Defense Information Infrastructure (DII) Common Operating Environment (COE). GCCS-A ensures that Army units can share in the joint picture of the battlefield and operate more effectively.

With the success of ABCS elements in the AWEs, the Army is moving forward to equip the first digitized division. The two brigades of the 4th Infantry Division (Mechanized) [4ID(M)], located at Ft. Hood, TX will be equipped with the essential systems for digitization by October 2000. The division will receive all elements of ABCS, SINCGARS radios and the Global Broadcast System (GBS) to give it the tactical internet backbone required for situational awareness. The division will also get new M1A2 tanks with embedded FBCB2 and new M2/3A3 Bradley fighting vehicles with embedded FBCB2. To ensure that the division is able to operate as envisioned with all of its units linked together, the Army will digitize variants of the M1A1s and M2/3A2s already fielded to 4ID(M).

The acquisition community faces significant challenges in pursuing Army XXI and AAN. Foremost among these is the need to complete the current modernization of the force, while beginning the acquisition of the next generation systems. The Army faces the reality that

defense spending is unlikely to increase in the foreseeable future. Therefore the Army will have to complete its acquisition of current requirements (especially support equipment), even as it tries to develop and acquire the systems for Army XXI and AAN. To help manage that process, the Army has developed a set of investment components to guide its acquisition program.

### **PROVIDING FULL SPECTRUM DOMINANCE– INVESTMENT COMPONENTS**

Within the frameworks of *JV2010* and *AV2010*, the Army modernization vision and resultant modernization strategy guide the development of innovative technologies and the fielding of new systems. The Army modernization vision is to equip a capabilities-based Total Army able to achieve Full-Spectrum Dominance against any potential adversary by 2015–2020. “Full-Spectrum Dominance” is defined as the ability to dominate an enemy across the entire spectrum of military operations. The modernization strategy resulting from this vision allocates resources and determines priorities among critical, but often competing, modernization objectives. The strategy categorizes modernization programs into a series of Investment Components, which include the following:

#### **Information Dominance**

Information Dominance is fundamental to the near-term focus of acquiring mental agility and to the overall Investment Component strategy. As a result, it has the highest priority. Information Dominance is also the underpinning of Army XXI and AAN. It is the foundation upon which all other capabilities and changes will be built. Key programs include critical elements of the digital command and control architecture, such as the Tactical Internet, Advanced Field Artillery Tactical Data System (AFATDS) and Forward Area Air Defense Command, Control and Intelligence system (FAADC2I), as well as those systems which contribute to the battlespace awareness of Army forces, such as the Comanche helicopter, Tactical Unmanned Aerial Vehicle (TUAV) and Ground Based Common Sensor (GBCS).

#### **Overmatch Capabilities**

Overmatch Capabilities are derived from technologically advanced combat systems which create a disparity between the capabilities of friendly and enemy forces. The inherent superiority of such systems endows Army forces with an operational advantage over

potential adversaries. For example, the unequaled speed, firepower, and survivability of M1A1D and M1A2 tanks provide Army forces with superior agility and lethality in high-intensity combat. The AH-64D Apache Longbow equipped with the Longbow HELLCIRRE missile provides unprecedented survivability, firepower, precision strike and the capability to fight worldwide in day/night, adverse weather and obscured battlefields. The Patriot Advanced Capability-3 (PAC-3) system upgrade along with the PAC-3 missile, provides an advanced anti-tactical missile capability to the current fielded systems. Similarly, systems such as the Javelin anti-tank missile and Land Warrior greatly heighten the ability of early entry forces to fight and survive across the full range of operational environments.



#### **Essential Research and Development/Leap-Ahead Technologies**

Essential Research and Development programs are the foundation of success in future conflicts. Focused investment in promising technologies today will ensure that Army forces have the weapons and supporting systems they need to be effective on the battlefields of tomorrow. Key leap-ahead technologies have been incorporated into the Brilliant Anti-Armor Submunition (BAT), Line-of-Sight

Antitank (LOSAT) missile, and the Theater High Altitude Area Defense (THAAD) system. These and other S&T programs are critical to ensuring land force dominance in the next century.



## Recapitalization

In order to maintain its combat effectiveness, the Army must make a substantial investment in the maintenance and upgrade of systems currently in the force. A major focus of recapitalization is to reduce the cost of ownership for legacy systems. One such investment to reduce life cycle costs is through the Apache. The Apache helicopter will reduce its life cycle costs through a new Prime Vendor Support (PVS) arrangement, where the contractor, Boeing Corporation, will provide most logistic support for the aircraft. Recapitalization also includes upgrades to extend the life of a platform. For example, superior computer and navigation systems, a new gun and gun mount, enhanced ballistic and NBC protection, and other improvements to the Paladin provide a substantial increase in capability over previous versions of the M109 howitzer, endowing the platform with enhanced effectiveness and survivability. The CH-47 Chinook/Improved Cargo Helicopter (ICH), Family of Heavy Tactical Vehicles (FHTV), Force Provider and other recapitalization programs provide similar cost effective capability enhancements, while reducing future operations and support (O&S) costs. Such investments ensure that our soldiers are never made to use equipment, that is unsafe or inferior to that of an adversary.

## Contributing Capabilities

Contributing capabilities comprise the many remaining programs that significantly contribute to the *AV2010* patterns of operation described above. They provide critical, if often overlooked, supporting capabilities to Army forces across the range of operational environments. Training our soldiers is the cornerstone of victory. The Army is investing in simulations and simulators that are vital tools to ensure soldiers are trained and ready to fight with this technologically advanced equipment.

These investment components are the framework upon which the Army modernization strategy is planned and executed. They are the method by which individual systems are categorized in *Army Weapon Systems 1999*, and each is described in greater detail at the start of the relevant chapter.

## CONCLUSION

The systems listed in this book are not isolated, individual products. Rather they are building blocks needed to create the integrated capabilities that are the defining characteristics of Army XXI and AAN. The systems in this book, like the capabilities in the Army Modernization Plan, are part of an integrated approach to make the Army of the future capable of meeting the increased demands of our nation with fewer resources. Each system and each capability has an important role to play in making modernization a reality. Each system and each capability will contribute towards the Army's ability to respond to our nation's needs. The systems in this book are today's investment to ensure the future readiness of our Army. The Army of tomorrow will rely on these systems to successfully perform all assigned missions.

# Information Dominance

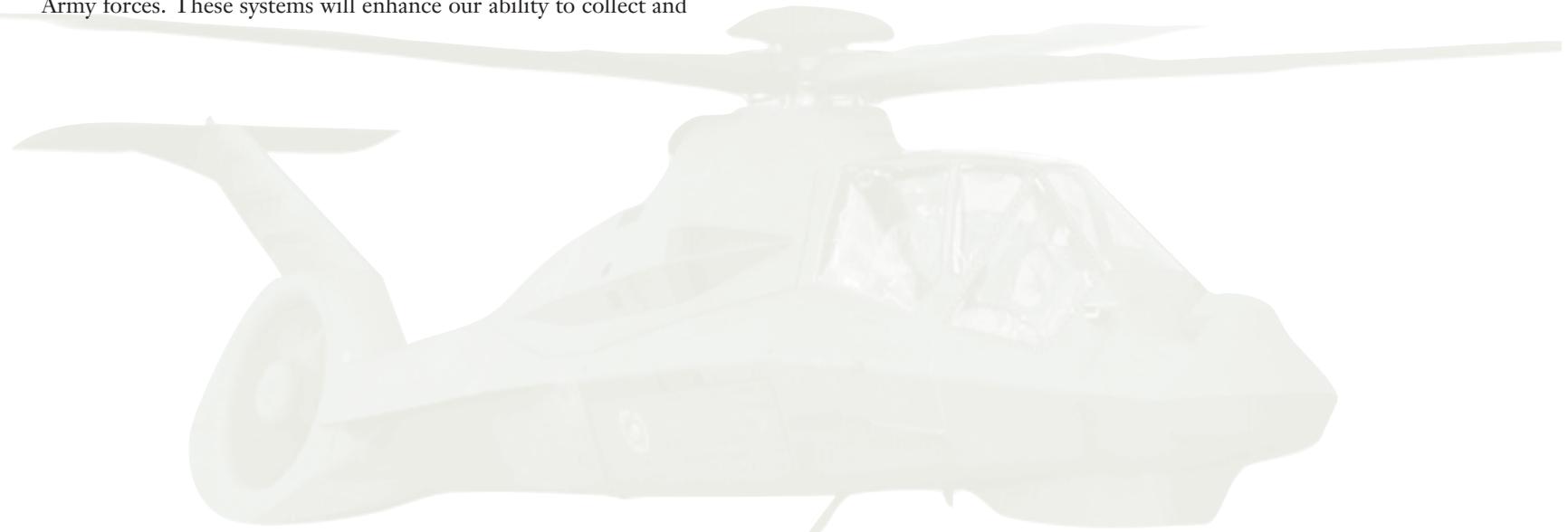
Success in future operational environments will hinge on the timely and effective manipulation of information. Commanders must have a clear understanding of the disposition and actions of both friendly and enemy forces to effectively utilize the resources available to them. Such an understanding increases the ability of friendly forces to seize and maintain the initiative, and imparts greater lethality and survivability. Concurrently, they must conduct information operations to disrupt enemy intelligence gathering activities and prevent the enemy from exercising effective command and control.

Information Dominance is the degree of information superiority that enables Army forces to use information systems and capabilities to achieve an operational advantage, while denying those capabilities to an adversary. Such superiority results in a disparity between the battlespace awareness of friendly and enemy commanders across the tactical, operational, and strategic levels of operations. Information Dominance derives from the employment of key systems that provide superior capabilities for battlefield visualization, situational awareness, spectrum supremacy, and C2 attack and protection.

Ensuring Information Dominance requires substantial investment in systems and technologies that support the “mental agility” of Army forces. These systems will enhance our ability to collect and

process data, identify critical information, and disseminate that information in an uninterrupted flow to the appropriate combat, combat support, and combat service support forces. Intelligence and sensor systems such as the Guardrail/Common Sensor (GR/CS), the Ground-Based Common Sensor (GBCS), Tactical Unmanned Aerial Vehicle (TUAV), and others will gather the information needed to provide a clear understanding of the battlefield. Computer hardware and software systems, including the Advanced Field Artillery Data System, the All Source Analysis System, and the Army Data Distribution System, will process that raw data into usable products. Those products will then be rapidly and securely disseminated by an advanced communications architecture that includes the Single Channel Ground Air Radio System (SINCGARS), Warfighter Information Network–Terrestrial (WIN-T) Switches, Military Satellite Communications (MILSATCOM), and others.

Information Dominance is the highest-priority investment component. The Army modernization strategy seeks to field the capabilities throughout the force that would provide for Information Dominance by 2009. In the interim, the objective is to equip a digitized division by FY00 and a digitized corps by FY04.



Concept Exploration	Program Definition and Risk Reduction	Engineering and Manufacturing Development	Production, Fielding/Deployment, and Operational Support
<p><b>CONCEPT EXPLORATION</b></p> <p>Air/Land Enhanced Reconnaissance and Targeting (ALERT) ATD      Battlespace Command and Control ATD      Integrated Situation Awareness and Targeting ATD      Logistics Command and Control ATD      Military Operations in Urban Terrain ACTD      Multi-function Staring Sensor Suite ATD      Multi-mission Unmanned Aerial Vehicle Sensor ATD      Rapid Terrain Visualization ACTD      Rotorcraft Pilot's Associate ATD      Tactical Command and Control Project ATD      Tactical Unmanned Aerial Vehicle (TUAV)      Theater Precision Strike Operations ACTD</p>	<p><b>PROGRAM DEFINITION AND RISK REDUCTION</b></p> <p>Comanche</p>	<p><b>ENGINEERING AND MANUFACTURING DEVELOPMENT</b></p> <p>Air/Missile Defense Planning and Control System (AMDPCS) (WRAP Candidate)      Army Airborne Command and Control System (A2C2S)      Combat Identification for the Dismounted Soldier (CIDDS)      Counter Intelligence/Human Intelligence (CI/HUMINT) Automated Tools Set (CHATS)      Firefinder (TPQ-36 and TPQ-37/Block II)      Force XXI Battle Command Brigade-and-Below (FBCB2)      Global Command and Control System—Army (GCCS-A)      Ground-Based Common Sensor (GBCS)      Integrated System Control (ISYSCON)      Joint Biological Point Detection System (JBPD)      Joint Collection Management Tools (JCMT)      Joint Service Lightweight Stand-off Chemical Agent Detector (JSLSCAD)      Joint Surveillance Target Attack Radar System (Joint STARS) Common Ground Station (CGS)      Maneuver Control System (MCS)      Sentinel      Tactical Exploitation System (TES)      Tactical Simulation Interface Unit (TSIU) (WRAP Candidate)</p>	<p><b>PRODUCTION, FIELDING/DEPLOYMENT, AND OPERATIONAL SUPPORT</b></p> <p>Advanced Field Artillery Tactical Data System (AFATDS)      Airborne Reconnaissance Low (ARL)      All Source Analysis System (ASAS)      Analysis and Control Team (ACT) Enclave (WRAP Candidate)      Army Data Distribution System (ADDs)—EPLRS/NTDRS      Army Data Distribution System (ADDs)—JTIDS/MIDS      Army Key Management System (AKMS)      Automatic Chemical Agent Detector/Alarm (ACADA)      Combat Service Support Control System (CSSCS)      Combat Synthetic Training Assessment Range (CSTAR)      Common Hardware Systems (CHS)      Counter Intelligence/Human Intelligence (CI/HUMINT) Automated Tools Set (CHATS)      Digital Topographic Support System (DTSS) (WRAP Candidate)      Forward Area Air Defense Command, Control and Intelligence (FAADC2I)      Grenadier Beyond Line-of-Sight Reporting and Targeting (BRAT) (GB) (WRAP Candidate)      Guardrail/Common Sensor (GR/CS)      High-Speed Multiplexer Cards (HSMUX) (WRAP Candidate)      Improved Chemical Agent Monitor (ICAM)      Integrated Meteorological System (IMETS)      Joint Collection Management Tools (JCMT)      Joint Tactical Ground Station (JTAGS)      Joint Tactical Terminal (JTT)      Joint Warning and Reporting Network (JWARN)      Kiowa Warrior      Military Satellite Communications (MILSATCOM)—EHF      Military Satellite Communications (MILSATCOM)—UHF/SHF/TACSAT      NAVSTAR Global Positioning System (GPS)      Nuclear, Biological and Chemical Reconnaissance System (NBCRS)—Fox      Standard Army Management Information Systems (STAMIS)      Standard Integrated Command Post System (SICPS)      Tactical Endurance Synthetic Aperture Radar (TESAR)      Tactical Operations Centers (TOC)      Tactical Quiet Generators (TQG)      Thermal Weapon Sight (TWS)      Warfighter Information Network—Terrestrial (WIN-T) Switches      Warfighter Information Network—Terrestrial (WIN-T) Tech Insertion</p>

# Advanced Field Artillery Tactical Data System (AFATDS)



## MISSION

Provide the warfighter with a battlefield management and decision support tool that automates all twenty-seven of the fire support battlefield functions.

## DESCRIPTION AND SPECIFICATIONS

The Advanced Field Artillery Tactical Data System (AFATDS) provides the multi-service (Army and Marine Corps) automated Fire Support Command, Control and Communications portion of the Army Battle Command System (ABCS). AFATDS enables the maneuver commander to plan and execute attacks on the right target, at the right time, with the right weapons system, and the right munitions. It provides for maximum utilization of the fire support assets available on an expanding battlefield. 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 (BFA) as well as with the Fire Support capabilities of the Navy's Joint Maritime Command Information System (JMCIS) and the Air Force's Theater Battle Management Core System (TBMCS).

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/software used by the other ABCS BFA. AFATDS uses the results of its target-value analysis to establish target priorities, to select the best weapon system from all fire support assets available, and to coordinate target acquisition and sensor assets to provide targeting information and target damage assessment data. Through interoperability with TBMCS, 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-JMCIS interface allows for the exchange of friendly and enemy unit information and battlefield geometry messages. The AFATDS software is being developed in incremental, fieldable versions to accommodate evolving technology, doctrines, tactics, weapons capabilities, and procedures. Each version adds capability and functionality with AFATDS '04 currently projected as the objective system. AFATDS follows the Deputy Chief of Staff, Operations' (DCSOPS) approved "First to Fight" fielding schedule which prioritizes fieldings to units to be deployed into combat first.

## FOREIGN COUNTERPART

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

## FOREIGN MILITARY SALES

Letters of Offer/Acceptance to sell AFATDS have been issued to Kuwait, Portugal, Saudi Arabia, and Turkey.

## PROGRAM STATUS

AFATDS '97 Limited user test (LUT): September–October 1997; AFATDS '97 Materiel Release: July 22, 1998; AFATDS '98 Test readiness review: September 29, 1998; AFATDS '98 LUT: October–November 1998.

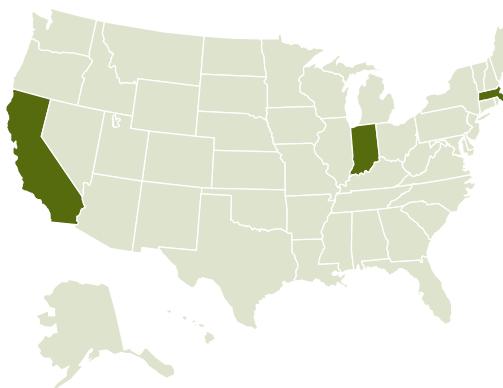
## PROJECTED ACTIVITIES

- 1QFY99** III Corps Warfighter Exercise.
- 2QFY99** AFATDS '98 Package 11 Interoperability Test.
- 2QFY99** Joint Interoperability Test 99-1.
- 3QFY99** AFATDS '98 Materiel Release.
- 4QFY00** AFATDS '99 Materiel Release.

## PRIME CONTRACTOR(S)

**Software:** Raytheon Systems Company (Fort Wayne, IN)

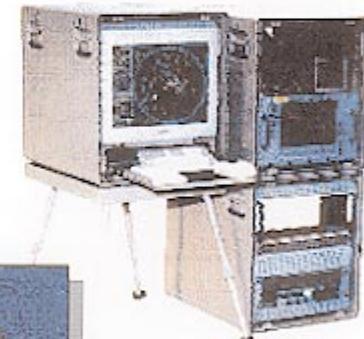
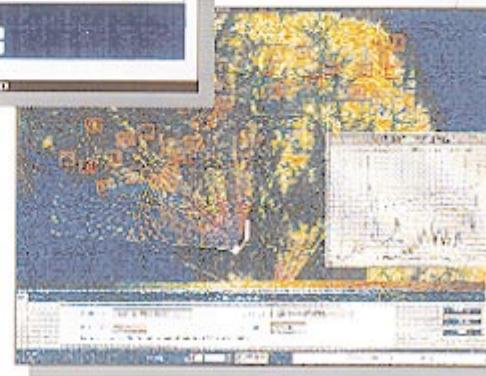
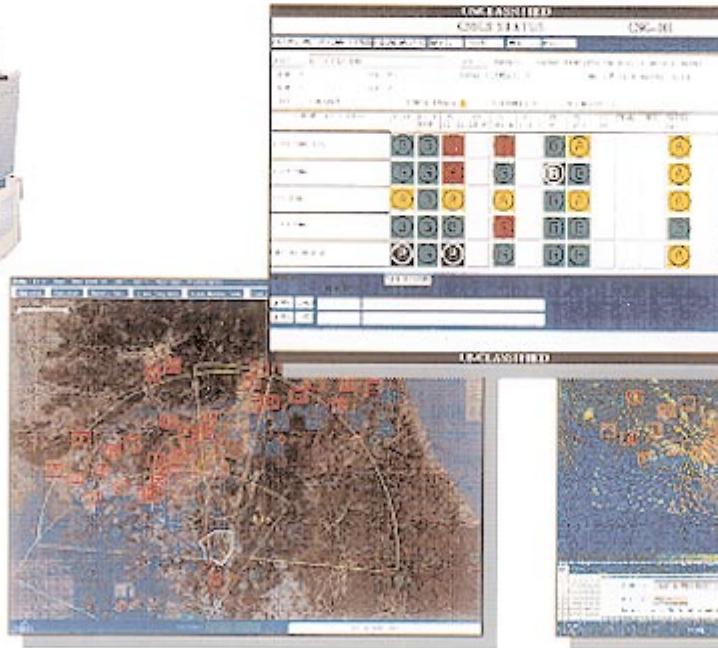
**Hardware:** GTE (Taunton, MA) (CHS 2); Litton Systems (San Diego, CA) (LCU)



\* See appendix for list of subcontractors



# Air/Missile Defense Planning and Control System (AMDPCS) (WRAP Candidate)



## MISSION

Provide effective, integrated 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.

## DESCRIPTION AND SPECIFICATIONS

The Air/Missile Defense Planning and control System (AMDPCS) is comprised of an integrated system of hardware components (shelters, computers, communications equipment) and software programs (e.g., the Air and Missile Defense Workstation-AMDWS). Its objective is to provide all-echelon command and control of all air and missile defense (AMD) sensors, weapon systems, and units within the Army force. The system provides ADA Brigades with a Fire Control System for monitoring and controlling subordinate battalions. It also provides the AMDWS, a common defense planning and situational awareness tool; it will be fielded to all air and missile defense units at all echelons of command, battery through theater.

The requirements for the AMDPCS are defined in the AMDPCS Operational Requirements Document (ORD). The AMDPCS allows for integration of air and missile defense operations with the supported force, whether Army, Joint, or coalition. These operations are generally divided into two types: engagement operations (EO) and force operations (FO). EO functions detect, identify, perform engagements, and conduct kill assessments. They are peculiar to the sensors, weapons, and integrating software of a particular weapon system. The responsibility for developing the EO elements of the ADA force structure belongs to the Project Managers (PMs) of the AMD weapon and supporting C2 systems. FO functions include planning, monitoring, assessing, and controlling air defense operations not directly attributed to EO. They are conducted by the commanders and staff to allow for the effective employment and support of the weapons system. Many FO functions are common to all AMD weapon systems; these will be integrated with weapon-system-peculiar FO requirements, and made available to all AMD command and control elements through the development of AMDWS.

AMDWS development is a cooperative effort between the PM, Air Defense Command and Control Systems (ADCCS) and the AMD weapon system PMs [PATRIOT, Theater High Altitude Area Defense (THAAD), the Medium Extended Air Defense System (MEADS)]. AMDWS functionality will evolve over time in keeping with requirements of the weapon system development programs. The AMDWS incorporates record/playback and

embedded training features, supports JTA-A, and accepts/transmits standard messages (VMF/JVMF, USMTF, ADAT-P3). It is an integrated institutional training workstation for training MOSSs 14J and 140A. It allows retirement of the obsolete AN/TSQ-73 Brigade fire control system. AMDPCS is the Army common and planning module for incorporation into joint planning and control systems.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

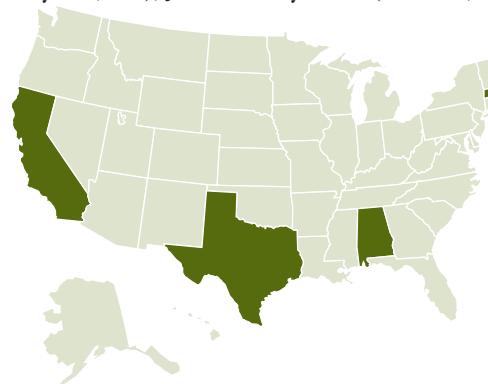
The ORD was approved in May 1997. The system was approved as an ACAT III Program, September 1997.

## PROJECTED ACTIVITIES

- FY99** Fielding 2 ADA Brigades, AAMDC.
- FY00** Fielding 2 ADA Brigades, ARNG, AAMDC.
- FY01** Fielding ADA Brigade, ARMHDOCC, BCD.

## PRIME CONTRACTOR(S)

**Brigade FCS:** Brown International (Huntsville, AL), APC (Austin, TX); **AMDWS:** FAADC2: TRW ( Huntsville, AL), PATRIOT: Intergraph (Huntsville, AL), THAAD: Lockheed/Martin (Sunnyvale, CA), JLENS: Raytheon (Bedford, MA)



\* See appendix for list of subcontractors



## 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 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 three configurations of the ARL system:

- The ARL-IMINT (ARL-I) configuration with an imagery payload consisting of a Forward Looking Infrared (FLIR) sensor, an Infrared Line Scanner (IRLS), and a Daylight Imagery System (DIS);
- The ARL-COMINT (ARL-C) configuration with a conventional communications intercept and direction finding (location) payload; and
- The ARL-Multifunction (ARL-M) equipped with a combination of IMINT, COMINT, and MTI/SAR payloads.

Six ARL systems have been fielded to date. Two ARL-Cs and one ARL-I currently provide support to U.S. SOUTHCOM and three ARL-Ms provide support to U.S. PACOM (Korea). Two additional ARL-Ms are currently in production.

## 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

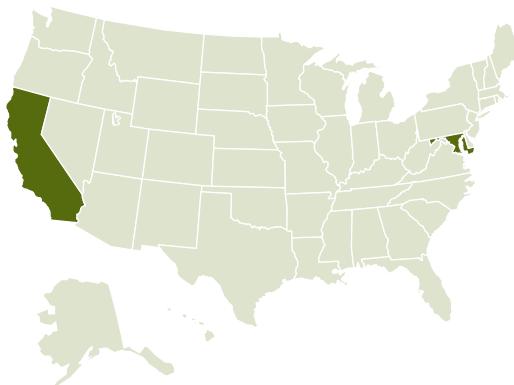
Continued ARL-M #4 and #5 production; began ARL-I upgrade to ARL-M configuration.

## PROJECTED ACTIVITIES

- Complete and field ARL-M #4 & #5 (Ft. Bliss).
- Continue ARL-I upgrade.
- 2nd Generation Forward Looking Infrared (FLIR) upgrade.
- MTI/SAR performance upgrade.

## PRIME CONTRACTOR(S)

California Microwave (Belcamp, MD)



\* See appendix for list of subcontractors



# All Source Analysis System (ASAS)



## MISSION

Provide fused all-source, near-real-time intelligence, and targeting products at collateral and compartmented levels; provide warfighting commanders, at all echelons, with a timely and comprehensive understanding of the current threat situation for the common operating picture.

## DESCRIPTION AND SPECIFICATIONS

The All Source Analysis System (ASAS) is the Intelligence Electronic Warfare (IEW) sub-element of the Army Battle Command System (ABCs). A "system of systems," it is built upon the common hardware (CHS-2) platform. ASAS automates IEW asset management, intelligence preparation of the battlefield, and dissemination. It supports all echelons and functions in all phases of military operations across the full spectrum of conflict, and is mission critical. ASAS is tactically deployable; it receives and correlates data from strategic and tactical intelligence sensors and sources. It produces ground battle situation analysis through threat integration, rapidly disseminates intelligence information, provides target nominations, and helps manage organic IEW assets. ASAS supports current operations and future planning.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

ASAS is an ACAT 1 evolutionary acquisition project with five blocks. Block I, which provided initial software functionality, was fielded to eleven high priority units and the training base during FY93-95. ASAS-Extended, a non-developmental items (NDI) hardware variant of fielded ASAS, using the Block I software, was fielded to the remainder of the active force and is being fielded to the National Guard Enhanced Readiness Brigades. ASAS Block II, a streamlined acquisition initiative, builds upon the success of Block I by providing significant upgrades to software functionality and interoperability. ASAS Block II leads the Army in common operating environment standards; it is already certified at Defense Information Infrastructure (DII) Common Operating Environment (COE) level 6, with level 8 as the objective common

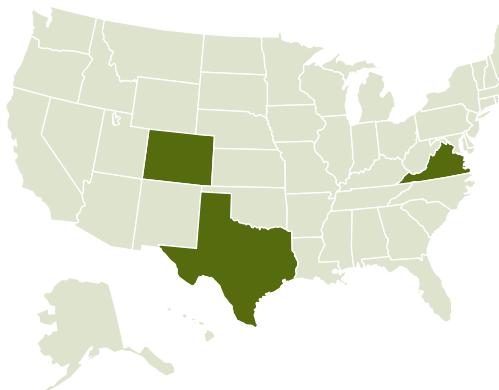
operating environment. Block II is an open architecture capable of running on common hardware; the Remote Workstation software has 81 completed segments.

## PROJECTED ACTIVITIES

- FY98** Complete Y2K certification.
- FY99** Participate in end-to-end testing and operational evaluations; complete fielding ASAS-Extended to the remaining two NG Enhanced Readiness Brigades.
- FY99-00** Conduct Operational Test of the ASAS RWS and begin fielding. Complete ASAS Block II development.
- FY00** Begin fielding ASAS Block II. Procure and field CHS-2 hardware as part of Block II. Develop and field a deployable laptop version of the RWS for battalion operations. Continue to achieve greater joint interoperability.
- FY01** ASAS Block III development begins. ASAS Block III is a software enhancement that provides the Army with the objective ASAS functionality. Blocks IV and V will be developed under post-production software support (PPSS).

## PRIME CONTRACTOR(S)

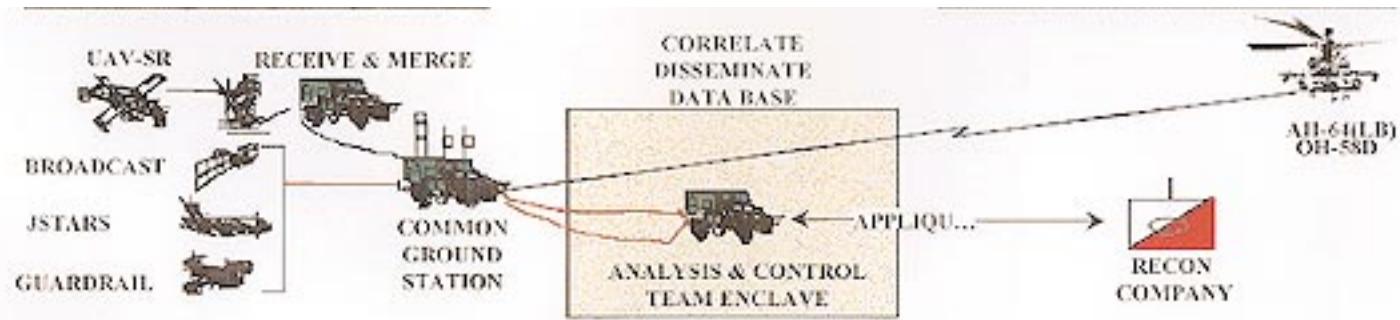
**ASAS Block II:** Lockheed Martin (Littleton, CO)



\* See appendix for list of subcontractors



# Analysis and Control Team (ACT) Enclave (WRAP Candidate)



*The ACT Enclave is the nexus of intelligence operations, integrating information received by the CGS and UAV TCS into the ABCS systems of the brigade through the ASAS-RWS. It is self-contained, deployable, fully integrated, and capable of information processing, networking, and communications.*

## MISSION

Provide intelligence analytical capability, previously only available at the division and corps Analysis and Control Element (ACE), to the maneuver brigade commander; provide combat leaders the asset management and the all-source intelligence fusion capability needed to visualize the battlespace and more effectively conduct the land battle.

## DESCRIPTION AND SPECIFICATIONS

The Military Intelligence (MI) Analysis and Control Team (ACT) Enclave provides the integrating nexus for intelligence, surveillance and reconnaissance (ISR) within the maneuver brigade. This HMMWV-mounted shelter is designed to complement the Common Ground Station (CGS). It will be fielded to each maneuver brigade's supporting (DS) MI Company, beginning in FY99. Its modular and scaleable features allow further integration of the following: Tactical Unmanned Aerial Vehicle (TUAV) Ground Control Station (GCS) (scheduled to enter the same force structure in FY99-03); the Trojan SPIRIT II high-capacity satellite communications system (uniquely suited to early-entry and autonomous brigade operations); and other digital communication and Force XXI Battle Command Brigade-and-Below (FBCB2) capabilities as required. This capability can be tethered to the larger brigade Army Battle Command System (ABCs) LAN architecture, where available.

The shelter seamlessly integrates stand-alone Table of Organization and Equipment (TO&E) communications and processing capabilities, through a combination of networking capabilities, supporting intercom, ASAS-RWS workstations, and software. With the exception of the shelter, with its imbedded LAN and router architecture, and power generation equipment, the ACT Enclave hardware components are already standard to the A Series, MI Company TO&E. The integrated, sheltered configuration supports ease of setup/tear down, facilitates rapid integration of information, and affords suitable environmental protection for the computer equipment and work area for ASAS-RWS operators/analysts. Its basis of issue will be three per Division MI BN, and one per Armored Cavalry Regiment (ACR). ASAS MI ACT provides support during low-, mid- and high-intensity conflicts, and during restoration and return to peacetime stabilization periods.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

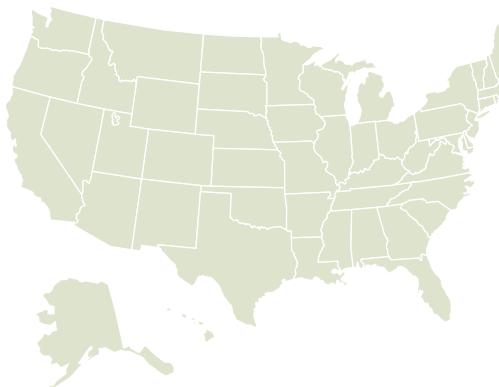
The ACT Enclave is a streamlined evolutionary WRAP initiative, relying heavily on commercial-off-the-shelf/government-off-the-shelf (COTS/GOTS) and non-developmental items (NDI) products. The ACT system is currently awaiting funding to complete the engineering and manufacturing development (EMD) effort, test and field. The ACT Enclave has been tested at Force XXI Brigade and Division level.

## PROJECTED ACTIVITIES

- Continue MI ACT Enclave EMD effort.
- Initial Production and Field Support.
- MI ACT will participate in the first digitized division (FDD) Army Warfighter Experiment (AWE).

## PRIME CONTRACTOR(S)

To be determined.



# Army Airborne Command and Control System (A2C2S)



## MISSION

Provide commanders with Airborne Command and Control (C2) capability, including voice and data equipment that provides battlefield information processing and connectivity equivalent to Tactical Command Post and the Battle Command Vehicle.

## DESCRIPTION AND SPECIFICATIONS

The Army Airborne Command and Control System (A2C2S) is a UH-60 Blackhawk-based Command and Control (C2) mission kit that will serve as a corps, division, or maneuver brigade commander's airborne Tactical Command Post (TACCP). This system provides commanders with unprecedented range and mobility, without sacrificing their access to situational awareness or their ability to direct, coordinate and control operations.

During stability and support operations, the system will provide connectivity to embassy, law enforcement, maritime, civil, and/or other humanitarian information/communication networks. This ability enables the warfighter to exercise "on-the-move" control of assigned and attached elements, and to coordinate with adjacent, supported, and supporting forces. The system incorporates the Maneuver Control System (MCS), the All Source Analysis (ASAS), Aviation Mission Planning System (AMPS), FBCB2, and the remaining ATCCS software components.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

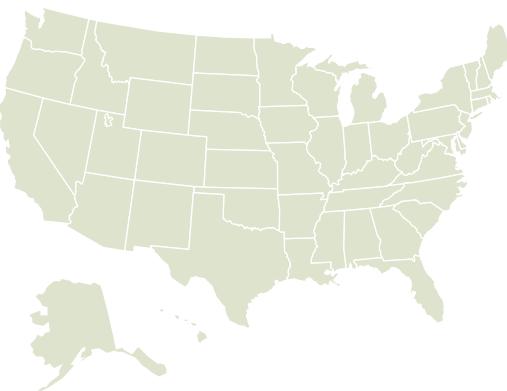
The Army began development of the A2C2S in 1996. Since then, two prototype systems containing federated systems were delivered to the first digitized division at Ft. Hood, TX for participation in the Task Force XXI Advanced Warfighting Experiment. Its successful performance and proven combat effectiveness resulted in the program's selection to receive Warfighter Rapid Acquisition funding.

## PROJECTED ACTIVITIES

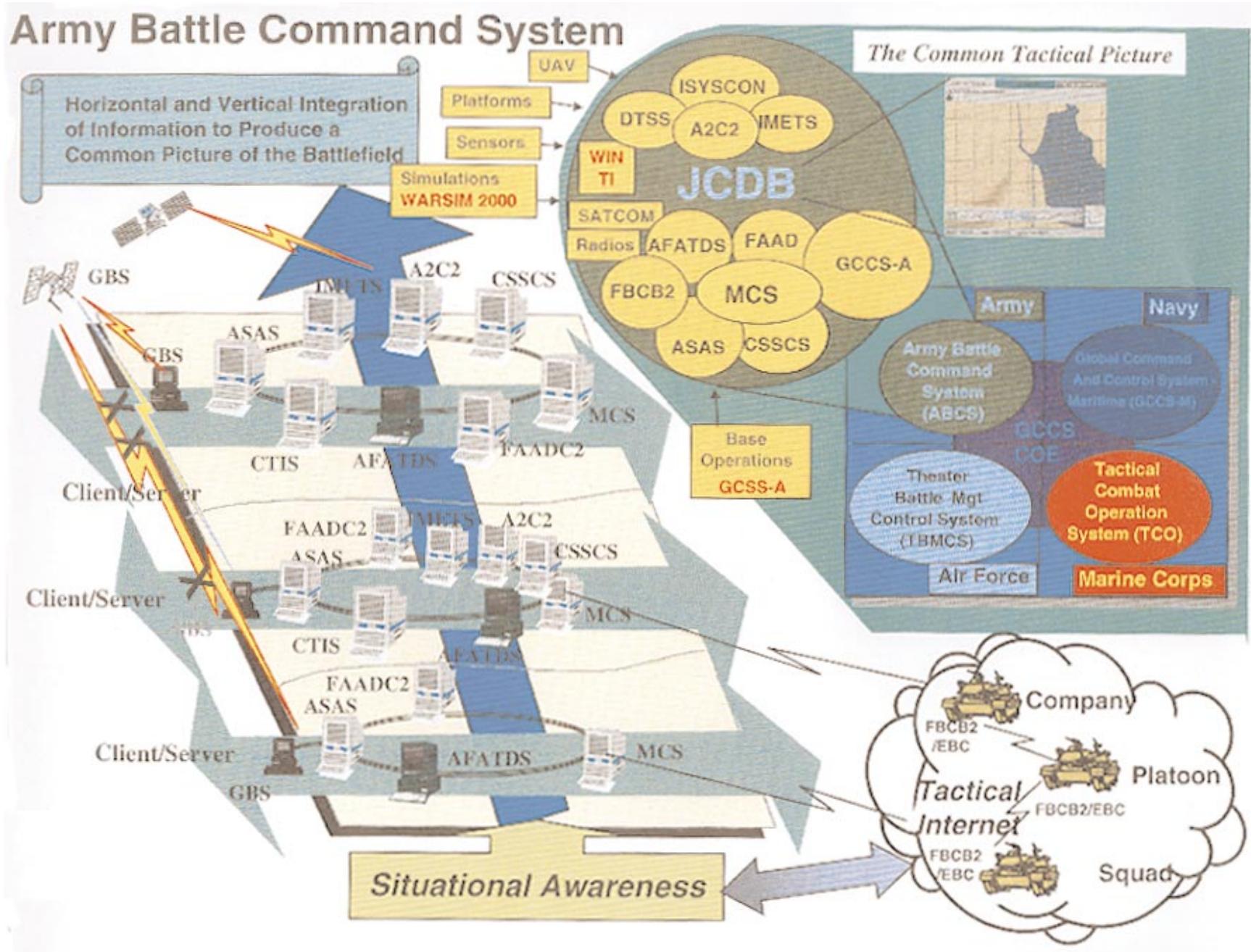
- 3QFY00** Scheduled initial operational test and evaluation (IOTE).
- 4QFY00** Scheduled Milestone III decision.

## PRIME CONTRACTOR(S)

The Navy Research Laboratory is the development and initial production agency. Upon completion of the objective system, the production units will be competed to industry.



# Army Battle Command System (ABCS)





## MISSION

ABCS is a complex system of systems that links automation assets, communications media, and operational facilities to support the 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

The Army Battle Command System (ABCS) is the Army's component of the GCSC and, as such, provides the mechanism to receive and transmit information among the joint forces. The ABCS consists of subsystems for the Battlefield Functional Area (BFA) each of which supports, provides information to other systems, and provides situational awareness of the battlefield. By integrating the ABCS components through the Joint Common Data Base (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.

## PROGRAM STATUS

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

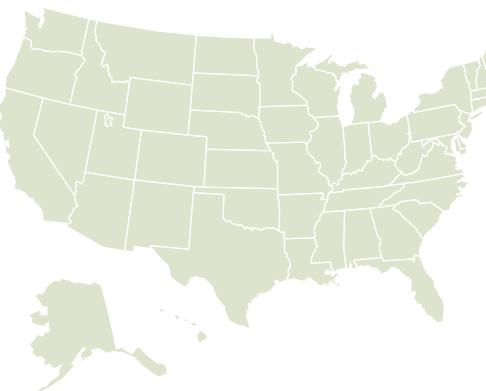
## PROJECTED ACTIVITIES

- Develop the ABCS infrastructure (e.g., JCDB, C2 Registry, and ABCS Servers).
- Integrate ABCS subsystems into ABCS Version 5.0, 6.0, and 6.1, and so on.

## PRIME CONTRACTOR(S)

PEO C3S is the integrator of the ABCS subsystems. There is no industry Prime Contractor.

BFA	ABCS Subsystem	Functionality
Global C2	GCCS-A	Provides access to the Global Command and Control System.
Maneuver	MCS, FBCB2, EBC	Plans, coordinates, and controls current 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 services	DTSS	Produces tactical topographic products, including digital and full color paper maps of the battlefield.
Air Defense	FAADC2	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 Support	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.
Airscape management	A2C2	Provides the capability to plan air movements and track aircraft during movement, and to enable deconfliction with weapons systems planning and operations.



\* See appendix for list of subcontractors

# Army Data Distribution System (ADDS)–EPLRS/NTDRS

NTDR



EPLRS

## MISSION

Provide automated, secure, near-real-time radio communications systems to tactical commanders and their staffs; provide data distribution capability between computers as well as position, location and navigation reporting of their combat elements in support of tactical operations.

## DESCRIPTION AND SPECIFICATIONS

The Army Data Distribution System (ADDS) program will create the Army communications data backbone from platoon to brigade for Force XXI. It includes two major products: Enhanced Position Location Reporting System (EPLRS) and Near-Term Digital Radio System (NTDRS). The 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 EPLRS User Units (EPUUs) 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. The NTDRS is a largely non-developmental item (NDI) R&D program that fulfills the Army's near-term requirements for a higher-capacity data network between critical nodes within the Tactical Internet. Consisting of wideband data radios and Network Management Terminals, the NTDRS provides additional network capacity in the timeframe required for the First Digitized Division. The NTDRS will be the primary data hauler between the Brigade Tactical Operation Centers (TOC), the Battalion TOCs, high data rate logistics hosts and all mobile TOCs. It will help support the MSE TPN and EPLRS data networks for the first digitized division (FDD). It also provides: operation on-the-move in all terrain and foliage; Tactical Multinet Gateway/Internet Controller interfaces for seamless links with SINCGARS data; MSE Tactical Packet Network (TPN); EPLRS data nets; compliance with the Joint Technical Architecture-Army; and secret high system operations.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

**NTDRS:** Canadians have procured 18 radios and the United Kingdom is considering NTDRS for their Bowman Program.

## PROGRAM STATUS

**EPLRS:** Option contract was awarded in FY98, procuring the remainder of the Army's previous AAO (5015); EPLRS Army Acquisition Objective (AAO) was increased to 8,157 in FY98; currently reviewing options to procure the remaining EPLRS by FY04; successfully supported the Division Army Warfighter Experiment (AWE) in November 1997 and FBCB2 limited user test (LUT) in August 1998.

**NTDRS:** Successfully supported the Division XXI AWE and FBCB2 LUT in FY98; an in-process review (IPR) approval obtained to develop the radio as the TOC-to-TOC network radio system for the first digitized division (FDD) in May 1998; contract option to procure 174 NTDRS was exercised in July 1998.

## PROJECTED ACTIVITIES

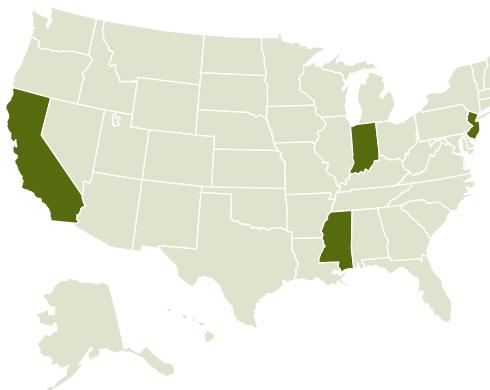
**EPLRS:** Congressional plus-up of \$23M in FY99 will procure additional EPLRS radios to support the Army's goal to digitize the battlefield and meet the current AAO (8,157). Planned fielding of the FDD is March 1999–April 2000. In August–October 1999, EPLRS will participate in the FBCB2 FDTE/IOTE.

**NTDRS:** Deployment to the FDD in 4QFY00. Participation in FBCB2 FDTE/IOTE (August–October 1999)

## PRIME CONTRACTOR(S)

**EPLRS:** Raytheon Systems Company (Fullerton, CA; Forest, MS; Fort Wayne, IN)

**NTDRS:** ITT (Fort Wayne, IN; Clifton, NJ)



\* See appendix for list of subcontractors



# Army Data Distribution System (ADDS)–JTIDS/MIDS



JTIDS Terminal



MIDS LVT-2 Terminal

## MISSION

Provide automated, secure, near-real-time radio communications systems to tactical commanders and their staffs; provide data distribution capability between computers as well as position, location and navigation reporting of their combat elements in support of tactical operations.

## DESCRIPTION AND SPECIFICATIONS

The Link-16 [Joint Tactical Information Distribution System (JTIDS)/Multifunctional Information Distribution System (MIDS)] program is contained within the overall Army Data Distribution System program. The ADDS will create the Army communications data backbone from platoon to brigade for Force XXI.

The JTIDS program is a joint program representing all services and allied force requirements. Its purpose is to acquire a digital information system for tactical interoperability and awareness that complies with the ASD/C3I policy establishing Link-16 as the DoD primary tactical data link for C2I. The primary use of the Army's Class 2M terminal is to provide an interoperable joint and allied Link-16 tactical digital data link with air, ground, surface and subsurface platforms. The Link-16 program supports the Army's Theater Air and Missile Defense Engagement Operations. The Army intends to migrate to the MIDS through investment in an Army variant of that multi-national terminal.

## FOREIGN COUNTERPART

Link-16 is a joint and multi-national system that will be interoperable with NATO units.

## FOREIGN MILITARY SALES

**Link-16:** Netherlands Air Force procured 2 JTIDS Class 2M Terminals in FY96; Germany A.F. intends to procure 3 JTIDS Class 2M Terminals in FY99.

## PROGRAM STATUS

**Link-16:** The Army will satisfy its immediate Link-16 requirement through the procurement and fielding of a minimum number of JTIDS Class 2M terminals and then transition to MIDS. A MIDS low-rate initial production (LRIP) decision DAB is scheduled for January 1999, with a planned competitive contract award in FY99. The Link-16 acquisition strategy is being reviewed and dates may change.

## PROJECTED ACTIVITIES

### Link-16:

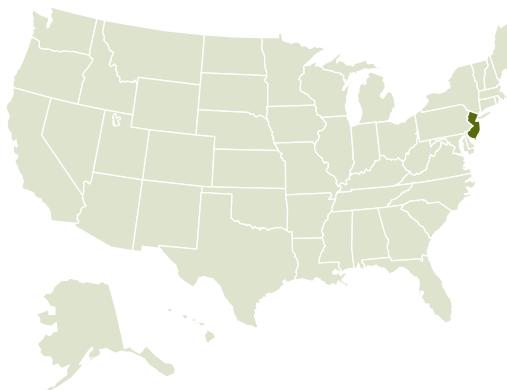
**4QFY99** MIDS Development Test/Operational Test (DT/OT)/Multi-service testing will be completed.

**FY00** A full-rate production (FRP) decision for the MIDS program is planned.

## PRIME CONTRACTOR(S)

**Link-16-JTIDS:** GEC-Marconi Hazeltine (Wayne, NJ)

**Link-16-MIDS:** Engineering Development Models: MIDSCO (Fairfield, NJ), consisting of GEC-Marconi Hazeltine (USA), Thomson-CSF (France), Italtel (Italy), Siemens (Germany), Enosa (Spain)



\* See appendix for list of subcontractors

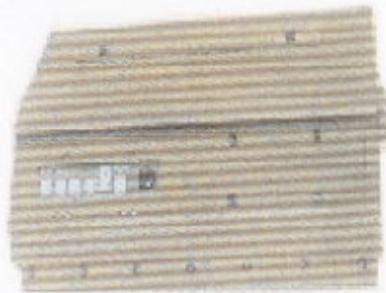


# Army Key Management System (AKMS)

## AKMS LCMS (EKMS) COMSEC Account



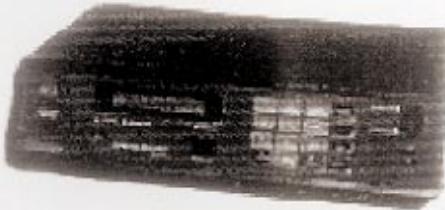
Ruggedized Laptop



Tactical Printer



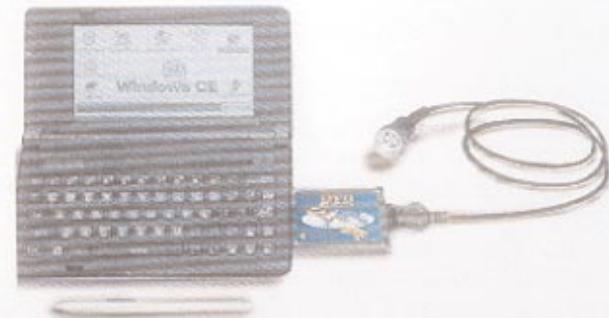
Ruggedized Laptop



NSA Key Processor



Data Transfer Devices



## MISSION

Enable frequency management and 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 SOI, and associated time and resource-intensive courier distribution. LCMS is the Army's position in the four-tiered Electronic Key Management System (EKMS). The EKMS is a key management, COMSEC material distribution, and logistics support system. The National Security Agency (NSA) established the EKMS program to meet multiple objectives, which include:

- Supplying electronic key to COMSEC devices in a secure and timely manner; and
- Providing COMSEC managers with an automated system capable of 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 (MCEB) 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, ISYSCON, Spectrum XXI, RBECS, Operational Tasking Command (OPTASKCOM), Air Tasking Order (ATO), and Space ATO workstations.

The Data Transfer Device (DTD) provides 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.

## PROJECTED ACTIVITIES

**1QFY00** LCMS fielding starts.

**4QFY00** ACES fielding starts.

## PRIME CONTRACTOR(S)

L3 Corporation (Camden, NJ); Group Technologies Corporation (Tampa, FL)



\* See appendix for list of subcontractors



## Automatic Chemical Agent Detector/Alarm (ACADA)



## MISSION

Detect both nerve and blister agents.

## DESCRIPTION AND SPECIFICATIONS

The Automatic Chemical Agent Detector/Alarm (ACADA) is an advanced point-sampling, chemical agent alarm system. It will be used by Army, Navy, Air Force and Marine Corps units. The ACADA replaces the M8A1 Alarm as an automatic point detector and augments the M1 Improved Chemical Agent Monitor (ICAM) as a survey instrument. It can communicate its warning automatically (using MICAD) to battlefield data transfer and warning systems; it 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

Finland: M90-D1 Detector.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

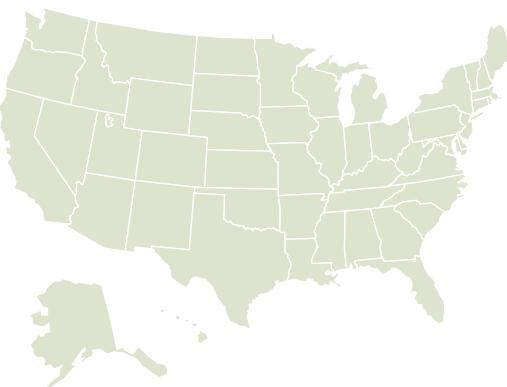
Contract with priced options (through FY00) awarded in December 1995; type-classified standard in 3QFY97; first unit equipped (FUE)-Army in 4QFY98.

## PROJECTED ACTIVITIES

- Continue production deliveries.
- Ongoing pre-planned product improvement (P3I) for Surface Sampler to provide first time capability to detect agents/vapor on surface at cold temperatures.

## PRIME CONTRACTOR(S)

Graseby Dynamics, LTD (Watford, United Kingdom)



\* See appendix for list of subcontractors



# Comanche



### 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 and light-attack reconnaissance mission. The Comanche will significantly expand the Army's capability to conduct reconnaissance operations in all battlefield environments, adverse weather, and during day or night. 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 Joint Surveillance and Target Attack Radar System (JOINT STARS), and other joint sensors and weapons platforms. Comanche's design for rapid rearm, refuel and repair will provide increased operation tempo. 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).

**Armaments:** 20-mm turreted gatling gun, air-to-ground and air-to-air missiles.

**Mission Equipment Package:** Advanced electro-optical target acquisition and designation system, aided target recognition, and helmet-mounted display. Each aircraft will have provisions to incorporate a fire control radar.

### FOREIGN COUNTERPART

French/German: Tigre.

### FOREIGN MILITARY SALES

None.

### PROGRAM STATUS

Restructured program into more efficient pre-production prototype (PPP) program; continued flight test program of Prototype #1; completed manufacturing of Prototype #2; conducted maintenance development test on Prototype #2.

### PROJECTED ACTIVITIES

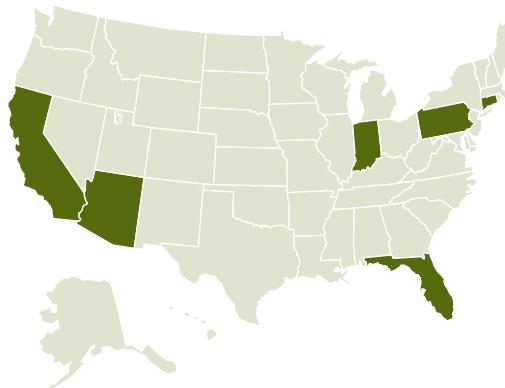
**3QFY99** First flight of Prototype #2.

**2QFY00** Milestone II.

**1QFY07** Initial operational capability (IOC).

### PRIME CONTRACTOR(S)

AlliedSignal/Rolls-Royce (Allison Engines) Team (Indianapolis, IN); Boeing and Sikorsky Team (Philadelphia, PA)



\* See appendix for list of subcontractors



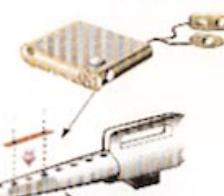
# Combat Identification for the Dismounted Soldier (CIDDS)



CIDDS Weapon subsystem (0.89 lb)

- 1.54 Micron Laser for CIDDS
- Integrated MILES Laser - .904 Microns
- Integrated IR Aiming Light - .820 Microns

Stand Alone CIDDS



CIDDS Helmet subsystem (0.96 lb)

- CIDDS and MILES Integrated Detectors
- L-Band Radio Link For LW Compatibility
- Multiple Conformal Antennas for Reliable RF Response



Land Warrior CIDDS



Laser Detectors

- Leverage LW Laser Detectors to Detect CIDDS Interrogation and MILES Hits

Multifunctional Laser Transmitter

- Combat ID Interrogator
- Near IR Aiming Pointer
- MILES Interoperable

Computer/Radio Subsystem

- Leverages:
  - LW Computer to Process CIDDS/MILES Msgs
  - Soldier Radio to XMIT/Rec Friendly Response
  - Power Supply



## MISSION

Provides the materiel solution for minimizing battlefield fratricide incidents among dismounted soldiers.

## DESCRIPTION AND SPECIFICATIONS

Combat Identification for the Dismounted Soldier (CIDDS) is a lightweight, laser interrogate, radio frequency reply, question-and-answer combat identification system. Two configurations of CIDDS are being developed: **Stand-alone** and **Land Warrior**.

The **Stand-alone CIDDS** includes a weapon subsystem and a helmet subsystem, each weighing approximately one pound. The weapon subsystem integrates a compact, eyesafe laser interrogator; a near-infrared laser pointer for aiming the soldier's weapon at night using night vision goggles; and a MILES laser for an embedded training capability that is interoperable with MILES/MILES 2000. The helmet subsystem consists of CIDDS and MILES integrated laser detectors, an electronic processor unit, and an omnidirectional radio frequency responder with conformal antennas.

The **CIDDS Land Warrior** configuration uses the weapon subsystem developed for Stand-alone CIDDS. It leverages the Land Warrior laser detectors to detect CIDDS interrogations and MILES hits, the Land Warrior computer to process CIDDS/MILES messages, and the Land Warrior Soldier Radio to transmit friendly responses.

CIDDS' operating range is 1.1 kilometers minimum, under clear weather conditions, and exceeds the soldier's target acquisition capability under degraded atmospheric conditions. CIDDS fulfills requirements stated in the Operational Requirements Document for use by Army, Marine and Special Operations forces. CIDDS is a Horizontal Technology Integration program. The acquisition objective is approximately 102,000 systems, including 34,000 Stand-alone and 68,000 Land Warrior versions.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

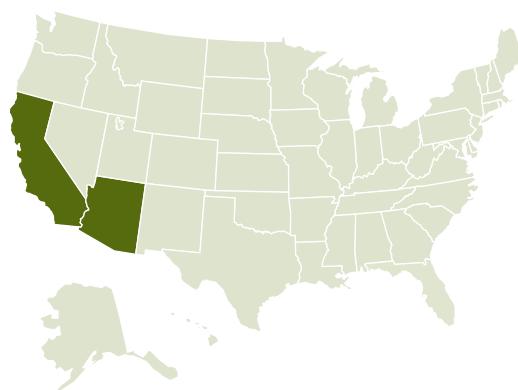
Awarded competitive contract for engineering and manufacturing development (EMD) effort, 4QFY97; continued design of hardware, software, and weapon integration kit, FY98; initiated interoperability/integration efforts for MILES/MILES 2000 and near infrared laser pointer, FY98.

## PROJECTED ACTIVITIES

- FY99** Complete design of hardware, software and weapon integration kit; begin build of 148 EMD models for technical/operational testing.
- 1QFY00** Conduct government testing.
- 2QFY00** Conduct initial operational test and evaluation (IOTE); begin low-rate initial production (LRIP).
- 2QFY01** Milestone III.

## PRIME CONTRACTOR(S)

Motorola (Prime) (Scottsdale, AZ); Raytheon (Team Member) (El Segundo, CA); Lockheed Martin (Team Member) (Pomona, CA)



\* See appendix for list of subcontractors

# Combat Service Support Control System (CSSCS)



## MISSION

Provide timely situational awareness and force projection information to determine capability of supporting current operations and sustaining future operations.

## 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, financial, and personnel information.

Currently, CSS commanders and staffs manually gather, correlate, and analyze volumes of technical data from the existing Standard Army Management Information Systems (STAMIS) and the Army Tactical Command and Control System. 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. 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 procured through Project Manager (PM) Common Hardware Systems (CHS), Common Operating Environment Software, and CSSCS-unique software. The CSSCS is deployed in a tent configuration and can also be housed in the family of Standardized Integrated Command Post Systems (SICPS) provided by PM CHS.

## FOREIGN COUNTERPART

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

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

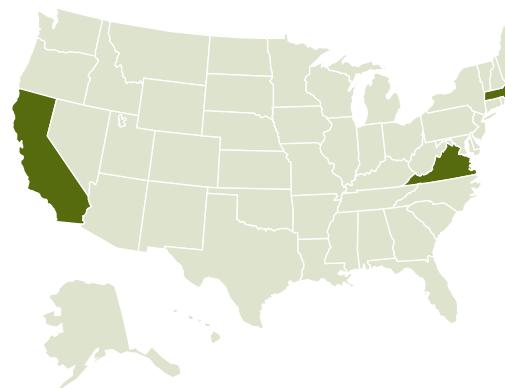
The current CSSCS software (Version 3) provides an initial operational capability (IOC) at division and corps level and includes initial horizontal interoperability with ABCS systems. Version 4 will extend CSSCS to EAC, and provide added capabilities. Version 5, the objective CSSCS software, will extend CSSCS capabilities to joint, allied, and coalition forces.

## PROJECTED ACTIVITIES

- Continue Fielding Version 3.
- Develop Versions 4 and 5.
- Support Army Warfighting Experiments (AWE).

## PRIME CONTRACTOR(S)

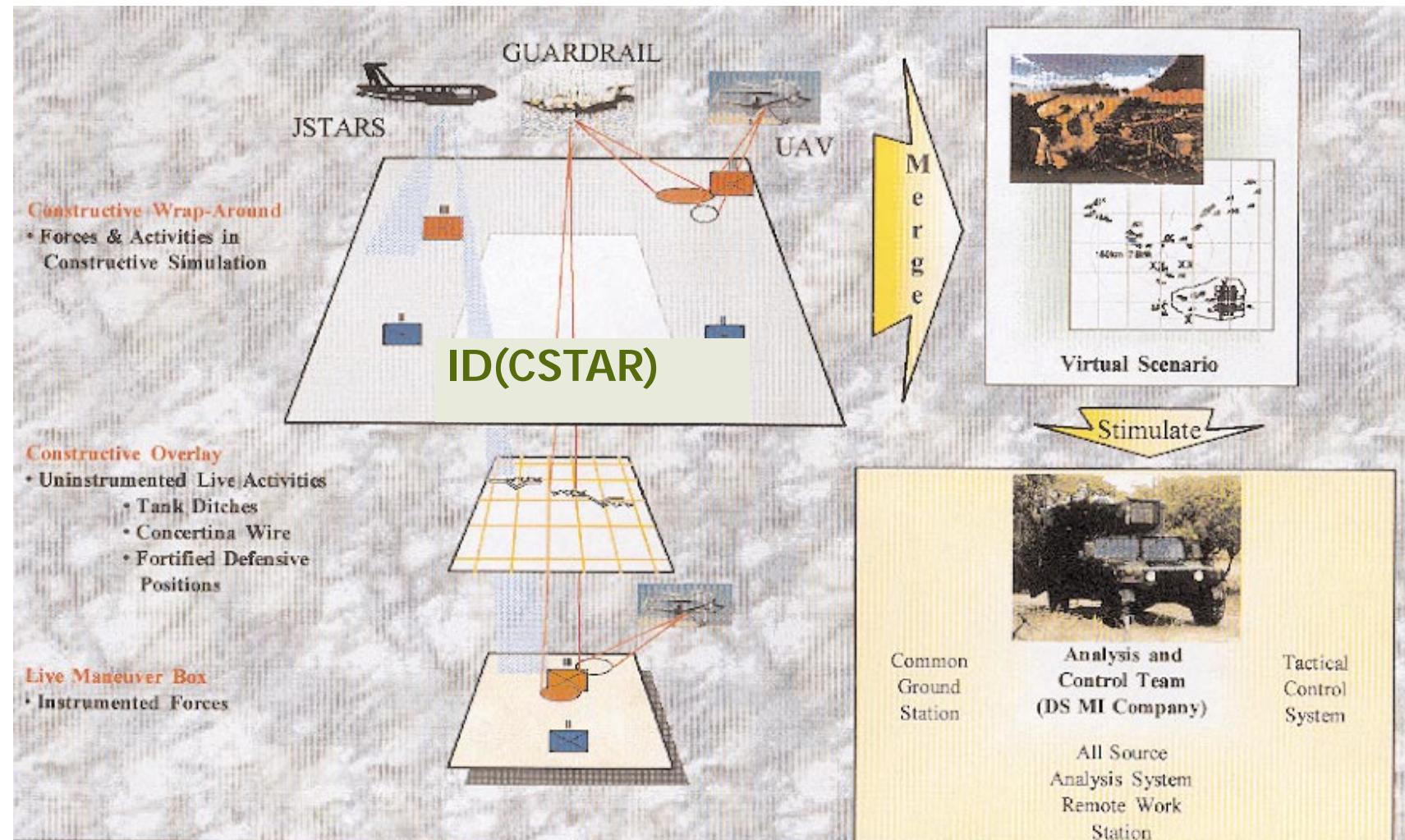
TRW (Carson, CA); Lockheed Martin (Springfield, VA)



\* See appendix for list of subcontractors



# Combat Synthetic Training Assessment Range (CSTAR)



# Combat Synthetic Training Assessment Range (CSTAR)



Concept Exploration

Program Definition and Risk Reduction

Engineering and Manufacturing Development

Production, Fielding/Deployment, and Operational Support

## MISSION

Create an environment in which to train commanders, staffs, and operators in the integration and employment of Intelligence, Surveillance, and Reconnaissance (ISR) capabilities, including: Joint Surveillance Target Attack Radar System (Joint STARS), Tactical Unmanned Aerial Vehicles (TUAV), and Signals Intelligence (SIGINT).

## DESCRIPTION AND SPECIFICATIONS

The Combat Synthetic Training Assessment Range (CSTAR) is a brigade-level battle command training system. CSTAR merges live and constructive simulation to create a synthetic environment in which to train battlefield visualization, dynamic ISR integration, real-time tactical targeting, and deep operations. It enables commanders to develop an understanding of the impact of ISR capabilities on extended battle space and tactical decision making.

CSTAR merges a constructive simulation, such as Janus or CBS, with a live instrumentation system to generate a 200 x 200 kilometer synthetic battlespace. This battlespace includes the close battle, deep battle, and flank forces. Data from this synthetic environment stimulates ISR sensor models for Joint STARS, TUAV, and SIGINT. The entity-level output from the sensor models stimulates the surrogate, or real, tactical C4I equipment organic to the direct-support Military Intelligence Company supporting the Brigade. These systems include the All Source Analysis System Remote Work Station, the Joint STARS Common Ground Station, and the TUAV Tactical Control System. CSTAR trains the commander and staff to receive, filter, interpret, and otherwise manage the information derived from these systems.

CSTAR includes a satellite communications subsystem that allows transmission of data between the instrumentation system and the Tactical Operation Center. This subsystem also facilitates a home station training capability, allowing one brigade to train with these capabilities at home, while another goes through a rotation at the National Training Center (NTC) using a common scenario.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

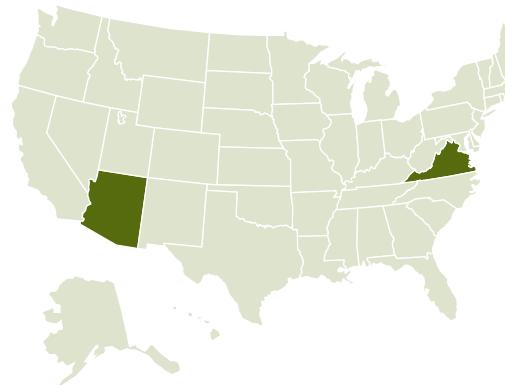
CSTAR is currently in production for fielding to the NTC and Ft. Hood. CSTAR is the operational prototype for the Intelligence Electronic Warfare Tactical Proficiency Trainer (IEWTPT), which begins development in FY00, and scheduled fielding in FY03. CSTAR trains imagery and signals intelligence. The IEWTPT will expand these capabilities to include electronics, communications, and human intelligence. In addition to Ft. Hood and NTC, it will be fielded to the remaining Maneuver Combat Training Centers (Joint Readiness Training Center and Combat Maneuver Training Center), Ft. Bragg, and Ft. Huachuca.

## PROJECTED ACTIVITIES

- Installation at Ft. Hood is scheduled for May 1999.
- Installation at the NTC is scheduled for May–June 1999.
- CSTAR will be ready for training, effective October 1999.

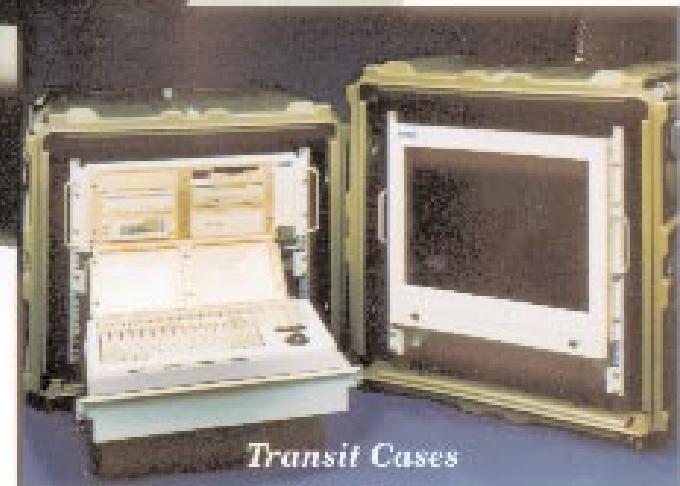
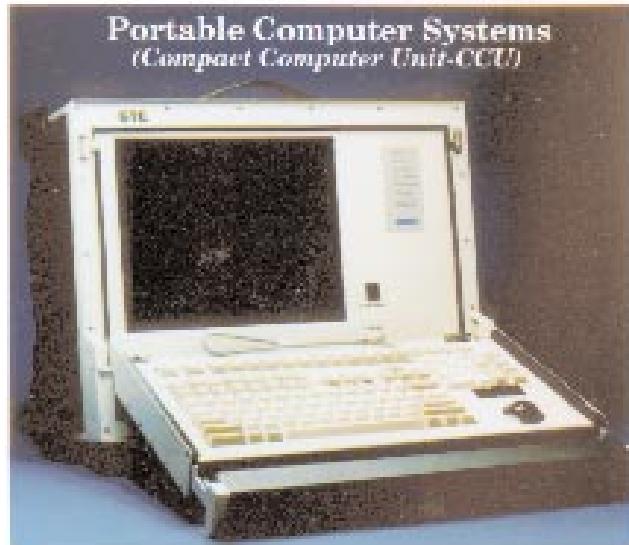
## PRIME CONTRACTOR(S)

Motorola (Systems Solutions Group) (Scottsdale, AZ); Sterling Software, Inc. (Federal Systems Group) (McLean, VA)



\* See appendix for list of subcontractors

# Common Hardware Systems (CHS)





## MISSION

Provide common hardware systems and common software (including Common Operating Environment (COE) software) for the Army Battle Command System (ABCs) which includes the Global Command and Control System-Army (GCCS-A), Army Tactical Command and Control Systems (ATCCS) and Force XXI Battle Command Brigade and Below (FBCB2).

## DESCRIPTION AND SPECIFICATIONS

The Common Hardware Systems (CHS) program improves interoperability and lowers life-cycle costs by standardizing Battlefield Command and Control (C2) automation through centralized buys of non-developmental items (NDI), standardized protocols, and the development of reusable Common Software (CS). The program provides CHS to over 80 Army and DoD customers. Two primary contracts are available with the following hardware: the CHS-2 and Lightweight Computer Unit (LCU) programs, CHS-2 Ultra Computer Unit (UCU), Handheld Terminal Unit (HTU), High Capacity Computer Unit (HCU), Compact Computer Unit (CCU), Notebook Computer Unit (NCU), and the LCU and Tactical Communications Interface Module (TCIM) for interface to tactical radios. 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-POSIX; RDBMS; GKS, PHIGS, PEX; DoD Protocols; GOSIP; E-MAIL; NIX, NFX, DCE; MPN/DDN X.28; ADA; DOS; PURGING SW; CASE TOOLS.

	<b>CHS-2 (HTU)</b>	<b>CHS-2 [HCU(1)]</b>	<b>CHS-2 [HCU(2)]</b>
<b>Processor:</b>	8058	RISC/SPARC	UltraSPARC IIi
<b>MHz clock:</b>	133	75, 150	300, 333
<b>RAM:</b>	16 or 32 MB	32-512 MB	32-1GB
	<b>CHS-2 (CCU-1)</b>	<b>CHS-2 (CCU-2)</b>	<b>CHS-2 (NCU)</b>
<b>Processor:</b>	UltraSPARC 1	UltraSPARC IIi/Axi	Pentium MMX
<b>MHz clock:</b>	170	300/333	266
<b>RAM:</b>	512 MB	1GB	32-160MB
	<b>CHS-2(UCU)</b>	<b>LCU</b>	
<b>Processor:</b>	UltraSPARC II	Pentium	
<b>MHz clock:</b>	300	200	
<b>RAM:</b>	64MB-1GB	16-128MB	

The CHS hardware can be procured in Version 1 (commercial workstations), Version 2 (ruggedized workstations), and Version 3 (MIL-SPEC Handheld Terminal Unit, and LCU/TCIM), in addition to commercial-off-the-shelf counterparts.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

The CHS-2 contract, a follow-on to the CHS-1 Contract, was awarded to GTE on April 10, 1995. Version 2 equipment began delivery in February 1996. Version 2 hardware is fully qualified and was successfully used during both the Army Warfighter Experiment (AWE) Task Force XXI exercise and the Division AWE (DAWE) at Ft. Hood, TX.

## PROJECTED ACTIVITIES

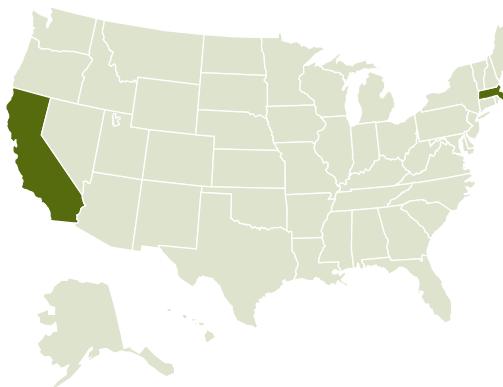
**2QFY99** CHS-2 Option 5 award.

**3QFY99** LCU last order.

## PRIME CONTRACTOR(S)

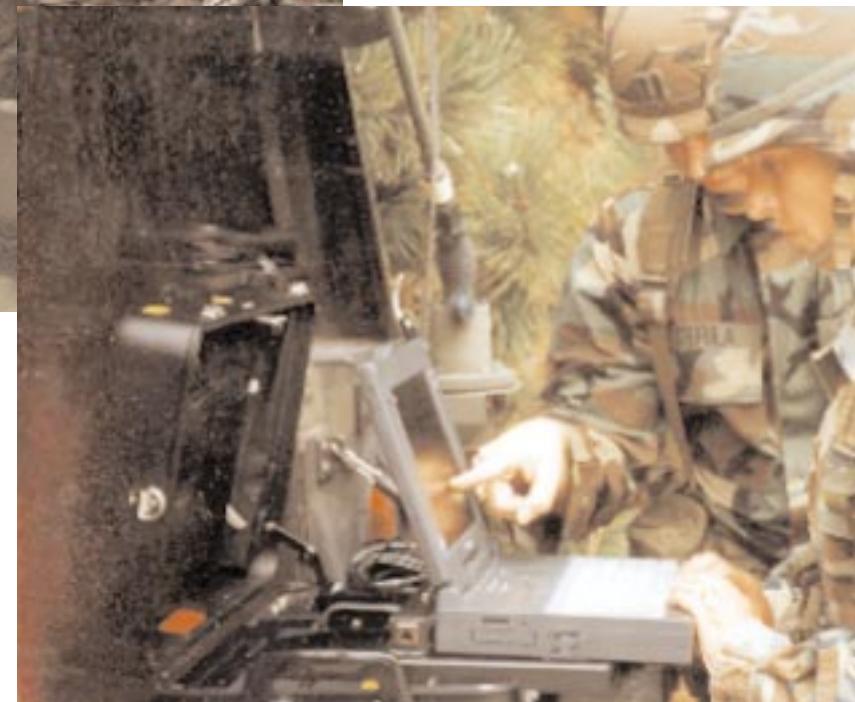
**CHS-2:** GTE (Taunton, MA)

**LCU:** Litton (San Diego, CA)



\* See appendix for list of subcontractors

## Counter Intelligence/Human Intelligence (CI/HUMINT) Automated Tools Set (CHATS)





## MISSION

Support tactical CI/HUMINT teams during hostilities, while conducting security and stability operations; provide force protection.

## DESCRIPTION AND SPECIFICATIONS

The AN/PYQ-3 Counter Intelligence/Human Intelligence (CI/HUMINT) Automated Tools Set (CHATS) is a portable, ground-based, transit-cased suite of hardware. Operating up to the SECRET level, the AN/PYQ-3 CHATS enables CI/HUMINT team leaders to manage assets and analyze information collected through investigations, interrogations, collection, and document exploitation.

CI teams can store collected information electronically in a local database, associate information with digital photography, interactively generate standard messages, transmit/receive information over existing military and civilian communications, query stored information in local databases, and share databases with like systems.

The AN/PYQ-3 CHATS provides these functions using (primarily) a combination of commercial-off-the-shelf software and tailored Government-developed software, operating on the CHATS laptop computer within a hardened transport case. CHATS is interoperable with the Defense Counterintelligence Information System (DCSIIS) and is Y2K compliant.

## FOREIGN COUNTERPART

Foreign counterparts that provide similar capabilities exist, but none that duplicate the AN/PYQ-3 CHATS.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

CHATS Version 1 completed fielding in 4QFY98. Currently, the system is undergoing continued evolutionary development and fielding. CHATS is being fielded to teams in the Army Active and Reserve Component, Army Special Forces and to the Marine Corps. Fielding of the other tactical CI/HUMINT automation tools will follow.

## PROJECTED ACTIVITIES

**2QFY99** Initiate fielding of Version 2.

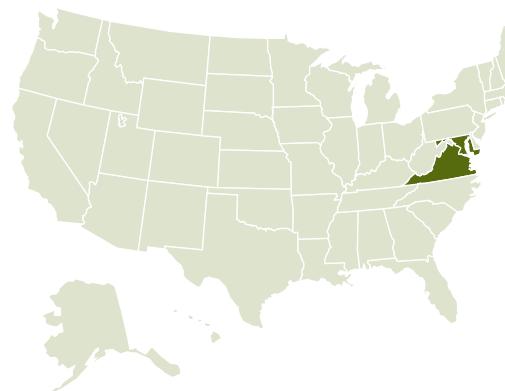
**FY99-00** Begin development of enhanced CI/HUMINT workstations, such as the CI Operations/Interrogation Facility Workstation (CI OPS/IF WS), Hand-Held Terminal Unit (HTU), and CI/HUMINT Single-Source Workstation (CI/H SS WS).

**FY00** Complete fielding of CHATS.  
Continue to improve the level of joint interoperability.

## PRIME CONTRACTOR(S)

**CHATS:** Engineering System Solutions, Inc. (Frederick, MD)

**CHATS Software:** Sterling Software, Inc. (Vienna, VA)



\* See appendix for list of subcontractors

# Digital Topographic Support System (DTSS) (WRAP Candidate)



## MISSION

Provide Commanders at Brigade through echelons-above-corps (EAC) 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, then processing these data into hardcopy and softcopy topographic products. The DTSS accepts topographic and multi-spectral imagery data from the National Imagery and Mapping Agency's standard digital databases, and from commercial sources. DTSS functional capabilities include the 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 and terrain intelligence information to all Army Battle Command System (ABCS) workstations on the battlefield, and accept terrain intelligence/data updates from these systems. The DTSS uses the latest commercial-off-the-shelf (COTS) technology in printers, scanners, and computer workstations, combined with image processing and geographic information system software. It will be supported by standard Army inventory environmental control units, generators, and communication equipment. The system will be produced in two variants: Heavy (DTSS-H) and Light (DTSS-L). The DTSS-H will be housed in a 20-foot ISO shelter and mounted on a standard 5-Ton truck. The DTSS-L will be housed in a pair of Lightweight Multipurpose Shelters mounted on High-Mobility Multipurpose Wheeled Vehicles.

## FOREIGN COUNTERPART

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

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

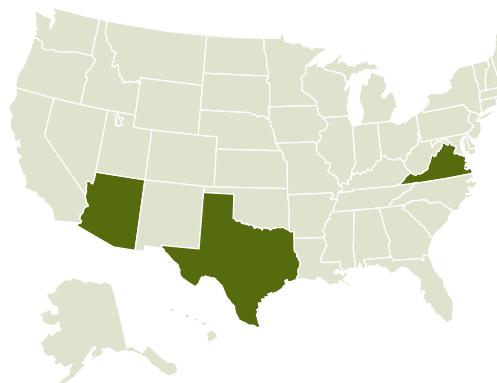
The Project Management Office for Combat Terrain Information Systems is currently fielding nine DTSS-H systems. Five have been fielded to U.S. Army engineer terrain teams at Ft. Hood, Ft. Bragg and Ft. Stewart. The remaining four systems will be fielded to units in Korea and Germany in FY99. A firm fixed price production contract will be awarded in 2QFY99 for the DTSS-L. Ten DTSS-L systems will be procured in FY99 and fielded in FY00, in accordance with HQDA-approved fielding requirements. A total of 60 DTSS-L systems will be procured (pending available funding) to support Force Package 1-3 requirements. A preplanned product improvement (P3I) program will be conducted to address technology insertion (e.g. improved ABCS interoperability, terrain data base management), and the cyclic upgrade of commercial-off-the-shelf equipment (e.g. CHS2). Products developed as part of the P3I Program will be incorporated into all DTSS hardware and software architectures.

## PROJECTED ACTIVITIES

- Participate in Corps Warfighter Exercise, 1QFY99.
- Initiate procurement of the DTSS-L, 2QFY99.
- Complete fielding of DTSS-H, 3QFY99.
- Continue P3I Program for DTSS.

## PRIME CONTRACTOR(S)

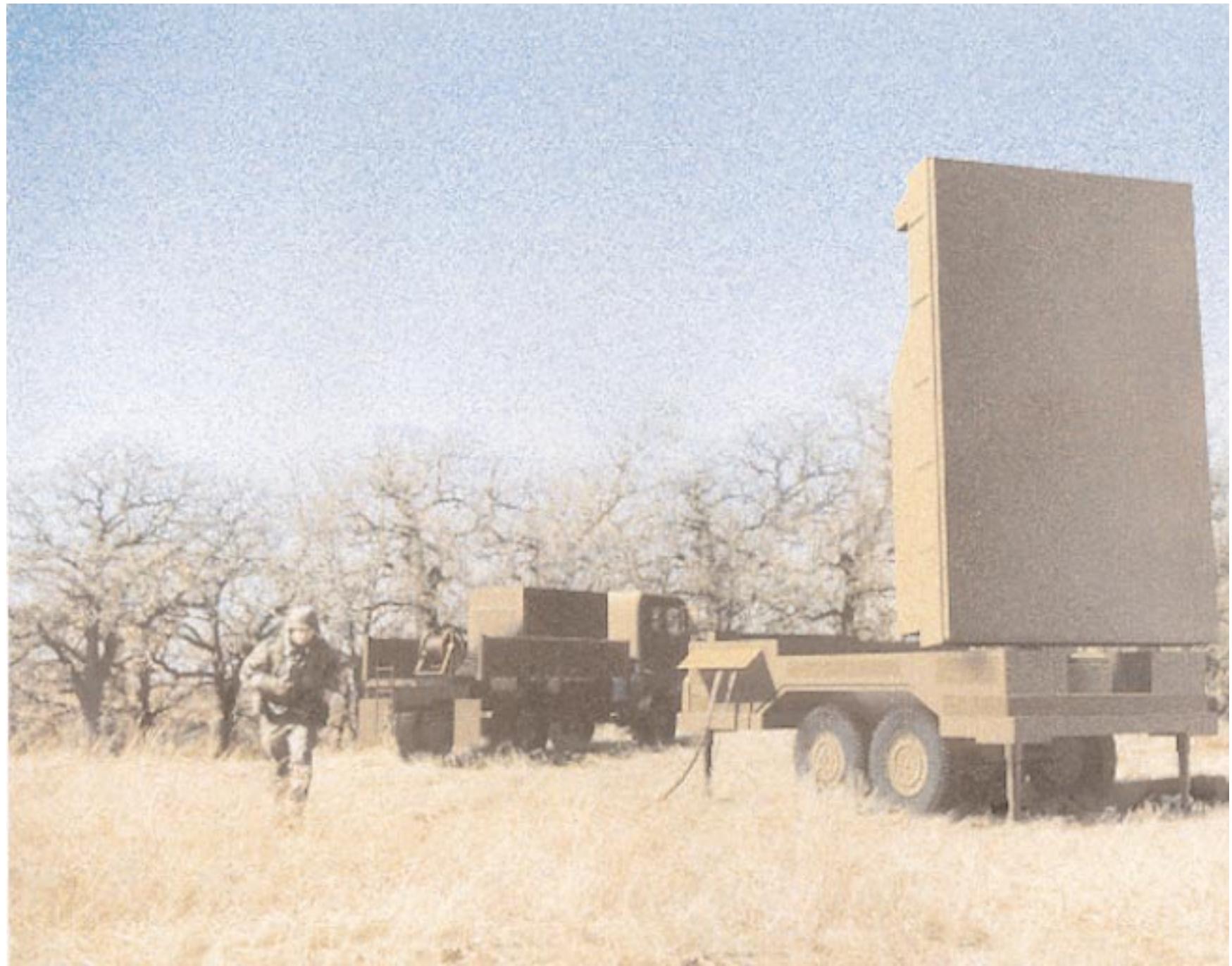
Litton TASC, Inc. (Reston, VA); SYTEX Corp (McLean, VA); MITRE Corp (McLean, VA); MANTECH Corp (Copperas Cove, TX); ILEX Corp (Sierra Vista, AZ)



\* See appendix for list of subcontractors



## Firefinder (TPQ-36 and TPQ-37/Block II)



## MISSION

Provide an Advanced Firefinder System with longer range and reduced manpower requirements.

## DESCRIPTION AND SPECIFICATIONS

The Firefinder (TPQ-36 and TPQ-37/Block II) program will replace the AN/TPQ-37 Artillery Locating Radar. The Firefinder Block II will double the current AN/TPQ-37 artillery range performance out to 60 kilometers, with improved accuracy and target throughput. The Firefinder Block II will also provide a new capability for missile and rocket detection at ranges of 150–300 kilometers.

The system will use standard 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 of 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 man-machine interface.

## FOREIGN COUNTERPART

European Consortium-Sponsored EuroArt Cobra.

## FOREIGN MILITARY SALES

There are currently 30 AN/TPQ-37 radars sold to 9 countries: China: 4; Egypt: 3; Israel: 4; Jordan: 2; Korea: 4; Italy-NATO: 1; Saudi Arabia: 7; Singapore: 3; Taiwan: 2.

## PROGRAM STATUS

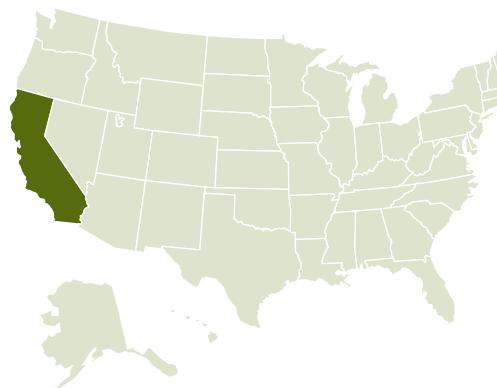
The Milestone II decision was reached October 1997. Subsequent market surveys resulted in a competitive solicitation released November 1997. Raytheon Systems Company was awarded the Block II contract for three systems, with work starting July 1, 1998. The Firefinder program office established a partnering agreement with Raytheon on July 28, 1998.

## PROJECTED ACTIVITIES

- 2QFY99** Preliminary design review scheduled.
- 4QFY99** Critical design review to complete the design scheduled.
- 1QFY01** The first unit produced will be available for government testing.
- 1QFY02** The government test program will run through November 2001.

## PRIME CONTRACTOR(S)

Raytheon Systems Company (El Segundo, CA)



\* See appendix for list of subcontractors



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





## MISSION

Field a digital command-and-control system that provides battle command and situational awareness information from brigade 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-and-Below.

The FBCB2 System is designated ACAT II and is in the engineering and manufacturing development (EMD) phase. Applique hardware, software and EBC 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 interconnecting of platforms through a communications infrastructure called the Tactical Internet to pass Situation Awareness data and conduct Command and Control.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

Participated in TFXXI experiment; conducted Milestone II Phase II Decision Review; started EMD phase; delivered V2.1 SW for EPG Field Test 1; formal developmental testing: May–June 1998; field system version 2HW and train 1-22 BN Test Unit: January–May 1998; conduct limited user test (LUT): August 1998.

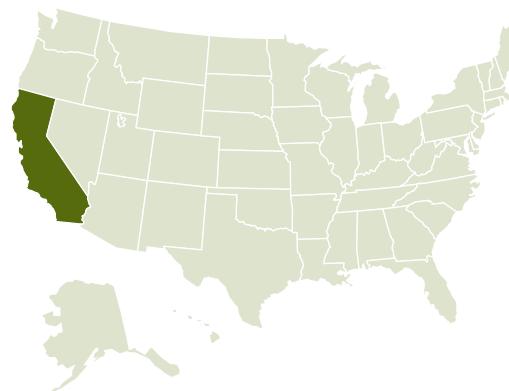
## PROJECTED ACTIVITIES

- 2QFY99** Version 3.0 SW.
- 4QFY99** Force development test and evaluation (FDTE).
- 1QFY00** Conduct initial operational test and evaluation (IOTE).
- 2QFY00** Milestone III.
- 2QFY00** Production award.
- 3QFY00** Version 4 software.
- 1QFY01** Equip first digitized division (FDD).

## PRIME CONTRACTOR(S)

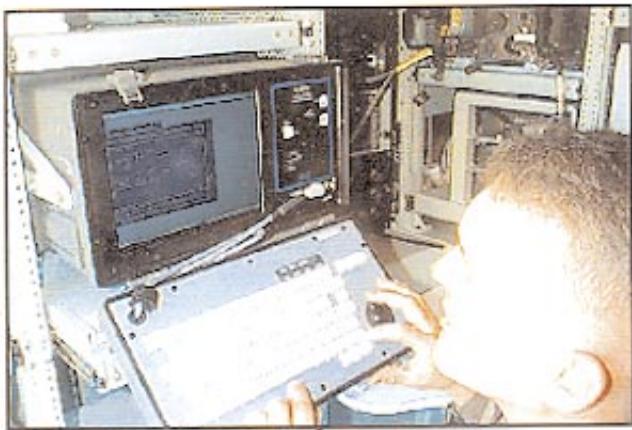
**Prime Contractor:** TRW Data Technologies Division, Systems Integration Group (Carson, CA)

**Sub-Contractor:** Raytheon Systems Company (El Segundo, CA)



\* See appendix for list of subcontractors

# Forward Area Air Defense Command, Control and Intelligence (FAADC2I)



## MISSION

Provide an automated means of communicating target data to forward area air defense (FAAD) weapons, to protect friendly aircraft and facilitate management of the air battle.

## DESCRIPTION AND SPECIFICATIONS

The Forward Area Air Defense Command, Control and Intelligence (FAADC2I) system consists of the following elements:

- Non-developmental computers, displays, printers and communication systems that are common to the Army Battle Command System (ABCS);
- Non-developmental ground sensors; and
- The requisite software to enable the execution of air defense engagement operations (EO) and force operations (FO).

The FAADC2I system integrates air defense fire units, sensors, liaison elements, and command posts into a synergistic system capable of defeating and denying the aerial threat. It provides the automated interface (division and below) for the air defense component to the ABCS, and allows the commanders and staffs to communicate, plan, coordinate, and control the counter-air fight.

The system is capable of collecting, storing, processing, displaying and disseminating situational awareness (air and ground) targeting data, and battle command information throughout FAAD units and from other ADA, Army, Joint and Combined elements. FAADC2I enhances the ability of commanders, staff and weapon system operators to visualize the battlespace, realize situational awareness, defeat the enemy, and synchronize operations with the supported unit.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

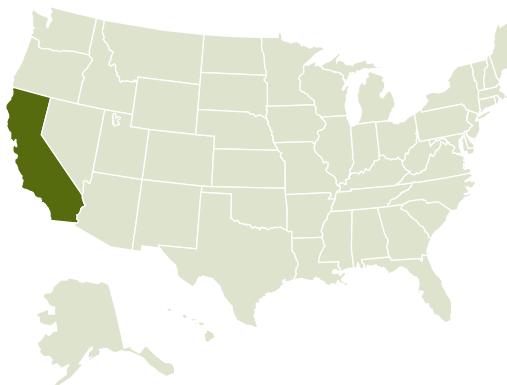
Blocks I and II are completed. Block III software development is ongoing. V5.1 of engineering and manufacturing development (EMD) phase to be completed by December 1998.

## PROJECTED ACTIVITIES

- |               |                                                                      |
|---------------|----------------------------------------------------------------------|
| <b>FY99</b>   | Participate in Roving Sands.                                         |
| <b>1QFY00</b> | Test V5.2 with FBCB2 initial operational test and evaluation (IOTE). |
| <b>2QFY01</b> | Block III in-process review (IPR) scheduled.                         |
| <b>4QFY00</b> | Contract award for Block IV planned.                                 |
| <b>FY03</b>   | Block IV software development begins.                                |

## PRIME CONTRACTOR(S)

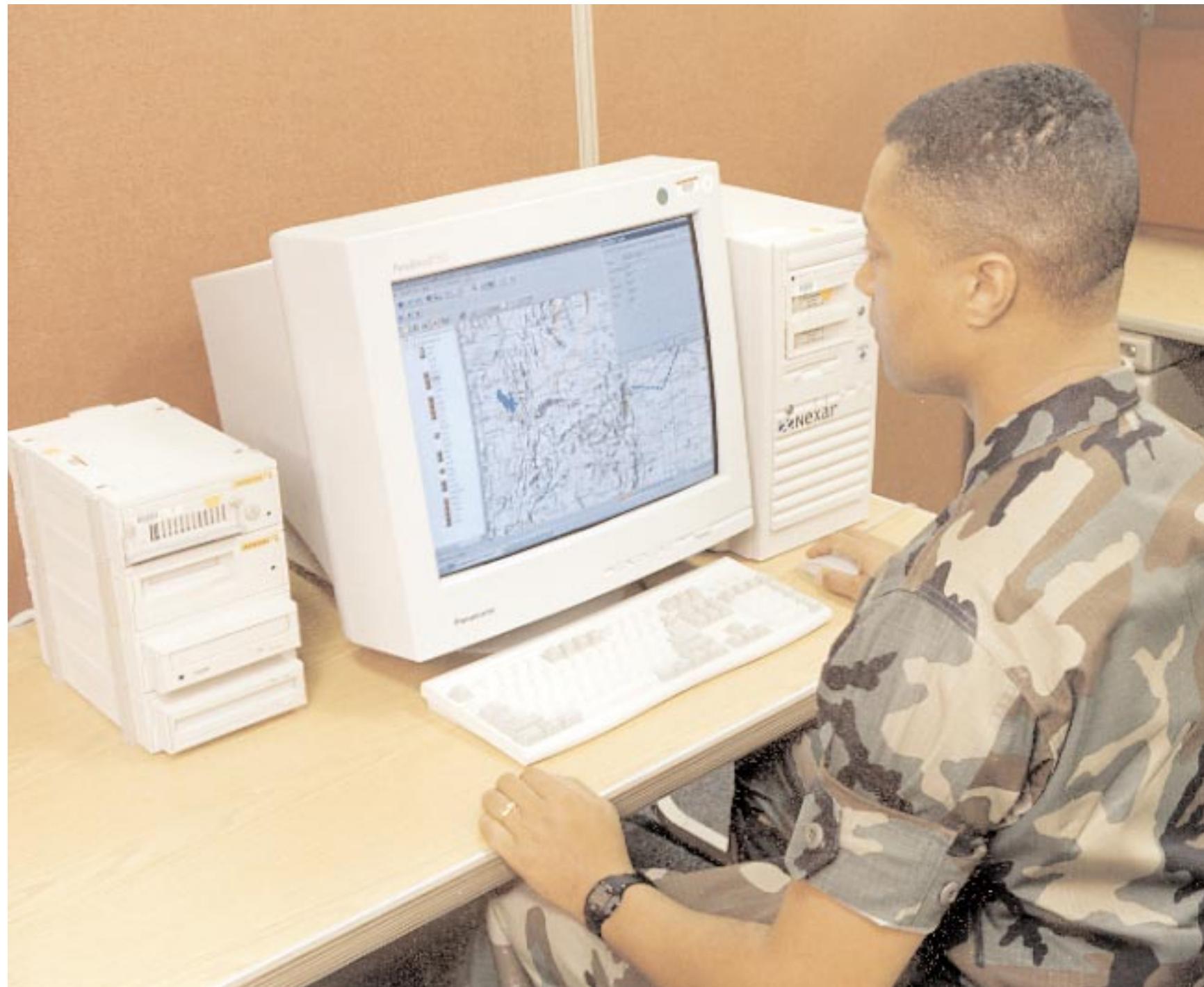
TRW (Redondo Beach, CA)

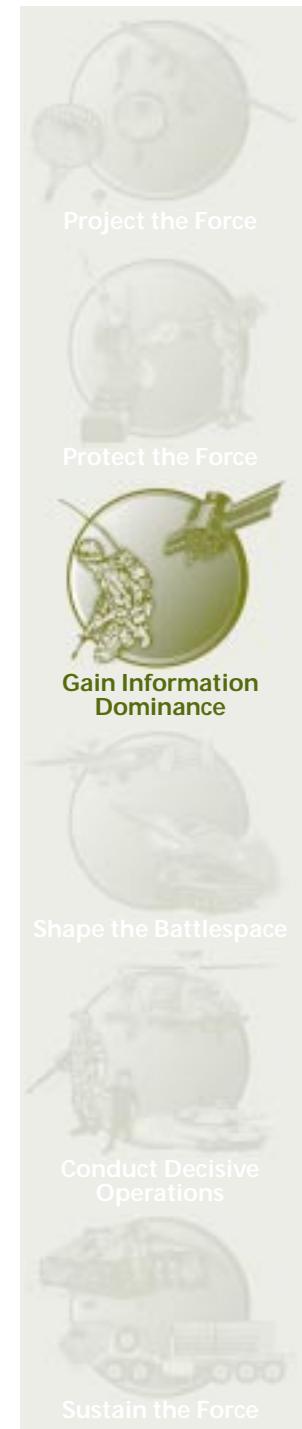


\* See appendix for list of subcontractors



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





## MISSION

Provide the Army component of the Joint Global Command and Control System (GCCS) in support of the C4I for the warrior vision of the battlespace.

## DESCRIPTION AND SPECIFICATIONS

The Global Command and Control System-Army (GCCS-A) is a C2 System developed through implementation of the Defense Information Infrastructure (DII) Common Operating Environment (COE).

The GCCS-A is a user-oriented system that supports Army Units from the National Command Authority, CINCs in the theater and down through the Joint Task Force Commander. It is part of the Army Battle Command System (ABCs) and provides a seamless Army extension from the strategic GCCS system to echelons-corps-and-below (ECB). Compatibility and interoperability is achieved by building the GCCS-A applications to operate on the DII COE and through interfaces to other C2 systems within the Army as well as to other services.

The DII COE specifies a common system infrastructure for all C2 systems in accordance with the Joint Technical Architecture (JTA) 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 (COTS) hardware and the products in the Common Hardware Software II (CHS II) contract. The system architecture links users via Local Area Networks (LANs) 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

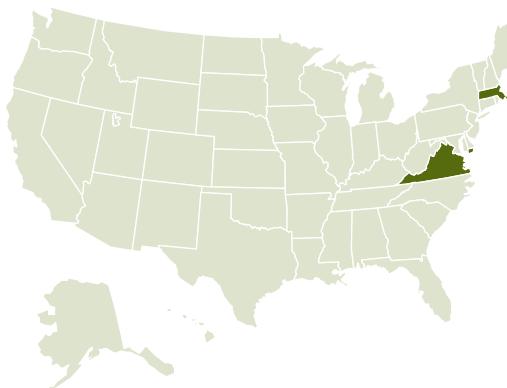
GCCS-A has been fielded to FORSCOM, USAREUR, USARPAC, SOUTHCOM, HQDA, and ARCENT. GCCS-A is being fielded to U.S. Army, Korea, as the replacement for the Theater Automated Command and Control Information Management System (TACCIMS). GCCS-A is fully involved in the Army's digitization efforts.

## PROJECTED ACTIVITIES

- Conclude fielding system to U.S. Army, Korea.
- Upgrade currently fielded systems to be Y2K compliant.
- Continue the spiral development process in support of Army digitization and program requirements.

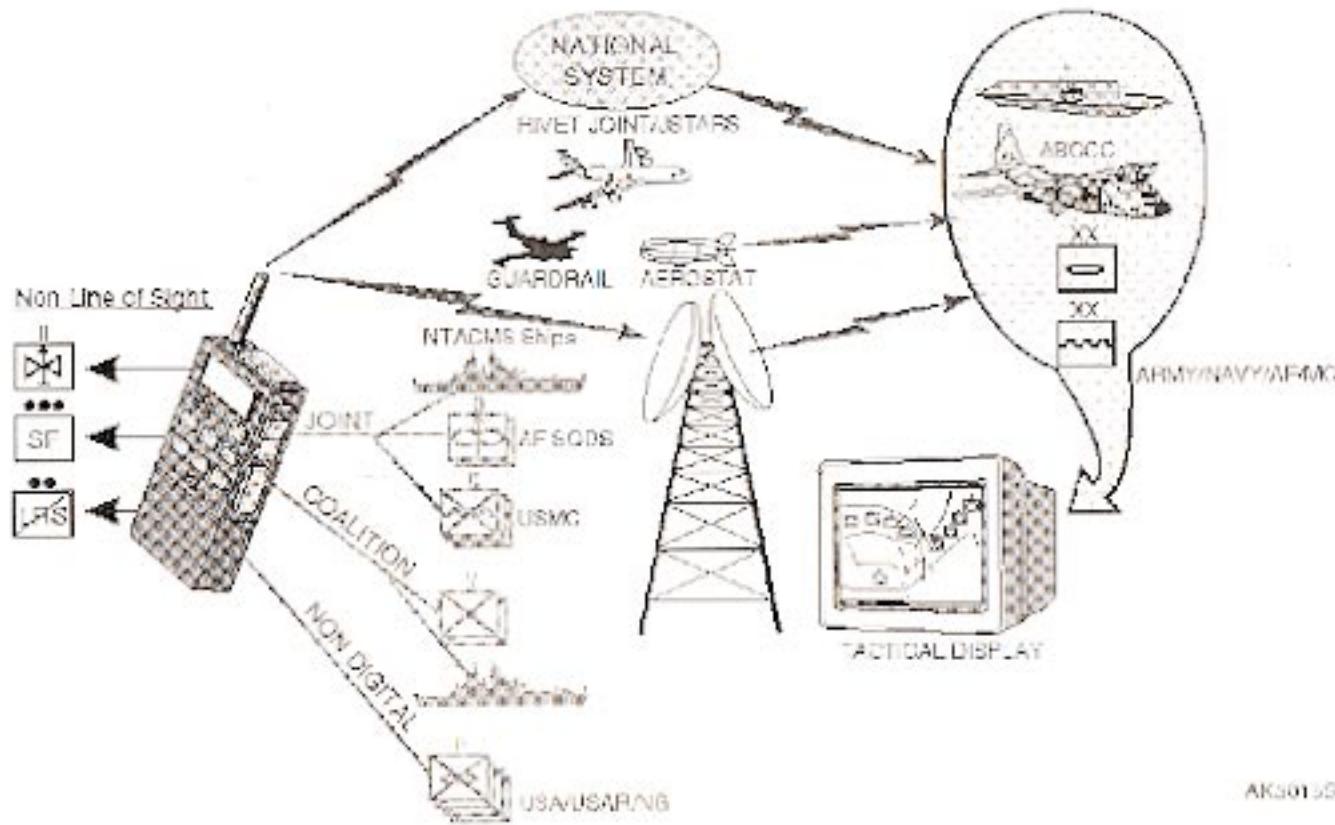
## PRIME CONTRACTOR(S)

Lockheed Martin (Springfield, VA)



\* See appendix for list of subcontractors

# Grenadier Beyond Line-of-Sight Reporting and Targeting (BRAT)(GB)(WRAP Candidate)



AK3015G

## MISSION

Provide a near-term capability for tracking blue-force assets operating deep, and for other situations beyond the normal digital umbrella.

## DESCRIPTION AND SPECIFICATIONS

Grenadier Beyond Line of Sight Reporting and Targeting (BRAT)(GB) is a small, lightweight transceiver that derives location information from Global Positioning System (GPS) satellite broadcasts. It transmits its unit identification, location, and message in a Low Probability of Intercept (LPI)/Low Probability of Detect (LPD) waveform. This information can then be displayed on TENCAP systems (FAST, MITT, AEPDS), the Global Command and Control System (GCCS), Global Command and Control System-Army (GCCS-A), and the Maneuver Control System (MCS). Information can also be displayed on any system with a Tactical Receive Equipment (TRE) receive capability, including the Common Ground Station (CGS) and the SOF Intelligence vehicle (SOFIV).

GB uses the same LPI/LPD waveform—Collection of Broadcasts from Remote Assets (COBRA)—used by the Combat Survivor Evader Locator (CSEL) radio being fielded to all services. The production GB devices will use the same three printed-circuit cards as the CSEL radio, packaged in a box suitable for mounting in military vehicles. GB leverages existing infrastructure to include communications relay systems, worldwide broadcast systems, and existing Command and Control systems. Software has been modified on GCCS to support GB, which will be released and propagated to GCCS-A. TENCAP systems are being modified to provide GB data to MCS at the division and corps level.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

The WRAP Initiative was approved in FY98, with FY98 and FY99 funding for 450 devices.

## PROJECTED ACTIVITIES

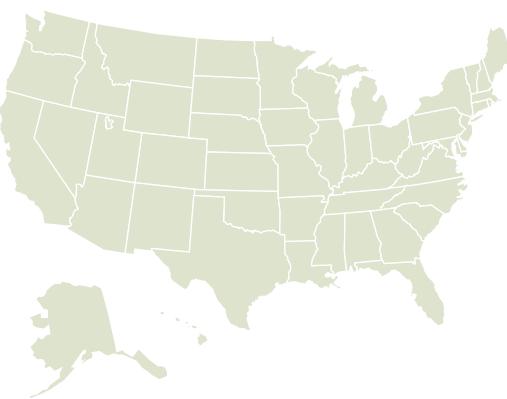
**1QFY99** Production contract begins.

**4QFY99** Production GB devices delivered.

**1QFY00** GB fielding begins in October 1999 and ends in December 1999.

## PRIME CONTRACTOR(S)

Classified.



## Ground-Based Common Sensor (GBCS)



## MISSION

Intercept, precisely locate, and identify enemy conventional and Low Probability of Intercept (LPI) communications and non-communications emitters.

## DESCRIPTION AND SPECIFICATIONS

The Ground-Based Common Sensor (GBCS) Limited Production Urgent (LPU) is a vehicle-mounted, signals-intercept, and precision-emitter location system that intercepts and identifies threat emitters. Leap-ahead technology exploits Communications Intelligence (COMINT) and Electronic Intelligence (ELINT) against LPI signals and conventional signals. GBCS (LPU) is an evolutionary, open architecture system that satisfies the Army's requirement to conduct tactical ground communications intelligence, electronic intelligence, and electronic support against enemy emitters.

GBCS (LPU) enhances the commander's ability to outmaneuver and destroy the enemy by locating command-and-control, fire control, and air defense centers. GBCS (LPU) will be deployed on a Highly Mobile Multipurpose Wheeled Vehicle (HMMWV) in support of the 82nd Airborne and 4th Infantry Divisions. The GBCS (LPU) can be transported by a C-130 or C-141.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

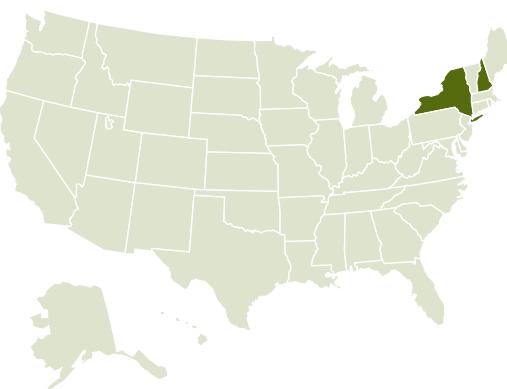
Program being restructured; GBCS-Heavy development terminated; GBCS-Light production cancelled; GBCS (LPU) fielded as interim solution until follow-on system is developed.

## PROJECTED ACTIVITIES

- 4QFY99** Begin fielding GBCS (LPU).  
Begin development of follow-on system.

## PRIME CONTRACTOR(S)

Lockheed Martin Federal Systems (Owego, NY)



\* See appendix for list of subcontractors



## Guardrail/Common Sensor (GR/CS)



## MISSION

Provide signals intercept and precision target location of threat communications and noncommunications 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 MI Brigade at each corps. A standard system consists of six to twelve RC-12 aircraft that fly operational missions in sets of three. Ground processing is conducted in the Integrated Processing Facility (IPF). Interoperable Data Links provide microwave connectivity between the aircraft and the IPF. The GR/CS provides near real-time SIGINT and targeting information to tactical commanders throughout the Corps area via the Joint Tactical Terminal. Key features include:

- Integrated COMINT and 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 Ground Based Common Sensor, Airborne Reconnaissance Low, and other Joint systems.

## FOREIGN COUNTERPART

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

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

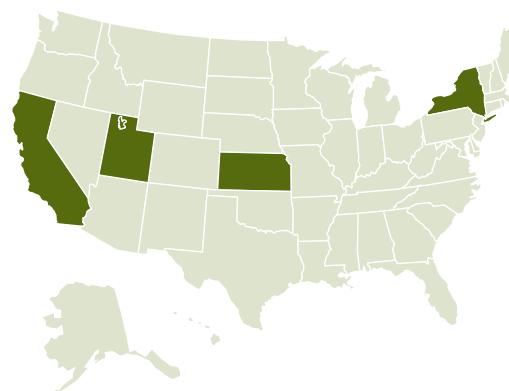
- Completed precision location upgrade for System 3 (Korea).
- Completed remote relay upgrade for System 1 (XVIII Corps).
- First unit equipped (FUE) Tactical Intelligence Broadcast System (TIBS) upgrade.
- FUE Air Force interoperability upgrade.

## PROJECTED ACTIVITIES

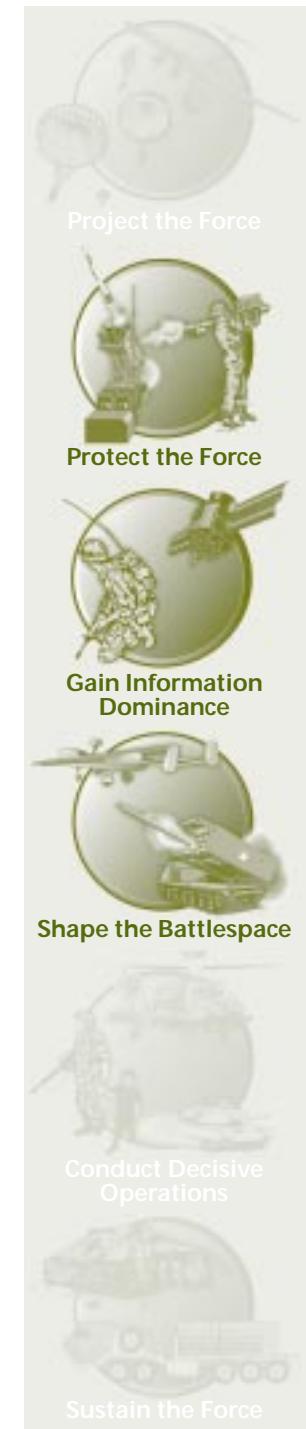
- Complete TIBS upgrade.
- Complete Air Force interoperability upgrade.
- Begin RC-12N-to-P upgrade.
- Begin mini-IPF upgrade.
- Field GR/CS System 2.

## PRIME CONTRACTOR(S)

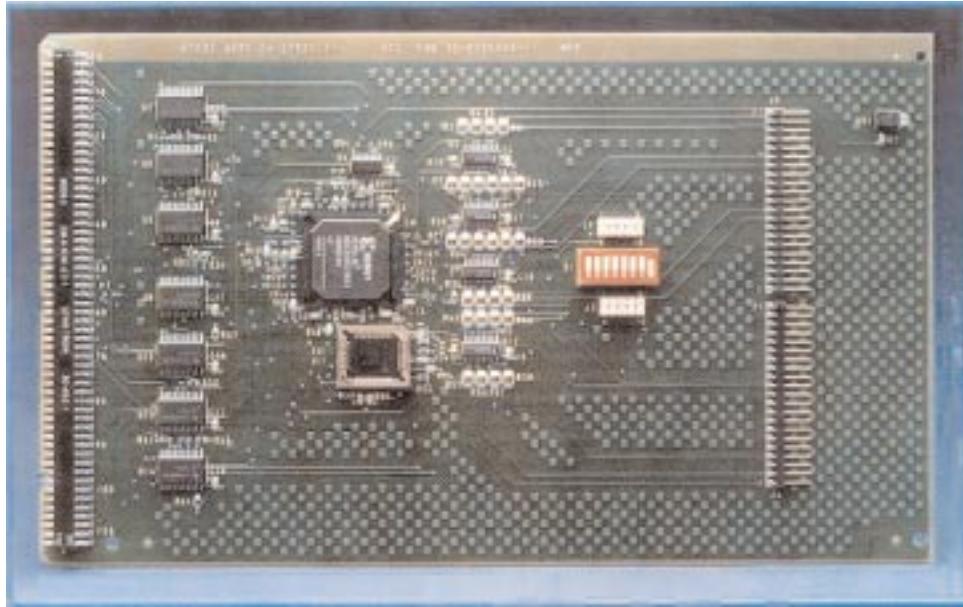
Raytheon (Raytheon Aircraft) (Wichita, KS)  
TRW (Sunnyvale, CA)



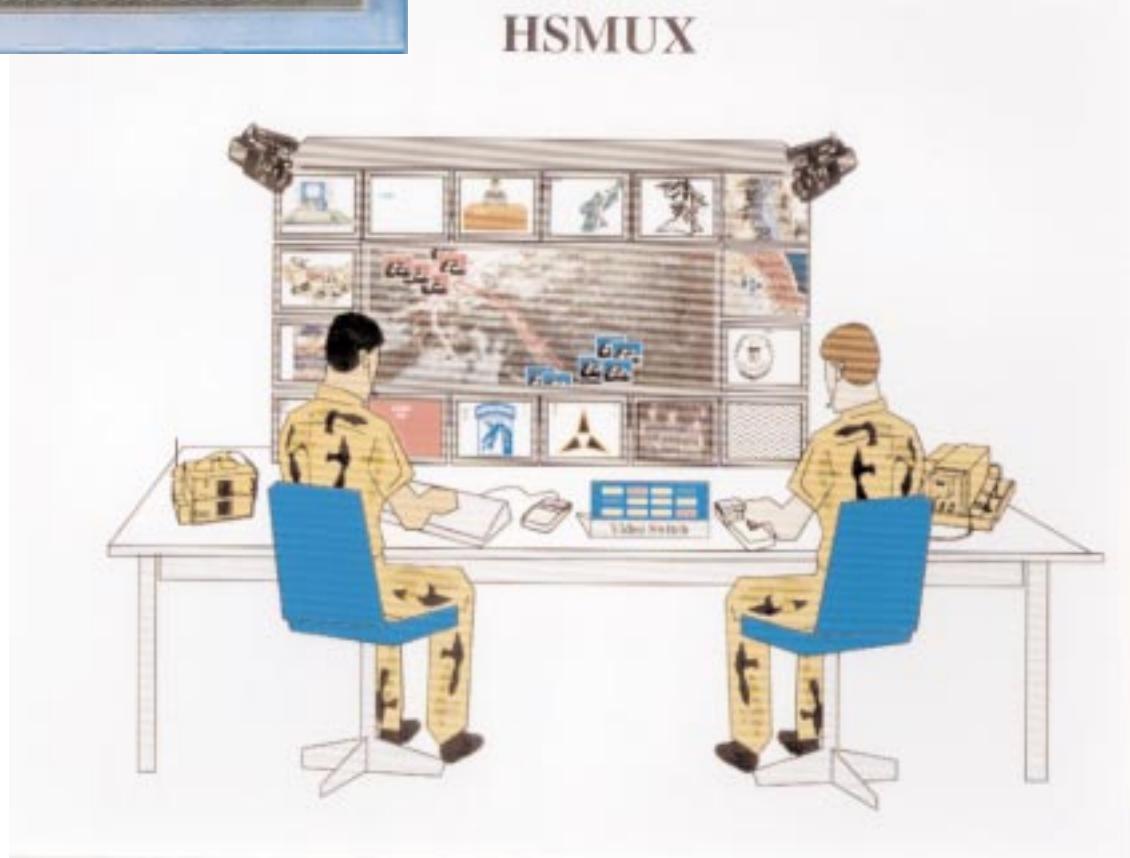
\* See appendix for list of subcontractors



# High-Speed Multiplexer Cards (HSMUX) (WRAP Candidate)



HSMUX





## MISSION

Provide video and high-speed data access through the Mobile Subscriber Equipment (MSE) by supporting data rates of 64, 128 and 256 kb/s; Enhance data throughput on the MSE backbone communications system to enable users to successfully employ video teleconferencing systems.

## DESCRIPTION AND SPECIFICATIONS

High-Speed Multiplexer (HSMUX) is a research and development program that maximizes the use of non-developmental item and commercial-off-the-shelf hardware and software. It has four serial port connections per circuit card and supports data rates of 64, 128, and 256 kb/s. HSMUX cards are installed in the Small Extension Node (SEN) Switch to facilitate data throughput from the users' end terminal into the MSE backbone communications network.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

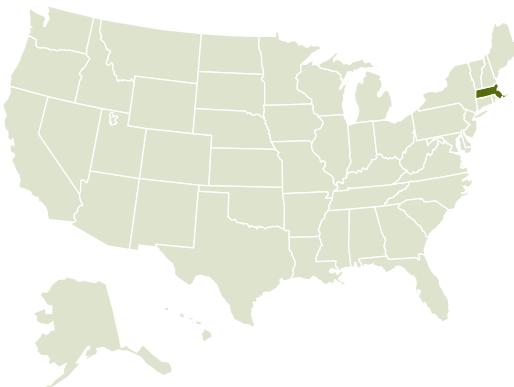
HSMUX has been proven during the Division Advanced Warfighter Experiment (DAWE), and two Simulation Exercises in Communications (SIMEX COM) conducted at Ft. Hood, TX. HSMUX proved to be a reliable data enhancer. HSMUX was submitted as an FY98 Warfighter Rapid Acquisition Program (WRAP) candidate where it received an OPTEC rating of 1. The Army System Acquisition Review Council (ASARC) awarded \$4.9 million to field HSMUX to 15 active signal units in FY99 and FY00.

## PROJECTED ACTIVITIES

- Continue fielding of HSMUX to the active Army.
- Work with GTE to upgrade the HSMUX into a "kit" that will template all the necessary installation components into one package.

## PRIME CONTRACTOR(S)

GTE (Taunton, MA)



\* See appendix for list of subcontractors

## Improved Chemical Agent Monitor (ICAM)



## MISSION

Provide a means for quickly detecting the presence of (or lack of) nerve and mustard agent contamination on personnel and equipment.

## DESCRIPTION AND SPECIFICATIONS

The Chemical Agent Monitor (CAM) and the Improved CAM (ICAM) are hand-held devices used to quickly detect nerve and mustard agent contamination on people and equipment. The CAM is used by troops in full protective clothing, after an attack, or after going through a contaminated area. It provides fast, low-level detection of both nerve and mustard vapors, differentiates between nerve and mustard agents, provides an indication of the relative magnitude of the hazard present, and is not affected by most common battlefield interferences.

The CAM provides information not previously available about the chemical hazard, in seconds, for both nerve and mustard. Use of the CAM on a chemical battlefield reduces the risk commanders may have to assume when they reduce the level of mission-oriented protective posture in a combat situation. With the CAM, a commander can quickly monitor for contamination, allowing soldiers and equipment to remain engaged in their combat missions and reducing the need for decontamination. The CAM is also used to check the effectiveness of decontamination operations on people and equipment. Compared to the CAM, the ICAM is more reliable and much less costly to operate and repair.

## FOREIGN COUNTERPART

France: AP2C.

## FOREIGN MILITARY SALES

CAM is a foreign-developed item (United Kingdom). Foreign military sales, therefore, are restricted by a license agreement. Sales are allowed under Foreign Military Credits. Egypt has procured and is considering a significantly larger purchase.

## PROGRAM STATUS

**CAM:** Production of 9,634 CAMs is complete and more than 9,300 have been fielded. **ICAM:** A multi-year contract was awarded to Intellitec in December 1995 for 135 ICAMs and associated spares. Delivery began in September 1998, following an extensive production acceptance test.

## PROJECTED ACTIVITIES

**2QFY99** First unit equipped (FUE) scheduled.

## PRIME CONTRACTOR(S)

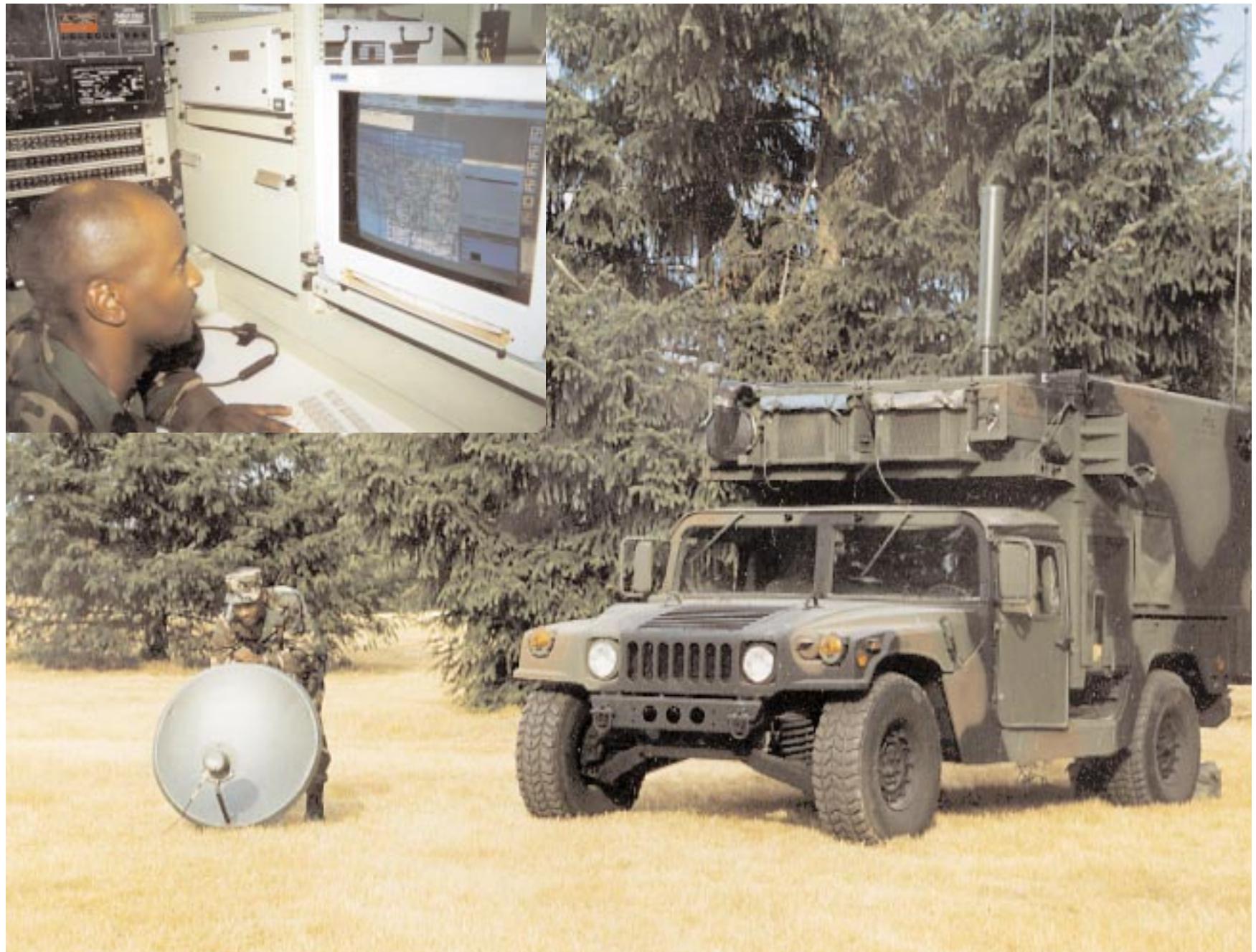
Intellitec Division, Technical Products Group (DeLand, FL)



\* See appendix for list of subcontractors



# Integrated Meteorological System (IMETS)



## MISSION

Provide commanders at all echelons with an automated weather system that receives, processes, and disseminates weather observations, forecasts, and weather, and provides environmental effects decision aids to all Battlefield Operating Systems (BOS).

## 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 a tactical automated weather system mounted on a High Mobility Multipurpose Wheeled Vehicle (HMMWV). It provides automation and communications support to Air Force Combat Weather Teams assigned to the Army at echelons-above-corps (EAC) down to Aviation Battalions and to Army Special Operations Forces.

IMETS receives weather information from polar-orbiting civilian and defense meteorological satellites, Air Force Global Weather Central, artillery meteorological and remote sensors, and civilian forecast centers. 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 to warfighters are the automated tactical decision aids. These graphics display the impact of the weather on current or planned operations for both friendly and enemy forces. The warfighter can thus 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

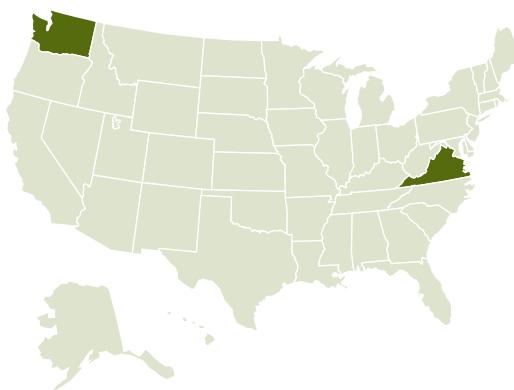
IMETS has a streamlined evolutionary acquisition strategy that relies on commercial-off-the-shelf/government-off-the-shelf (COTS/GOTS) products and non-developmental items (NDI). IMETS has three blocks of development. Planned upgrades to the fifteen Block 1 IMETS have been accelerated to resolve Year 2000 (Y2K) problems. The IMETS program is currently being realigned with the Air Force Weather Reengineering initiative. The Army is developing a laptop version of the weather effects workstation that will complement the Air Force global weather forecast workstation. The Army will be able to equip the increased number of Air Force Combat Weather Teams identified by the Air Force to better support Army weather requirements.

## PROJECTED ACTIVITIES

- 1QFY99** Complete Y2K certification.
- FY99** A total of twenty-seven HMMWV-mounted IMETS will be fielded.
- FY01** Develop and start fielding the laptop version of IMETS.

## PRIME CONTRACTOR(S)

Logicon RDA (Tacoma, WA)



\* See appendix for list of subcontractors



# Integrated System Control (ISYSCON)



## MISSION

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

## DESCRIPTION AND SPECIFICATIONS

The Integrated System Control (ISYSCON) facility represents the Signal Corps' major thrust to overcome network management problems identified 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.

A change to the requirements document has added planning and management of satellite resources as a requirement. The battlefield spectrum management (BSM) software has been designated as a part of the migration system for DoD use.

An ISYSCON node consists of an S-250E shelter on a heavy HMMWV, and two extension tents, two server and four client workstations, and peripherals. Signal S-3 staffs will use ISYSCON to manage Army and JTF tactical battlefield information systems for both deployed and split-based operations. The ISYSCON Program serves as a baseline foundation to support future network management initiatives tied to and part of the evolution to the Digitized Division and the Warfighter Information Network (WIN) Architecture. ISYSCON is also being extended to manage the Tactical Internet at brigade and battalion levels. As such, ISYSCON will provide centralized control of the data networks that interconnect all C2 systems and all weapon systems on the battlefield.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

The ISYSCON contract was awarded to GTE Government Systems in 4QFY92. The program was approved to enter low-rate initial production (LRIP) in 3QFY95, and is headed towards a Milestone III Decision in January 1999. In September–October 1998, the Phase I ECB capability was tested during initial operational test and evaluation (IOTE).

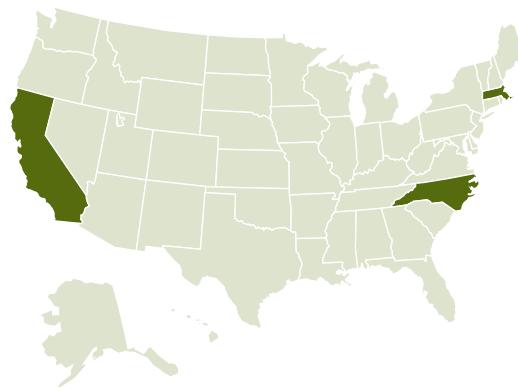
## PROJECTED ACTIVITIES

**2QFY99** Planned Milestone III full-rate production decision review; production contract award.

**2QFY00** Scheduled Phase 2 follow-on operational test and evaluation.

## PRIME CONTRACTOR(S)

GTE (Taunton, MA; Raleigh, NC)



\* See appendix for list of subcontractors

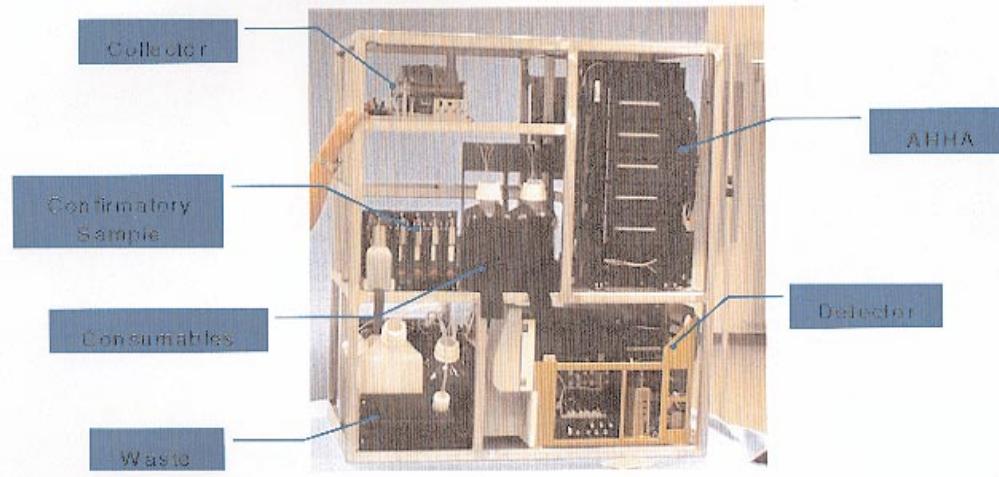


# Joint Biological Point Detection System (JBPDs)



PRODUCT MANAGER - JOINT BIOLOGICAL POINT DETECTION SYSTEM

## Basic Bio Suite Unit Integration



## MISSION

Automatically detect and identify biological warfare agents.

## DESCRIPTION AND SPECIFICATIONS

The Joint Biological Point Detection System (JBPDs) will be installed on vehicles, ships, and at fixed installations to provide biological detection and warning for all service personnel. The JBPDs is designed to detect and identify low concentration biological warfare agents in less than fifteen minutes. The system is fully automated and is compatible with the Joint Technical Architecture. Ten different biological warfare agents can be identified simultaneously, and a sample of any positive identification is immediately captured by the system for further analysis at designated laboratories.

The JBPDs can be operated remotely out to a distance of five kilometers, either by hard wire link or by radio modem. Over thirty JBPDs can be controlled from a single control station. Two configurations of the JBPDs are under development: a portable configuration that will be troop-movable and free standing; and a vehicle and fixed-site configuration. Vehicle-mounted platforms will be capable of operation on the move. The JBPDs is designed to meet the environmental, shock, and vibration profiles of its intended platforms, as well as service reliability, availability, and maintainability requirements. A joint logistic and training package is in development; it will provide common logistical support and training to all services.

## FOREIGN COUNTERPART

Canadian Integrated Biological Agent Detector System (CIBADS).

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

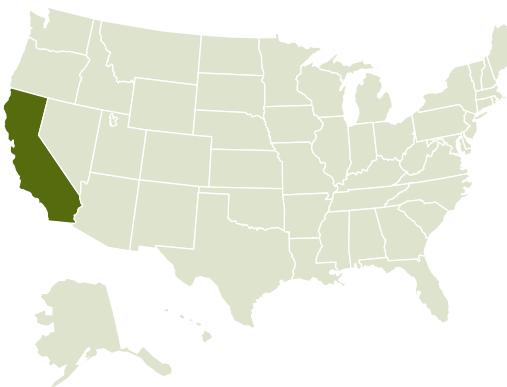
The JBPDs completed preliminary and critical design reviews in FY98. Currently, JBPDs are being fabricated for testing.

## PROJECTED ACTIVITIES

- FY99** The JBPDs will complete fabrication of test units in early FY99. These units will then undergo a series of developmental tests at the end of FY99.
- FY00** After refurbishment, the units will be tested and evaluated by an independent tester and evaluator in mid-FY00.

## PRIME CONTRACTOR(S)

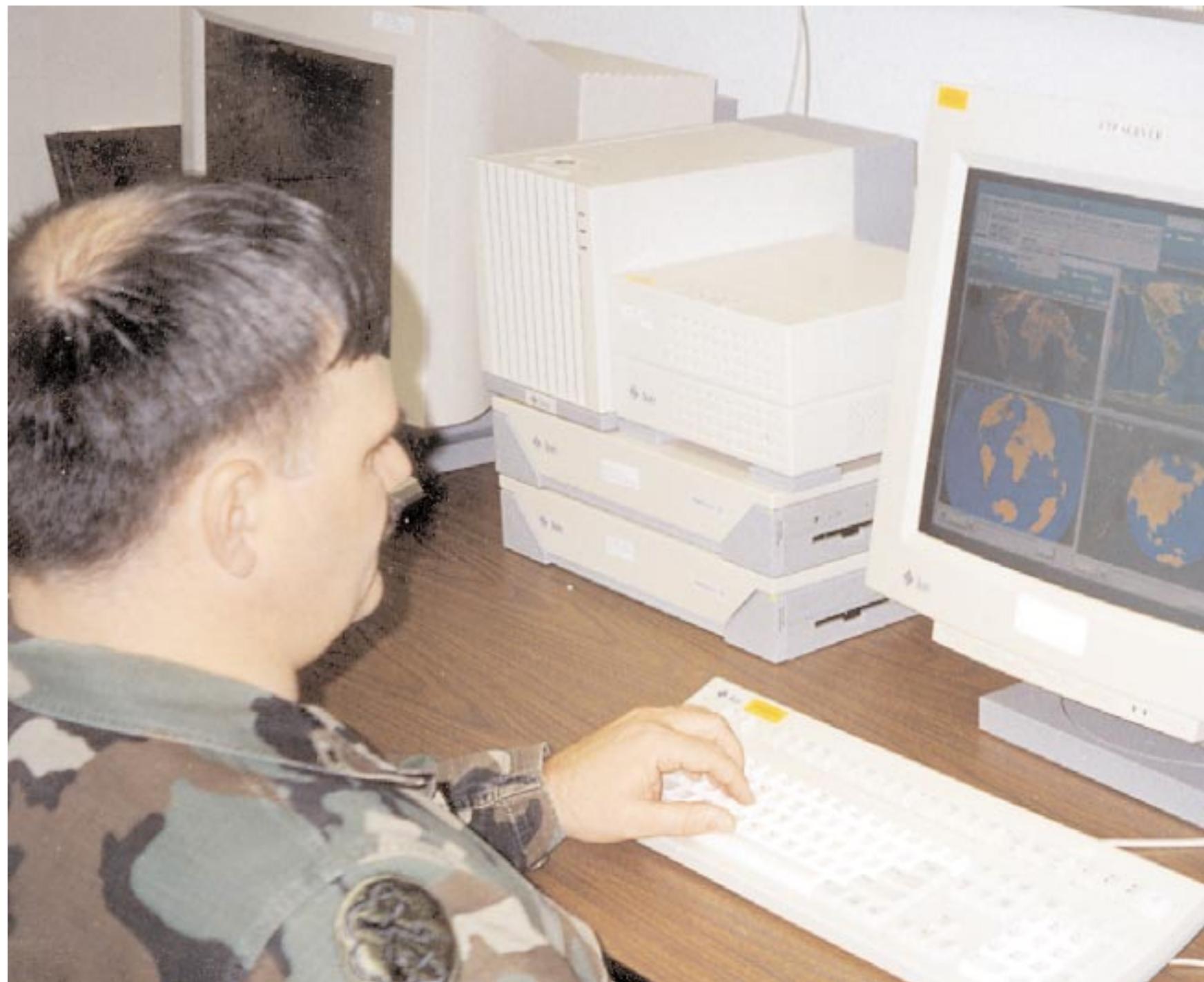
Lockheed Martin Librascope (Glendale, CA)



\* See appendix for list of subcontractors



# Joint Collection Management Tools (JCMT)





## MISSION

Provide all-source collection management; permit combat leaders to effectively use collection to answer mission critical intelligence needs.

## DESCRIPTION AND SPECIFICATIONS

Joint Collection Management Tools (JCMT) is the DoD Intelligence Information System (DoDIIS) migration system for all-source collection management. It will be used by national, theater, and tactical organizations of all services. JCMT provides tools for gathering, organizing, and tracking intelligence collection requirements for all intelligence disciplines. The JCMT system also provides collection managers with automated support to determine which intelligence products are already available that might satisfy intelligence collection requirements. If products are not available, JCMT's various databases and platform/sensor models can be queried for data about asset capabilities and availabilities.

This allows a collection manager to determine if requirements can be satisfied by existing collection missions or whether new collection is required. The collection manager uses JCMT to develop collection plans, generate tasking and request messages. A key feature of JCMT, which will be enhanced in the future, is its ability to ascertain the status of requirements that have been forwarded to other organizations for action.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

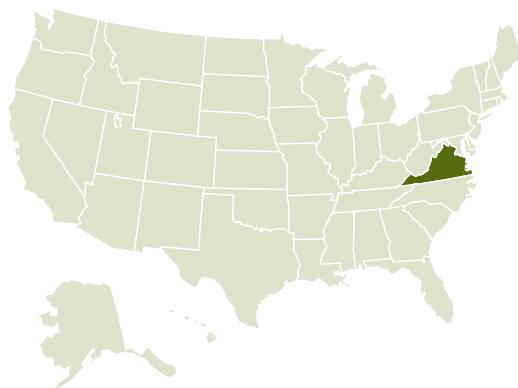
The JCMT Capabilities Package (CP) 1.0 was formally approved for fielding in April 1998. The development contractor has completed work on CP 1.1, and formal government testing began in September 1998. CP 1.1 was submitted to the Joint Interoperability Test Facility (JITF) for Y2K certification in October 1998. The Operational Evaluation of CP 1.1 will take place at the National Ground Intelligence Center (NGIC) in March 1999. Fielding of CP 1.1, which will replace the last of the legacy systems, is expected to begin in May 1999. The scope of subsequent development depends on funding and direction provided by the Collection Requirements Management Board.

## PROJECTED ACTIVITIES

- Conduct technical and operational test of CP 1.1.
- Deliver CP 1.1 to sites, beginning with the Collection Requirements Management System (CRMS) legacy sites.
- Begin development of post-CP 1.1 functionality.

## PRIME CONTRACTOR(S)

TRW (Fair Lakes, VA)



\* See appendix for list of subcontractors

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



## MISSION

Provide the Joint Services with the ability to detect the presence and provide enhanced early warning of chemically contaminated battle spaces.

## DESCRIPTION AND SPECIFICATIONS

The Joint Service Lightweight Stand-Off Chemical Agent Detector (JSLSCAD) will provide detection, identification, mapping on-the-move, and reporting of nerve, blister and blood agent vapors. It will provide 360° 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 (MOPP) gear. Intended applications include various ground-vehicle, aerial, shipboard, and fixed-emplacement platforms such as the following: M93A1 Fox vehicle; Light NBC Reconnaissance System (JSLNBCRS); Pioneer Unmanned Aerial Vehicle (TUAV); C130 Aircraft; CH53 Helicopter; ships, and fixed site installations.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

The engineering, manufacturing and development (EMD) phase of the program was initiated in February 1998. A preliminary design review was conducted in October 1998. An integrated product team has been formed to develop the test methodology for the JSLSCAD, since testing is a significant portion of this program phase.

## PROJECTED ACTIVITIES

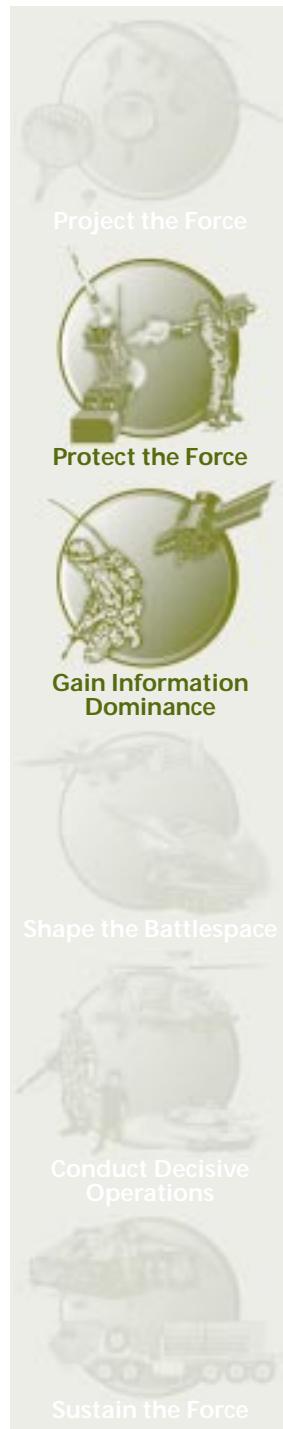
- |               |                                                    |
|---------------|----------------------------------------------------|
| 3QFY99        | Detailed design review.                            |
| 3QFY99–2QFY00 | Fabricate the engineering design test (EDT) units. |
| 2–4QFY00      | Conduct EDT.                                       |

## PRIME CONTRACTOR(S)

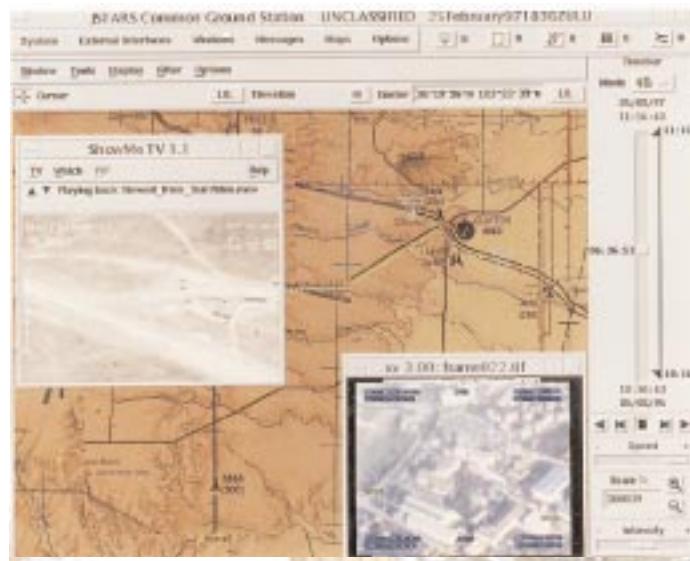
Intellitec Division, Technical Products Group, Inc. (Deland, FL)



\* See appendix for list of subcontractors



# Joint Surveillance Target Attack Radar System (Joint STARS) Common Ground Station (CGS)



## MISSION

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

## DESCRIPTION AND SPECIFICATIONS

The Joint Surveillance Target Attack Radar System (Joint STARS) Common Ground Station (CGS) is a joint Air Force/Army program. The airborne platform is a USAF E-8 (a militarized Boeing 707) with a multi-mode radar (capable of 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 at long ranges. The radar data is received by Air Force and Army operators aboard the aircraft and then downlinked to multiple CGSs via the SCDL. The information provides tactical air and ground commanders with near-real-time wide area surveillance and deep targeting data. The Joint STARS system can detect, locate, track, classify, and assist in attacking both fixed and moving targets beyond the FLOT during daylight and darkness in nearly all weather conditions.

The CGS is a mobile, tactical, multi-sensor ground station that receives, displays, processes, and disseminates targeting battle management and intelligence information to all echelons. In addition to Joint STARS radar data, the CGS is capable of receiving and displaying Unmanned Aerial Vehicle imagery as well as signals intelligence data via an integrated Joint Tactical Terminal. A previous Ground Station Module (GSM) was produced in two variants: a medium version (MGSM) mounted on a 5-Ton truck, and a light version (LGSM) mounted on a High Mobility Multipurpose Wheeled Vehicle (HMMWV). The CGS is a light version mounted on a HMMWV. Beginning in FY99, the GSM will transition into the CGS. The CGS will be a key node on the digitized battlefield, receiving multiple national, theater, and tactical sensor inputs.

## FOREIGN COUNTERPART

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

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

The Joint STARS MGSMs have completed the low-rate initial production (LRIP) phase. Fielding of 16 MGSMs was completed 2QFY97. LGSM fielding (4 systems) was completed 2QFY97. The CGS Production Contract was awarded 1QFY96 and initial fielding begins 3QFY99. An initial operational test and evaluation (IOTE) delay can potentially delay the fielding of the CGSs.

## PROJECTED ACTIVITIES

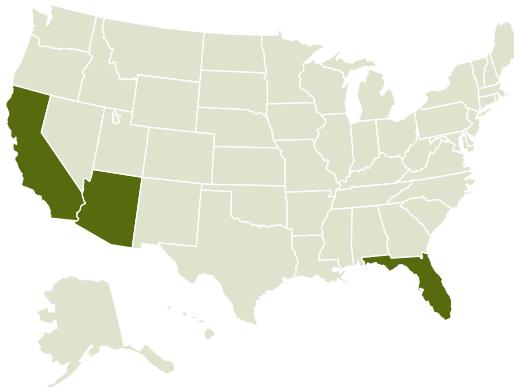
- 2QFY99** Initial operational test of the CGS units is planned for completion.
- 3QFY99** CGS full-production (Milestone III) Decision is scheduled.
- 3QFY99** CGS initial fielding begins.

## PRIME CONTRACTOR(S)

**Datalink:** CUBIC Defense Systems (San Diego, CA)

**CGS:** Motorola (Scottsdale, AZ)

**Aircraft:** Northrop-Grumman (Melbourne, FL)



\* See appendix for list of subcontractors



# Joint Tactical Ground Station (JTGS)



## MISSION

Provide the Theater Commanders with real-time, spaced-based infrared warning, alerting and cueing information on Theater Ballistic Missiles (TBMs) and other tactical events of interest.

## DESCRIPTION AND SPECIFICATIONS

The Joint Tactical Ground Station (JTAGS) is a transportable information processing system that receives and processes in-theater, direct down-linked data from Defense Support Program and the follow-on Space-Based Infrared System (SBIRS) satellites. JTAGS disseminates warning, alerting and cueing information on TBMs and other tactical events of interest, throughout the theater, using existing communications networks. A JTAGS unit consists of a standard 8 x 8 x 20-ft shelter, 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 operational within hours. For redundancy during contingency situations, the system will deploy in pairs. During crisis situations, the system will conduct joint operations. JTAGS is compatible with major existing communications systems and will interface with future planned communication systems.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

JTAGS is a Program Executive Office Air and Missile Defense, ACAT III managed program, and is a joint interest effort with the Navy. The Program transitioned directly from a Ballistic Missile Defense Organization/U.S. Army Space and Strategic Defense Command Advanced Technology Demonstration to an Army funded formal acquisition program in 1994. The Tactical Surveillance Demonstration validated the technical feasibility of the JTAGS proof-of-principle prototype, through successful tests at White Sands Missile Range in 1QFY94. A transportable prototype of the system began developmental and operational testing that culminated in 1QFY96. Subsequently, the U.S. Army fielded five production units to EUCOM, PACOM, and Army Space Command in CONUS during FY97. Additionally, JTAGS

Phase I Preplanned Product Improvements (P3I) began during FY97. These efforts will enhance joint communications and the system's ability to predict both the launch and impact points of Theater Ballistic Missiles.

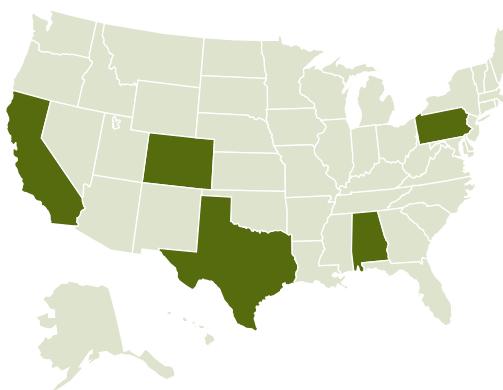
## PROJECTED ACTIVITIES

**FY98-03** Phase II P3I will enable JTAGS to operate with the Space Based Infrared Satellites. SBIRS is the next generation of infrared satellites scheduled to replace the aging Defense Support Program satellite constellation. This upgrade initiates a common Multi-Mission Mobile Processor (M3P), based on JTAGS, for use by all services.

## PRIME CONTRACTOR(S)

**Deployment, Production and Phase I, P3I:** GenCorp (Aerojet) (Azusa, CA; Colorado Springs, CO)

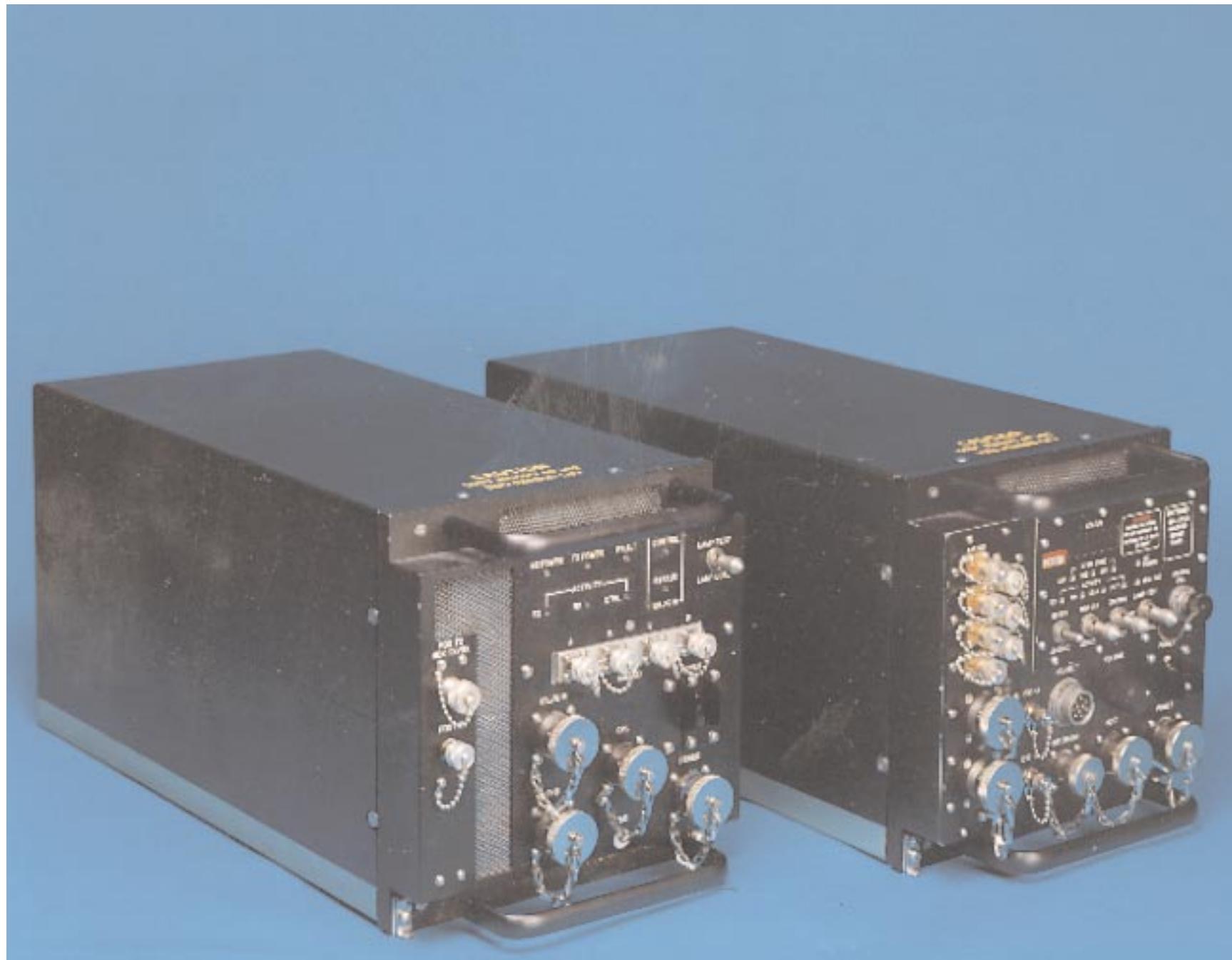
**Phase II P3I:** Lockheed Martin (Sunnyvale, CA; Boulder, CO)



\* 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) and Commanders Tactical Terminal (CTT) provide the critical data link to battle managers, intelligence centers, air defense, fire support, and aviation nodes across all services. The JTT allows Army, Air Force, Navy, and Marine Corps users to exploit intelligence broadcast networks via a General Purpose Link including:

- 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).

In addition to receiving intelligence data, data provider or relay functions are provided. The JTT and CTT are provided for integration into systems on vehicles, aircraft, ships, and fixed sites.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

Sales to the United Kingdom, Australia, and Canada are planned.

## PROGRAM STATUS

A contract was awarded 3QFY97 for ninety-six CTTs for the Army, Navy, and Marine Corps urgent requirements. A contract was awarded 4QFY97 for one hundred thirty-two JTTs. Additionally, a JTT option was awarded in 3QFY97 for ninety-five JTTs. Fielding of the CTT One Channel is complete. One hundred eighty CTT two-channel receivers have been delivered to various elements within the Army, Air Force, Navy, Marine Corps and Special Operating Forces, and fielding continues. One hundred twenty CTT3s have been delivered.

## PROJECTED ACTIVITIES

**3QFY99** Delivery of 96 urgent CTT3s will be completed.

**4QFY99** JTT deliveries will begin.

**1QFY00** Operational test scheduled.

**2QFY00** Milestone III production decision scheduled.

## PRIME CONTRACTOR(S)

**CTT:** Raytheon Systems (St. Petersburg, FL)

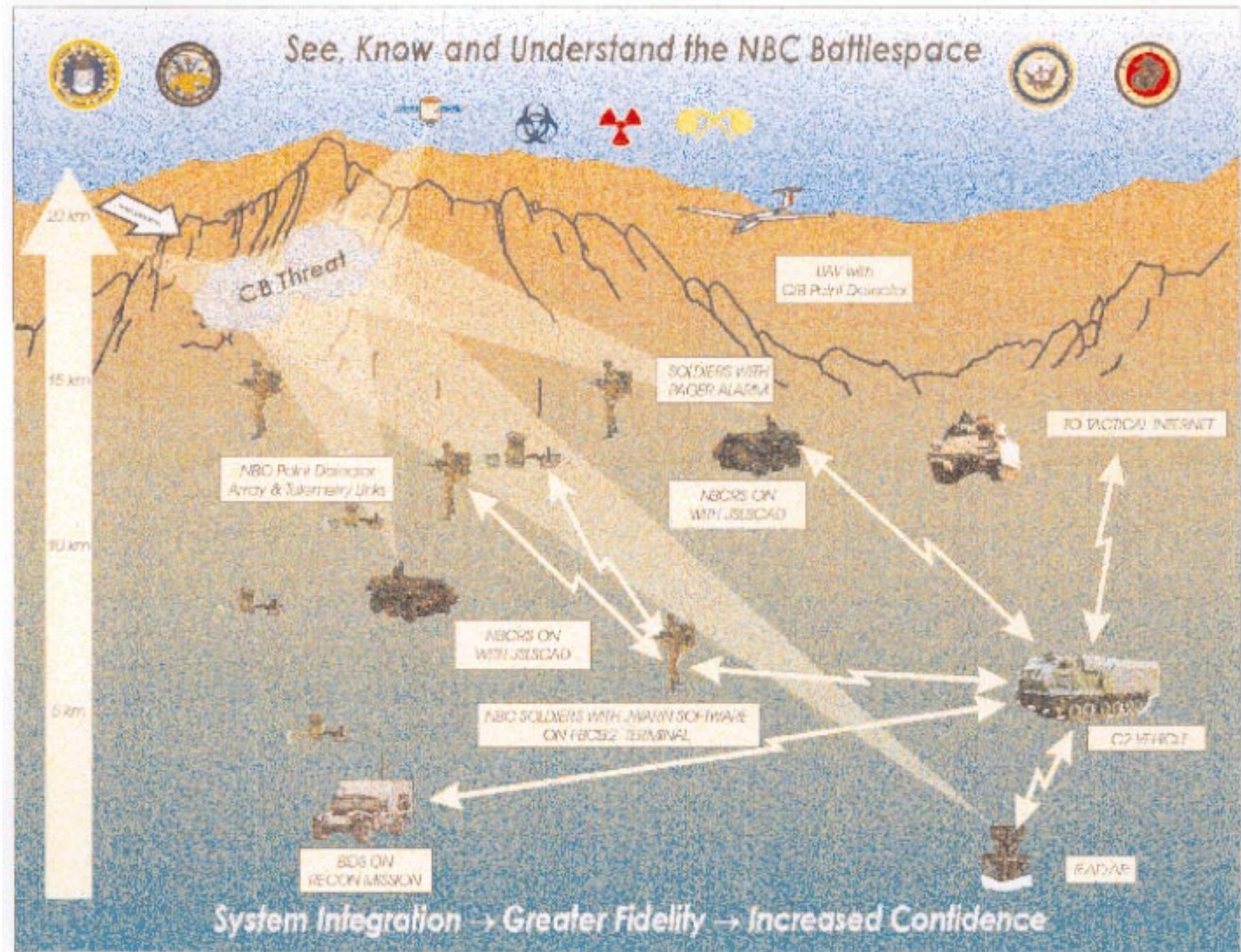
**JTT:** Raytheon Systems (St. Petersburg, FL)



\* See appendix for list of subcontractors



# Joint Warning and Reporting Network (JWARN)



## 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 employs NBC warning technology to collect, analyze, identify, locate, report and disseminate information regarding NBC threats. JWARN software and hardware will be compatible and integrated with Joint Service C4I2 systems. The JWARN will be located in Command and Control Centers and will be employed by NBC Defense specialists. These specialists will transfer data used in making decisions about disseminating warnings, down to the lowest level on the battlefield. The JWARN will provide additional data processing, 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-phased acquisition approach:

- Phase 1:** Non-developmental item commercial-off-the-shelf/government-off-the-shelf (NDI COTS/GOTS) products to standardize warning and reporting.
- Phase 2:** Provide the total JWARN capability, by integrating NBC detector systems, NBC Warning and Reporting Software Modules, and NBC Battlefield Management software modules into the Services' Command, Control, Communications, Computer and Intelligence Information (C4I2) systems.
- Phase 3:** Preplanned Product Improvement will include artificial intelligence modules for NBC operations, an upgrade to match future C4I2 systems, and standard interface modules for use in 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

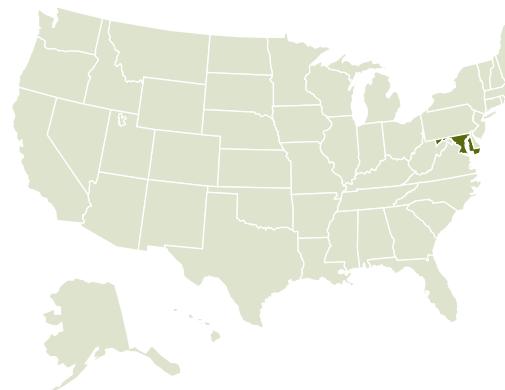
The JWARN Milestone III approval for Phase I occurred in December 1997. The fielding of COTS NBC Analysis software pack and GOTS models is completed. The COTS software (with Automated Nuclear, Biological and Chemical Information System (ANBACIS) Battlefield Management functionality) is being integrated with the Maneuver Control System (MCS) and into the Windows 32-bit environment.

## PROJECTED ACTIVITIES

- 2QFY99** Scheduled Source Selection process and the contract award of JWARN Phase II.

## PRIME CONTRACTOR(S)

- Phase I:** Bruhn Newtech (Columbia, MD)



\* See appendix for list of subcontractors



# Kiowa Warrior



## MISSION

Conduct armed reconnaissance/security, target acquisition/designation, command and control, light attack, and air combat (defensive) missions in support of combat and contingency operations.

## DESCRIPTION AND SPECIFICATIONS

The Kiowa Warrior is the rapidly deployable, light armed reconnaissance aircraft for the Army. The OH-58D consists of advanced visionics, navigation, communication, weapons, and cockpit integration systems. The OH-58D Mast-Mounted Sight houses a Thermal-Imaging System, Low-Light Television, and a Laser Rangefinder/Designator. These systems allow for target acquisition and engagement at stand-off ranges and in adverse weather conditions. A highly accurate navigation system permits precise target location that can be handed off to other aircraft or artillery via the digital communications system. Battlefield imagery can be transmitted to provide near-real-time situational awareness to command and control elements. The Kiowa Warrior can be rapidly and easily deployed, and, upon arrival, placed into operation within minutes. The armament systems combine to provide anti-armor, anti-personnel, and anti-aircraft capabilities at stand-off ranges.

**Max Gross Weight:** 5,500 lb

**Max Speed:** 118 kt, clean; 113 kt, armed

**Crew:** 2

**Armament:** 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, Alouette; Germany: BO-105; Russia: Hind, Hip, Hoplite.

## FOREIGN MILITARY SALES

Taiwan: 26 Kiowa Warriors—deliveries complete. Thirteen additional aircraft requested as amendment to the existing FMS case.

## PROGRAM STATUS

The OH-58D is in the 15th and last year of production. The Kiowa Warrior remanufacture program began in FY93. Three hundred sixty-two aircraft have been fielded through October

1998. Aircraft deployments include training bases and operational units worldwide. The procurement objective is currently 411, with a total requirement of 507 aircraft. The final twenty-five Kiowa Warriors are in the manufacturing process. The first three aircraft to be modified as part of the Safety Enhancement Program (SEP) have been delivered to Bell Helicopter Textron. The Safety Enhancement Program (SEP) began and will upgrade the entire Kiowa Warrior fleet with improved engines, crashworthy seats, cockpit airbags, and a digitized mission equipment package.

## PROJECTED ACTIVITIES

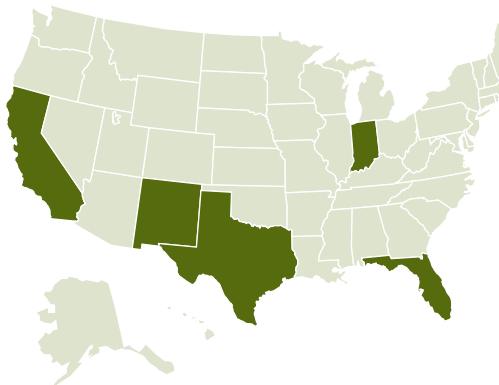
**FY99** Twenty-one aircraft are scheduled for the safety enhancement program upgrade.

**4QFY99** Deliveries of current contracts end September 1999.

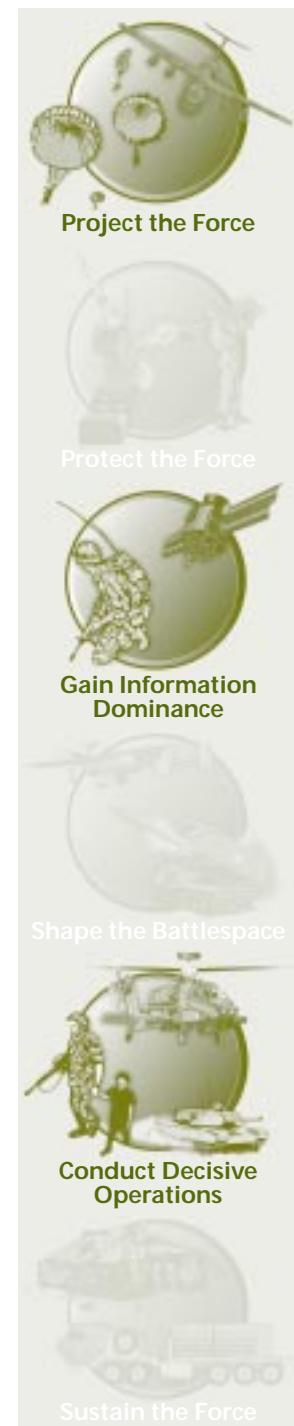
**FY06** The RAH-66 Comanche fielding will begin to displace Kiowa Warriors from the Active Army to the National Guard. The Kiowa Warrior will remain in service past 2020.

## PRIME CONTRACTOR(S)

Allison Engines (Indianapolis, IN); Honeywell (Albuquerque, NM); Future Tech (Orlando, FL); Textron (Bell Helicopter) (Fort Worth, TX); Boeing (Monrovia, CA)



\* See appendix for list of subcontractors



# Maneuver Control System (MCS)





## MISSION

Provide automated, on-line, 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 for the Army Battle Command System (ABCs). The MCS integrates battle information from other Battlefield Functional Area (BFA) C2 systems to provide timely, accurate status information, as well as situational awareness for the ABCS. The MCS Block IV software will incorporate the Common Operating Environment (COE) and will be compliant with the Joint Technical Architecture. The software will also evolve to the Army Battle Command System. The MCS will be fielded on CHS-2 hardware and will implement a client/server architecture in a distributed computing environment.

## FOREIGN COUNTERPART

The MCS is designed to interoperate with the respective command and control systems of the United Kingdom, Germany, France, Italy and Canada.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

Currently, the MCS Block II Version 10.03.1G software is fielded to all heavy Army units with Non-Developmental Item equipment. The MCS Block III Version 12.01 software was used at TFXXI in 2QFY97, and at the Division Advanced Warfighter Experiment (DAWE) in 1QFY98. Additionally, the initial operational test and evaluation (IOTE) of MCS Block III Version 12.01 was conducted in 3QFY98. The MCS system evaluation report (SER) is anticipated for release in 2QFY99 with a subsequent DAB Milestone III decision later in FY99. The MCS Block IV software development contract was awarded in 4QFY96 and will produce the software for the first digitized division (FDD) in FY00, and the first digitized corps (FDC) in FY04.

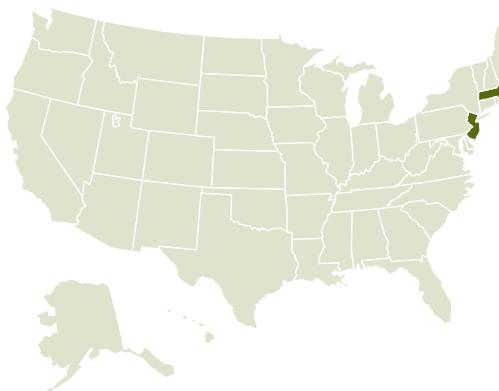
## PROJECTED ACTIVITIES

- Begin to field MCS Block III Version 12.01 on CHS-2 Hardware in FY99 in accordance with Army DCSOPS Directives.
- Continue development of MCS Block IV software for the first digitized division (FDD) and the FDC.
- Continue AWE participation.

## PRIME CONTRACTOR(S)

**Software:** Block III Software: CSC (Eatontown, NJ); Mitre (Eatontown, NJ); Telos (Shrewsbury, NJ)  
 Block IV Software: Lockheed Martin (Tinton Falls, NJ)

**High Capacity Computer Unit:** GTE (Taunton, MA)



\* See appendix for list of subcontractors

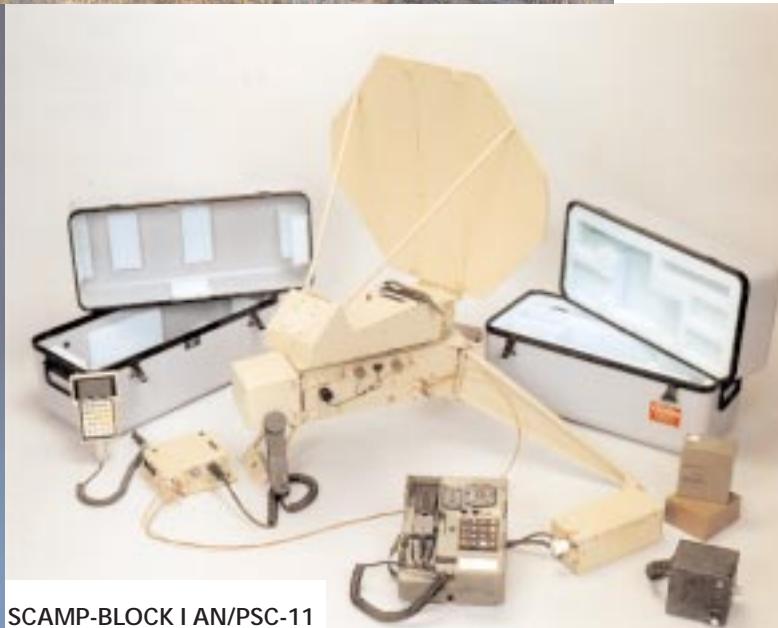
# Military Satellite Communications (MILSATCOM)-EHF



SCAMP-BLOCK I AN/PSC-11



SCAMP II



SCAMP-BLOCK I AN/PSC-11

## MISSION

Achieve end-to-end connectivity to satisfy JCS Command, Control, Communications, Computers, and Intelligence (C4I), supporting 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.

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

The **SMART-T**, mounted on a standard HMMWV, provides range extension for the Army's Mobile Subscriber Equipment (MSE) system at echelons-corps-and-below (ECB). It processes data and voice communications at both Low Data Rate (LDR) and Medium Data Rate (MDR) (75 bps–1.544 Mbps).

**SCAMP** is a manportable, battery-powered terminal that provides LDR secure voice at 2400 bps and secure data at 75–2400 bps. Development is underway for technologies leading to an objective SCAMP Block II 12–15 pound manpackable terminal.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

**SCAMP:** Final operational test and evaluation (FOTE), October/November 1998.

**SMART-T:** In low-rate initial production (LRIP); Milestone III, November 1998.

## PROJECTED ACTIVITIES

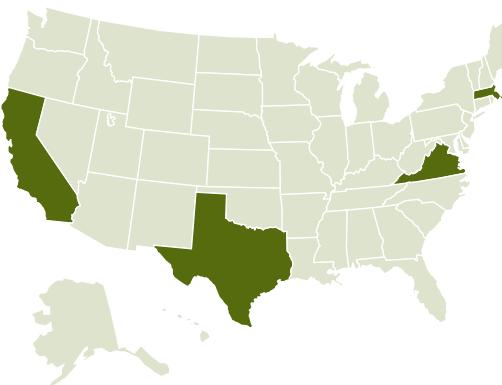
**SCAMP:** First unit equipped (FUE), March 1999.

**SMART-T:** Seeking Milestone III Decision approval in 1QFY99; fielding to critical units in FY99; FOTE scheduled for 4QFY99.

## PRIME CONTRACTOR(S)

**SCAMP:** Rockwell Collins (Richardson, TX)

**SMART-T:** Raytheon (Marlborough, MA; Virginia Beach, VA)



\* See appendix for list of subcontractors



# Military Satellite Communications (MILSATCOM)–UHF/SHF/TACSAT



SPITFIRE



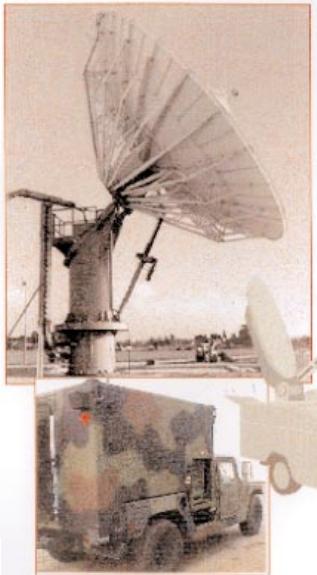
MILSAT



STAR-T



TACSAT



GBS





## MISSION

Achieve end-to-end connectivity to satisfy JCS Command, Control, Communications, Computers, and Intelligence (C4I), supporting 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 provide the reach-back capability between the forward deployed force and the CONUS sustaining base required to support power projection.

**TACSAT.** The AN/PSC-5 Spitfire UHF Manpack Terminal, provides support to the Army, Air Force, Marine Corps, and Special Operations Forces (SOF) units' requirements for use on FLTSAT/AFSAT/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 SATCOM radios.

For SHF Tactical Satellite (TACSAT) Terminals, the **SHF Tri-Band Advanced Range Extension (STAR-T)** terminal is mounted in a heavy HMMWV, and will eventually replace the aging fleet of AN/TSC-85B/93B Tactical Satellite 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; and it has an integrated switch to interface with commercial and joint military switching systems.

**GBS.** GBS responds to the need for high-speed, one-way broadcast of high volume multi-media information such as imagery, weather data, maps, logistics, air-tasking orders, and so on, to users worldwide. GBS will transmit data up to 24 Mbps on each of the four transponders on the Navy's UFO 8, 9 and 10 satellites.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

**Spitfire:** Fielding ongoing; **STAR-T:** in low-rate initial production (LRIP), development test and evaluation (DTE) is ongoing; **GBS:** in LRIP.

## PROJECTED ACTIVITIES

**Spitfire:** Sixty-seven Spitfires to be provided to first digitized division (FDD) in 2QFY00.

**STAR-T:** Initial operational test and evaluation (IOTE): May–September 1999; Milestone IIIB decision: December 1999; full scale production contract award: 2QFY00.

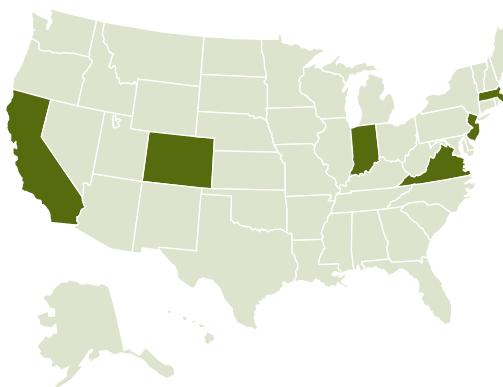
**GBS:** Field seventeen LRIP Transportable Ground Receive Suite (TGRS) to Army units in FY99.

## PRIME CONTRACTOR(S)

**Spitfire:** Raytheon (Fort Wayne, IN)

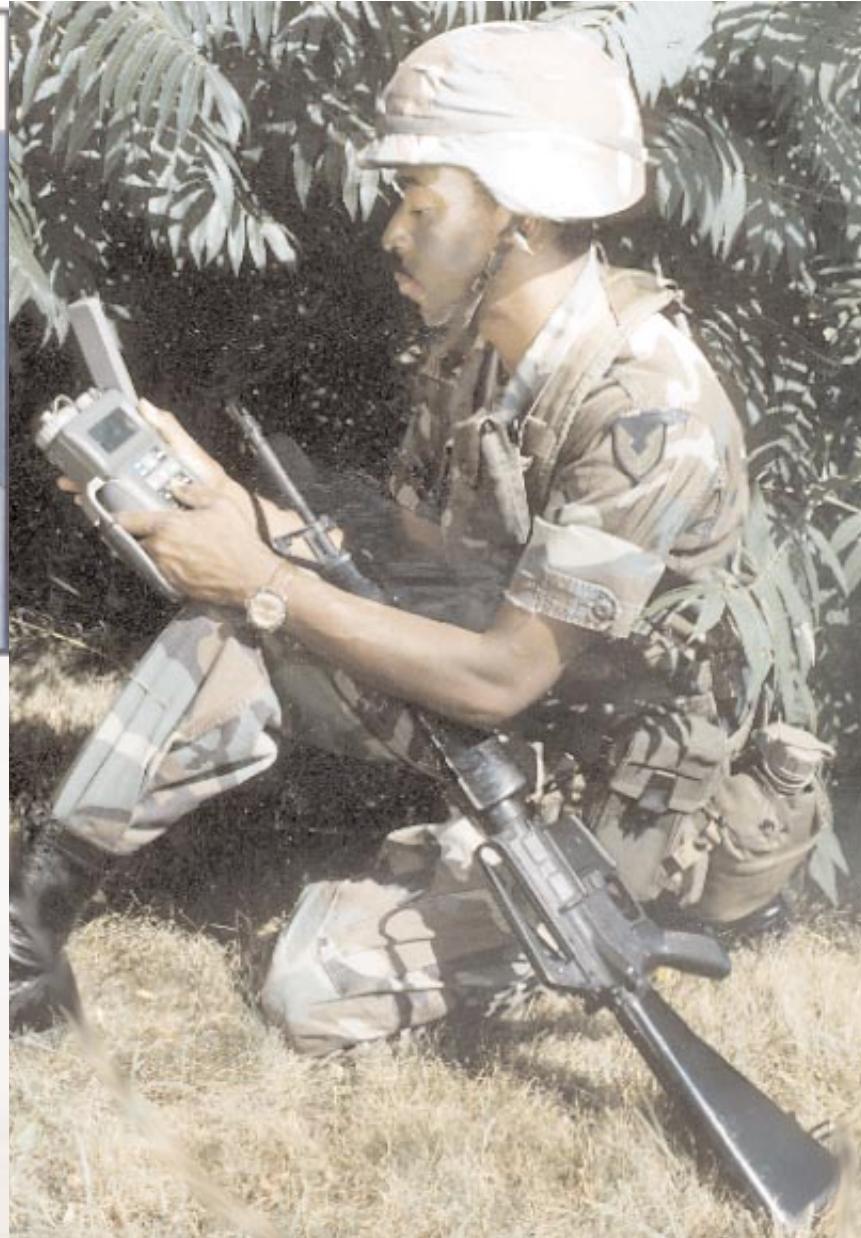
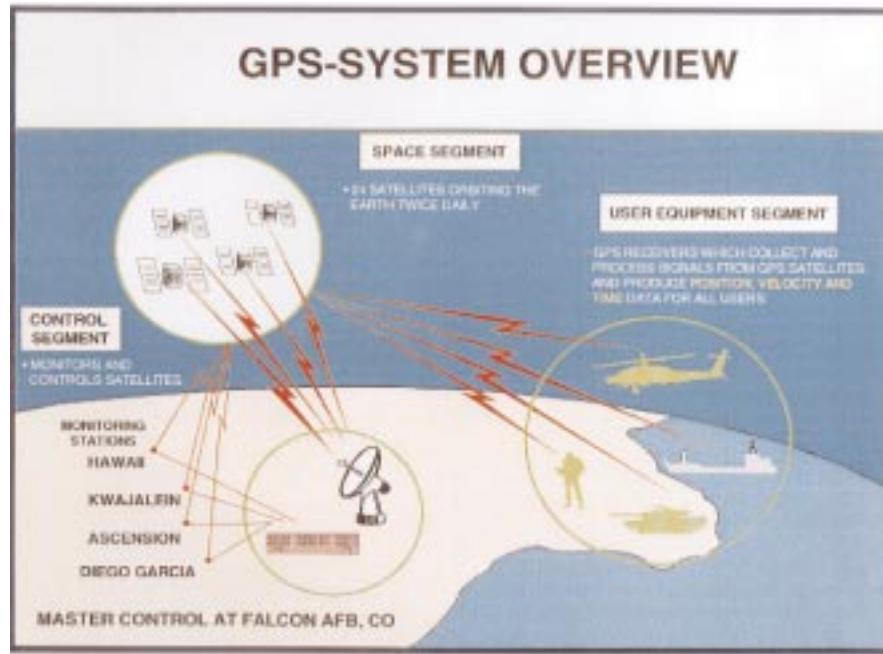
**STAR-T:** Raytheon (Marlborough, MA; Virginia Beach, VA)

**GBS:** Raytheon (Reston, VA)



\* See appendix for list of subcontractors

# NAVSTAR Global Positioning System (GPS)





## 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 NAVSTAR Global Positioning System (GPS) is a joint Army, Navy, and Air Force program, with the Air Force as the lead service. GPS is a space-based navigation, three-dimensional positioning, velocity and time-distribution system. It has three segments: a space segment, nominally consisting of twenty-four satellites; a ground control segment; and a user equipment segment. The user equipment segment consists of receiver configurations for ground, aircraft and watercraft applications. The GPS receiver is a passive device that will be integrated into approximately 170 Army systems at all echelons. The Army represents over 80% of the DoD requirement.

## FOREIGN COUNTERPART

The Russians have developed a similar system, GLONASS. The Europeans are developing the European Geostationary Navigation Overlay System (EGNOS).

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

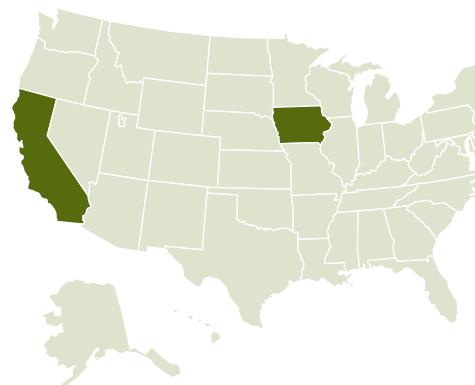
**PLGR fieldings:** The last Army Precise Lightweight GPS Receiver (PLGR) purchased under the production contract, was delivered in September 1998. The Army acquired 82,822 units and worldwide fielding was completed September 1998, on an accelerated basis. **SLGR replacement:** SLGRs have been displaced by the objective PLGRs for all but some temporary aircraft applications. One thousand SLGRs have been upgraded to PPS accuracy and reallocated as the receiver for the non-modernized rotary wing fleet. These receivers are designated as Stand Alone GPS Receivers (SAGRs). **Aircraft Receivers:** The Miniaturized Airborne GPS Receiver (MAGR), the AN/ASN-149, the AN/ASN-128B/C, and the EGI are for the modernized aircraft fleet. The Cargo Utility GPS Receiver (CUGR) is being fielded as the objective solution for UH-1 aircraft. **Survey Receivers:** PM GPS completed fielding of ninety GPS Survey Receivers to Topographic Engineering companies in 1998.

## PROJECTED ACTIVITIES

**Fielding:** Throughout FY99–FY00, PM GPS will continue to field and support the installation of the CUGR in helicopters. PM GPS will continue the installation of the AN/ASN-169 SAGR into National Guard AH-1H and OH-58A/C aircraft, and provide installation and repair-by-replacement support for the AN/PSN-10 SLGR. **GPS Modernization:** The Army is currently addressing the future use of GPS. The Navigation Warfare (NAVWAR) program, directed by the USD (A&T) to address known GPS vulnerabilities on the battlefield, became a sub-element of the GPS Modernization program. This multi-agency program, led by the Air Force, is examining GPS redesign alternatives that enable both military and civilian users uninterrupted access to GPS throughout the world, while retaining the military advantages of GPS. Anticipated key design and functional changes to user equipment will result in the need to replace or upgrade virtually all Army GPS receivers. Wholesale modernization of Army GPS Receivers is anticipated during the FY01–06 timeframe. **HTI:** Three systems will be designated as Horizontal Technology Integration: the Defense Advanced GPS Receiver (DAGR), the GPS Receiver Applications Module (GRAM) and the GPS Inertial Navigation System (GPS/INS). These receivers will be managed for the Army by PM GPS and will be the mainstay of this modernization effort. According to the GPS Tactical Operational Requirements Document (ORD), the total number of receivers required during this timeframe is 647,685 and is initially estimated to cost \$1.9 Billion.

## PRIME CONTRACTOR(S)

Rockwell International (Cedar Rapids, IA); Trimble Navigation (Sunnyvale, CA)



\* See appendix for list of subcontractors

## Nuclear, Biological and Chemical Reconnaissance System (NBCRS)–Fox



## MISSION

Detect, identify, and mark areas of nuclear and chemical contamination; sample for nuclear, biological and chemical contamination; 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 RSACAL, MM1 Mobile Mass Spectrometer, CAM/ICAM, AN/VDR-2, M22 ACADA/M8A1. The NBC sensor suite has been digitally linked with the communications and navigation subsystems by a dual purpose central processor system known as the 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 position navigation system (GPS and ANAV) that enables the system to accurately locate and report agent contamination. The mobility platform is a six-wheeled, all-wheel-drive, 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. It is used as a reconnaissance vehicle to 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 the first Army system to be 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 supports the system.

## FOREIGN COUNTERPART

China: NBC reconnaissance vehicle; Russia: BRDM-ZRKH, MTLB, RKHM, UAZ-469RKH.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

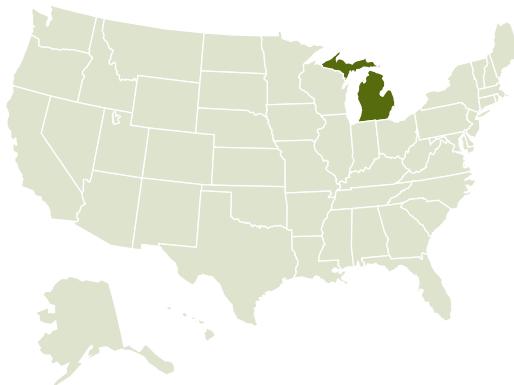
Production contract for the Block I modification awarded May 1996; first unit equipped (FUE), 1QFY99.

## PROJECTED ACTIVITIES

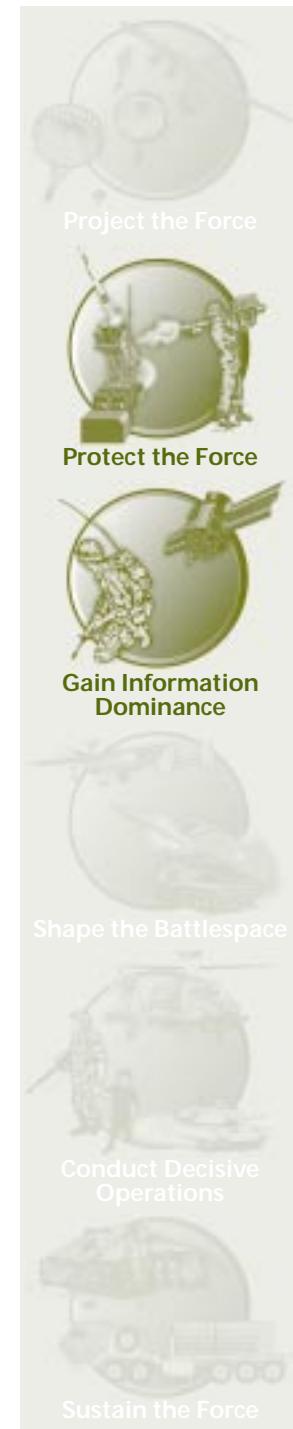
- Production of the NBCRS Block 1 Modification (M93A1) continues. Approximately eighty-nine of the legacy Fox systems are planned in this conversion.
- Last modification is scheduled for completion in April 2003.

## PRIME CONTRACTOR(S)

General Dynamics, Land Systems Division (Detroit, MI); Henschel (Germany)



\* See appendix for list of subcontractors



# Sentinel



## MISSION

Provide critical air surveillance of the forward areas; automatically detect, track, classify, identify, and report targets (cruise missiles, unmanned aerial vehicles, rotary wing and fixed wing aircraft) to Air Defense Weapons Systems located in the forward area.

## DESCRIPTION AND SPECIFICATIONS

The Sentinel is used with the Army's Forward Area Air Defense Command, Control, and Intelligence (FAADC2I) system. The Sentinel provides key target data to Short Range Air Defense (SHORAD) weapons systems and battlefield commanders via the FAADC2I data link or directly from the Sentinel, using the Enhanced Position Location Reporting System (EPLRS) or Single Channel Ground And Airborne Radio System (SINC-GARS) 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 FAADC2 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, in battlefield environments of dust, smoke, aerosols, and enemy countermeasures. It provides 360-degree azimuth coverage for acquisition and tracking. The Sentinel contributes to the digital battlefield by automatically detecting, tracking, classifying, identifying, and reporting targets including cruise missiles, unmanned aerial vehicles, rotary-wing aircraft, and fixed-wing aircraft. Targets can be hovering, to fast moving and from nap of the earth, to the maximum engagement altitude of SHORAD weapons. Accurate and quick reacting, Sentinel acquires targets sufficiently forward of the forward line of own 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. Mobile and reliable, the performance of Sentinel's anti-radiation missile and electronic countermeasures supports Army corps and divisional air defense operations across the full spectrum of conflict. The Sentinel is transported by an M1097A1 HMMWV, using standard transportation methods.

## FOREIGN COUNTERPART

There are seven other foreign air defense radars specializing in search and track of low and slow airborne targets. Italy: Contraves LPD-20; Switzerland: Skyguard Improved; Russia: Hot Shot 2S6; France: El Dorado; Germany: Siemens DR-641; France: Rodeo and RA-20S.

## FOREIGN MILITARY SALES

Turkey.

## PROGRAM STATUS

In production and deployment phase; maintenance trainer fielded to Ft. Sill, September 1997; operator training system fielded to Ft. Bliss, January 1998; field 2-44 ADA in 1QFY99.

## PROJECTED ACTIVITIES

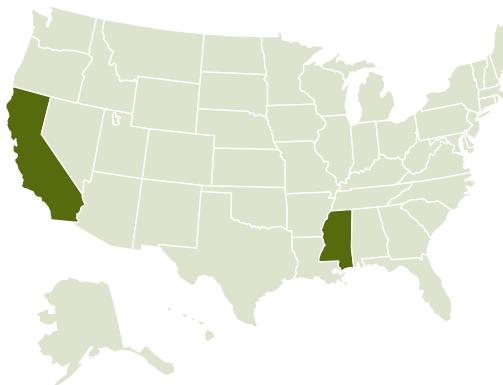
**2QFY99** Award full rate production (FRP) 4; field 3 ACR Air Defense Artillery (ADA).

**3QFY99** Begin FRP3 deliveries; field 5-5 ADA.

**4QFY99** Field 1-62 ADA; transition to SHORAD.

## PRIME CONTRACTOR(S)

Raytheon Systems Company (El Segundo, CA; Forrest, MS)

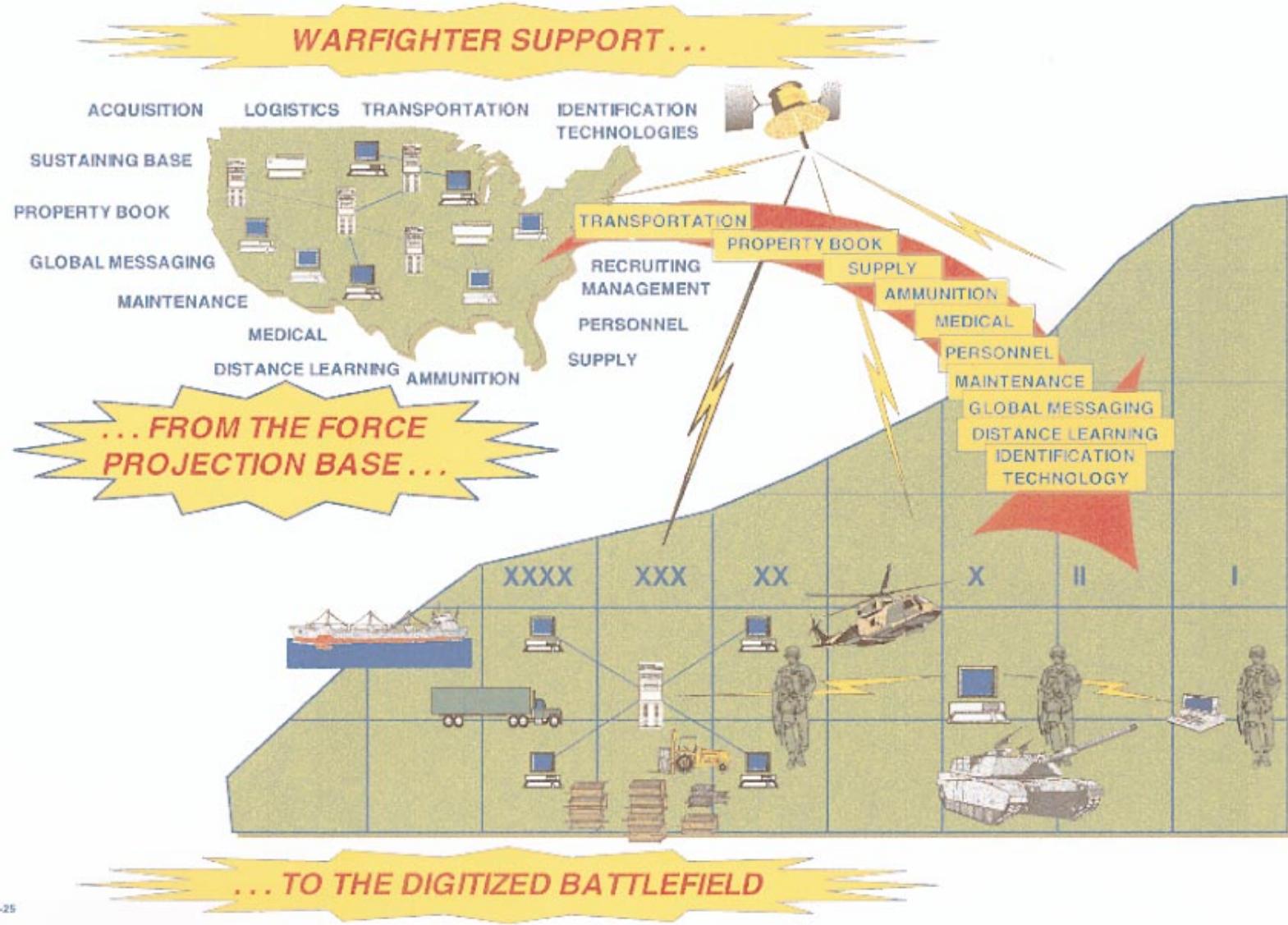


\* See appendix for list of subcontractors



# Standard Army Management Information Systems (STAMIS)

## Standard Army Management Information Systems



law7-25

### MISSION

Plan, design, develop, acquire, install, and maintain highly complex management information systems to support the warfighter, from the force projection base to the battlefield.

### DESCRIPTION AND SPECIFICATIONS

The Standard Army Management Information Systems (STAMIS) programs acquired by PEO STAMIS are diverse, in terms of size and variety of products (computer hardware and software systems), and the breadth of customers. Joint Service programs include: Joint Computer-aided Acquisition and Logistic Support (JCALS); Transportation Coordinator Automated Information System II (TC-AIMS II); and the Defense Message System-Army (DMS-A).

Army programs include: Medical Communications for Combat Casualty Care (MC4); The Total Army Distance Learning Program (TADLP); Standard Installation/Division Personnel System (SIDPERS); Army Recruiting Information Support System (ARISS); and the Sustaining Base Information Services (SBIS). The following are currently fielded systems that will be migrated into Global Combat Support System-Army (GCSS-A): Standard Army Ammunition System (SAAS); Standard Army Maintenance System (SAMS); Standard Army Retail Supply System (SARSS); and Unit Level Logistics Systems (ULLS)/ Standard Property Book System-Redesign (SPBS-R).

The span of STAMIS systems is Defense-wide and world-wide to provide the warfighter with a modern power projection platform to support peacetime operations, training, mobilization, force projection, split-based operations, and redeployment. As an integral part of the Army Enterprise Strategy, STAMIS programs acquire integrated systems using commercial technology that meets validated needs.

### FOREIGN COUNTERPART

No known foreign counterpart.

### FOREIGN MILITARY SALES

None.

### PROGRAM STATUS

The STAMIS programs are at various stages of life-cycle management. STAMIS programs use commercial-off-the-shelf (COTS)

hardware and software to the maximum extent possible. STAMIS programs use various Indefinite Delivery/Indefinite Quantity Contracts and/or government software development centers.

JCALS has begun the infrastructure fielding to many of the 269 DoD sites. SBIS continues hardware and software application fieldings to twenty-nine installations. ARISS has fielded an "Alpha" increment to Active Army and National Guard recruiting units. The SARSS, SAAS, SAMS and ULLS fieldings are nearly complete. The integration of Automated Identification Technology (AIT), such as Radio Frequency Tags into the STAMIS that support the Digitized Force, is ongoing through the new release of the AIT II contract.

### PROJECTED ACTIVITIES

- SIDPERS-3 will be fielded Army-wide.
- The initial GCSS-A modules will continue toward operational testing early in FY99.
- The follow-on contract to the successful Warfighter Rapid Acquisition Program (WRAP) for the Movement Tracking System contract will be awarded early FY99.

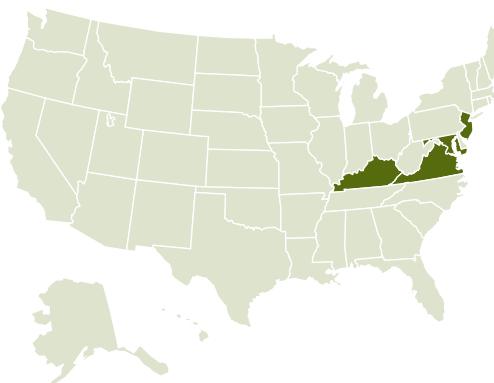
### PRIME CONTRACTOR(S)

**JCALS:** Computer Sciences Corporation (Morristown, NJ)

**SBIS and DMS-A:** Lockheed Martin (Bethesda, MD)

**ARISS:** EDS (Fort Knox, KY)

**GCSS-A:** GRCI (Tyson's Corner, VA)



\* See appendix for list of subcontractors



# Standardized Integrated Command Post (SICPS)

5 ton Expansible Van CP



Rigid wall shelter CP



Soft Top HMMWV CP



Track Vehicle CP

Tent CP



## MISSION

House the Army Battle Command System across all Battlefield Functional Areas (BFA).

## DESCRIPTION AND SPECIFICATIONS

The Standardized Integrated Command Post (SICPS) is a family of standard command post (CP) facilities. The family includes a Tent CP, a Rigid Wall Shelter (RWS) CP, a Track Vehicle CP (M1068), a 5-Ton Expansile Van CP, and a Soft Top HMMWV CP.

**Tent CP:** The Tent CP is eleven by eleven feet and is supported by a three-piece aluminum frame, with interchangeable fabric sidewalls. Any of these can be removed when attaching two or more tents. The Tent CP is fielded with two tables, mapboards, and a fluorescent light set. It can be attached to any of the other SICPS variants, except the 5-Ton Expansile Van CP, by replacing one sidewall with an interface boot wall.

**Rigid Wall Shelter CP:** This CP mounts on the HMMWV shelter carrier (M1097) and is powered by an on-board ten kW generator. Components include: equipment racks, internal lighting and blackout, power and signal import/export panels, internal wiring/cabling, vehicular intercom system, 18000 BTU environmental control unit, chemical/biological protection, electromagnetic interference shielding, and Quick Erect Antenna Mast. The CP provides workspace for two-each Command, Control, Communications, Computers and Intelligence (C4I) workstations and operators.

**Track Vehicle CP:** This is a modification of the existing M577 track vehicle to the M1068 CP vehicle. Added components include: an on-board five kW generator, equipment racks, internal lighting, power and signal import/export panels, internal wiring/cabling, vehicular intercom system, QEAM, and workspace for two-each C4I workstations and operators.

**5-Ton Expansile Van CP:** An installation kit, M-2780/G, for the existing 5-Ton Expansile Van (M934A2) provides equipment racks, internal lighting and blackout, power and signal import/export panels, internal wiring/cabling, QEAM, and workspace for four-each moveable C4I workstations and operators.

**Soft Top HMMWV CP:** An installation kit, M-2727/G, for existing HMMWV, provides equipment racks, internal lighting and blackout, power and signal import/export modules, internal wiring/cabling, mount for QEAM, and workspace for two-each C4I workstations and operators.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

**Tent CP:** In production. One tent delivered with each RWS and M1068.

**RWS CP:** 250 Version 1 shelters delivered to Battlefield-Functional Areas (BFA) and Tactical Operations Centers (TOC). 275 Version 4s on contract. Deliveries began in March 1998.

**Track CP:** 200 of 330 on contract delivered to BFA and TOCs. Follow-on contract scheduled for February 1999.

**5-Ton Expansile Van CP:** Sixty-six on contract with TYAD. Deliveries began August 1998.

**Soft Top HMMWV CP:** 130 of 160 on contract delivered to BFA and TOCs.

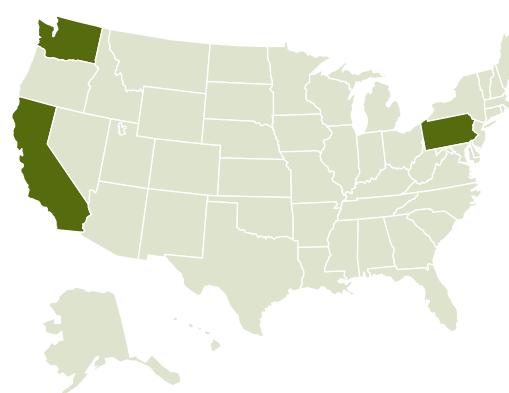
## PROJECTED ACTIVITIES

Continue to deliver platforms to BFA and TOCs to support ATTCS fieldings.

## PRIME CONTRACTOR(S)

**Systems Support:** RDA (Tacoma, WA); **M1068 Installation Kits:** FMC (United Defense L.P.), (San Jose, CA);

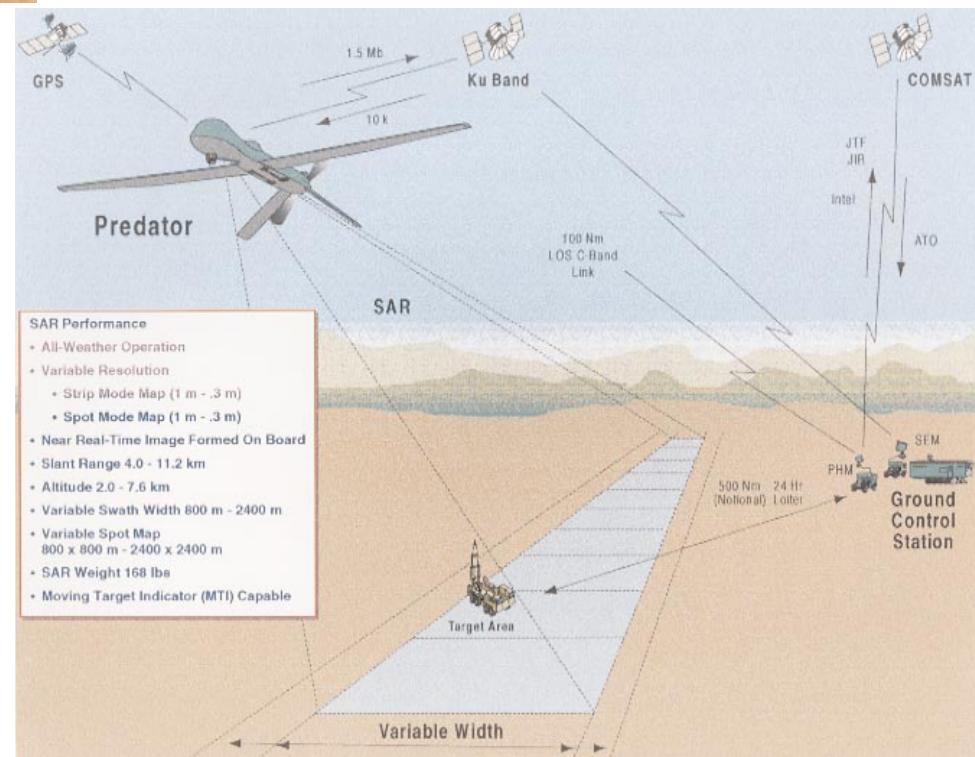
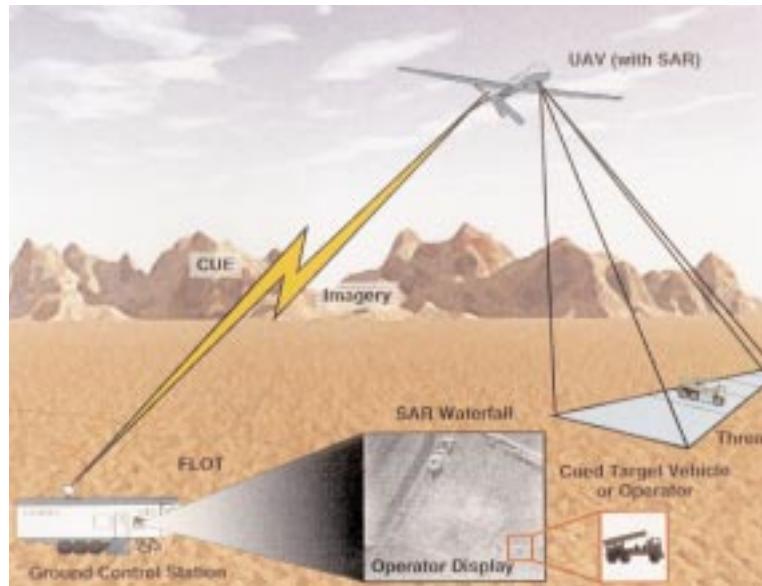
**RWS:** Gichner Shelter System (Dallastown, PA)



\* See appendix for list of subcontractors



# Tactical Endurance Synthetic Aperture Radar (TESAR)



## MISSION

Provide the Air Force's Predator Air Vehicle with continuous all-weather coverage of worldwide targets; support long endurance missions at significant operational ranges.

## DESCRIPTION AND SPECIFICATIONS

The Army's Tactical Endurance Synthetic Aperture Radar (TESAR) is key to the OSD-sponsored Predator 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 lbs and provides high resolution (1 ft). The payload performs aerial image formation processing and downlinks continuous high-quality, strip-map imagery (800 m wide). The one foot to three foot, operator-selected, variable resolution imagery is downlinked, analyzed and distributed to the user. Collected data is stored in the ground station, and selected images are disseminated via satellite link to various intelligence nodes. An additional Moving Target Indicator (MTI) mode is being developed and could be installed on the Predator.

The Synthetic Aperture Radar Target Recognition and Location System (STARLOS) is the TESAR Target detection/recognition system, an Advanced Technology Demonstration (ATD) which has produced a realtime Aided Target Recognition (AiTR) Technology. STARLOS provides for the integration of sensor and signal processing. Using new and emerging systems, it demonstrates reduced sensor-to-shooter timelines and enhanced identification against mobile, time-critical ground targets at deep and extended ranges.

Currently STARLOS is being used in concert with the TESAR sensor. The STARLOS program is actively involved in the progression of the STARLOS technology with the next generation TESAR sensor, applied to the Tactical Unmanned Aerial Vehicle (TUAV). TUAV systems with reconnaissance, intelligence and target acquisition objectives will man the battlefield of the 21st century. AiTR is a high priority element for the TESAR payload on the TUAV. The implementation of the AiTR capability will enable tactical ground control operators to perform their mission efficiently and will give them more time to focus on the dynamics of the ongoing mission without missing critical targets.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

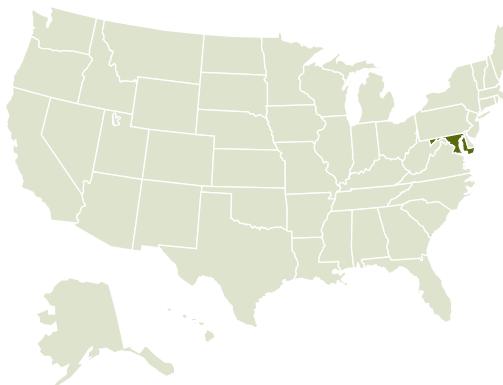
Twenty-two TESAR payloads, seven Ground Control Station (GCS) racks and spares have been delivered to General Atomics for integration in Predator systems. Thirty additional TESAR payloads and four additional GCS racks are currently on contract.

## PROJECTED ACTIVITIES

- Continue production of TESAR payloads and GCS racks.
- Predator initial operational test and evaluation (IOTE) scheduled for 3QFY99.

## PRIME CONTRACTOR(S)

Northrop Grumman (Baltimore, MD)



\* See appendix for list of subcontractors



# Tactical Exploitation System (TES)



## 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 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 TENCAP functionality in a single, integrated, scaleable system designed for split-based operations. TES is designed for split-based deployment and will consist of Forward and Main elements. TES Forward is a highly mobile, HMMWV-based element configuration, and the 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 a 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 set-up/tear-down and C-130 drive-on/drive-off capability to support rapid deployment.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

The TES preliminary design review (PDR) was completed in December 1997. The TES critical design review (CDR) was completed in May 1998. The TES Review was completed with the TENCAP General Officer Steering Committee in November 1998.

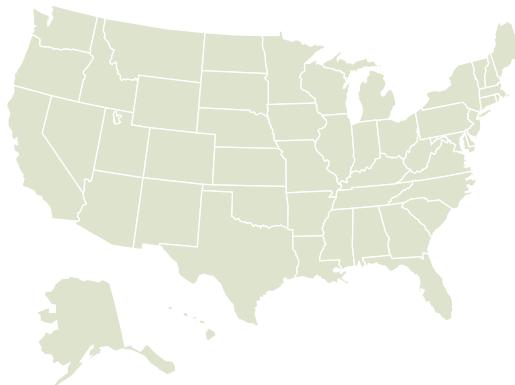
## PROJECTED ACTIVITIES

**4QFY99** Fielding of TES #1 Forward to XVIII Airborne Corps.

**3QFY00** Fielding of TES #1 Main to XVIII Airborne Corps in April 2000.

## PRIME CONTRACTOR(S)

Classified.



## Tactical Operations Centers (TOC)



## MISSION

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

## DESCRIPTION AND SPECIFICATIONS

Tactical Operations Centers (TOC) incorporate Army Battle Command Systems, standard vehicles, shelters and tentage, and are transportable in military aircraft. TOCs are digitized, tactically mobile, and fully integrated. Military off-the-shelf (MOTS), non-developmental items (NDI), commercial off-the-shelf (COTS), and emerging technologies are incorporated, and the centers are Defense Information Infrastructure Common Operating Environment (DII/COE) and Joint Tactical Architecture-Army (JTA-A) compliant.

TOCs are interoperable across all Army mission areas and Joint/Allied mission nodes, and provide a common operational picture. TOCs also provide "Jump" or split-based operations, and command and control protection. They are modular and highly reconfigurable.

Operations are revolutionized through a combination of state-of-the-art data processing, communications, and information transport methods, using tactical internetting, and the latest networking capabilities. Information dominance is achieved through the orderly evolution of capabilities; these were demonstrated during Army Warfighting Experiments, Advanced Concept Technology Demonstrations (ACTD), collaborative planning, Advanced Technology Demonstrations (ATD), improved displays, communication, and data transfer.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

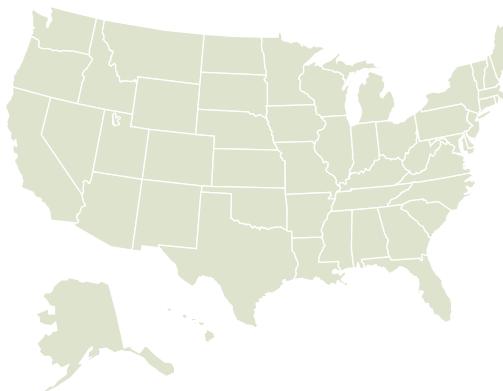
The TOC program was established in January 1997. The Final division system architecture was completed in 4QFY98. The program acquisition strategy was completed in 4QFY98 and a request for proposal (RFP) was issued on September 4, 1998.

## PROJECTED ACTIVITIES

- 2QFY99** Projected contract award.
- FY00** Planned fielding to first digitized division (FDD).
- FY03** Complete fielding to second digitized division (SDD).
- FY04** Field digitized corps.

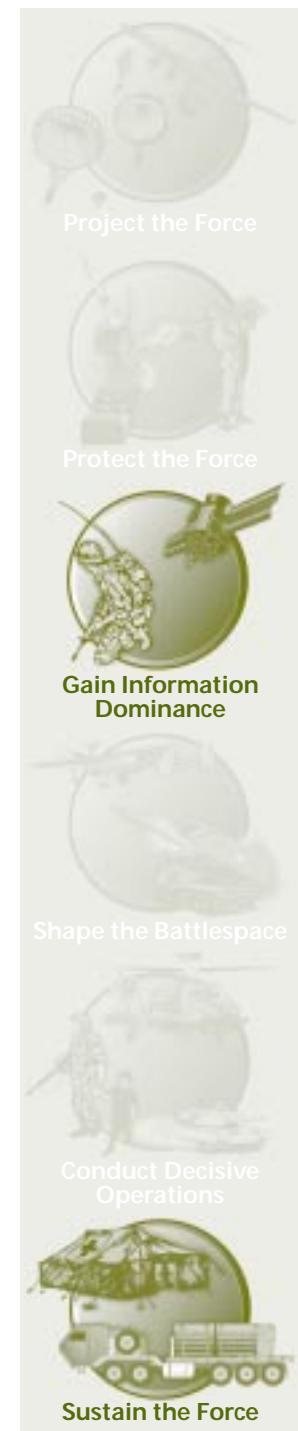
## PRIME CONTRACTOR(S)

To be determined.



# Tactical Quiet Generators (TQG)





## MISSION

Provide lightweight, more efficient, reliable, and survivable electric power generator sets to units and equipment in a field environment.

## DESCRIPTION AND SPECIFICATIONS

Tactical Quiet Generators (TQG) are the new DoD Standard Family of tactical electric power sources, providing DoD with “single fuel” generator sets that:

- Are more reliable (500–600 hours MTBF).
- Provide improved mobility (decreased weight/cube).
- Reduce noise (to 70dBA @ 7m) and infrared (IR) signature.
- Are survivable in a nuclear environment.
- Provide quality electric power for command posts, C4I systems, weapon systems, logistics and maintenance functions, and other battlefield support equipment.

The newly type-classified—Standard diesel 2kW Military Tactical Generator (MTG) meets this need. It is the latest addition to the DoD Standard Family, and will replace the existing 1.5kW MIL-STD gasoline engine generators and some 3kW MIL-STD generators. Assembly of Power Units and Power Plants (PU/PP) (trailer-mounted generator sets), and procurement of 5kW 28-Volt DC and 10kW Shelter-Mounted Auxiliary Power Units (APUs) continues. 920kW Deployable Power Generator and Distribution System (DPGDS) development is underway. The 30/60kW TQG Re-Engine procurement for new EPA-compliant diesel engines and digital controls/displays continues. engineering and manufacturing development (EMD) for 100kW and 200kW TQGs is ongoing.

## FOREIGN COUNTERPART

No known foreign counterpart; however, the 2kW MTG was originally manufactured in Canada and bought by the Canadian Ministry of Defense. It has been adapted by the U.S. DoD.

## FOREIGN MILITARY SALES

TQGs have been obtained by: Bahrain, Brunei, Canada, Columbia, Egypt, Greece, Honduras, Israel, Korea, Kuwait, Portugal, Spain, Saudi Arabia, Taiwan, Thailand, Tunisia, Turkey, United Arab Emirates, and New Zealand.

## PROGRAM STATUS

**5-60kW TQGs:** Force Package (FP) 1 fielding completed (over 10,000 sets); FP 2 and Data Interchange (DI) Fielding continues.

**2kW MTG:** Began production deliveries and fielding.

**3kW MTG:** Began production deliveries and fielding.

**30/60kW TQG Re-Engine:** First article test.

**100kW and 200kW TQGs:** Phase I EMD (multiple contractors prototypes) award.

## PROJECTED ACTIVITIES

**5-60kW TQGs:** FP 2 and Data Interchange (DI) fielding continues.

**2kW MTG:** FP1 fielding continues.

**3kW TQG:** Continue testing.

**30/60kW TQG Re-Engine:** Production release.

**100kW and 200kW TQGs:** Phase II EMD single contractor prototype award.

## PRIME CONTRACTOR(S)

**5-60kW TQGs and 3kW TQG:** Fermont (Bridgeport, CT)

**2kW MTG:** Dewey Electronics (Oakton, NJ)

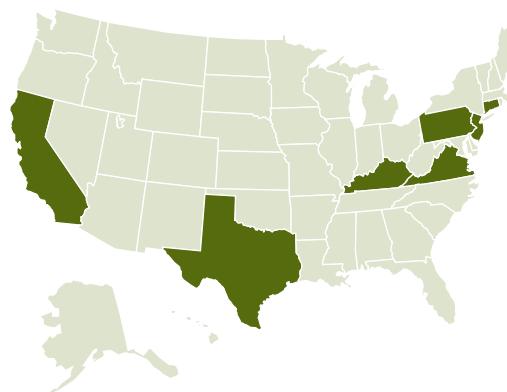
**30/60kW TQG Re-Engine:** MCII (Dallas, TX)

**5kW 28VDC APU:** Goodman Ball (Menlo Park, CA)

**10kW APU:** KECO Industries (Florence, KY)

**100kW and 200kW TQG:** To be determined.

**DPGDS:** Radian (Alexandria, VA)



\* See appendix for list of subcontractors

# Tactical Simulation Interface Unit (TSIU) (WRAP Candidate)



## MISSION

Provide an interface between simulation/simulators and elements of the Army Battle Command System (ABCs) and other automated command and control systems; Provide staff and commanders the opportunity to train, rehearse missions, or refine tactics, techniques and procedures (TTP), at Command, Control, Communications, Computers and Intelligence (C4I) workstations, and as a collective battle staff.

## DESCRIPTION AND SPECIFICATIONS

The Tactical Simulation Interface Unit (TSIU) generates tactical messages compatible with elements of the Army Tactical Command and Control System (ATCCS), Force XXI Battle Command Brigade and Below (FBCB2), and the Global Command and Control System (GCCS). These messages originate in simulation or simulators supported by the Distributed Interactive Simulation (DIS) standard. Signal Protocol Data Units (PDUs), or Command and Control Simulation Interface Language (CCSIL) messages transport data from simulation/simulators to the TSIU. The TSIU provides two-way message traffic between the tactical system and the simulation environment. The system runs on a SUN platform and can provide messages via local area networks (LANs) or serial links. The TSIU supports the following protocols: Variable Message Format (VMF); Joint Variable Message Format (JVMF); United States Messages Text Formats (USMTF); Moving Target Indicator and Position (MTI); Tactical Data Link-B (TADIL-B); Tactical Data Link-A (TADIL-A); Tactical Data Link-J (TADIL-J); Tactical Information Broadcast Service (TIBS); TRAP Data Dissemination System (TDDS); and FAAD Data Link (FDL). The TSIU is deployable for training purposes worldwide.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

Transition of the TSIU to the High Level Architecture (HLA) protocol, and compliance with the Joint Technical Architecture (JTA) have begun. An upgrade to send data via tactical radio is in progress. Atlantic Command, Central Command, European

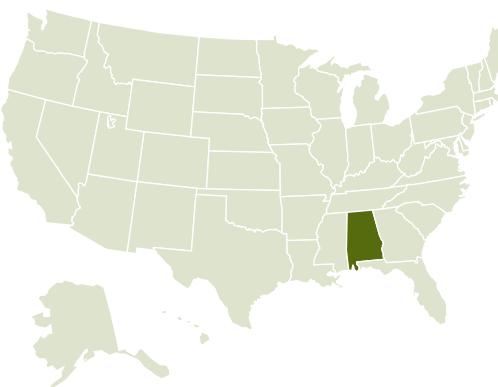
Command, U.S. Forces Korea, Forces Command, Army Space Command, and TRADOC currently use the TSIU. Integration with the Close Combat Tactical Trainer (CCTT) and the Aviation Combined Arms Tactical Trainer (AVCATT-A) was demonstrated to the Secretary of the Army in October of 1998. Improvements for FY99 will include Defense Information Infrastructure Common Operating Environment (DII/COE) and COMPASS upgrades, and increased message capability.

## PROJECTED ACTIVITIES

- Roving Sands.
- Southern Watch.
- Joint Project Optic Windmill.
- Provide units with leave-behind capability and sustainment training.
- Synthetic Theater of War-Army (STOW-A).
- Integrate with JANUS.
- RAH-66 TTP.

## PRIME CONTRACTOR(S)

The TSIU is government-owned software and is maintained by the Space and Missile Defense Battle Lab (SMDBL) (Huntsville, AL). SMDBL's prime contractor for this project is Coleman Research Corporation.



\* See appendix for list of subcontractors



# Tactical Unmanned Aerial Vehicle (TUAV)



Hunter



Outrider



## MISSION

Provide Reconnaissance, Surveillance, and Target Acquisition (RSTA) to U.S. Army Brigades and Regiments at a range up to 200 km, day or night, and in limited adverse weather conditions.

## 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 less than prudent. The TUAV system consists of two Ground Control Stations (GCS); one Remote Video Terminal (RVT); four Air Vehicles (AVs); Modular Mission Payloads (MMPs); and launch and recovery equipment.

The Ground Control Station collects, processes, analyzes, and distributes digitized battlefield information by interfacing with present and planned Service Command, Control, Communications, and Intelligence (C3I) systems. Flight and mission commands are sent to the AVs from the GCS. RSTA imagery and AV position data are sent by downlink directly to the GCS or RVTs located in tactical operations centers. The TUAV is transportable by one C-130, with a roll-on, roll-off capability. Mission capability will be enhanced as advanced mission payloads become available, maximizing battlefield digitization to increase the effectiveness of other weapon systems.

## FOREIGN COUNTERPART

Israel has considerable experience with UAVs; the TUAV specifications, however, and the requirements that it meets, make it unique.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

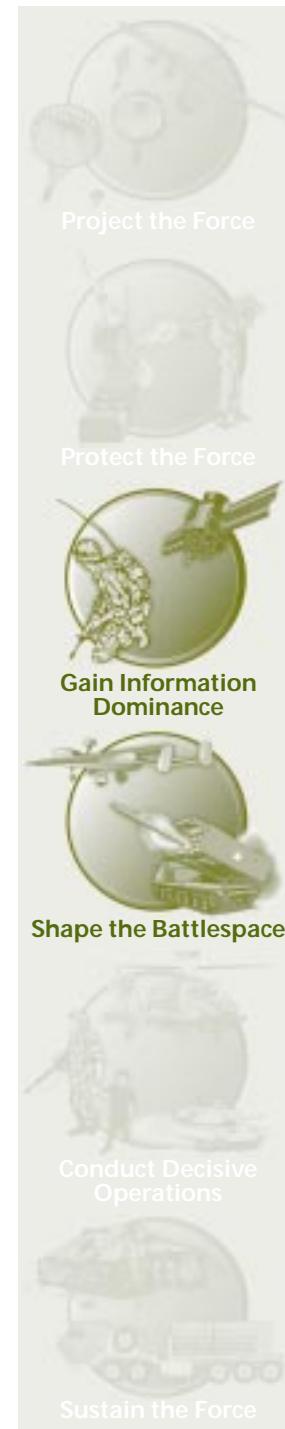
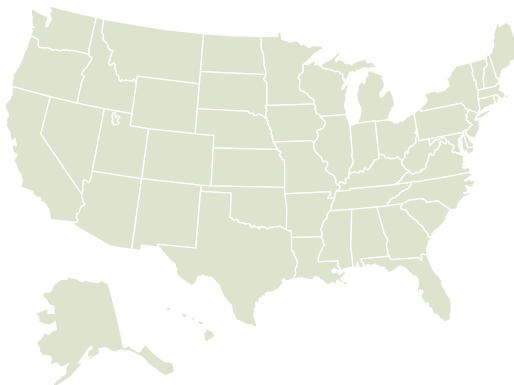
A full and open competition will be pursued in FY99 for a commercial-off-the-shelf TUAV system.

## PROJECTED ACTIVITIES

- The Army will field residual demonstration TUAV systems left from prior development programs.
- The Army expects to begin a competitive process in March 1999, culminating in an extensive fly-off, beginning in July of 1999.

## PRIME CONTRACTOR(S)

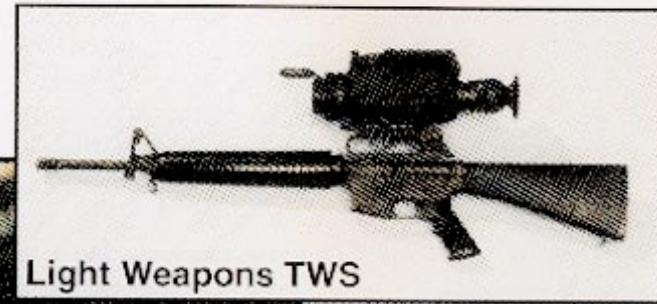
To be determined.



# Thermal Weapon Sight (TWS)



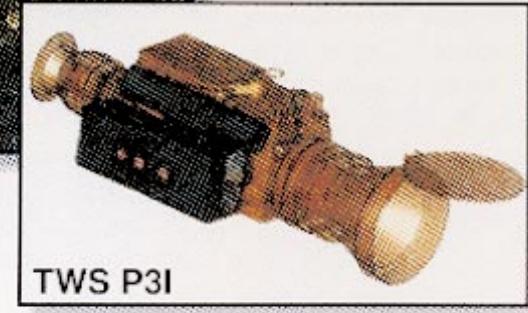
Medium Weapons TWS



Light Weapons TWS



Heavy Weapons TWS



TWS P3I



## MISSION

Provide the U.S. Army Infantry with the ability to continue day or night operations during degraded visual conditions caused by smoke, fog, or dust.

## DESCRIPTION AND SPECIFICATIONS

The AN/PAS-13 Thermal Weapon Sight (TWS) enables the soldier to see deep into the battlefield, increases surveillance and target acquisition range, and penetrates obscurants, day or night. With this capability, individual and crew-served weapon gunners will truly "own the 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 MBS (TWS with Land Warrior LRF/DCA) will incorporate a rangefinder, compass, vertical angle, cant measurement, and aimpoint adjustment for ballistic solution. TWS is concluding limited production and is ready for full-rate production (FRP).

TWS Family	Range	Weight	Field of View	Weapons Supported
<b>Light Wpns **</b>	550 m	3.25 lb	15°	M16, M4, M203, M136
<b>Medium Wpns</b>	1100 m	4.5 lb	9° and 15°	above plus M249, M60, M240B
<b>Heavy Wpns</b>	2200 m	5.0 lb	3° and 9°	M2, MK19, M24, M16 Squad Ldr

\*\* Light Wpns TWS requirement may be dropped.

Those weapons are supported by the Medium Wpns TWS.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

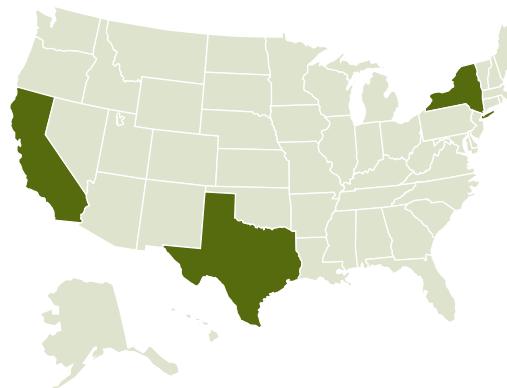
TWS limited production (LP) concluding; TWS "Bridge" production beginning; Thermal Omnibus FRP contract awarded.

## PROJECTED ACTIVITIES

- TWS MBS effort for Laser Rangefinder/Digital Compass Assembly (LRF/DCA) is being pursued.
- PY2 Thermal Omnibus Award (options may include LTWS).

## PRIME CONTRACTOR(S)

Raytheon (Hughes Aircraft Company EOS) (Dallas, TX)



\* See appendix for list of subcontractors

# Warfighter Information Network-Terrestrial (WIN-T) Switches

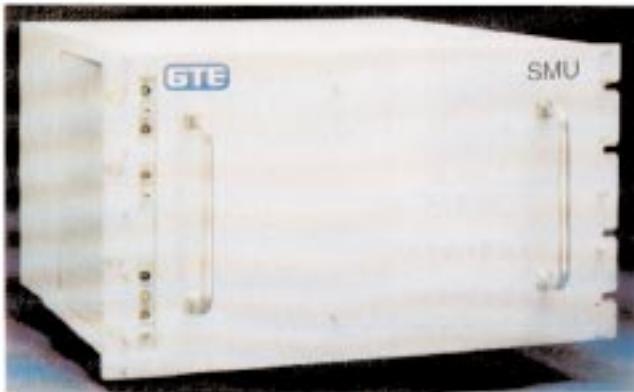
**Compact Digital Switch (CDS)**



AN/TTC-39D W/PS

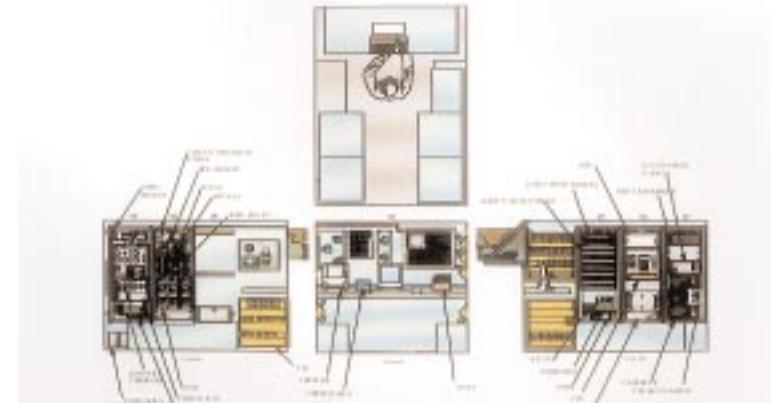


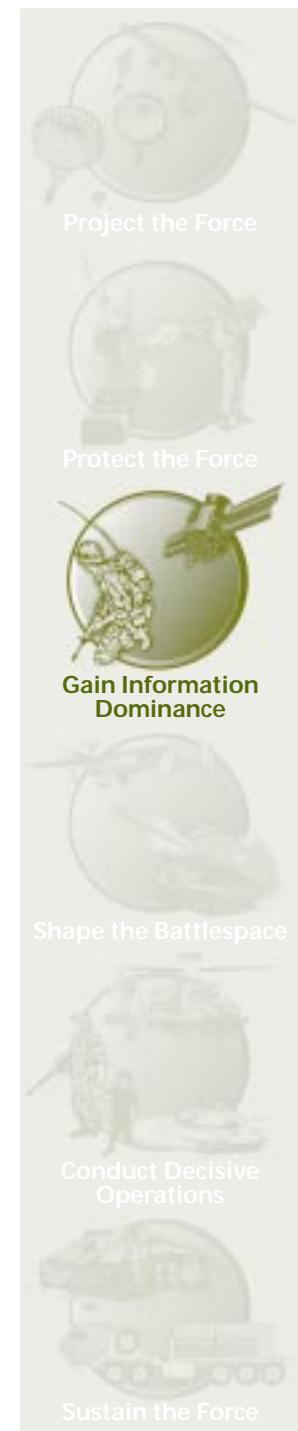
**Switch Multiplexer Unit (SMU)**



AN/TTC-56(V)1  
SSS  
Shelter Layout

LAST CHANGE : 1-HCT 98





## MISSION

Improve the tactical communications infrastructure; significantly reduce the amount of lift assets required to deploy Signal Forces into the area of operation.

## DESCRIPTION AND SPECIFICATIONS

PM Warfighter Information Network-Terrestrial (WIN-T) Switches is fielding two new switches—the Compact Digital Switch (CDS) and the Switch Multiplexer Unit (SMU)—which are the results of downsizing the existing thirty-nine circuit switches. The goal is to provide easier transportability for rapid mobilization and increased mobility of a network that supports Command and Control On-the-Move (C2OTM). A third switch, the Single Shelter Switch (SSS), is being downsized, and the AN/TTC-39D switch is being cascaded to the reserve components.

**AN/TTC-39D.** The mission of the AN/TTC-39D is to serve as a gateway switch (interface) between Mobile Subscriber Equipment (MSE) systems deployed at echelons at corps and below (ECB) and other Joint Service switches deployed at echelons-above-corps (EAC). It is a transportable automatic switching system. The circuit switch also has a routing function that provides a means for locating subscribers in a network. This is accomplished using a method called “Flood Search.” Other characteristics include a deducible numbering plan, affiliation, trunk selection, classmark and service features, precedence, preemption, conferencing to include progressive and preprogrammed, compressed dialing call forwarding, secure call mode/key conversion, direct access service, and ESOP.

**CDS.** The CDS is a small, lightweight, stand-alone circuit switch designed for rapid deployment. It is used by Army and Air Force Contingency Forces in support of Special Operation Forces (SOF).

**SMU.** The SMU can be assembled in a transit case configuration, capable of being carried by four personnel, or easily mounted into rack configurations. It can interface with and accommodate a wide range of communication systems and equipment, both tactical and strategic, via a T1/CEPT2 circuit card. The SMU is employed in the Tri-band Satellite Terminal, Common Air Defense Communications Interface (CACDI), Patriot Fire Control Shelter, U.S. Navy Flag Ships (Blue Ridge and Mount Whitney), Kuwait Air Defense Shelters, Marine Signal Battalions, and at Strategic Tactical Entry Points (STEPS) Sites.

**SSS.** The mission of the Single Shelter Switch (SSS) is to serve as a gateway switch (interface), between MSE systems deployed at ECB and other Joint Service Switches deployed at EAC. It is a downsized HMMWV-mounted version of the AN/TTC-39D.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

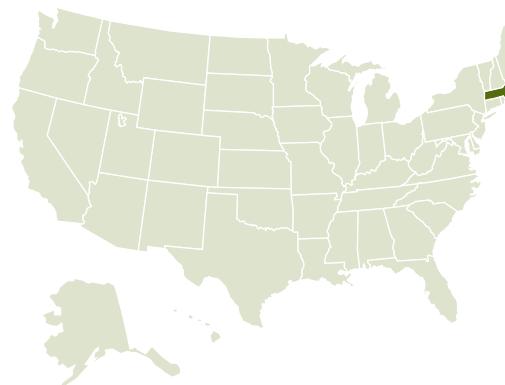
- The CDS and SMU programs are presently in production. They can be acquired from the Tactical Switch Requirements Contract, DAAB07-97-D-F758.
- The Single Shelter Switch program is in production (seventeen units presently being built by GTE).
- The AN/TTC-39D fieldings are complete.

## PROJECTED ACTIVITIES

The AN/TTC-39D will be re-distributed to Guard and Reserve units after they are displaced by fielding of the Single Shelter Switch.

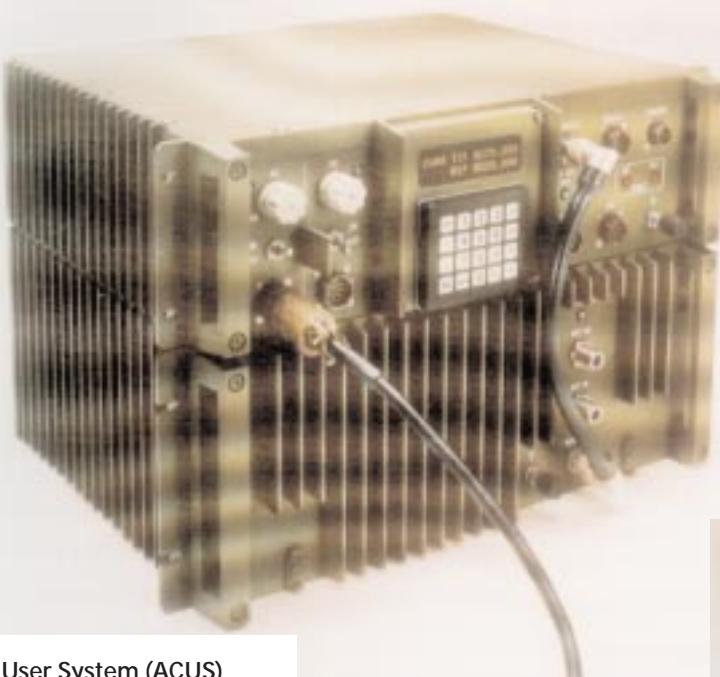
## PRIME CONTRACTOR(S)

**CDS, SMU, SSS, and AN/TTC-39D:** GTE Government Systems Corporation (Taunton, MA)



\* See appendix for list of subcontractors

## ACUS Radio Modernization Program



Army Common User System (ACUS)



High Capacity Line of Sight (HCLOS) Radio

## MISSION

Provide switching and data transmission capability for the U.S. Army's Area Common User System (ACUS).

## DESCRIPTION AND SPECIFICATIONS

The High Capacity Line of Sight (HCLOS) Radio replaces the existing AN/GRC-226 radios in the AN/TRC-190 LOS shelter family. The HCLOS radio will provide the larger transmission "pipes" required to transport the increased volume of data on the digital battlefield. It will support full duplex digital traffic at rates of up to 8192 kbps per second and distances up to forty km. It provides high bandwidth efficiency and low bit-error rate. The radio will operate in both Band I (225–400MHz) and Band III+ (1350–2690 MHz). The radio is controlled by a menu-driven keypad. Modified radio software can be downloaded from a personal computer for field upgrades. The multiplexer will be enhanced and a fiber optic capability will be added. A new Band III+ antenna will be provided.

The Army Common User System (ACUS) Asynchronous Transfer Mode (ATM) upgrade provides the first step in increasing data and video capacity on the digitized battlefield. The ACUS ATM upgrade is a two-phase program that fills the gap while tactical communications is transitioned from current legacy capabilities to the objective Warfighter Information Network-Terrestrial (WIN-T) capabilities. Phase I of this upgrade provides a Division Slice upgrade to the 4th Infantry Division's (ID) 124th Signal Battalion Mobile Subscriber Equipment (MSE) Equipment. This upgrade utilizes commercial-off-the-shelf (COTS) ATM switches and COTS Routers. Forward Error Correction (FEC) is provided to adapt ATM to the inherently "dirty" tactical line-of-sight radio systems. Interface to legacy systems is retained for both voice and data. Phase 2 of the program will provide increased data communications bandwidth to the First Digitized Division (FDD) and First Digitized Corps (FDC) at Ft. Hood, TX. For FDD/FDC the upgrades will provide larger "pipes," simplify the Soldier Machine Interface, provide a scalable data network, automate addressing schemes for data subscribers, provide standardized Battlefield Video Teleconference transport, increased network security, and improved network management.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

Similar ATM upgrades are planned for the Improved Mobile Subscriber Equipment (IMSE) being sold to Taiwan.

## PROGRAM STATUS

The HCLOS contract was awarded to Canadian Marconi Company in 3QFY98. The initial order will provide hardware adequate to equip FDD during 3QFY00. Operational testing and fielding to the unit will be completed in 4QFY00. The ACUS ATM Upgrade Phase 1 was awarded in October 1996 and will begin fielding to Ft. Hood in January 1999. The FDD/FDC contract was awarded in June 1998. The FDD unit at Ft. Hood will be fielded beginning in April 2000. Contract options are available for FY99 and FY00 to procure and field the balance of FDC.

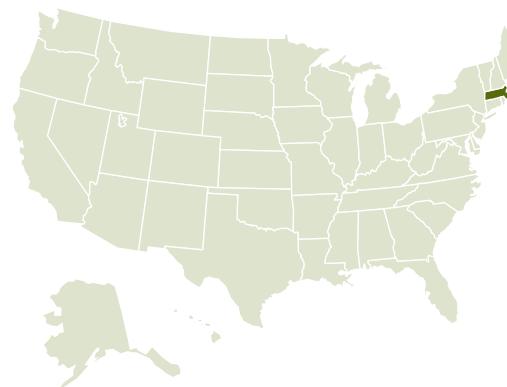
## PROJECTED ACTIVITIES

- As funding becomes available, the HCLOS radio will be installed in remaining Echelon Corps and Below (ECB) units. It is also expected to be the baseline for the WIN objective system.
- The ATM fielding of the Phase 1 "slice" to the 4th ID begins in 2QFY99; Award of FY99 option in 1QFY99; Field FDD in 3QFY00.

## PRIME CONTRACTOR(S)

**HCLOS:** Canadian Marconi Company (Ville Saint-Laurent, Quebec, Canada)

**ATM:** GTE Government Systems Corporation (Taunton, MA)



\* See appendix for list of subcontractors



## AIR/LAND ENHANCED RECONNAISSANCE AND TARGETING (ALERT) ADVANCED TECHNOLOGY DEMONSTRATION (ATD) (1998–2001)

The ALERT ATD will demonstrate on-the-move, automatic-ic-aided target acquisition and enhanced identification via the use of a second-generation forward-looking infrared sensors (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 high-speed flight or mobile ground operations. Range profiling of the highest priority detections will dramatically reduce false alarms and provide enhanced target identification. This technology will provide a dramatic increase in performance over current automatic target cues (ATC), such as the Comanche ATC, that rely on a single infrared sensor and have limited capability to distinguish target types, are limited by false alarms, and are severely degraded in on-the-move operations. The ALERT ATD supports Battlefield Digitization.

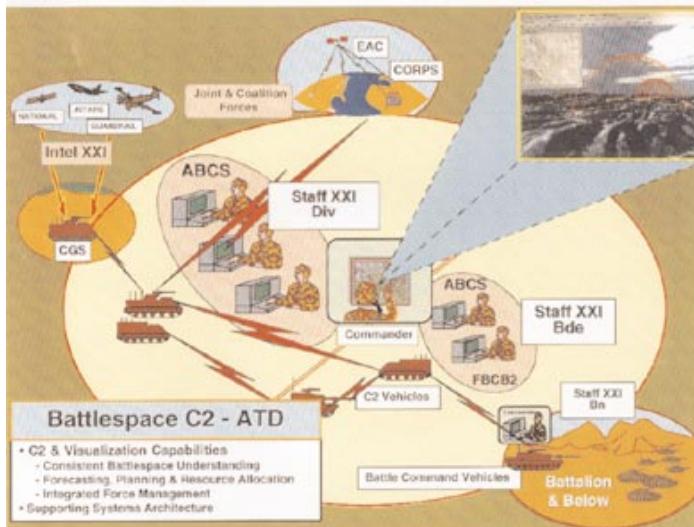
## BATTLESPACE COMMAND AND CONTROL ADVANCED TECHNOLOGY DEMONSTRATION (ATD) (1997–2000)

The objective of the Battlespace Command and Control ATD is to demonstrate, through modeling, simulation, and experimentation with the user, critical solutions leading to a Command and Control and Battlefield Visualization prototype. This prototype will provide software tools and architecture to support: consistent battlespace understanding; forecasting, planning and resource allocation; and integrated force management for commander and staff. These capabilities will be integrated into the C4I systems architecture at Battalion through Division. Interoperability with Corps/Joint/Allied assets is a goal. This ATD will also explore the insertion of developed C2/BV software into Corps and Echelons above Corps. The BC2 ATD will provide C2/BV applications to the Rapid Terrain Visualization ACTD. BC2 ATD will provide technology options for upgrades to applications on the Army Battle Command System, including Maneuver Control System and Force XXI Battle Command Brigade and Below. It will also provide system and operational architectures that will reduce reaction and decision times. The Battlespace Command and Control (BC2) ATD supports Battlefield Digitization.

## INTEGRATED SITUATION AWARENESS AND TARGETING ADVANCED TECHNOLOGY DEMONSTRATION (ATD) (1999–2002)

The Army's Integrated Situation Awareness and Targeting (ISAT) program will develop integrated system concepts to enhance the warfighting effectiveness and efficiency of the recipient weapon system/team. ISAT will demonstrate an air-borne multi-spectral warning suite with precision location capabilities. ISAT will also demonstrate tactical EW's role in information and intelligence warfare (I2W) 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.

The cooperative integration of the radar, missile, and laser warning spectrums will produce this “picture,” thus enabling reduced decision timelines for defensive/offensive actions, rerouting/threat avoidance, target acquisition/ID and anti-fratricide. Operationally, ISAT will provide our warfighters at the crew level and above with a significant advantage. We will have increased awareness of the environment around the aircraft and at higher echelons. This enables better and more rapid decision-making while on the move. Increased awareness will reduce risk to warfighters, whether dispersed or in



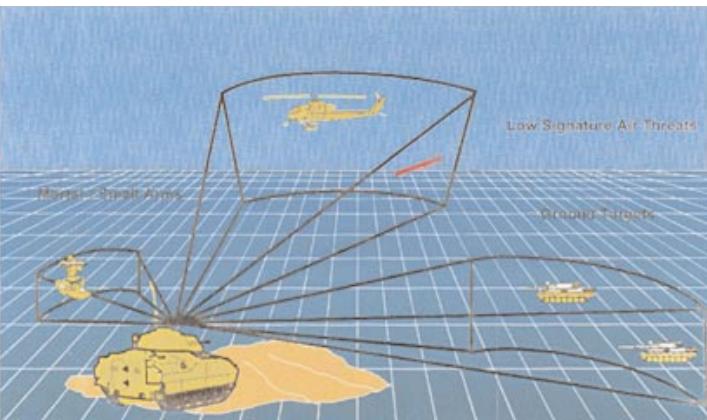
close proximity. The multi-spectral warning suite will enhance the detectability of targets across the battlespace, improving engagement ranges and providing other options for enemy suppression. The precision emitter location capability will increase the effectiveness and efficiency of the warfighter. These advances will also aid the warfighter in the areas of combat identification and system/team survivability.

### **LOGISTICS COMMAND AND CONTROL ADVANCED TECHNOLOGY DEMONSTRATION (ATD)**

The Logistics Command and Control Advanced Technology Demonstration (ATD) will revolutionize the tactical decision making process for Army logisticians, through development, demonstration, and transition of software products to enhance Combat Service Support (CSS) decision-making capabilities. The Log C2 ATD will attain real-time planning and situation data visualization through interfacing with current and emerging CSS systems. The Log C2 ATD will provide data to commanders to enhance 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 the one-hour Force XXI decision cycle. Complete access to automated CSS data will be available, down to the unit level. The Log C2 ATD supports the Army Global Combat Service Support (AGCSS) System.

### **MULTI-FUNCTION STARING SENSOR SUITE ADVANCED TECHNOLOGY DEMONSTRATION (ATD) (1998–2001)**

This ATD will demonstrate a modular, reconfigurable Multifunction Staring Sensor Suite (MFS3) that integrates multiple advanced sensor components, including staring infrared imager, a multi-function laser, and acoustic arrays. The MFS3 will provide ground vehicles, amphibious assault vehicles, and surface ships with a compact, affordable sensor suite for long range noncooperative target identification, mortar/sniper fire location, and air defense against low signature targets. The infrared imaging system will be configured to accommodate either visible-to-mid infrared or far-infrared focal plane arrays. As single focal planes capable of operating across the full optical spectrum mature, these may be inserted into the assembly. The staring infrared sensor will operate at high field rates to allow sniper and mortar detection in addition to the conventional target acquisition functions. Integration of a multi-function, multi-wavelength laser system will incorporate ranging, range mapping, target profil-



ing, and laser designation to support target location, target cueing, aided target identification, and target designation. An acoustic array will provide target cueing, location, and assist in automated targeting functions. The MFS3 supports: Future Scout Cavalry system, Future Infantry Vehicle, Future Combat System.

### **MULTI-MISSION UNMANNED AERIAL VEHICLE (MUAV) SENSOR ADVANCED TECHNOLOGY DEMONSTRATION (ATD) (1998–2001)**

The Multi-mission Unmanned Aerial Vehicle(MUAV) Sensors ATD will demonstrate modular and interchangeable electro-optic/infrared (EO/IR), multi-spectral, and integrated moving-target-indicator (MTI)/synthetic aperture radar (SAR) payloads for future tactical and short-range UAVs. These advanced, modular payloads will be form/fit/interface compatible and share common electronics, data link, and data compression. The common modular approach will include common down link data protocols for delivering image intelligence products to tactical control stations and common ground stations equipped with DARPA's semi-automated imagery processing capability. These advanced sensor payloads, coupled with ground station automated processing, will provide enhanced reconnaissance, surveillance, battle damage assessment, and targeting for brigade and below-manuever forces.

# Information Dominance Advanced Concept Technology Demonstrations (ACTD) and Advanced Technology Demonstration (ATD)

## ROTORCRAFT PILOT'S ASSOCIATE ADVANCED TECHNOLOGY DEMONSTRATION (ATD) (1993–1999)

The goal of the Rotorcraft Pilot's Associate(RPA) ATD is to significantly increase the mission effectiveness of our combat aviation systems. The RPA ATD program will establish revolutionary improvements in combat helicopter mission effectiveness, through the application of artificial intelligence for: cognitive decision aiding and integration of advanced pilotage sensors; target acquisition, armament and fire control; communications, cockpit controls and displays; navigation; survivability; and flight control technologies. Revolutionary mission equipment package technologies will be integrated with high-speed data fusion processing, and cognitive decision-aiding expert systems, to achieve maximum effectiveness and survivability for combat helicopter forces. The RPA will expand aviation's freedom of operation, improve response time for quick reaction and mission redirect events, increase the precision-strike capability for high-value, short-dwell-time targets, and increase day/night, all-weather operational capability. It will contribute greatly to the pilot's ability to see and comprehend the battlefield in all conditions; to rapidly collect, synthesize and disseminate battlefield information; and to take immediate and effective actions. The RPA ATD will demonstrate the following quantitative measures of performance, beyond Comanche-like baseline performance during 24-hour, all-weather battlefield conditions: a fifty-percent or greater improvement in lethality, a twenty-percent or greater improvement in OPTEMPO, and a thirty-percent or more

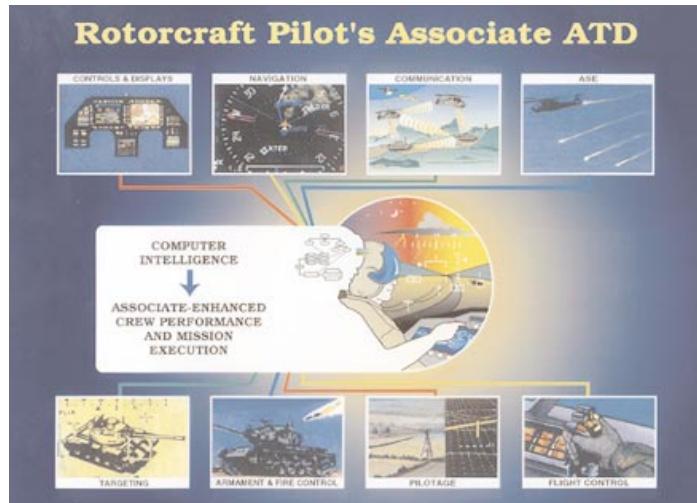
improvement in survivability. The RPA ATD supports the RAH-66 Comanche, AH-64 Apache, future Scout/reconnaissance systems, A2C2S and other dual-use programs.

## THE TACTICAL COMMAND AND CONTROL PROTECT (TCCP) ADVANCED TECHNOLOGY DEMONSTRATION (ATD)

The Tactical Command and Control Protect(TCCP) ATD will focus on the Army's ability to protect modern commercial-based tactical information networks, components and data. This ATD will leverage existing commercial-off-the-shelf technology and Department of Defense programs targeting network security technology. The objective of the ATD is to develop, integrate, and validate hardware/software tools, tactics and procedures that will secure the systems and networks of the Tactical Internet and the First Digitized Division, and to develop methods for conducting information warfare. The approach will be to develop tactical network protection and attack/assessment capabilities, then use the attack/assessment techniques against the protection mechanisms 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 TCCP ATD supports Battlefield Digitization.

## MILITARY OPERATIONS IN URBAN TERRAIN (MOUT) ADVANCED CONCEPT TECHNOLOGY DEMONSTRATION (ACTD) (1998–2002)

The joint Army/Marine Corps Military Operations in Urban Terrain (MOUT) ACTD will explore a breadth of technologies, based upon user requirements in the functional areas of command, control, communications, computers, and intelligence (C4I); engagement (lethal and non-lethal); force protection; and mobility. Technologies under consideration include advanced individual precision weapons, combat identification, counter-sniper, non-lethal weapons, advanced sensors, situational awareness, and personal protection. The core capability to be generated by the ACTD is an integration of advanced systems/components into a MOUT "system of systems" capability. Components will be interfaced, integrated, or linked in an architecture to ensure interoperability and functionality for increased performance at the soldier and unit level in the MOUT environment. The full exploitation of technologies will be achieved by the development of tactics, techniques, and procedures (TTPs) to employ new capabilities. A series of quarterly



experiments began in FY98 and will continue through FY00, culminating in the ACTD's major demonstration in 4QFY00, at Fort Benning and Camp Lejeune. The ACTD residual or interim capability will be provided to the participating operational units (the XVIII Airborne Corps/10th Mountain Division, and the 2d Marine Division MCSFLANT), and supported for Extended User Evaluation through FY01–02. The MOUT ACTD integrated, system of systems, approach will provide a robust and enhanced, joint operational capability to improve operational effectiveness in the MOUT environment.



### RAPID TERRAIN VISUALIZATION (RTV) ADVANCED CONCEPT TECHNOLOGY DEMONSTRATION (ACTD) (1997–2000)

The objective of the Rapid Terrain Visualization(RTV) ACTD is to demonstrate the technologies and infrastructure necessary to provide Digital Topographic Terrain Data V (DTED V) (1 meter) feature data and imagery over a 90x90 kilometer area in 72 hours. This high-fidelity data set will allow soldiers to "see" the roads, trees, hills and waterways and to visualize complex battlefield situations before the fight. It will enable commanders and their staffs to more effectively plan and rehearse missions, evaluate courses of action and maintain situational awareness, using two-dimensional and dynamic three-dimensional displays. The RTV ACTD will demonstrate a contingency capability for rapid collection of high-resolution DTED V in cooperation with DARO and the USAF. Feature data will be generated from multi-spectral and hyperspectral imagery collected by commercial and government sensor sys-

tems. The IFSAR data to generate DTED V will be rapidly processed by using a high-performance multi-computer. An integrated software package for rapid, semi-automated generation of a minimum set of key features will be developed. Transformation software will be integrated to tailor the terrain data for specific applications.

### THEATER PRECISION STRIKE OPERATIONS (TPSO) ADVANCED CONCEPT TECHNOLOGY DEMONSTRATION (ACTD) (1997–2003)

The Theater Precision Strike Operations(TPSO) ATCD is designed to enhance the theater commander's situational awareness and to significantly improve the warfighters' ability to conduct theater counterfire and precision strikes. The advanced technology in TPSO will be demonstrated initially in the Korean theater, with the full support and sponsorship of the Commander in Chief, United Nations Command (CINCUNC) and U.S. Forces Korea (USFK). The centerpiece of this effort will be to provide a new Command, Control, Communications and Intelligence (C4I) capability at the theater Army level. This will be achieved by integrating new technologies with the Army Battlefield Command Systems (ABCs), in a prototype Enhanced Deep Operations Coordination Center (EDOCC) that supports a new Army Service Component Command Headquarters organization.

The EDOCC will provide automation technologies to enable the Ground Component Commander (GCC) to plan, integrate, and synchronize joint and coalition deep operations, within the GCC commander's area of responsibility, in near-real-time coordination with the Air Component Commander, other Component Commanders, and Coalition Partners. The Joint Precision Strike Demonstration (JPSD) Project Office and the Depth and Simultaneous Attack Battle Lab (D&SABL) are the demonstration and operational managers, respectively, of this ACTD.

Demonstrations to evaluate the military utility of RTV ACTD technologies are being conducted with the XVIII Airborne Corps, Fort Bragg, NC, in close coordination with the Maneuver Support Battle Lab. Technologies that prove to have military utility during the demonstrations will be provided to the XVII Airborne Corps as leave-behinds in FY00, and supported through FY01. Technologies with potentially significant military value to other Army and Joint units will be demonstrated to those units during Army Warfighting Experiments.

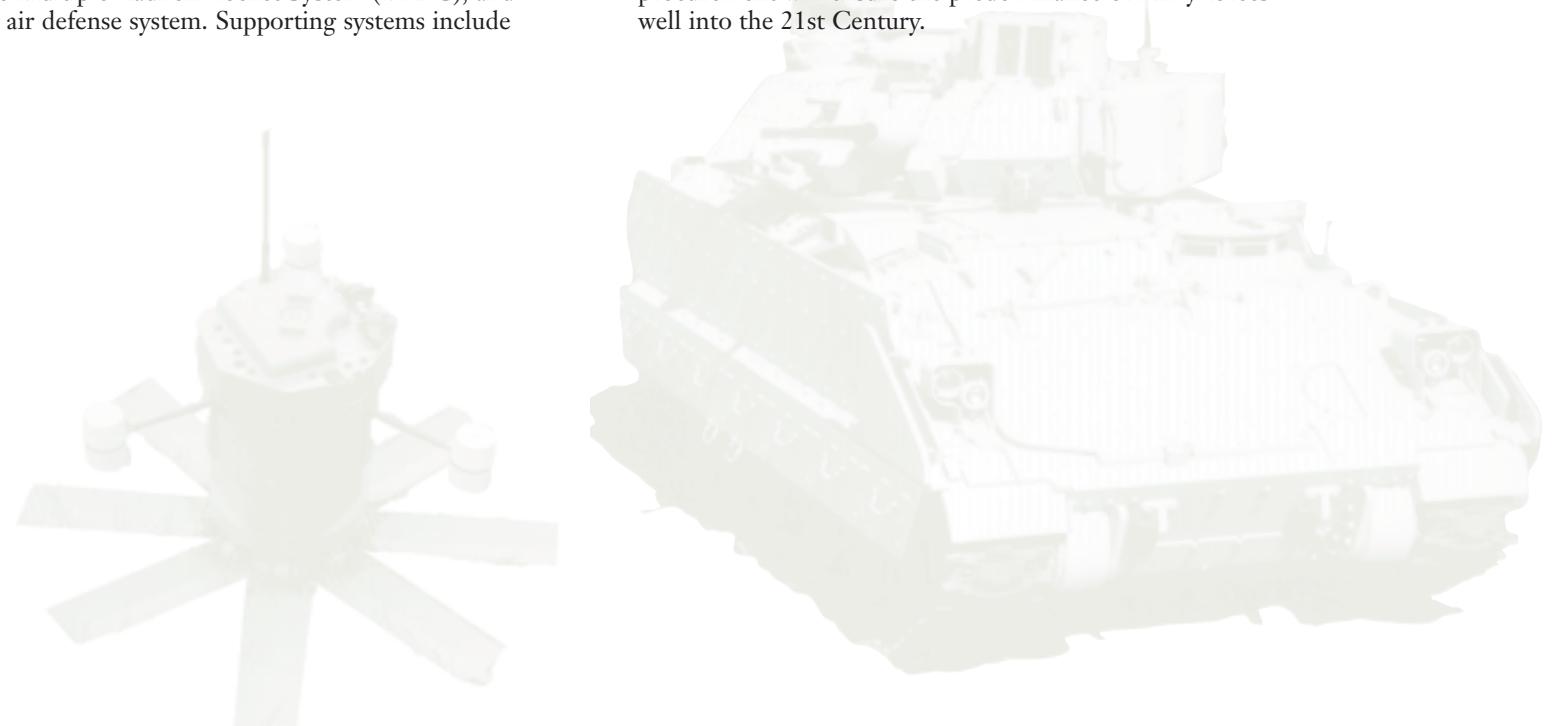
# Overmatch Capabilities

In both high-intensity combat environments and Operations Other Than War (OOTW), the close combat and precision engagement weapons systems employed by the United States Army have proven vastly superior to those of real and potential enemies. This advantage is enhanced by the Information Dominance capabilities provided by intelligence and C2 architectures, and results in a degree of superiority known as “Overmatch.” Overmatch is defined as “an advantage in combat capabilities over current and potential opponents by virtue of superior combat systems that employ advanced technologies.” Such dominance confers a tremendous deterrent value to Army forces, and should deterrence fail, leaves them without equal in ground combat operations.

Several key systems contribute to Overmatch Capabilities. Major combat systems include the Abrams tank, Bradley Fighting Vehicle, Longbow Apache and Black Hawk helicopters, the Multiple Launch Rocket System (MLRS), and the Patriot air defense system. Supporting systems include

precision engagement weapons such as Javelin and the Brilliant Anti-Tank (BAT) and Sense and Destroy Armor (SADARM) munitions. Together, these systems provide Army forces with a qualitative advantage in equipment over potential adversaries across the full range of operational environments.

Current combat systems overmatch must not only be retained but enhanced through tailored, on-going improvements. The Army is seeking to maintain its overmatch capabilities by funding improvements to its current fleet of tanks, armored vehicles, and helicopters. It is developing new, more lethal munitions to increase precision strike capabilities. In the next decade, the Overmatch Capabilities of Army forces will be further enhanced with the fielding of the Highly Mobile Artillery Rocket System (HIMARS), Hornet, Land Warrior, and others. This program of upgrades and new procurement will ensure the predominance of Army forces well into the 21st Century.



## Concept Exploration

## Program Definition and Risk Reduction

## Engineering and Manufacturing Development

## Production, Fielding/Deployment, and Operational Support

**PROGRAM DEFINITION AND RISK REDUCTION**

Crusader  
 Highly Mobile Artillery System (HIMARS)  
 Theater High Altitude Area Defense (THAAD) System

**CONCEPT EXPLORATION**

Direct Fire Lethality ATD  
 Enhanced Fiber Optic Guided Missile ATD  
 Low Cost Precision Kill ATD  
 Mine Hunter/Killer ATD  
 Precision Guided Mortar Munition ATD

**ENGINEERING AND MANUFACTURING DEVELOPMENT**

Army Tactical Missile System (ATACMS) Blocks II and IIA  
 Bradley Fire Support Team (BFIST) Vehicle  
 Grizzly  
 Guided Multiple Launch Rocket System (GMLRS)  
 Hornet  
 Land Warrior (LW)  
 Lightweight Laser Designator Rangefinder (LLDR)  
 Long Range Advanced Scout Surveillance System (LRAS 3)  
 Multi-Purpose Individual Munition/Short-Range Assault Weapon (MPIM/SRAW)  
 TOW Improved Target Acquisition System (ITAS)  
 Wolverine  
 XM777 Joint Lightweight 155mm Howitzer (LW155)  
 XM982 155mm Extended Range Artillery Projectile Family

**PRODUCTION, FIELDING/DEPLOYMENT, AND OPERATIONAL SUPPORT**

Abrams  
 Apache Longbow  
 Army Tactical Missile System (ATACMS) Blocks I and IA  
 Avenger  
 Bradley Linebacker  
 Bradley M2 Infantry/M3 Cavalry Fighting Vehicle (IFC/CFV)  
 Close Combat Tactical Trainer (CCTT)  
 Driver's Vision Enhancer (DVE)  
 Extended Range Multiple Launch Rocket System (ER-MLRS)  
 Hercules  
 High Energy Laser System Test Facility (HELSTF)  
 HYDRA 70 Rocket System  
 Integrated Family of Test Equipment (IFTE)  
 Javelin  
 Joint Service Lightweight Integrated Suit Technology (JSLIST)  
 Longbow HELLFIRE  
 Mortar (120 mm)  
 Multiple Launch Rocket System (MLRS)  
 Night Vision (NV) Image Intensification (I2)  
 Patriot  
 Protective Masks  
 Second Generation Forward Looking Infrared (FLIR)  
 Selectable Lightweight Attack Munition (SLAM)  
 Sense and Destroy Armor (SADARM)  
 Small Arms  
 Stinger  
 Striker  
 Tank Main Gun Ammunition

# Abrams



## MISSION

Provide heavy armor superiority on the battlefield.

## DESCRIPTION AND SPECIFICATIONS

The Abrams tank closes with and destroys enemy forces on the integrated battlefield using mobility, firepower, and shock effect. The 105 mm main gun on the M1 and IPM1, and the 120 mm 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. Additional features of the M1A1 are increased armor protection, suspension improvements, and an NBC protection system that increases survivability in a contaminated environment. The M1A1 "D" modification will add Applique computers and a far target designate capability to 1535 M1A1s. 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 2<sup>nd</sup> generation thermal sensors and upgrades processors/memory to enable the M1A2 to use the Army's common Command and Control (C2) software enabling the rapid transfer of digital situational data and overlays.

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

## PROGRAM STATUS

Production of new Abrams for the U.S. and Foreign Military Sales is complete. Continuing the upgrade of about 1000 older M1 tanks to the M1A2 configuration (for an 1150 total M1A2 fleet) and the modification of 1535 M1A1s to the M1A1 D. The program is entering year four of the five year, multiyear procurement for 600 M1A2 Upgrades in July 1996.

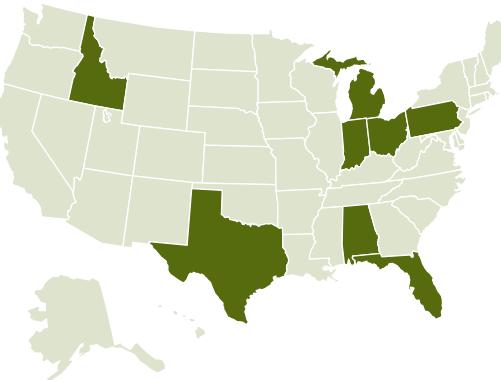
## PROJECTED ACTIVITIES

**4QFY99** The M1A2 SEP begins production in August 1999. M1A2 SEP and M1A1 with Applique are scheduled to participate in the Force XXI Battle Command Brigade and Below (FBBCB2) initial operational test and evaluation (IOTE).

**3QFY00** M1A2 SEP tanks scheduled to begin fielding.

## PRIME CONTRACTOR(S)

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



\* See appendix for list of subcontractors



# Apache Longbow



## 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 consists primarily of the integration of a mast-mounted millimeter-wave fire control radar (FCR), a radar frequency interferometer, and a radar frequency fire-and-forget HELLCFIRE 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 multi-plex all systems. The MANPRINT crew stations have multi-function displays to reduce pilot workload and increase effectiveness. The modernized Apache heavy attack team now will be able to provide a truly "coordinated" rapid-fire (sixteen separate targets within one minute) capability to the maneuver force commander on a 24-hour basis in day, night, and adverse weather conditions. The Apache Longbow will add significant warfighting capability to the combined arms team through increased survivability, lethality, and versatility, as well as through long-term reliability improvements.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

The Netherlands; Commercial Cooperative: United Kingdom.

## PROGRAM STATUS

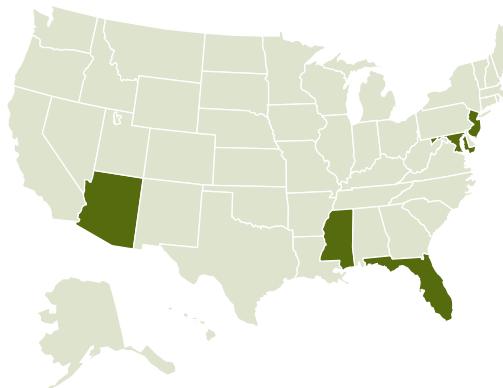
The Apache Longbow System completed full scale development and entered the production and deployment phase in October 1995. The first production model aircraft was delivered in March 1997. Technical successes during the proof of principle phase in 1990, initial operational test and evaluation (IOTE), 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. As expected, Longbow Apache was far more effective in defeating threat armored vehicles and more survivable against threat air defense weapons than the AH-64A. Single-year contracts for the airframe and FCR were awarded in December 1995 and March 1996 respectively, and five-year multi-year contracts for the airframe and FCR were signed on August 16, 1996 and November 26, 1997 respectively. The current program objective calls for the remanufacture of 530 AH-64A Apaches, of which 500 will be equipped with FCR and the upgraded T701C engine.

## PROJECTED ACTIVITIES

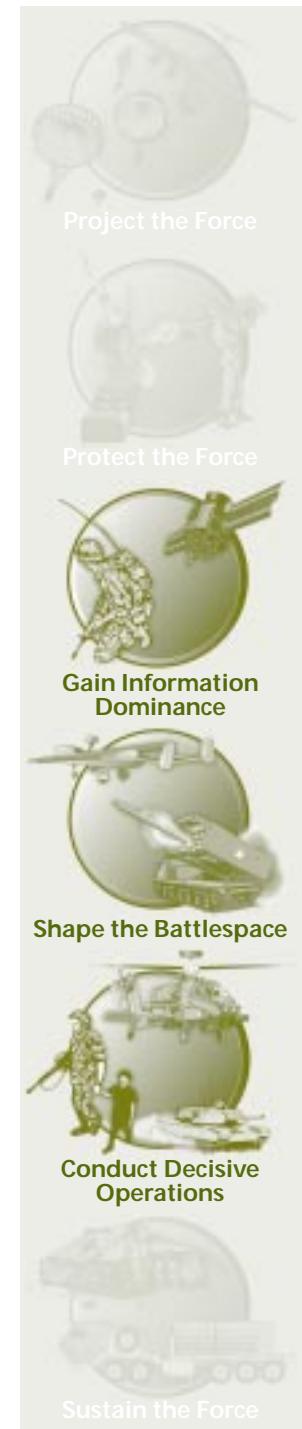
**1QFY99** Initial operational capability (IOC).

## PRIME CONTRACTOR(S)

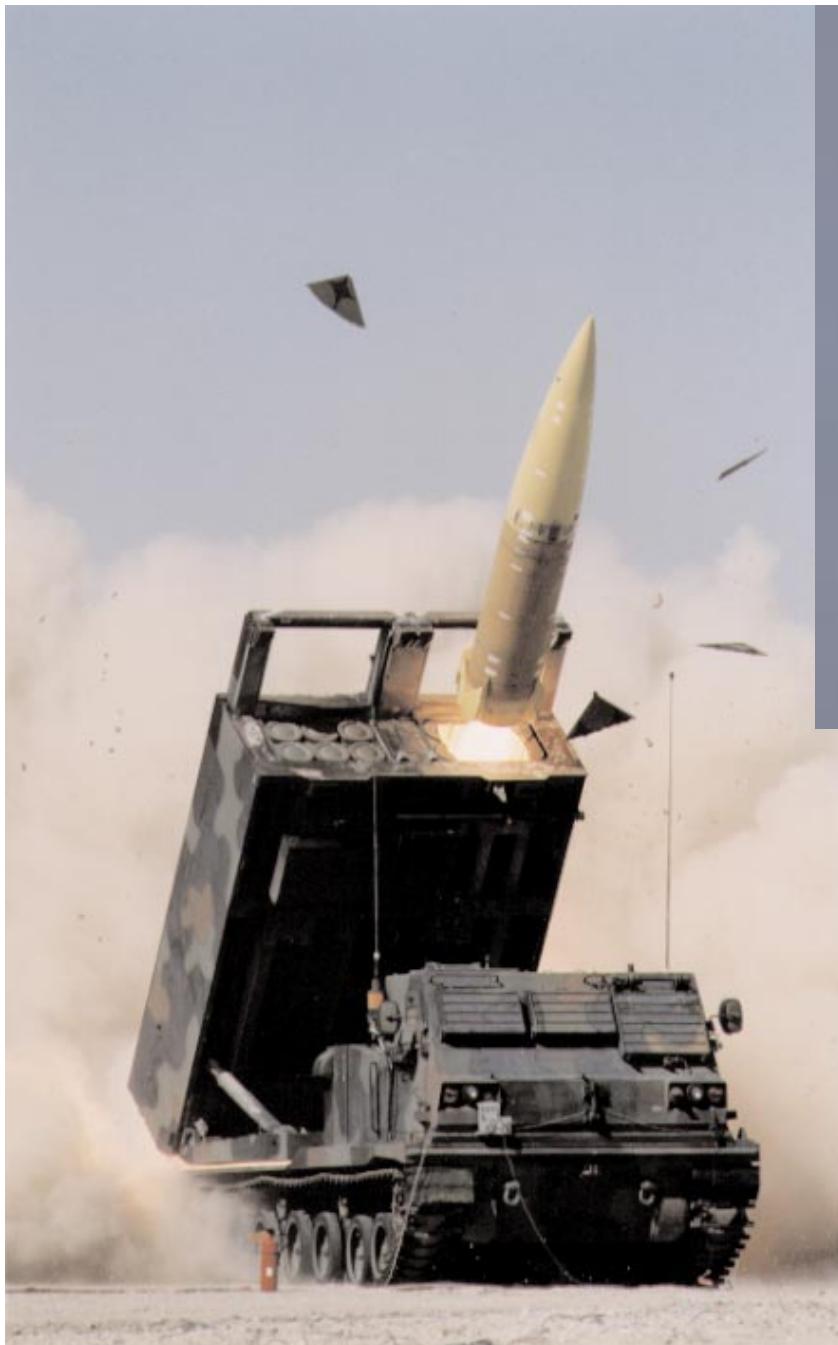
**Joint Venture:** Lockheed Martin (Orlando, FL); Northrop Grumman (Baltimore, MD); Boeing (Mesa, AZ)



\* See appendix for list of subcontractors



# Army Tactical Missile System (ATACMS) Block I and IA



## MISSION

Provide long-range, surface-to-surface, fire support for U.S. Army Corps and Division operations.

## DESCRIPTION AND SPECIFICATIONS

The Army Tactical Missile System (ATACMS) Blocks 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, air defense systems, logistics elements, and command, control, and communications complexes. The M270 Multiple Launch Rocket System (MLRS) launcher fires ATACMS missiles 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

The following countries possess similar missiles: Afghanistan, Bulgaria, China, Egypt, France, Iran, Iraq, Libya, North Korea, Poland, Romania, Russia, Slovakia, Syria, Vietnam, and Yemen.

## FOREIGN MILITARY SALES

Greece, South Korea, and Turkey.

## PROGRAM STATUS

Block IA full-rate production contract was awarded in May 1998. Block I Foreign Military Sales (FMS) case to Turkey production was completed in April 1998. Block I FMS case to Greece deliveries began in June 1998. Block I FMS case to South Korea deliveries began in August 1998.

## PROJECTED ACTIVITIES

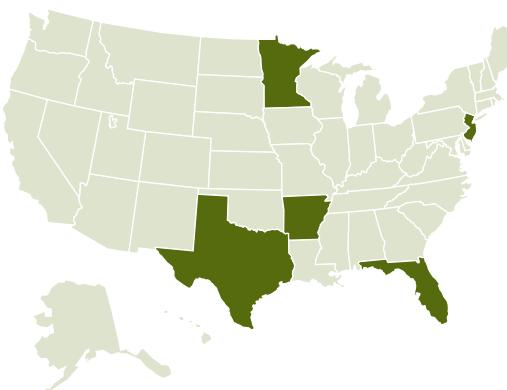
**Block IA:** Block IA missile fielding will continue; to be completed in FY03.

**FMS:** Projected FMS cases include Greece (additional buy), France, South Korea (additional buy), and Switzerland.

**Navy:** In conjunction with the Navy, the project office is proposing an Earth Penetrating Missile variant for the Hard and Deeply Buried Target Defeat Capability (HDBTDC) program. A more near-term prototype missile is being developed under the TACMS Penetrator Demonstration (TPD) program. TPD has been intermittently funded and is now being considered for funding as an out-of-cycle Advanced Concept Technology Demonstration (ACTD).

## PRIME CONTRACTOR(S)

Lockheed Martin Vought Systems Corporation (Vought Systems) (Dallas, TX; Horizon City, TX)



\* See appendix for list of subcontractors



# Army Tactical Missile System (ATACMS) Block II and IIA



## MISSION

Provide long-range, surface-to-surface fire support.

## DESCRIPTION AND SPECIFICATIONS

The Army Tactical Missile System (ATACMS) 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. The Block II will deliver 13 BAT or Preplanned Product Improvement (P3I) BAT submunitions deep at supersonic velocity, where these submunitions will autonomously attack and destroy high-payoff targets. Block II with BAT submunitions is designed to destroy moving armored formations. Block II with P3I BAT adds the capability of destroying cold and stationary armor, surface-to-surface missile transporter erector launchers, and multiple rocket launchers. The ATACMS Block IIA is an extended-range version of the Block II missile and will carry 6 P3I BAT submunitions to significantly extend ranges.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

Block II completed pre-production test (PPT) flights in April 1998, with successful engagement of moving tanks by all dispensed tactical BAT submunitions in each of the flights. The first Block II production qualification test (PQT) flight was successfully conducted in August 1998, and two subsequent PQT flights have been highly successful.

## PROJECTED ACTIVITIES

**FY98-99** Pilot production line and initial operational test and evaluation (IOTE) activities began in FY98 and will continue through FY99. Engineering qualification testing and functional configuration audit (FCA) activities also began in FY98 and will continue through FY99.

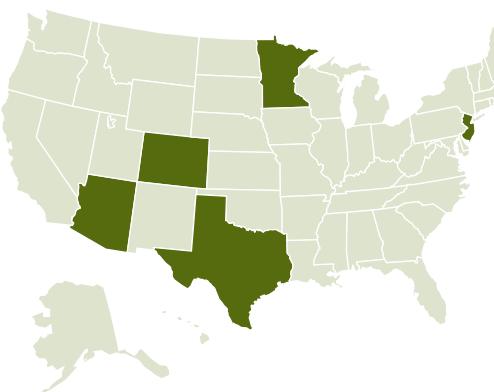
**FY99** PQT flights and developmental test/operational test (DT/OT) flights will be conducted.

**2QFY99** The ATACMS Block II (includes the BAT submunition) low-rate initial production (LRIP) Defense Acquisition Board (DAB) review is scheduled.

**FY01** Block IIA will enter engineering and manufacturing development (EMD).

## PRIME CONTRACTOR(S)

Lockheed Martin Vought Systems Corporation (Dallas, TX; Horizon City, TX)



\* See appendix for list of subcontractors



# Avenger



## 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 heavy 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 Multi-purpose Wheeled Vehicle (HMMWV). Avenger fills the Line of Sight-Rear (LOS-R) portion of the Forward Area Air Defense Systems. It has a two-man crew and can operate in day or night, in clear or adverse weather conditions. The system incorporates an operator's position with displays, fire control electronics, and Standard Vehicle Mounted Launcher (SVML). The SVML supports and launches multiple Stinger missiles. Avenger can be operated remotely up to 50 meters from the fire unit.

**Armament:** Eight ready to fire Stinger missiles; .50-caliber machine gun

**Sensors:** Forward Looking Infrared (FLIR) sensors/  
Laser/optical

**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

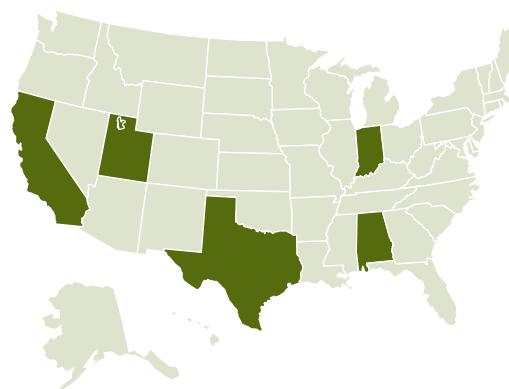
A multi-year production contract was completed in December 1997. Including previous buys, 767 Army and 237 USMC fire units were procured. Currently, all active Army units have been fielded. Army National Guard fielding and additional procurement is ongoing. Retrofit fielding of an Environmental Control Unit/Prime Power Unit (ECU/PPU) begins in early FY99. Fielding of the unique Slew-To-Cue (STC) capability is scheduled to begin in FY99. 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. STC is an approved Warfighting Rapid Acquisition Program (WRAP). The STC capability will be embedded into a new Avenger Fire Control Computer (AFCC). The AFCC corrects significant system obsolescence issues and allows for additional system growth at minimal cost.

## PROJECTED ACTIVITIES

**FY99-09** The Army plans to procure 437 Avenger fire units for the active Army and National Guard. Several modifications to the Avenger are planned for obsolescence mitigation, low observable enhancement, battlefield digitization and integration, and Advanced Integration Weapons and Control System.

## PRIME CONTRACTOR(S)

Boeing Company (Huntsville, AL)



\* See appendix for list of subcontractors



## Bradley Fire Support Team (BFIST) Vehicle



## 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 A2 Operation Desert Storm-based improvements, and A3 variants. 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:** 25 mm Bushmaster cannon; 7.62 mm, M240C machine gun

**Distribution:** Armor/Infantry Brigades-Battalions; Cavalry Regiments-Squadrons, Field Artillery Battalions

**Current models/variants:** A3-based BFIST planned (XM7A1)

## 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

The BFIST is currently in low-rate production. The Acquisition Objective is 190 M7 BFIST and 122 A3 BFIST.

## PROJECTED ACTIVITIES

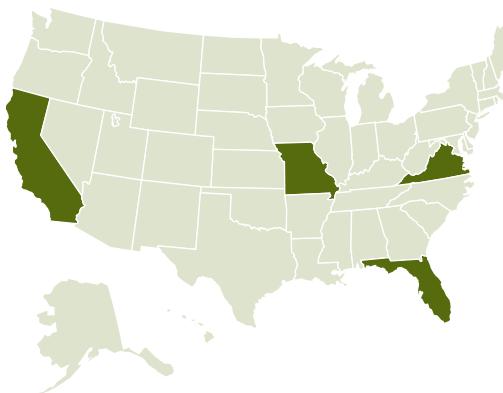
**1QFY00** PVT

**2QFY00** Initial operational test and evaluation (IOTE)

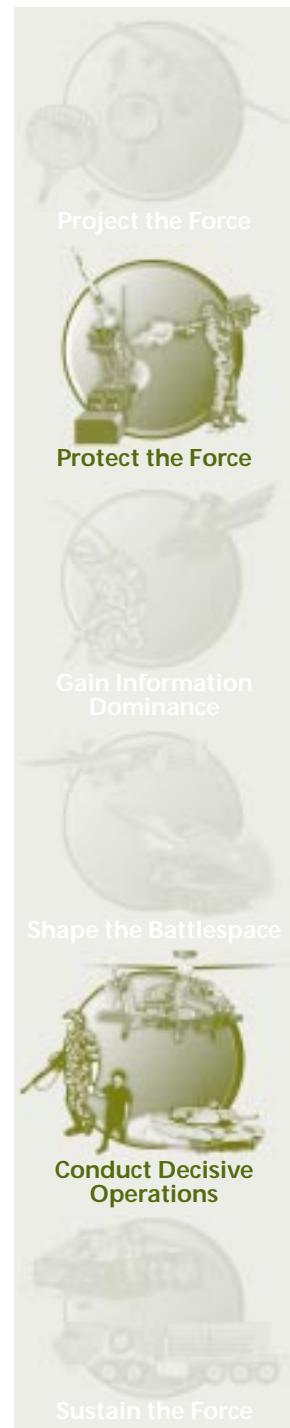
**4QFY00** Full-rate production

## PRIME CONTRACTOR(S)

FMC (United Defense, L.P.) (Rosslyn, VA)



\* See appendix for list of subcontractors



## Bradley Linebacker



## MISSION

Provide dedicated Forward Area Air Defense (FAAD) for the Heavy Maneuver Forces; engage and defeat a variety of threat platforms including rotary wing aircraft, unmanned aerial vehicles, cruise missiles, fixed-wing aircraft countered by other air defense systems.

## DESCRIPTION AND SPECIFICATIONS

The M6 Bradley Linebacker is a BFVS A2 ODS, modified by replacing the TOW launcher with a four-missile STINGER launcher [Standard Vehicle Mounted Launcher (SVML)]. This modification provides the crew with the capability of conducting a ground-to-air engagement while remaining under armor protection. The linebacker also incorporates the Forward Area Air Defense Command and Control System (FAADC2) software on a Handheld Terminal Unit (HTU). By integrating GPS and FAADC2 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; 25 mm Bushmaster cannon; 7.62 mm, M240C machine gun

**Distribution:** Air Defense Artillery Battalions

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

Fielded first five vehicles to ADA school at Ft. Bliss in July 1998. In production at York, PA (as of September 1998, 70 vehicles delivered). Only funded for the first 99 vehicles of a total requirement of 209; presently providing unfunded requirements (UFRs) to pull production for 110 vehicles funding to the left, in addition to providing UFRs for training devices and P3I.

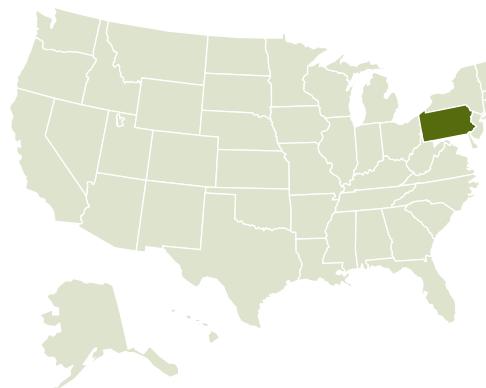
## PROJECTED ACTIVITIES

Funding for the additional 110 vehicles begins in FY04 and carries to FY10.

## PRIME CONTRACTOR(S)

**BFVS Chassis:** United Defense, L.P. (York, PA)

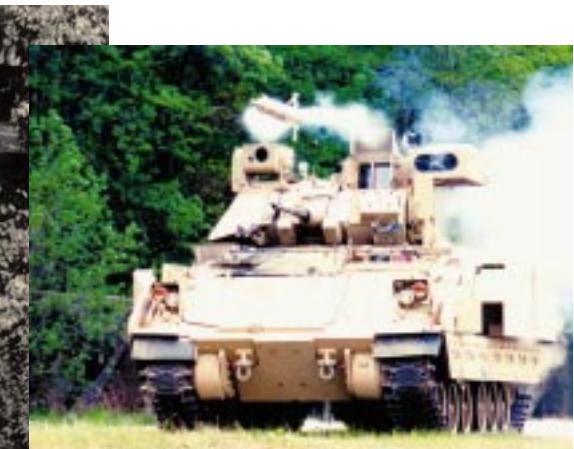
**Stinger mission equipment:** Boeing Co.



\* See appendix for list of subcontractors



# Bradley M2 Infantry/M3 Cavalry Fighting Vehicle (IFC/CFV)





## MISSION

Provide infantry and cavalry-fighting vehicles with digital command and control capabilities, significantly increased situational awareness, enhanced lethality and 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 hydromechanical automatic transmission

**Cruising range:** 250 mi

**Road speed:** 38 mph

**Crew:** 9 (3 on-board; 6 dismounts)

**Vehicle armament:** 25 mm Bushmaster cannon; TOW II missile system; 7.62 mm, M240C machine gun

**Distribution:** Armor/Infantry Brigades, Cavalry Regiments, Division Cavalry Squadron

**Current models/variants:** Bradley M2/M3A0, A1, A2, A2ODS (Operation Desert Storm) IFV/CFVs, Bradley Fire Support Team (BFIST) Vehicle, Bradley Linebacker.

## 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

Saudi Arabia (Bradley A2).

## PROGRAM STATUS

In FY98, the Bradley Program Office continued to upgrade Bradley A1s to the A2 configuration and to convert selected Bradley A2s to the A2 ODS configuration. The Bradley A3 is currently in low-rate initial production (LRIP).

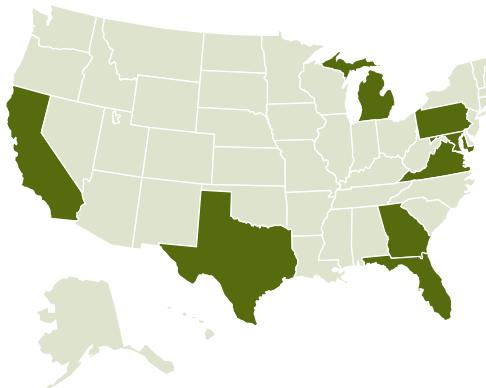
## PROJECTED ACTIVITIES

**FY99** The Bradley A3 program will complete testing prior to the Milestone III decision in December 1999. These tests include Live Fire Testing conducted at Aberdeen Proving Ground, both government and contractor production verification testing, and the Bradley A3 initial operational testing and evaluation (IOTE) conducted at Ft. Hood.

**1QFY00** Bradley A3 and A2 ODS vehicles will also participate in the FBCB2 testing in October 1999. The M2A3 first unit equipped (FUE) date is scheduled in FY00.

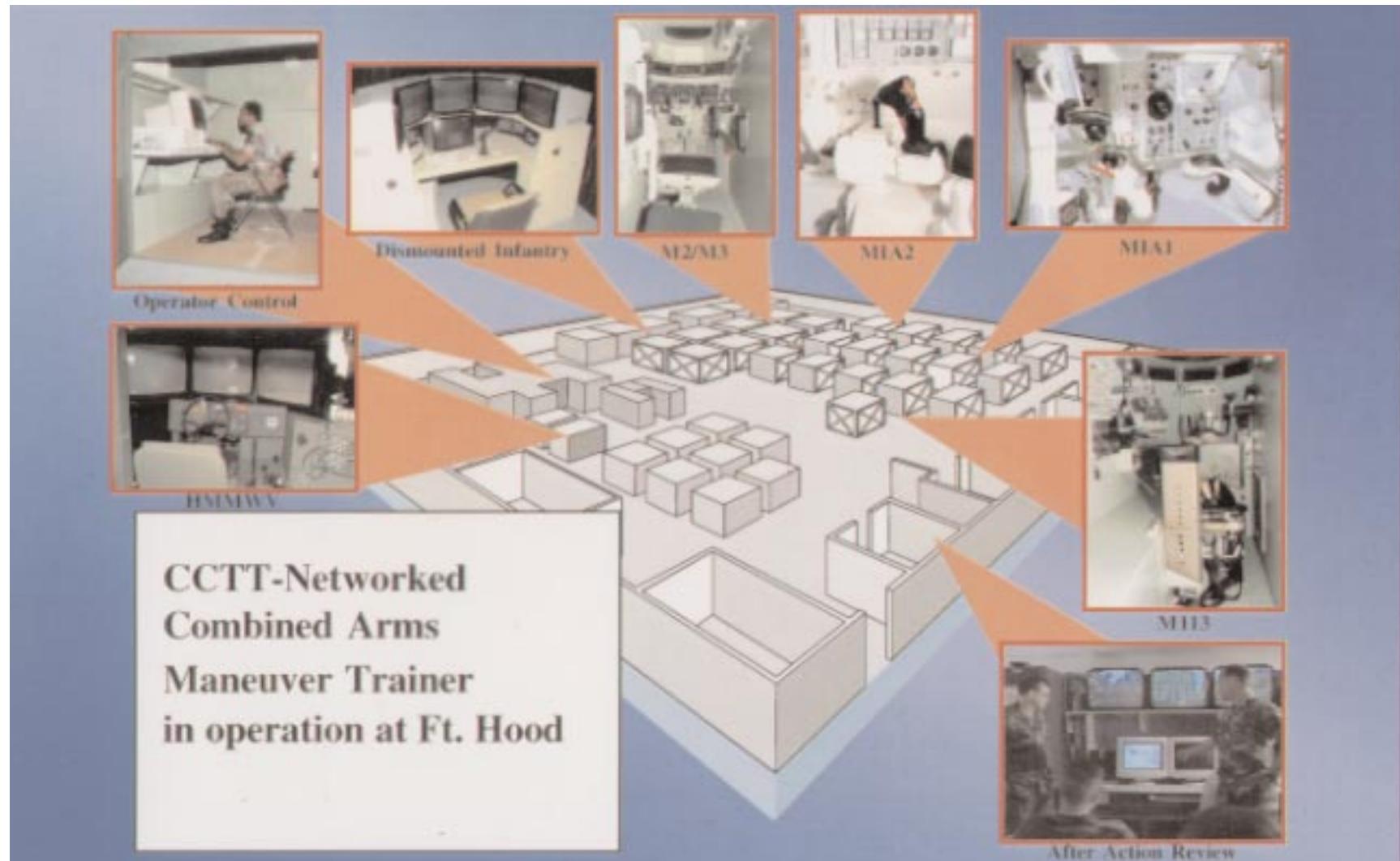
## PRIME CONTRACTOR(S)

United Defense, L.P. (Rosslyn, VA)



\* See appendix for list of subcontractors

# Close Combat Tactical Trainer (CCTT)



## MISSION

Provide realistic individual and collective training for armor and mechanized vehicle crews on a simulated battlefield.

## DESCRIPTION AND SPECIFICATIONS

The Close Contact Tactical Trainer's (CCTT) function is to train active and reserve component M1 Tank and M2/3 Bradley crews on mission training, plan-based collective (crew through battalion task force) tasks, and skills in command, control, communications, and maneuver. The CCTT uses a simulated, fully interactive, real-time battlefield. It will simulate, in real time, the conduct of combat operations in a realistic environment with an appropriate and challenging opposing force that will require realistic individual, crew, and staff actions, placing the stresses of combat on all participants.

The CCTT is fully distributed, interactive simulation compliant and can conduct joint/coalition combined arms training with other CCTT interoperable training systems. The system reduces the impact of restrictions on weapon effects, safety, terrain limitations, and time, and will assist in overcoming the effects of crew turbulence and scarce resources. The CCTT program comprises a group of fully interactive networked simulators and command, control, and communications workstations, replicating the M1 and M2/3 vehicles and weapon systems of a company/team operating in a simulated real-time battlefield. The system will exist in both fixed-site and mobile versions. The fixed-site version will be static at all times during operation. The mobile version will be static during operation but will move over primary and secondary roads during transport from site to site. The mobile version is capable of deploying with the unit during contingency operations.

## FOREIGN COUNTERPART

The United Kingdom (UK) Ministry of Defense is developing a counterpart system called UK-Combined Arms Tactical Trainer (UK-CATT). The United States and the United Kingdom have a Memorandum of Agreement covering cooperative development of CCTT and UK-CATT, providing for interoperability and sharing of development products.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

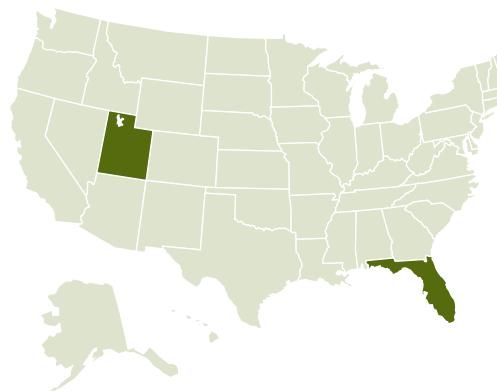
Initial operational testing and evaluation (IOTE) was completed in June 1998. Low-rate initial production (LRIP) hardware production site deliveries began in October 1998. Full-rate production (FRP) was approved at the Milestone III ASARC in November 1998.

## PROJECTED ACTIVITIES

- Modifying the Ft. Hood CCTT site to support Force XXI Battle Command Brigade and Below (FCB2) training 3QFY99.
- Continue Abrams Tank System Enhancement Package (SEP) work.
- Examine Bradley variant options.

## PRIME CONTRACTOR(S)

Lockheed-Martin (Orlando, FL)



# Crusader



## 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) XM2001, is a 155 mm self-propelled howitzer system that will provide a significant increase in artillery survivability, lethality, mobility, and operational capability and effectiveness through the use and integration of advanced technology. SPH critical technologies and capabilities include the XM297E2 integral mid-wall cooled cannon, Modular Artillery Charge System (MACS), autosettable multi-option fuze, automated ammunition-handling system, enhanced survivability, improved mobility, embedded training, and diagnostics.

The armored Resupply Vehicle (RSV) XM2002, will provide the foundation for resupply of ammunition and fuel for the SPH. The RSV will provide necessary ammunition to meet the expected firing rates; meet the goals for autonomous operations; and capitalize on cost and operational advantages of component commonality. RSV critical technologies and capabilities include automated docking boom, automated ammunition resupply system, automated fuel transfer system, improved mobility, survivability, embedded training, and diagnostics. These systems, when fielded, will displace the M109A6 Paladin self-propelled howitzer and M992A2 field artillery ammunition supply vehicle.

### SPH

**Range:** 40+ km (assisted)

**Rate of Fire:** 10–12 rd/min

**Multiple Round, Simultaneous Impact:** 4–8 rd (1 SPH)

**Ammo Storage:** 60 fuzed rd

**Crew:** 3

### RSV

**Automated Rearm:** 60 rd in less than 12 min

**Automated Refuel:** 132–190 L/min

**Range:** 405–450 km

**Speed:** 48 mph highway; 30 mph cross country

**Ammo Storage:** 130–200 fuzed rds

**Crew:** 3

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

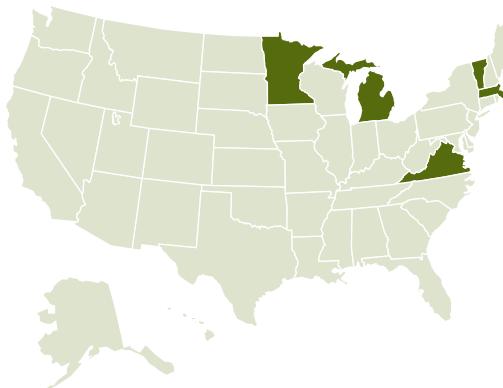
In November 1994, the Crusader program received approval to proceed to the program definition and risk reduction (PDRR) phase (formally Dem/Val). In March 1998 the PEO, Ground Combat and Support Systems, and the Commandant of the Field Artillery School conducted an in-process review and authorized manufacture of the PDRR prototype systems.

## PROJECTED ACTIVITIES

Delivery of first RSV(-) prototype in April 1999.

## PRIME CONTRACTOR(S)

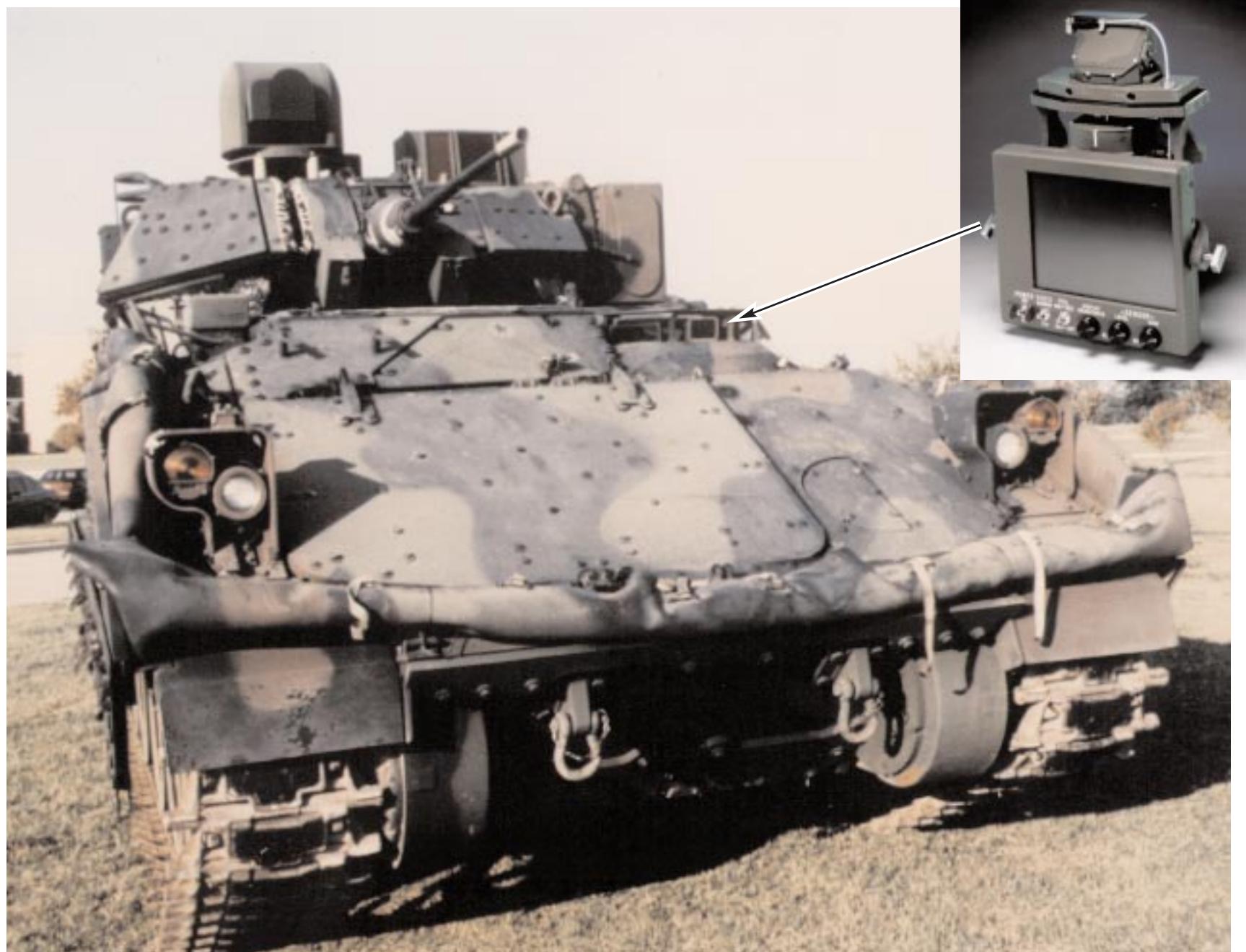
United Defense, L.P. (Minneapolis, MN)



\* See appendix for list of subcontractors



## 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's cost is very low, compared to other Forward Looking Infrared (FLIR) Sensors. The DVE provides mobility under the same conditions as the target engagement sensors, enabling a critical Go vs. No Go capability. The DVE provides situational awareness, target and ambush detection, and vehicle tracking. For the first time, combat service support will be able to keep up with the warfighter.

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 crewmembers. 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 vehicle, due to its horizontal technology integration features. These vehicles include the following:

- Abrams M1A2 and USMC M1A1
- Bradley M2A2 ODS and M2A3
- Command and Control Vehicle
- Family of Medium Tactical Vehicles—FMT
- Grizzly
- 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
- USMC Amphibious Assault Vehicle

- USMC Armored Vehicle Launched Bridge
- USMC Light Armored Vehicle
- Wolverine

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

Fielded to Bradley M2A2ODS, 3QFY97; awarded 3-year multi-year FFP, 3QFY98; full materiel release M58, 4QFY98; fielded to M58, 1QFY99.

## PROJECTED ACTIVITIES

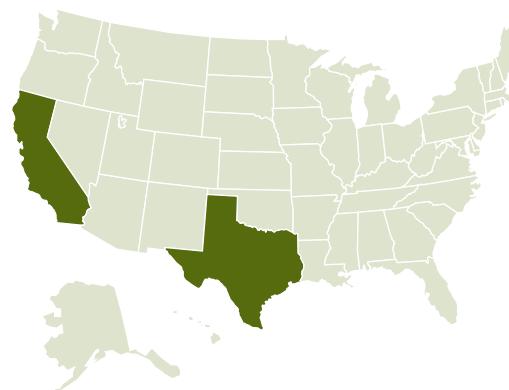
**2QFY99** 2nd program year award; DVE build.

**4QFY99** DVE test: production qualification testing (PQT), final operational test and evaluation (FOTE).

**1QFY00** DVE deliveries.

## PRIME CONTRACTOR(S)

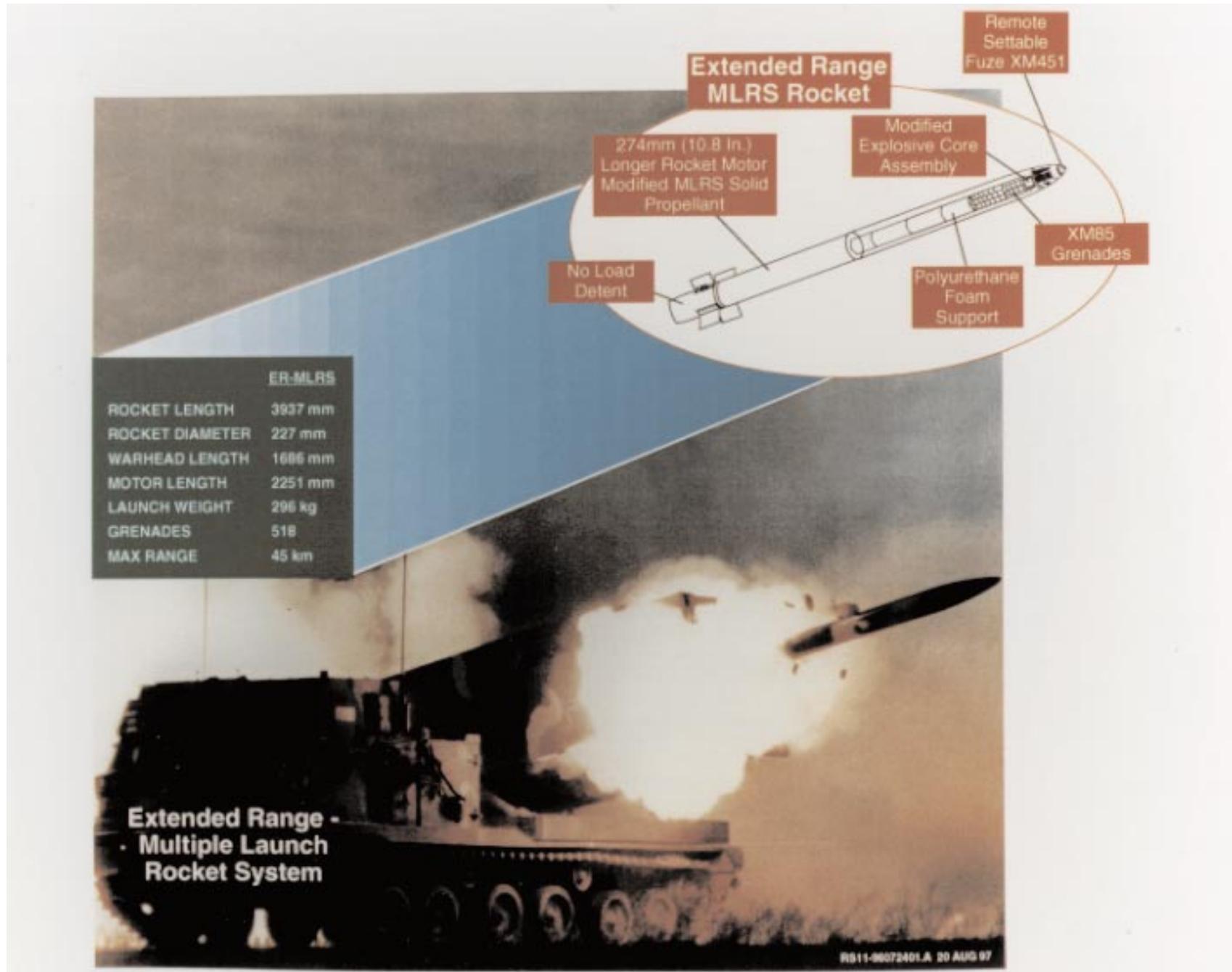
Raytheon (Dallas, TX)



\* See appendix for list of subcontractors



# Extended Range Multiple Launch Rocket System (ER-MLRS)



### MISSION

Provide longer-range rockets with lower submunition hazardous dud rate for the MLRS.

### DESCRIPTION AND SPECIFICATIONS

The Extended Range Multiple Launch Rocket System (ER-MLRS) is the logical step in the evolution of the MLRS rocket design. It resulted from operations in Desert Storm, in which senior level commanders, while applauding the effectiveness of the basic rocket, stated a requirement for greater range. The ER-MLRS is a free-flight, area-fire, artillery rocket designed to enhance the capabilities of the MLRS. It is designed to engage targets to 45 kilometers. The ER-MLRS has the same diameter and length as the basic rocket but has been modified to include a lengthened motor and a smaller warhead section with fewer grenades, a new warhead section fuse and a modified center core burster.

The M85 grenade is equipped with a new self-destruct fuse (SDF) designed to reduce the danger of residual duds to friendly troops. The launch pod for the ER-MLRS incorporates a new no-load detent system to increase accuracy and effectiveness at longer ranges. Early versions of the ER-MLRS have M77 grenades (without SDF), due to production delays of M85 grenades.

**Warhead:** Dual-Purpose Improved Conventional Munitions (DPICM)

**Propulsion:** Solid

### FOREIGN COUNTERPART

Several foreign multiple-launch rocket systems have a range of 45 km or greater.

### FOREIGN MILITARY SALES

FMS cases with the Republic of Korea and Bahrain are approved and additional cases are expected in FY99 with Greece, Norway and Denmark.

### PROGRAM STATUS

The program entered the engineering and manufacturing development (EMD) phase in November 1992 and was completed in 3QFY98. Production qualification testing (PQT) was completed in 2QFY96. The program received approval to enter low-rate initial production (LRIP) in 3QFY96. Design verification test (DVT) was completed 3QFY98. SDF high-rate equipment (HRE) is in development. ER-MLRS rockets are being loaded with M77 grenades until sufficient quantities of SDFs are available.

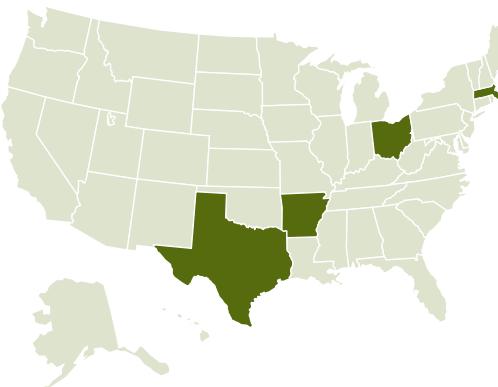
### PROJECTED ACTIVITIES

**1QFY99** Initial ER-MLRS fieldings (with M77).

**FY00** Delivery and fielding ER-MLRS (with M85).

### PRIME CONTRACTOR(S)

Lockheed Martin Vought Systems (Dallas, TX; Camden, AR)



\* See appendix for list of subcontractors



# Grizzly



## MISSION

Provide an in-stride capability to overcome simple and complex linear obstacles.

## DESCRIPTION AND SPECIFICATIONS

The Grizzly system will breach a full-width, clear lane to allow maneuver force mobility through minefields, rubble, tank ditches, wire, and other obstructions. The Army currently has no system with these capabilities. The Grizzly will be fielded in division and selected corps engineer battalions.

The Grizzly is an M1 Abrams, chassis-based system, equipped with a full-width mine clearing blade and a power-driven excavating arm. When buttoned up, the crew of two will be able to operate all systems. The vehicle contains electric drive, an advanced open systems vehicle electronic architecture, automatic depth control, and provisions for digital battlefield command and control.

## FOREIGN COUNTERPART

Germany: Pionierpanzer 2; Israel: MIKI; Russia: IMR-2.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

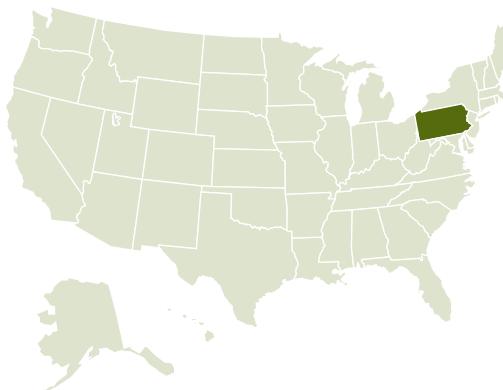
The Program Milestone II decision was made in December 1996. The system is currently in the design maturation and prototype fabrication phase of engineering and manufacturing development. In addition to two prototypes, a ballistic system structure is being fabricated to support live fire testing.

## PROJECTED ACTIVITIES

**April 2000** Low-rate initial production (LRIP) decision.

## PRIME CONTRACTOR(S)

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

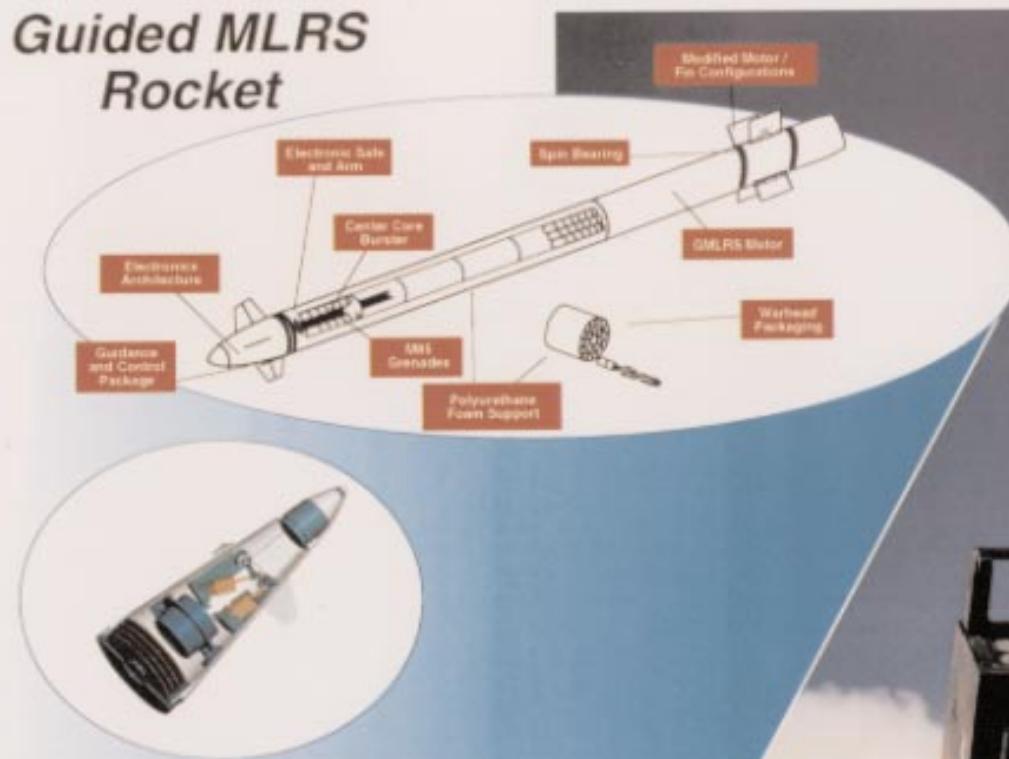


\* See appendix for list of subcontractors

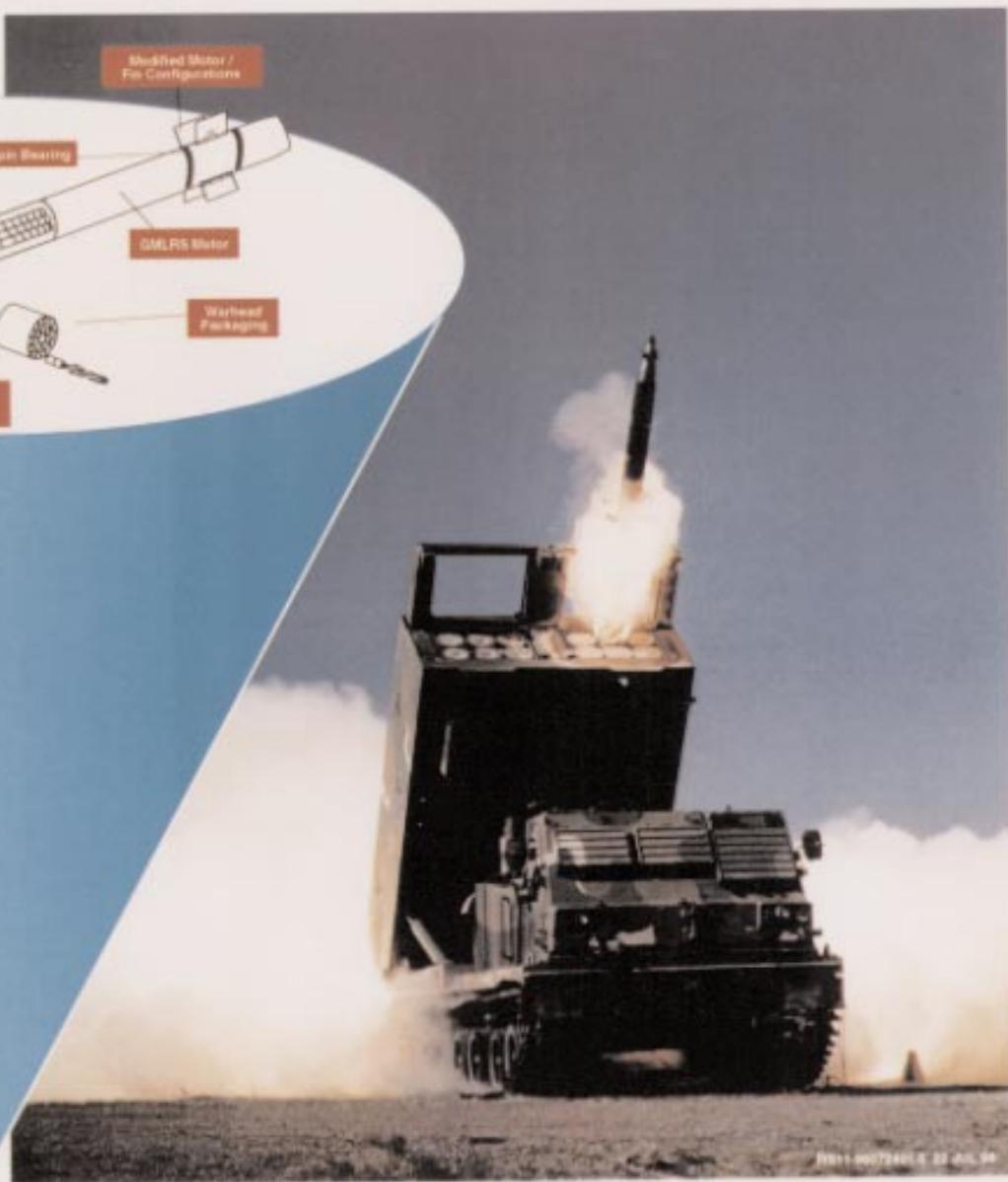


# Guided Multiple Launch Rocket System (GMLRS)

## 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



## MISSION

Provide longer range and more accurate rockets with lower submunition hazardous dud rate for the MLRS.

## DESCRIPTION AND SPECIFICATIONS

The Guided Multiple Launch Rocket System (GMLRS) is the next logical step in the evolution of the MLRS rocket after Extended Range Multiple Launch Rocket System (ER-MLRS). Utilizing various components of the ER-MLRS (e.g., rocket motor, grenades, rocket pod, etc.), it will transform the ER-MLRS freeflight rocket into a missile by incorporating a guidance and control package. This provides greater accuracy and range to 60 km. Control will be accomplished by four canards driven by electromechanical actuators.

Guidance will be performed by a low cost tactical-grade inertial measurement unit (IMU). It will be aided by an optional GPS receiver. Required accuracy will be met with the IMU in an independent mode. GPS is not mission-essential, but provides a further increase in accuracy when used in conjunction with the IMU. The guidance and control package in the GMLRS will form the basis for the future MLRS Smart Tactical Rocket (MSTAR) with a precision-guided smart submunition.

**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

Since 1994, the program has been in the advanced technology demonstration (ATD) phase, conducted by the U.S. Army Aviation and Missile Command's Missile Research, Development, and Engineering Center. Four ATD flight tests occurred in 3QFY98 and 4QFY98 with one remaining flight test planned in 2QFY99. The GMLRS program will transition to the engineering and manufacturing development (EMD) phase during 1QFY99. The EMD will be managed by the Project Manager, MLRS, as an international cooperative EMD with France, Germany, Italy, and the United Kingdom.

## PROJECTED ACTIVITIES

**4QFY99** EMD preliminary design review.

**4QFY00** EMD critical design review.

**2QFY02** Low-rate initial production (LRIP) decision.

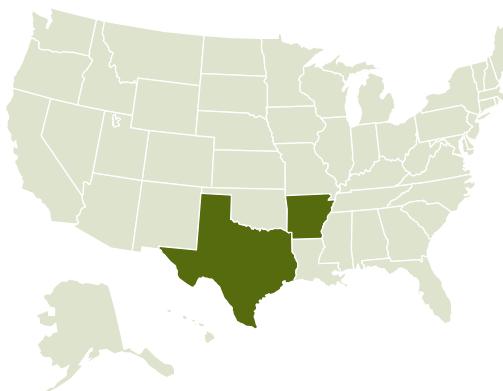
**3QFY03** Initial operational test (IOT).

**1QFY04** Milestone III Decision.

**4QFY04** Initial operational capability (IOC).

## PRIME CONTRACTOR(S)

Lockheed Martin Vought Systems (Dallas, TX; Camden, AR)



\* See appendix for list of subcontractors



# Hercules



## 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

**Aux. 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 onto existing recovery chassis or main battle tank chassis.

## FOREIGN MILITARY SALES

Kuwait; Egypt (Co-Production).

## PROGRAM STATUS

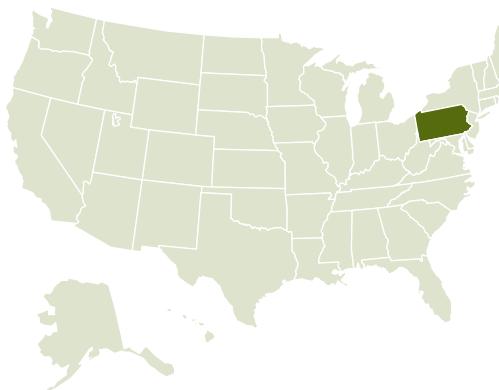
Type-classified-standard; first unit equipped (FUE), July 1997; Procured 86 vehicles.

## PROJECTED ACTIVITIES

Field to 1st CAV Division, TRADOC and 3rd ACR.

## PRIME CONTRACTOR(S)

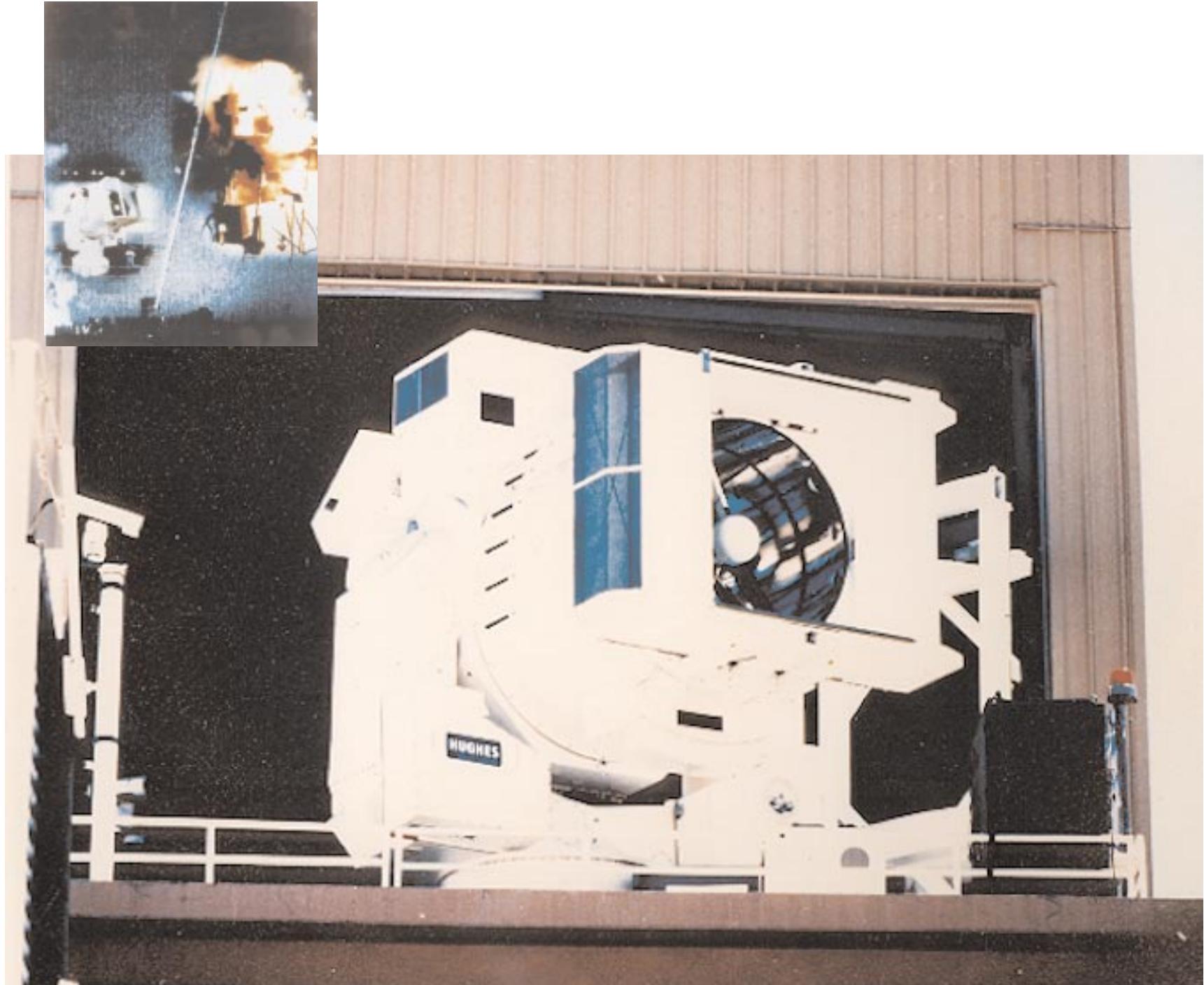
United Defense, L.P. (York, PA)



\* See appendix for list of subcontractors



# High Energy Laser System Test Facility (HELSTF)



## MISSION

Provide test capabilities for directed energy systems in a highly instrumented, controlled-access environment.

## DESCRIPTION AND SPECIFICATIONS

The High Energy Laser System Test Facility (HELSTF) is a range-based system developed primarily for testing high energy lasers, associated pointer-trackers, beam directors and other components for the purpose of demonstrating, developing, and evaluating laser weapon system capabilities. The facility supports a variety of test functions including live fire, lethality, vulnerability, and material testing for effects, physical property response and validation of hardening processes. With the ability to form and project high-energy laser beams, this facility also supports weaponization efforts for high-energy lasers, such as the Army's Tactical High Energy Laser (THEL) and the Air Force's Airborne Laser (ABL) program. HELSTF includes several lasers, ranging in spectrum from the visible to 10.6 microns, and in power from a few watts to the megawatt class Mid Infrared Advanced Chemical Laser (MIRACL). There are associated beam-control optics for shaping and forming beams from the high powered lasers, a beam director with an array of sensors that can be used for pointing and tracking with the beam director, or to record/assess actions by the beam on various targets.

**Lasers: MIRACL:** Megawatt class, Chemical/HF/DF

**Laser Demonstration Device (LDD):** Several Kilowatts Chemical/HF/DF

**Low Power Chemical Laser (LPCL):** 100 watt, Chemical Laser HF/DF

**Pulsed Laser Vulnerability Test System (PLVTS):** Pulsed high power

**CO<sub>2</sub> Beam Director:** Sea Lite Beam Director (SLBD).

**Sensors:** Visible HiRes TV, IR, MWIR, SWIR

## FOREIGN COUNTERPART

Former Soviet Union.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

HELSTF has functioned as a test facility for many years, performing lethality testing through the Nautilus program, extensive material testing for lethality, vulnerability and physical effects, and

recently, providing important measurements for the Data Collection Experiment (DCE). A representative test list includes: System Test and Evaluation-THEL; Live Fire-Nautilus; Damage and Vulnerability-DCE; Effects testing; Lethality testing; and Space Vehicle Tests. The SLBD is currently being upgraded to allow daytime tracking and to provide more accurate blind pointing and tracking. A more extensive data collection effort is anticipated using these upgrades. Currently HELSTF is renovating the LDD laser for use in lower power experiments. It has demonstrated weapons capabilities by destroying a variety of missiles and UAVs. HELSTF is currently participating in test activities for THEL.

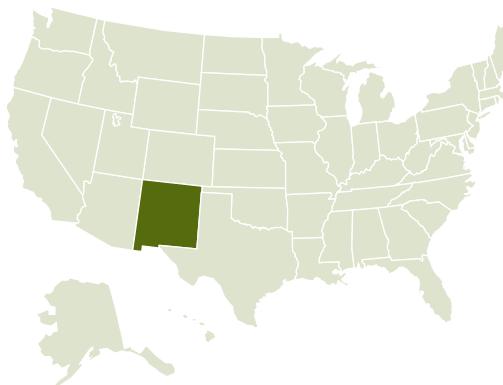
## PROJECTED ACTIVITIES

- Continue Nautilus testing.
- Extend the SLBD upgrade activities.
- Conduct additional data collection experiments.
- Continue THEL testing.
- Add a COIL laser.
- Complete the LDD renovation and begin testing.

## PRIME CONTRACTOR(S)

Aerotherm Corporation (Las Cruces, NM); Raytheon Systems Company (Las Cruces, NM)

**HELSTF SETA Contractor:** Mevatec Corporation (Las Cruces, NM)



\* See appendix for list of subcontractors



## Highly Mobile Artillery System (HIMARS)



## MISSION

Provide early-entry forces with Multiple Launch Rocket System (MLRS) firepower capability to conduct counterfire, suppression of enemy air defenses, and destruction of material and personnel targets.

## DESCRIPTION AND SPECIFICATIONS

The Highly Mobile Artillery System (HIMARS) is mounted on a Family of Tactical Vehicles (FMTV) 5-Ton truck and can be transported by the C-130 aircraft. The lightweight chassis allows for faster road movement, lower operating costs, and requires thirty percent fewer airlifts to transport a battery, compared to the current tracked M270 MLRS launcher. The HIMARS can fire the suite of MLRS Family of Munitions, including all Army TACMS versions. 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 HIMARS' mobility capabilities and the munitions' suite capability.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

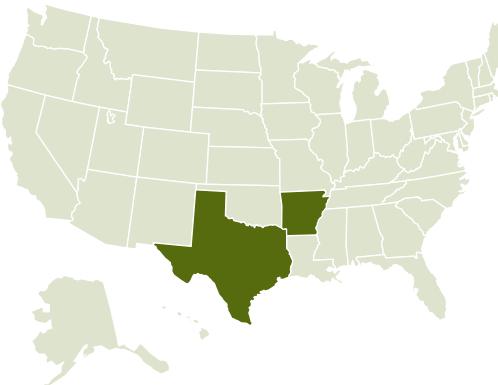
Four HIMARS prototypes have been built as part of the 4QFY98 Rapid Force Projection Initiative (RFPI) Advanced Concept Technology Demonstration (ACTD). Three of the prototype HIMARS will remain with the XVIII ABN Corps for training, a two-year extended user evaluation, and a "go-to-war" capability. Live fire safety certification testing was successfully completed at White Sands Missile Range, with 78 rockets and two Army TACMS Blk I missiles fired during 3QFY98 and 4QFY98. Lessons learned in the RFPI ACTD and the extended user evaluation will be used in the Maturation Program.

## PROJECTED ACTIVITIES

- FY99-00** Extended user evaluation.
- 3QFY00** Maturation phase begins.
- FY02-03** Combined developmental testing/operational testing (DT/OT).
- 3QFY03** Low-rate initial production (LRIP) decision.
- FY06** Battalion level first unit equipped (FUE).

## PRIME CONTRACTOR(S)

Lockheed Martin Vought Systems (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

The 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 (EFP) at the top of the target vehicle. The 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

Program in production and funded.

## PROJECTED ACTIVITIES

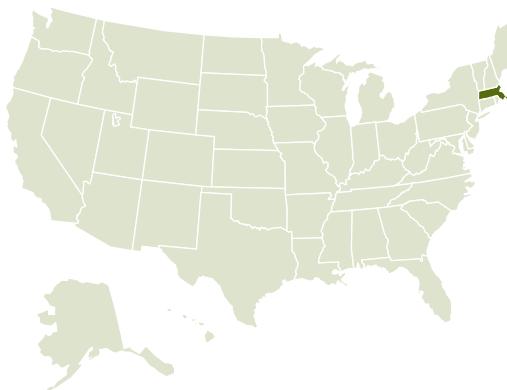
**2QFY99** First production deliveries scheduled for February 1999.

**4QFY00** Product improved units to be type-classified.

**FY01** First product improved units to be purchased.

## PRIME CONTRACTOR(S)

Textron (Textron Systems Division) (Wilmington, MA)



\* See appendix for list of subcontractors



# HYDRA 70 Rocket System



## MISSION

Perform a variety of functions: the war reserve unitary and cargo warheads are used for anti-materiel, anti-personnel, and suppression missions; the family of rockets also includes smoke screening, illumination, and training warheads.

## DESCRIPTION AND SPECIFICATIONS

The family of HYDRA 70 rockets is fired from Apache, Cobra, and Kiowa Warrior helicopters by the Army and are used from other platforms by Special Operations Forces, the Marine Corps, the Navy, and the Air Force. The warheads fall into three categories:

- Unitary warheads with impact-detonating fuses or remote-set multi-option fuses;
- Cargo warheads with airburst-range, setable fuses using the "wall-in-space" concept, or fixed-stanoff fuses; and
- Training rounds.

## FOREIGN COUNTERPART

Similar rockets are made by France and Canada.

## FOREIGN MILITARY SALES

Bahrain, Colombia, Egypt, Greece, Japan, Jordan, Korea, Kuwait, The Netherlands, Pakistan, Saudi Arabia, Taiwan, Thailand, Tunisia, and United Arab Emirates.

## PROGRAM STATUS

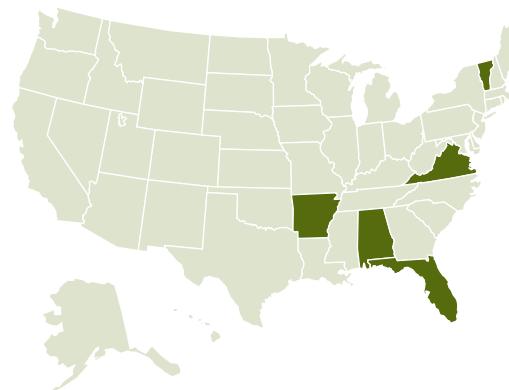
The prime contractor, General Dynamics, is currently delivering rockets on one contract. On their performance specification contract, they are working on first article testing. A Request for Proposal (RFP) has been released for the FY99-03 procurement. A contract award is anticipated for May 1999.

## PROJECTED ACTIVITIES

FY99-03 Planned procurement.

## PRIME CONTRACTOR(S)

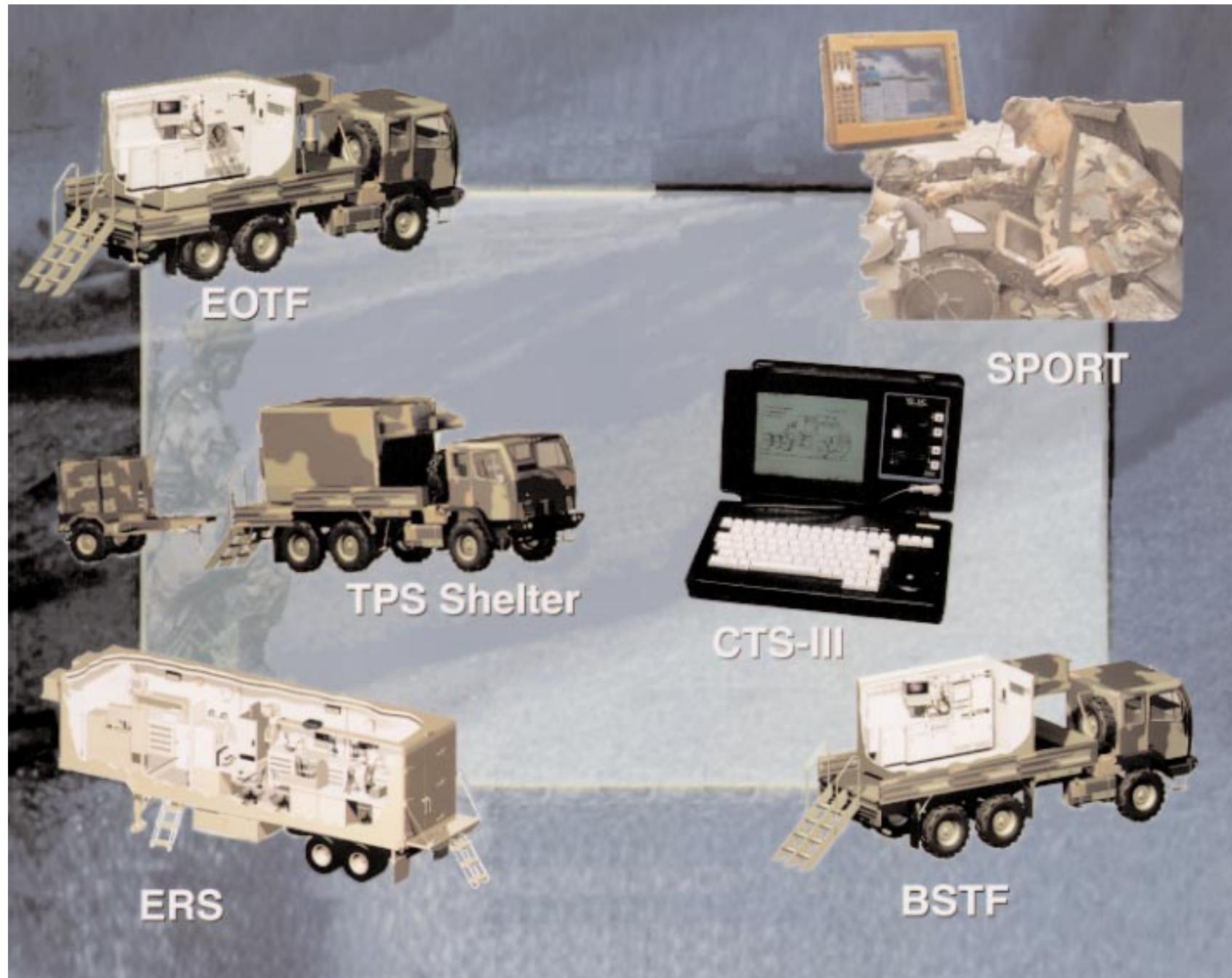
General Dynamics (Burlington, VT)



\* See appendix for list of subcontractors



# Integrated Family of Test Equipment (IFTE)



## MISSION

Isolate electronic faults in weapon systems.

## DESCRIPTION AND SPECIFICATIONS

The Integrated Family of Test Equipment (IFTE) is a modular test, measurement, and diagnostic equipment system that consists of four interrelated systems that provide general purpose, standard automatic test equipment (ATE) capability through all levels of maintenance. It allows the isolation of weapon systems faults to the Line Replaceable Unit (LRU) at the Organizational and Direct Support (DS) levels of maintenance, both on- and off-system. This supports rapid return to the battlefield. At General Support (GS) and Depot levels of maintenance, IFTE further diagnoses an LRU to the Shop Replaceable Unit.

Two tactical systems provide on- and off-system support, respectively:

- **On-system tester.** The AN/PSM-80 Contact Test Set (CTS) or the AN/PSM-95 Soldiers Portable On-system Repair Tool (SPORT); and
- **Off-system tester.** The AN/TSM-191 Base Shop Test Facility (BSTF).

The CTS/SPORT is also the host for Electronic Technical Manuals (ETMs) and interactive ETMs. The CTS/SPORT is man-portable and augments Built-in-Test/Built-in-Test-Equipment to isolate weapon systems failures to the bad LRU. The BSTF consists of the AN/USM-632 Base Shop Test Station, housed in an S-280 shelter mounted on a 5-Ton truck. A second shelter and truck stores Test Program Sets (TPSs). TPSs are the weapon systems-specific software that the ATE uses to diagnose faults in major items or components. A 60 kW generator powers the BSTF. Base Shops serve at both DS and GS levels.

The Commercial Equivalent Equipment (CEE) is a non-tactical, non-ruggedized equivalent of the BSTF, designed for TPS development and to support requirements at depots, contractor facilities, and Special Repair Activities. The Electro-Optic Test Facility (EOTF) is under development to provide an off-system electro-optic test capability at the DS and GS levels. The EOTF will be housed in an S-280 shelter, mounted on a 5-Ton truck, and will be powered by a 60 kW generator. The Electronic Repair Shelter (ERS) is utilized for on-site circuit card repair.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

Argentina, Denmark, Egypt, Greece, Israel, Korea, Kuwait, NAMSA, Norway, Organization of African Unity, Saudi Arabia, Taiwan, and Thailand.

## PROGRAM STATUS

BSTF, SPORT and ERS are in production; EOTF development continues.

## PROJECTED ACTIVITIES

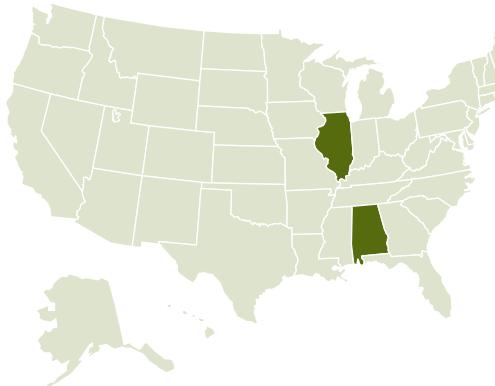
- Continue BSTF, SPORT and ERS fieldings.
- Initiate EOTF production.

## PRIME CONTRACTOR(S)

**BSTF/CEE/EOTF:** Northrop Grumman (Rolling Meadows, IL)

**SPORT:** Miltope (Hope Hull, AL)

**ERS:** Tec-Masters (Huntsville, AL)



\* See appendix for list of subcontractors



# 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-tank system developed for the U.S. Army and U.S. Marine Corps. It is replacing the Dragon. The system is highly lethal against tanks with both conventional and reactive armor. The Javelin comprises 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.

The Javelin system weighs 49.5 lb. and will have a maximum range in excess of 2500m. The key feature of the Javelin is the use of Fire and Forget technology that allows 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 warhead, imaging infrared seeker, target lock-on before launch, and soft launch (the Javelin can be fired safely from enclosures and covered fighting positions).

The Javelin Training System consists of three training devices, each fulfilling a specific role: The Missile Simulation Round (MSR) is used to familiarize the gunner with the physical characteristics of the Javelin; the Basic Skills Trainer (BST) is used to develop the basic tactical and technical gunnery skills required to operate the Javelin; and the Field Tactical Trainer (FTT) is used to refine the gunner's ability and enable the gunner to participate in both Range training and Force-on-Force exercises.

Since June 1996, the Javelin Weapon System has been successfully deployed to the U.S. Army Ranger Battalions at Ft. Lewis, WA; Hunter Army Airfield, GA; Ft. Benning, GA and the 82<sup>nd</sup> Airborne Division Ft. Bragg, NC. The fielding of the Javelin is the culmination of a successful engineering and manufacturing development (EMD) program, which used extensive product verification and user tests to validate system performance and reliability.

## FOREIGN COUNTERPART

The Israeli Spike and 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

None.

## PROGRAM STATUS

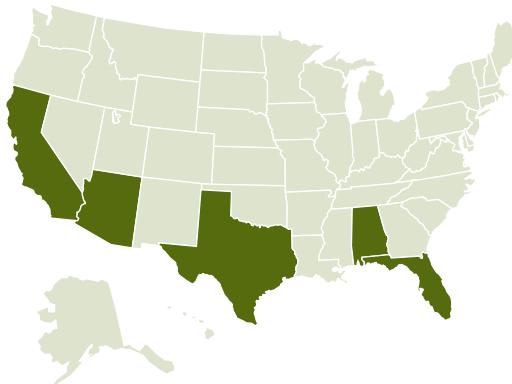
In May 1997, Full-Rate Production (FRP) began with the award of a three-year, multi-year contract. Fielding of the system continues on schedule.

## PROJECTED ACTIVITIES

- Fielding to the U.S. Marine Corps will begin in 1999.
- Fielding to the 101st AA Division will begin in late 1999.

## PRIME CONTRACTOR(S)

Raytheon Texas Instruments Systems (Lewisville, TX); Lockheed Martin (Orlando, FL)



\* See appendix for list of subcontractors



# 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 two major components: lightweight CB protective garments and 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. User performance is optimized by balancing CB protection and heat-strain management with service-defined mission requirements.

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, from 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

None.

## PROGRAM STATUS

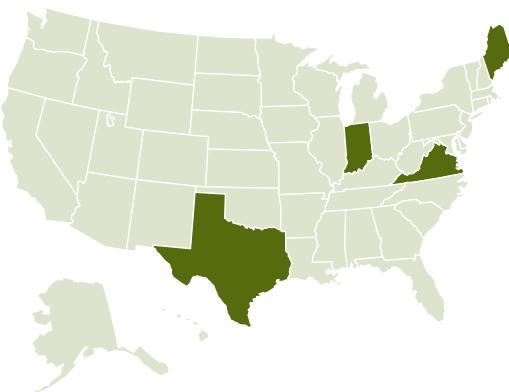
Milestone III was conducted in April 1997. Production commenced in August 1997.

## PROJECTED ACTIVITIES

The JSLIST P3I program is an iterative process that will allow for periodic technology insertion of tested, approved materials into the JSLIST production cycle, the pursuit of SOCOM requirements and of improved gloves.

## PRIME CONTRACTOR(S)

NCED (El Paso, TX); Trade Winds (Gary, IN); Group Home Foundation (Belfast, ME); Creative Apparel (Belfast, ME); Test Support-Battelle (Stafford, VA)



\* 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/technologies into a lethal, survivable soldier system. LW systems/components include: a modular weapon system with thermal weapon sight (TWS), laser rangefinder, digital compass, video camera, and close combat optics; an integrated headgear with helmet mounted display, TWS sight picture and image intensifier; enhancements to protective clothing and individual equipment; and an integrated individual soldier computer/radio. LW S&T advanced components include integrated sight, combat ID, enhanced radio and voice recognition. The systems 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 squad radio is provided to team leaders and above. The squad radio is SINCGARS capable 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

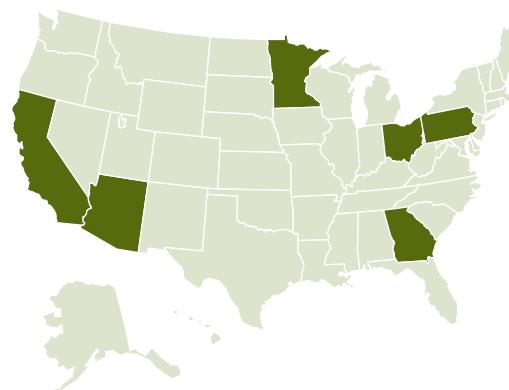
The LW program is currently in the engineering and manufacturing development (EMD) phase, and progressing well, in accordance with medium risk cost, schedule and performance goals. The EMD contract was awarded on July 11, 1995. An early operational experimentation took place at Ft. Benning, GA, in November/December 1996. Preliminary design review was held in early 1997, and critical design review (CDR) in September 1997.

## PROJECTED ACTIVITIES

- FY99** Sixty Seven (67) systems will be built and integrated for use in Contractor and Development Testing (18), and Operational Testing with 3-325th Inf of the 82nd Airborne Division and elements of the 4th Infantry Division.
- 1QFY00** A low-rate production (LRP) decision is planned.
- 1QFY02** First fielding of 500 systems is scheduled to a Ranger or Airborne Battalion.
- 2003** Full production is scheduled to begin for 34,000 LW sets. LW Force XXI Science and Technology advancements will be included as block upgrades.

## PRIME CONTRACTOR(S)

Raytheon (El Segundo, CA)



\* See appendix for list of subcontractors



## Lightweight Laser Designator Rangefinder (LLDR)



## MISSION

Provide artillery light forces and United States Marine Corps (USMC) 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 CCD camera, thermal imager, eyesafe laser rangefinder, digital magnetic compass, GPS and digital export capability. The DoD/NATO-compatible LDM can designate targets up to five kilometers. The LLDR weighs less than thirty-five lb and can be easily transported by a two-person team. Since it is modular, the target location capability can be operated without the LDM. The TLM performs boresight verification by "see spot" technology.

## FOREIGN COUNTERPART

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

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

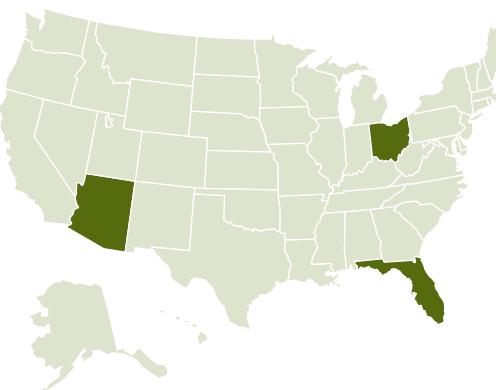
A thirty-month engineering and manufacturing development (EMD) phase was initiated in July 1997. The Army and Marine Corps have agreed to a Joint Development Program. LLDR is a Warfighter Rapid Acquisition Program (WRAP), and has received funding for early fielding of an initial operational capability. The critical design review (CDR) was held June 1998.

## PROJECTED ACTIVITIES

- 3QFY99** Ten EMD systems to be delivered.
- 3/4QFY99** Development testing (DT) is scheduled.
- 1QFY00** Initial operational test and evaluation (IOTE) is scheduled.
- 2QFY00** Production decision.

## PRIME CONTRACTOR(S)

Litton Systems Inc., Laser Systems Division (Apopka, FL)



\* 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 reconnaissance and surveillance sensor system that significantly enhances their capability over the currently fielded AN/TAS-6, Night Observation Device, Long Range (NODLR).

## DESCRIPTION AND SPECIFICATIONS

The Long Range Advanced Scout Surveillance System (LRAS3) will consist of a second-generation Forward Looking Infrared (FLIR) with long-range optics, an eyesafe laser rangefinder, a day video camera (DVC), and a global positioning system with attitude determination. The LRAS3 will permit scouts to detect targets at ranges in excess of 3X of the NODLR system. This additional standoff capability will allow 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 (FTL) coordinates for any target ranged to by the scout. The LRAS3 will operate in both mounted and dismounted configurations. The LRAS3 design will include a digital port for future exportation of targeting information.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

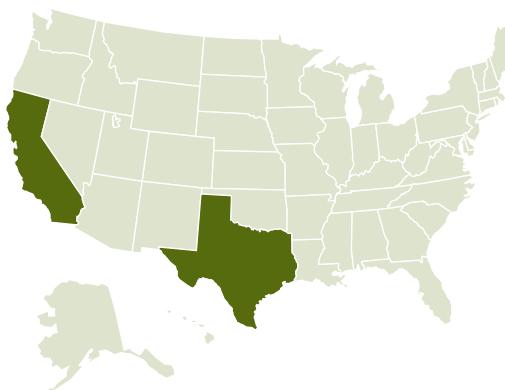
First engineering and manufacturing development (EMD) system delivery, July 24, 1998; production qualification testing (PQT), July–November 1998; development test (DT), November 1998–January 1999.

## PROJECTED ACTIVITIES

- 3/4QFY99** Initial operational test and evaluation (IOTE).
- 1QFY00** Milestone III decision brief.
- 1QFY00** Production contract award.
- 3QFY01** First unit equipped (FUE).

## PRIME CONTRACTOR(S)

Raytheon Texas Instruments Systems (McKinney, TX), DRS Technology, Inc. (El Segundo, CA)



\* See appendix for list of subcontractors



## Longbow HELLFIRE



## 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

Longbow HELLFIRE is a fire-and-forget version of the HELLFIRE missile. The Longbow program also includes the development of a mast-mounted fire control radar (FCR) and numerous modifications to the Apache helicopter. The Longbow FCR will locate, classify, and prioritize targets for the Longbow HELLFIRE missile. The Longbow system is being developed for integration onto the Apache and Comanche helicopters.

Longbow HELLFIRE incorporates a millimeter-wave radar seeker on a HELLFIRE II 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; and
- 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

United Kingdom (direct commercial sale).

## PROGRAM STATUS

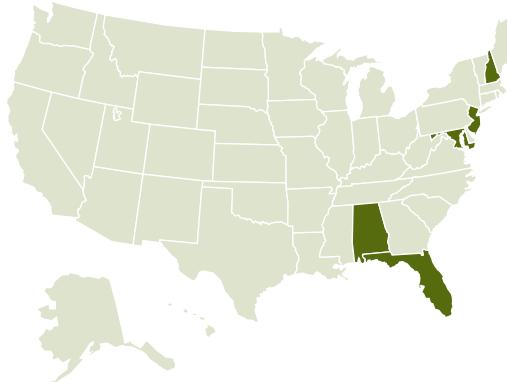
Longbow HELLFIRE entered production on October 13, 1995, with the successful completion of the Milestone III Defense Acquisition Board. The first low-rate initial production (LRIP) contract was awarded in December 1995 for 352 missiles. The program received full-rate production (FRP) approval in October 1997. A one-year FRP contract was signed in November 1997. The Army received Congressional approval for a five-year multi-year procurement beginning in FY99. First unit equipped (FUE) was in July 1998.

## PROJECTED ACTIVITIES

**2QFY99** Five-year, multi-year production contract.

## PRIME CONTRACTOR(S)

Longbow HELLFIRE Limited Liability Company  
(Lockheed Martin, Orlando, FL and Northrop Grumman,  
Baltimore, MD)



\* See appendix for list of subcontractors



# Mortar (120 mm)

## Mortar Fire Control System



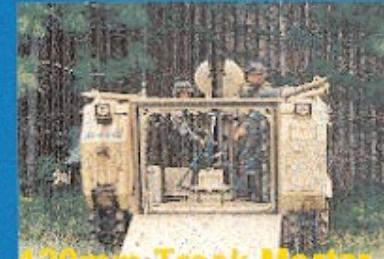
### Communications

Digital & Voice  
SINCGARS  
SIP, EPLRS



### Navigation & Pointing Device

Tube Mounted (INS)  
Inertial  
Navigation  
System



120mm Track Mortar

### PLGR

Location/  
Navigation Aid



### Driver's Display

Provides direction of fire for orienting gun



### Gunner's Display

Replaces Optical Sight  
Digitally Linked to Pointing  
Device & CI  
Improved Gun Laying Procedure



### Commander's Interface (CI)

Automatic Ballistic Computations  
Digital Interface with Tactical Internet for  
Situational Awareness & AFATDS



## MISSION

Provide organic indirect fire support capability to the maneuver unit commander.

## DESCRIPTION AND SPECIFICATIONS

The 120 mm mortar system is a conventional smoothbore, muzzle-loaded mortar system that provides increased range, lethality, and safety, compared to the WWII-vintage 4.2 inch heavy mortar system it replaces in mechanized infantry, motorized, armored, and cavalry units. It is employed in both towed and carrier-mounted versions and fires a family of enhanced ammunition produced in the United States. The Mortar Fire Control System (MFCS) will provide 120 mm mortar users with Paladin-like fire control capability that greatly improves mortar responsiveness and crew survivability. The M303 subcaliber tube insert allows mortar crews to perform live fire training with stockpiled 81 mm ammunition.

**Range:** 7,240 m

**Weight:** 319 lb

**Rate of fire:** 16 rd/min, first minute; 4 rd/min, sustained.

**Crew:** 4 carrier-mounted (M1064); 5 ground-mounted (M120).

**Ammunition:** High-explosive, smoke, illumination, full-range trainer.

## FOREIGN COUNTERPART

The U.S. Army 120 mm mortar system was adapted from the Israeli Army's 120 mm mortar system. 120 mm smoothbore mortars are used by Denmark, Finland, France, Germany, Israel, and other allied armies. The Russian-developed counterpart is the M43 120 mm mortar, which has a range of 5,700 meters, weighs 602 pounds, and has a six-person crew. New threat 120 mm mortars that out-range U.S. Army mortars, however, include turreted and extended-range Dual Purpose Improved Conventional Munitions (DPICM) ammunition.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

Fielding of the M1064 carrier mounted mortar is ongoing with completion expected in 1999. USASOC Rangers at three sites were equipped with 81 mm and towed 120 mm mortars. They are evaluating the "Arms Room Concept" to determine if a selection of three different mortars fulfills mission requirements better than just 60 mm mortars. Evaluation will continue through April 1999. Production continues of the M933/M934 High Explosive and M929 Smoke rounds. White Light (XM930) and

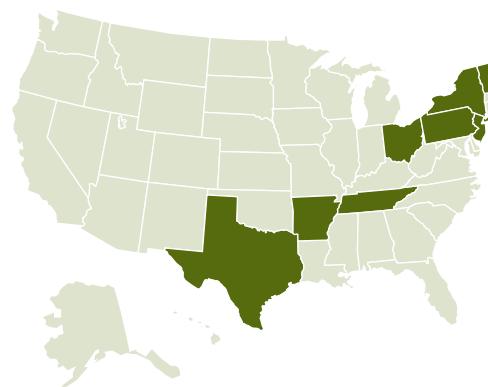
Infrared (XM983) 120 mm Illumination rounds completed development and were type-classified for production. Production contracts were awarded for the 120 mm full range training round. The M931 will provide low-cost training at the full range of HE cartridges.

## PROJECTED ACTIVITIES

- Initial fieldings of the M30 Improved Mortar Ballistic Computer (MBC) to replace the M23 MBC, one for one. The Mortar Fire Control System, which will replace the M30 MBC in the active 120 mm and 81 mm mortar units, provides an automated, on-board digital fire control system that integrates mortars into the current and future fire support command and control architecture.
- Incorporation of the M734A1 multi-option fuze to significantly improve lethality, reliability, and electronic countermeasure protection.
- Advanced Technology Demonstration (ATD) of the Precision Guided Mortar Munition (PGMM) with maximum range of 12–15 kilometers.
- Evaluation of technology leading to a DPICM with extended range and self-destruct capability. Composite components to maximize payload are also being explored.

## PRIME CONTRACTOR(S)

Pocal Industries (Scranton, PA); SNC (Le Gardeur, Quebec); KDI (Cincinnati, OH); GDOS (Burlington, VT); Valente Systems (Mt. Arlington, NJ); AlliedSignal (Teterboro, NJ); Milan Army Ammunition Plant (Milan, TN)



\* 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 basic warhead carries improved conventional submunitions. The MLRS, however, is capable of supporting and delivering all of the MLRS family of munitions, including the Army Tactical Missile System weapons. Growth programs are underway to extend the range of the rocket system and to upgrade the fire control and launcher mechanical systems.

**Length:** 6,832 mm

**Width:** 2,972 mm

**Weight:** 24,756 kg

**Range:** 483 km

**Average speed:** 40 kph

**Max speed:** 56 kph

**Crew:** 3

## FOREIGN COUNTERPART

Similar multiple launch rocket systems exist and have a broad range of capabilities.

## FOREIGN MILITARY SALES

Bahrain, Denmark, France, Germany, Greece, Israel, Italy, Japan, Korea, The Netherlands, Norway, Turkey, and the United Kingdom.

## PROGRAM STATUS

The U.S. initial operational capability for MLRS was achieved in 1983. Starting in FY89, 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: 772 for the active Army and 85 for the National Guard. Initial procurement of the planned system improvement—M270A1 upgrade—occurred in 3QFY98. This upgrade consists of 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 fifty percent. The Extended Range MLRS (ER-MLRS) Rocket will extend the current range of the basic rocket from thirty-two kilometers to a new range of approximately forty-five kilometers.

## PROJECTED ACTIVITIES

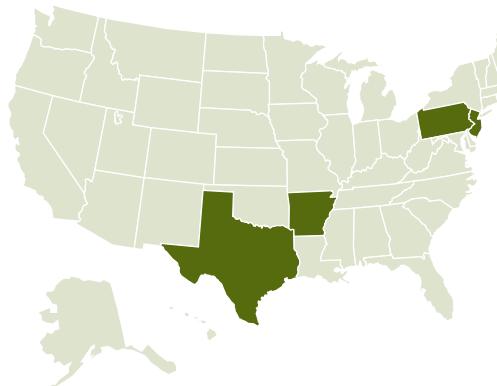
**4QFY99** M270A1 Initial operational test (IOT).

**2QFY00** M270A1 MSIII, Full-rate production (FRP) decision.

**4QFY00** M270A1 First unit equipped (FUE).

## PRIME CONTRACTOR(S)

Lockheed Martin Vought Systems (Dallas, TX; Camden, AR)



\* See appendix for list of subcontractors

## Multi-Purpose Individual Munition/Short-Range Assault Weapon (MPIM/SRAW)



## MISSION

Provide a one-man portable, lightweight, shoulder-fired, fire-and-forget, multi-purpose munition, capable of defeating enemy forces in buildings, reinforced structures, bunkers, and lightweight armored vehicles.

## DESCRIPTION AND SPECIFICATIONS

The Multi-Purpose Individual Munition/Short-Range Assault Weapon (MPIM/SRAW) munition consists of a disposable launcher/carry case equipped with a 2.5X telescopic sight compatible with current and future night vision devices. The shoulder-launched missile consists of a two-stage, soft-launch propulsion system with inertial guidance and explosively-formed penetrator with follow-through grenade warhead. The missile is capable of firing quickly from its carrying configuration and is safely fired from enclosures.

**Weight:** 20 lb

**Range:** 500M (target dependent)

**Crew:** 1

**Lethality:** Capable of incapacitating personnel in bunkers and reinforced concrete/brick buildings, and defeating modern light armor.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

Completed Phase I (Risk Reduction Phase) in March 1998. All Phase I requirements were met on schedule and within budget. Accuracy solution was verified by two successful full missile shots at 500m wall and 200m bunker.

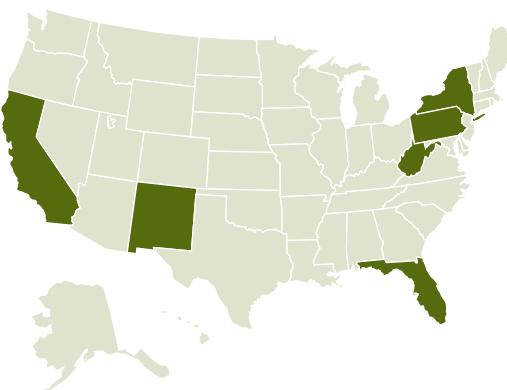
Executed Phase II (System Qualification) option in May 1998. USMC Predator qualification testing began in August 1998 and is on track. Early user demonstration (EUD) and system confidence testing began in October 1998.

## PROJECTED ACTIVITIES

**3QFY99** Preliminary design review (PDR); pre-production proveout testing begins.

## PRIME CONTRACTOR(S)

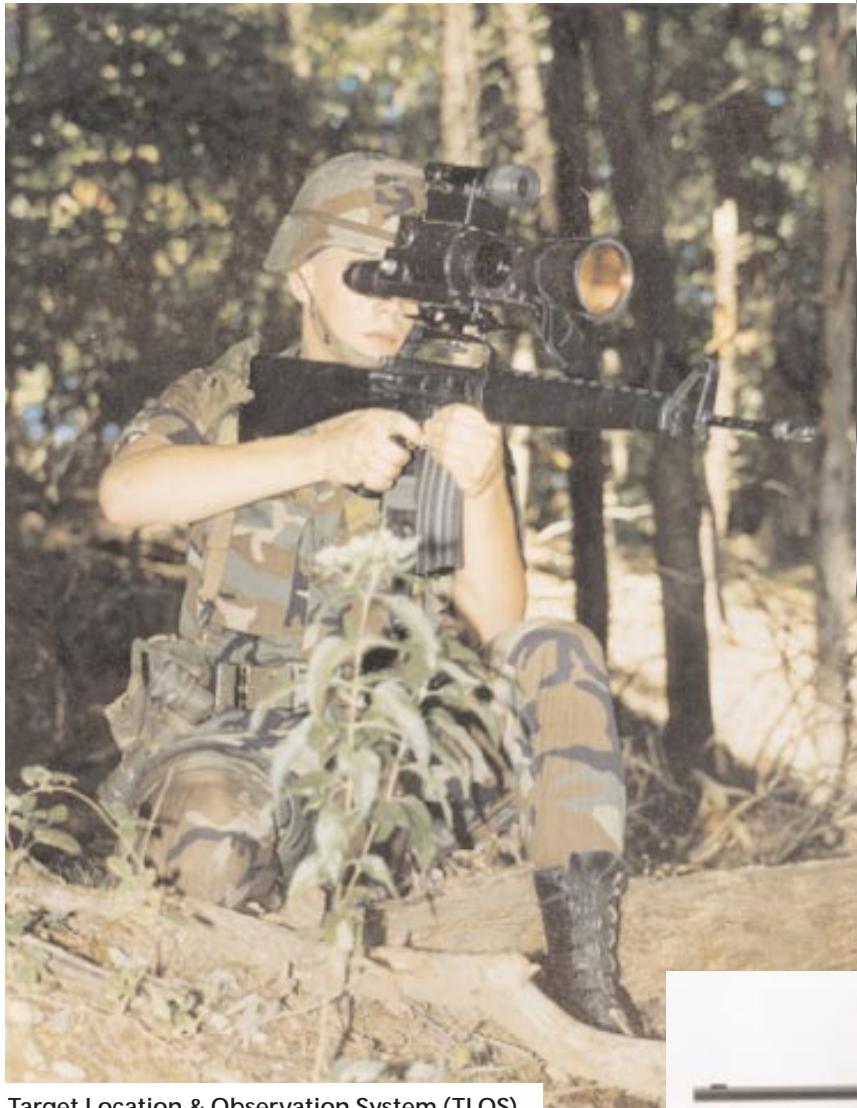
Lockheed Martin Electronics and Missiles (Orlando, FL)



\* See appendix for list of subcontractors



## Night Vision (NV) Image Intensification (I2)



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

## MISSION

Enable soldier 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 critical flight information superimposed on the visual image of the ANVIS. The system is electro-optical and provides both the pilot and copilot critical, real-time, high-resolution flight, and navigational information. Its primary purpose is to enhance flight safety, ease the crew workload, and heighten the crew members' situational awareness outside the cockpit. The **AN/PVS-7D Night-Vision Goggle** is a lightweight, binocular goggle used by individual soldiers. It uses a single passive third-generation image intensifier tube. The goggle is used in combat, combat support, and combat service support operations. Ancillary equipment includes a helmet mount, protective eyecups, an objective lens cover, a compass, and a 3X magnifying lens. The **AN/PVS-14 Monocular Night Vision Device** will provide 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. It can also be mounted to a small arms rail using a rail grabber. 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. The magnification for day and night operation is 8.5X, and the system's maximum weight is 4.9 lbs. The **Lightweight Video Reconnaissance System** consists of a man-portable out station and a vehicle-mounted base station. The out station is used by surveillance or reconnaissance teams to capture, compress and transmit still-frame images over military radios to the base station located at a higher echelon.

The **Target Location and Observation System** 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&2:** Bahrain, Colombia, Greece, Jordan, Mexico, Saudi Arabia, Taiwan, Thailand, United Arab Emirates.

**AN/PVS-7:** Italy, Kuwait, Mexico, Portugal, Saudi Arabia, Taiwan. **ANVIS/HUD:** Israel.

## PROGRAM STATUS

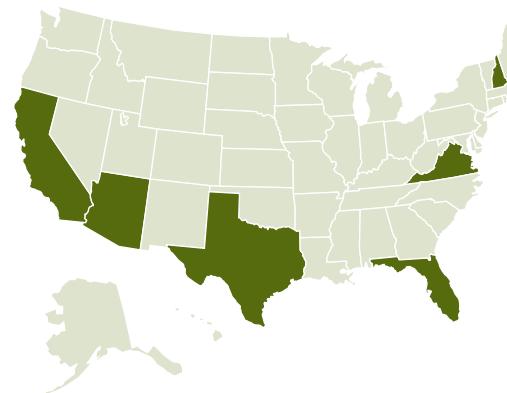
HUD fielding complete FY99; LVRS first unit equipped (FUE) Ft. Bragg, NC, October 1998; TLOS deliveries complete and FUE, 2QFY99.

## PROJECTED ACTIVITIES

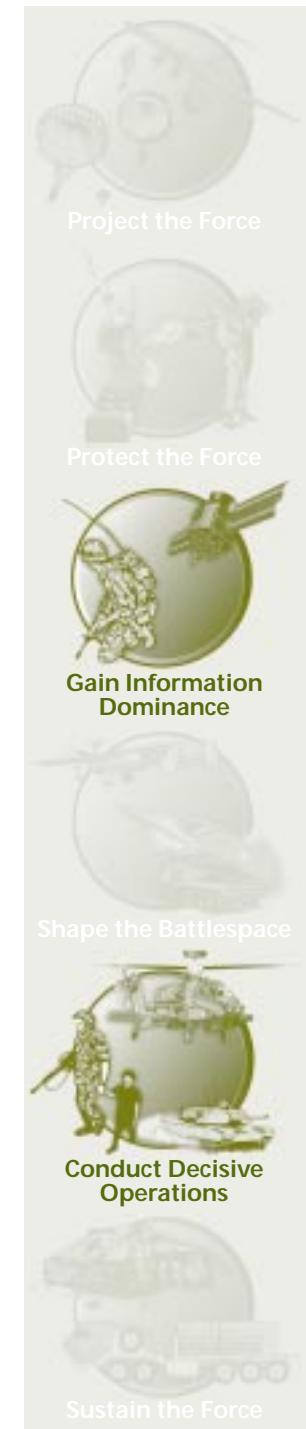
**3-4QFY99** Testing of New LVRS Outstation.

## PRIME CONTRACTOR(S)

ITT (Roanoke, VA); TRACOR Aerospace (Austin, TX); Litton Industries (Garland, TX; Tempe, AZ); Lockheed Martin (Orlando, FL; Nashua NH)



\* See appendix for list of subcontractors



# Patriot



### MISSION

Provide high- and medium-altitude defense against aircraft and tactical ballistic missiles, of critical assets and maneuver forces belonging to the corps, and to echelons above corps; provide an advanced anti-tactical missile capability to the current fielded system.

### 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 (EPP), an antenna mast group (AMG), and eight remotely located launching stations (LS). The RS provides all tactical functions of airspace surveillance, target detection and tracking, and missile guidance. The ECS provides the human interface for command and control of operations. Each launch station contains four ready-to-fire missiles sealed in canisters that serve a dual purpose: as shipping container; and as launch tube. Patriot's fast-reaction capability, high firepower, ability to track fifty targets simultaneously, and ability to operate in a severe electronic countermeasures environment are significant improvements over previous air defense systems.

The Patriot Advanced Capability (PAC-3) upgrade program will incorporate significant upgrades to the RS and ECS, and will include up to sixteen advanced hit-to-kill missiles on three to four of the eight launchers per firing battery. This increases fire power and ballistic missile defense capabilities. The primary mission of the PAC-3 missile is to kill both maneuvering and non-maneuvering tactical ballistic missiles. The PAC-3 missile will also be able to counter cruise missiles and aircraft. The PAC-3 upgrade program comprises system improvements to increase performance against an evolving threat, meet user needs, and correct existing system deficiencies.

### FOREIGN COUNTERPART

Russia: SA-10 and SA-12.

### FOREIGN MILITARY SALES

Germany, Israel, Japan, Kuwait, The Netherlands, and Saudi Arabia are currently participating in Patriot acquisition programs. Discussions are ongoing with several other interested allies for acquisition of the Patriot system.

### PROGRAM STATUS

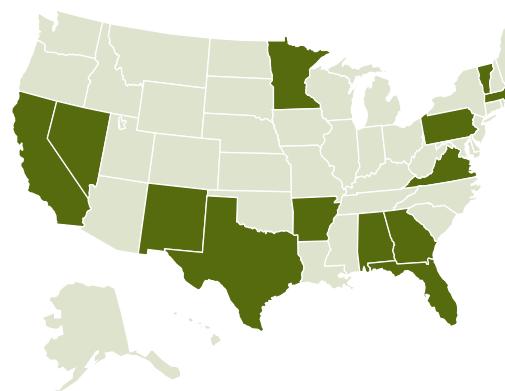
Fielding of Patriot to U.S. forces is complete. The missiles are deployed in CONUS, Europe, Korea, and Southwest Asia. U.S. missile production deliveries include Patriot Anti-Tactical Missile Capability-Level 2 (PAC-2) and Guidance Enhancement Missiles (GEM). The PAC-3 program is 75% complete, with the RS, ECS, and LS improvements in production. The PAC-3 missile has entered the test flight phase of engineering and manufacturing development (EMD).

### PROJECTED ACTIVITIES

**2QFY99** The first intercept flight test DT-3 and the low-rate initial production (LRIP) decision for the PAC-3 missile are scheduled to occur.

### PRIME CONTRACTOR(S)

Lockheed Martin Vought Systems (Grand Prairie, TX); Raytheon (Bedford, MA)



\* See appendix for list of subcontractors



# Protective Masks

M40A1



M48



M45



PATS Protection Assessment Text System



Joint SVC Mask

M42A2



## MISSION

Provide respiratory, eye, and face protection against chemical and biological agents, toxins, radioactive particles and battlefield contaminants.

## DESCRIPTION AND SPECIFICATIONS

M40 Series masks are issued to every soldier; the M42A2 is issued to armored crews, the M45 and M48/49 to aircrew, and the M40A1 to the balance of the force and to AMC Surety Sites. The masks have a silicone rubber facepiece with an in-turned peripheral faceseal and binocular rigid lens system. The basic mask, the **M40A1**, replaces all previously fielded masks. It includes a face-mounted canister, with NATO standard threads (gas and aerosol filter), that can be worn on either the right or left cheek, and includes a drinking tube, and clear and tinted lens outserts.

When the canister is attached to a connection hose and equipped with a canister harness, larger mask carrier, and a microphone, the mask becomes the **M42A2**, which is used by all combat vehicle crew personnel. The interchangeability has also permitted the repair of masks, using a facepiece assembly instead of a total replacement. Retaining existing, undamaged parts represents significant savings in cost and time. The **M45** is designed with close-fitting eye lenses and interchangeable nose cups to fit an increased range of soldiers. This unique design permits operation of aircraft sighting systems and night vision devices without the aid of forced-ventilation air. The **M48/M49** masks provide CB agent protection for aircrew members. During operations, positive air pressure is supplied to the mask by the lightweight motorblower. The M48's unique eyelens system makes the mask compatible with the Apache's Integrated Helmet Display and Sighting System, and Optical Relay Tube. The **M49** mask will be issued to general aviators assigned to the Eighth U.S. Army. The **M41 Protection Assessment Test System (PATS)** checks the readiness of a protective mask, including the acceptability of fit and the absence of critical leaks in the mask system. It also can be used to screen for unserviceable masks at unit level, and assists in training personnel on proper wearing and fitting of the mask. The **Joint Service General Purpose Mask (JSGPM)** is being designed to replace the M40 Series masks. It will be used in all ground, ship, and combat vehicle applications throughout the Services. Requirements for the JSGPM include protection against TIMs, significant weight and bulk reduction, reduced inhalation and exhalation breathing resistances, improved compatibility with weapon systems and optics, increased water intake capability, and improved comfort and reduced physiological burden.

## FOREIGN COUNTERPART

Britain: S10

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

M40 series masks and the M41 PATS are in production. The JSGPM is currently in development. Milestone I occurred in September 1998.

## PROJECTED ACTIVITIES

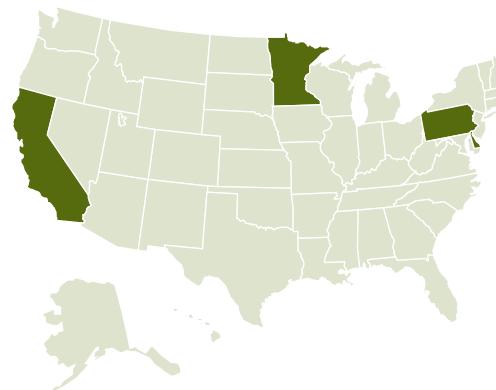
- Continued production of M40 Series.
- JSGPM development contract will be awarded September 1999.
- Program definition and risk reduction (PDRR) phase will be a three-year effort. Milestone II is in 4QFY01.
- Engineering and manufacturing development (EMD) will continue for three years with a Milestone III in-process review (IPR) in 4QFY04.

## PRIME CONTRACTOR(S)

ILC Dover (Frederica, DE); Mine Safety Appliances (Pittsburgh, PA)

**PATS:** TSI (St. Paul, MN)

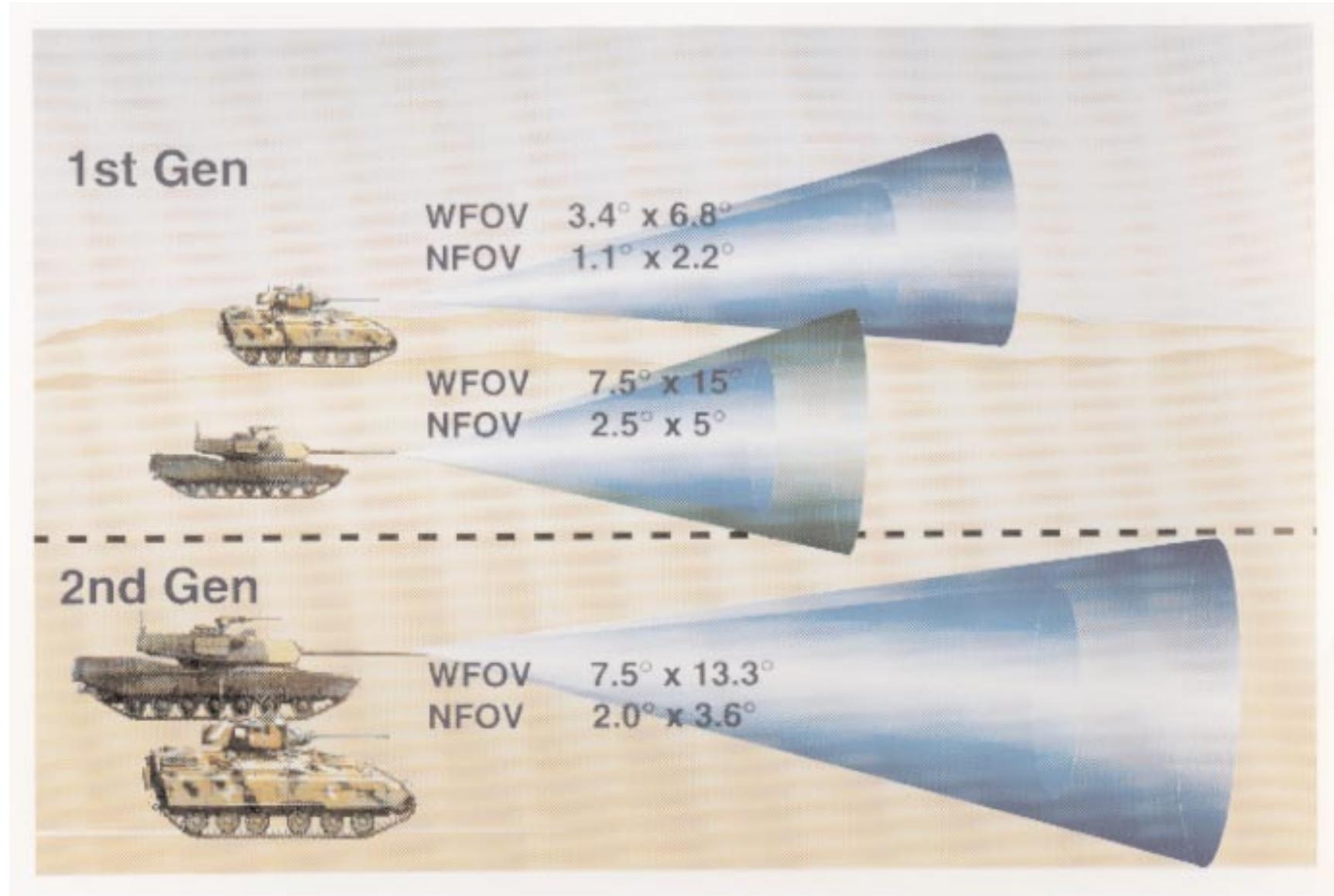
**M45:** Campbell Plastics (Corona, CA)



\* See appendix for list of subcontractors



# Second Generation Forward Looking Infrared (FLIR)



## 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 permitting them to see the same battlespace.

## DESCRIPTION AND SPECIFICATIONS

The Second Generation Forward Looking Infrared (FLIR) (SGF) is the Army's first major Horizontal Technology Integration (HTI) program. One of the Army's key objectives in its quest to "own the night" is the integration of Second Generation FLIR 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; 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 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

Low-rate initial production (LRIP) approval December 1996; LRIP contracts awarded April 1997; First LRIP deliveries May 1998; Bradley LUT I, 1QFY98 and Bradley LUT II, 1QFY99. First M2A3 deliveries, 1QFY99.

## PROJECTED ACTIVITIES

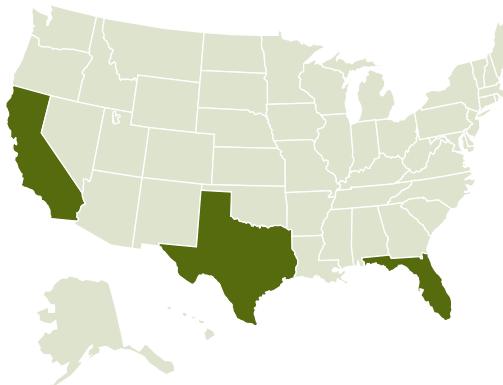
**3QFY99** Bradley, Abrams, LRAS3 operational testing (OT); First M1A2 SEP Deliveries.

**1QFY00** HTI SGF Milestone III Decision.

**2QFY00** HTI SGF full-rate production (FRP) contract award.

## PRIME CONTRACTOR(S)

Raytheon TI Systems (McKinney, TX); DRS Technology, Inc. (El Segundo, CA; Palm Bay, FL)



\* See appendix for list of subcontractors



# Selectable Lightweight Attack Munition (SLAM)



## MISSION

Defeat vehicles and light armored targets.

## DESCRIPTION AND SPECIFICATIONS

The Selectable Lightweight Attack Munition (SLAM) is an Army War Reserve Modernization munition. It is a lightweight (2.2 lb), hand-emplaced munition that offers the user multiple modes of operation. SLAM can engage and defeat targets up to twenty-five feet from detonation.

It can be used for bottom attack (magnetic signature), side/top attack (infrared signature), timed demolition, or by operator-initiated command detonation.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

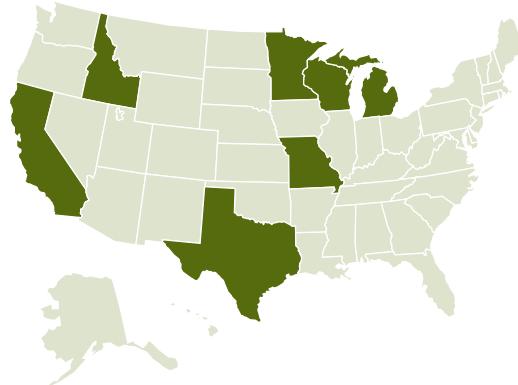
First Army production quantity of SLAM funded in FY97.

## PROJECTED ACTIVITIES

Deliveries of SLAM units will begin in 1999.

## PRIME CONTRACTOR(S)

Alliant Techsystems (Minneapolis, MN)



\* See appendix for list of subcontractors



# Sense and Destroy Armor (SADARM)



## MISSION

Provide an autonomous, counterbattery capability to indirect fire units.

## DESCRIPTION AND SPECIFICATIONS

Sense and Destroy Armor (SADARM) is a counterbattery, fire-and-forget, multi-sensor-fuzed smart munition designed to detect and destroy counter-measured armored vehicles, primarily self-propelled artillery. Each 155 mm artillery projectile delivers two SADARM submunitions. Once dispensed from the projectile, the submunitions descend and search for a target by scanning the ground in a spiral pattern. The submunitions use active and passive millimeter-wave radar and infrared sensors to detect a target. After detection, SADARM determines the optimum engagement point and fires a highly lethal explosively formed penetrator through the top of the target. With the multi-mode sensor suite, the submunition is effective in all weather and terrain. SADARM is a gun-hardened submunition that can be dispensed from a variety of carriers.

**Caliber:** 5.8 in

**Submunition weight:** 26.2 lb

**Range:** 22.5 km (from M109A6 howitzer)

**Number of submunitions:** 2/rd

## FOREIGN COUNTERPART

Germany: SMArt 155 (DM 702)

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

SADARM is in its final year of Low-Rate Initial Production (LRIP). Initial production testing was successfully completed in November 1997. Live fire testing was successfully completed in July 1998. Initial Operational Test and Evaluation (IOTE) was completed in August 1998. A performance enhancing product improvement program, initiated in 1996, is ongoing.

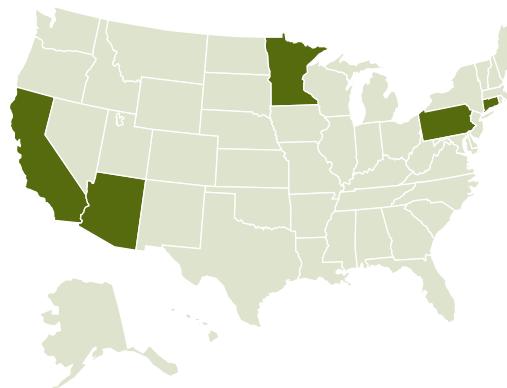
## PROJECTED ACTIVITIES

**4QFY00** First unit equipped (FUE).

**2001** Product improved SADARM production will begin.

## PRIME CONTRACTOR(S)

GenCorp (Aerojet) (Azusa, CA)



\* See appendix for list of subcontractors



# Small Arms



MK19-3



M16



M249



M4



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 improved 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. With the M4, the individual soldier operating in close quarters can 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 7.62 mm medium machine gun in certain units. **M240B Medium Machine Gun:** The M240B is a ground-mounted, gas-operated, crew-served machine gun. This highly reliable 7.62 mm machine gun delivers more energy to the target than the smaller caliber M249 SAW. It will be issued to infantry, armor, and combat engineer units that require medium support fires and will replace the ground-mounted M60 series machine guns currently in use. **MK19-3 40 mm Grenade Machine Gun:** A self-powered, air-cooled, belt-fed, blowback operated weapon, the MK19-3 is designed to deliver accurate, intense, and 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
<b>Caliber:</b>	5.56 mm	5.56 mm	5.56 mm	7.62 mm	40 mm
<b>Weight:</b>	7.5 lb	8.8 lb		16.5 lb	27.6 lb
<b>Max Effective Range:</b>	600m at 500m pt	800m at 550m pt	1000m at 600m pt	1,800m at 800m pt	2,200m at (at: area target, pt: point target)

## FOREIGN MILITARY SALES

Numerous foreign countries purchase U.S. small arms.

## PROGRAM STATUS

**MWS:** Materiel release FY98; **M16A2:** Army procurement completed FY98; **M16A4:** Currently in production to fulfill Modular Rifle requirements.

## PROJECTED ACTIVITIES

**FY99** M249 SAW production program ends.

**1QFY99** MWS first unit equipped (FUE).

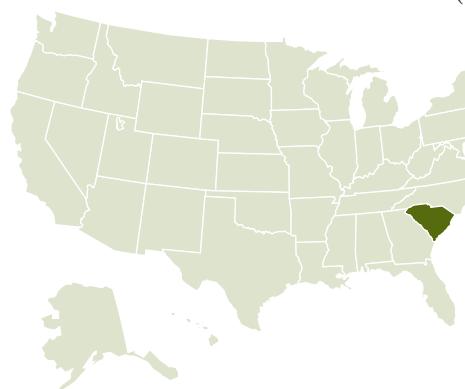
## PRIME CONTRACTOR(S)

**M4 Carbine:** Colt's Manufacturing (Hartford, CT)

**M16A4 Rifle:** FN Manufacturing (Columbia, SC); Colt's Manufacturing (Hartford, CT)

**M249 Squad Automatic Weapon and M240B Medium Machine Gun:** FN Manufacturing (Columbia, SC)

**MK19-3 Grenade Machine Gun:** Saco Defense (Saco, ME)



\* See appendix for list of subcontractors



# Stinger



## MISSION

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

## DESCRIPTION AND SPECIFICATIONS

Stinger is a fire-and-forget infrared missile system that can be fired from a number of ground-to-air and rotary wing platforms. This missile homes in on the heat emitted by fixed-wing aircraft or helicopters. The Stinger system employs a proportional navigation system that enables it to fly an intercept course to the target. The missile 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. The Stinger program has evolved from the Redeye, to Stinger Basic, followed by Stinger Post, then Stinger Reprogrammable MicroProcessor (Stinger-RMP), and to the Stinger Block I Upgrade. The Stinger Block I Upgrade program was initiated to extend service life, increase accuracy, resist counter-measures, increase effectiveness against low-observable unmanned aerial vehicles and cruise missiles, detect helicopters in clutter, and to eliminate the need for hazardous super-elevation when firing from a hovering helicopter.

To overcome targets in clutter, Stinger Block II improvements have been funded from FY95 through FY05. The Stinger Block II features a focal plane array seeker for acquiring, tracking, and hitting aerial targets at the kinematic range of the missile. This focal plane array seeker has demonstrated the capability of acquiring and tracking targets in clutter 2.5 times or greater than the Stinger Block I seeker. Stinger has been fielded on MANPADS, Avenger, Kiowa Warrior, Bradley Linebacker, and the USMC's Light Amphibious Vehicle-Air Defense.

**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, Israel, Italy, The Netherlands, Switzerland, and Taiwan.

## PROGRAM STATUS

Stinger-RMP was fielded in FY90. Block I Upgrades to the Stinger-RMP performance were developed under the Stinger Product Improvement Program, which began in FY92. The Stinger Block I Upgrade to the Stinger-RMP missile began in FY94 and will continue through FY05.

## PROJECTED ACTIVITIES

**2QFY99** The first Stinger Block I will be fielded.

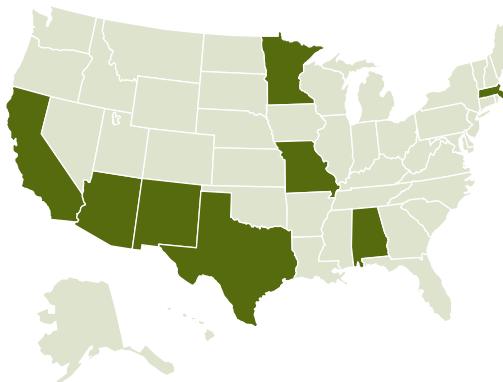
**FY99** The Army will continue with the Stinger Block II Upgrade program definition and risk reduction phase.

**FY00-05** Engineering and manufacturing development phase will begin in FY00 and end in FY05. The Army has planned funding for procuring 11,091 Stinger Block II Upgrade missiles.

**FY05** The first Stinger Block II missile will be fielded.

## PRIME CONTRACTOR(S)

Raytheon Missile Systems Company (Tucson, AZ; Farmington, NM; Austin, TX; Andover, MA)



\* See appendix for list of subcontractors



# Striker



## MISSION

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

## DESCRIPTION AND SPECIFICATIONS

The Striker will replace M981 FISTVs in heavy divisions and become a new asset to light divisions. It operates as an integral part of the brigade reconnaissance troop, providing Combat Observation Lasing Team (COLT) and fire support mission planning and execution. The Striker designates targets for laser-guided ordnance.

The Striker is built on a M1025 armored HMMWV. The Mission Equipment Package includes: Laser rangefinder/designator (G/VLLD); AN/TAS-4B night sight; Handheld Terminal Unit (HTU); Lightweight Computer Unit (LCU); Hosts Forward Observer Software (FOS); Inertial Navigation System (INS); 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:** 7.62 mm, M240B machine gun

**Distribution:** Brigade Reconnaissance Platoons in heavy and light divisions, Armor/Infantry Brigades-Battalions; Cavalry Regiments-Squadrons, Filed Artillery Battalions

**Current models/variants:** M707 Striker

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

**APO 802:** Low-rate initial production (LRIP) approval September 30, 1998. LRIP contract award, December 1998.

## PROJECTED ACTIVITIES

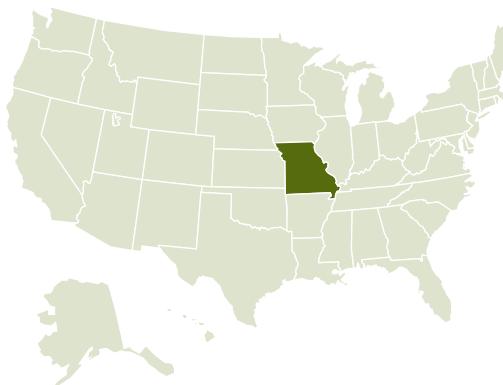
**FY99-01** LRIP.

**2QFY00** Initial operational test and evaluation (IOTE).

**4QFY01** Milestone III.

## PRIME CONTRACTOR(S)

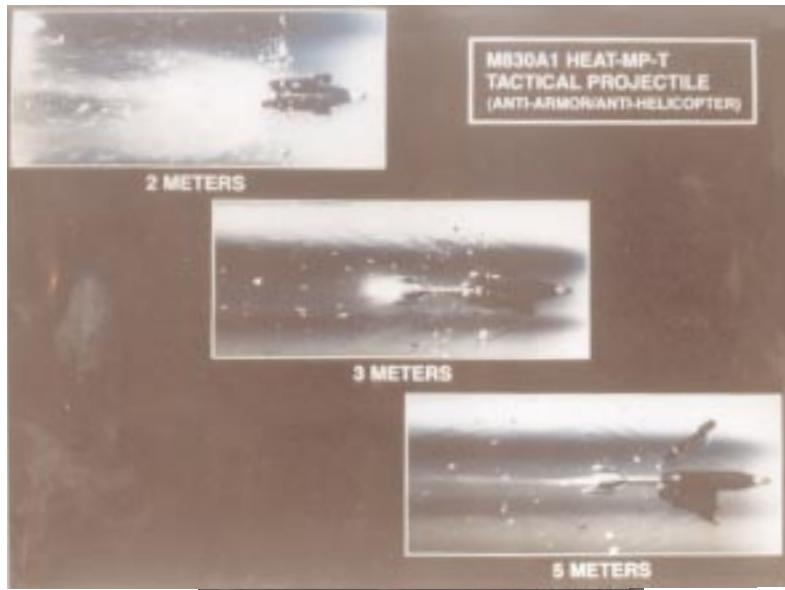
Systems and Electronics Inc. (SEI) (St. Louis, MO)



\* See appendix for list of subcontractors



# Tank Main Gun Ammunition



## MISSION

Provide and maintain the United States tank fleet with lethality capable of overmatching any adversary.

## DESCRIPTION AND SPECIFICATIONS

The 120 mm 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 Abrams tank: Kinetic Energy (KE) is used to defeat heavy armors frontally; Multi-Purpose (MP) is used for lightly-armored vehicles, helicopters, buildings and bunkers, and infantry.

**KE** lethality is optimized by firing a maximum-weight projectile at the greatest velocity possible. The 120 mm series of KE ammo (M829, M829A1, M829A2, and M829E3) have evolved using penetrators of increased mass, lighter sabots, and more powerful propulsion systems. There are two key components of U.S. KE rounds: depleted uranium penetrators that provide extremely dense material with excellent armor penetration capabilities; and light weight graphite composite sabots.

**MP** rounds use a high-explosive, shaped-charged warhead to provide blast, penetration, and fragmentation effects to defeat an array of targets. The M830A1 has an aerodynamic sub-calibered, shaped-charged projectile with discarding sabots. It has higher velocity and increased accuracy, and is the first anti-helicopter capability for the U.S. tank fleet. The XM908 High Explosive Obstacle Reduction cartridge reduces bunkers and large obstacles. It replaces the 165 mm ammunition used on Combat Engineering Vehicles (CEV).

**Smart Precision Munitions** enable precision strikes against high-value targets at extended ranges. XM1007 TERM-KE (Tank Extended Range Munition-Kinetic Energy) is a soft-launch, rocket-boosted, terminally-guided, kinetic-energy munition that could be used against moving and maneuvering targets. It is a candidate in the generic TERM Science and Technology Objective.

## FOREIGN COUNTERPART

NATO tanks employ similar types of KE and MP ammunition. The XM1007 has no similar counterparts worldwide.

## FOREIGN MILITARY SALES

M829 has been sold to Kuwait and Saudi Arabia. M830 has been sold to Kuwait and Egypt.

## PROGRAM STATUS

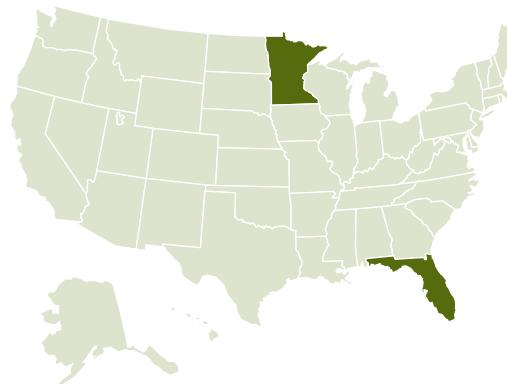
The M829, M829A1, M829A2, M830, and M830A1 have been fielded. The M829A2 and M830A1 are currently in production. The M829E3 is in the engineering and manufacturing development (EMD) phase. The XM1007 TERM-KE has been Congressionally funded.

## PROJECTED ACTIVITIES

- FY99** M829A2 production will be extended into FY99.  
M830A1 production continues.
- FY02** M829E3 Initial production.

## PRIME CONTRACTOR(S)

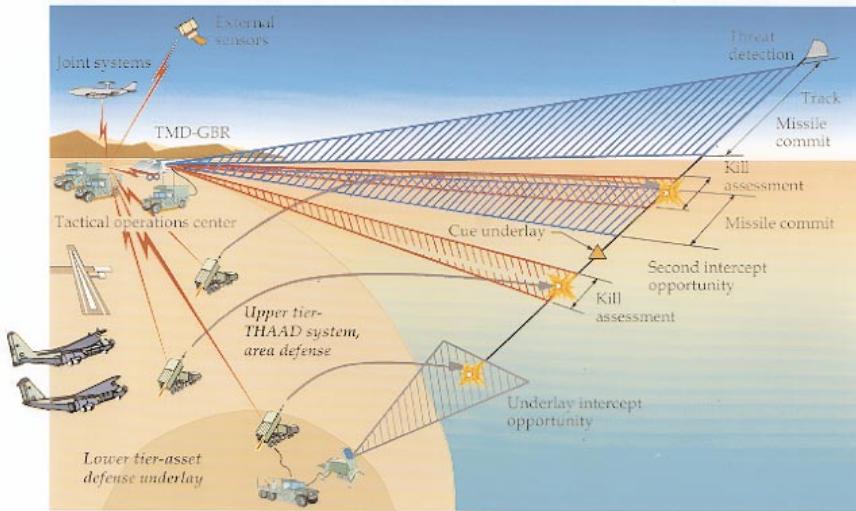
- M830A1, M829E3:** Alliant Techsystems (Hopkins, MN)
- XM1007:** Alliant Techsystems (Clearwater, FL)
- M829A2, M830:** Primex (St. Petersburg, FL)



\* See appendix for list of subcontractors



# Theater High Altitude Area Defense (THAAD) System



### MISSION

Provide theater-wide area defense of tactical ballistic missile 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 Loading System (PLS) 16-ton truck with a capacity of at least 8 missile rounds on a missile pack. The HMMWV-based BM/C4I centers will coordinate with the Theater Air Defense C2 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 allow THAAD

to be rapidly deployed to any theater on short notice. Current plans call for a user operational evaluation system (UOES) to be available in 1999.

### FOREIGN COUNTERPART

**THAAD System:** France and Italy: SAAM, SAMP/N, SAMP/T.

**THAAD Radar:** Russia: Hen House, Dog House, and Try Adds radars; Germany: MSAM.

### FOREIGN MILITARY SALES

None.

### PROGRAM STATUS

The program is in the program definition and risk reduction (PDRR) phase. Eight flight tests have been completed. The UOES Battalion Ft. Bliss, TX, supports flight testing and soldier training. The department is assessing an option to acquire prototype missiles to provide for a limited contingency capability in FY02.

### PROJECTED ACTIVITIES

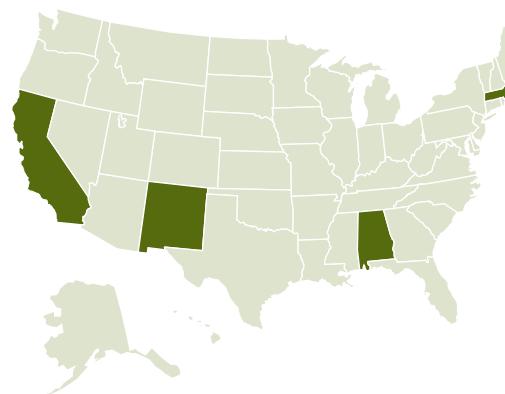
**2QFY99** Flight test 09 scheduled.

**FY00** Milestone II decision.

### PRIME CONTRACTOR(S)

**THAAD System:** Lockheed Martin (Lockheed Martin Missiles and Space Co.) (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



# TOW Improved Target Acquisition System (ITAS)



## MISSION

Increase target acquisition ranges and fire all configurations of TOW missiles while allowing room for growth for TOW missile improvements/follow-on missiles; increase maintainability and reduce logistics requirements; and improve system engagement performance.

## DESCRIPTION AND SPECIFICATIONS

The TOW Improved Target Acquisition System (ITAS) is a materiel change to the current Ground Tow 2 Weapon System for first-to-deploy light forces. ITAS has an improved design with BIT/BITES 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 (TAS), Fire Control Subsystem (FCS), Battery Power Source (BPS), and Modified Traversing Unit (TU). The ITAS will operate from the High Mobility Multi-Purpose 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

ITAS low-rate initial production (LRIP) I contract was awarded September 30, 1996, with a production quantity of twenty-five units. LRIP II was awarded March 1998 for a quantity of seventy-three systems for the 1st BDE Fielding in September 1999. First unit equipped (FUE) was conducted in September 1998.

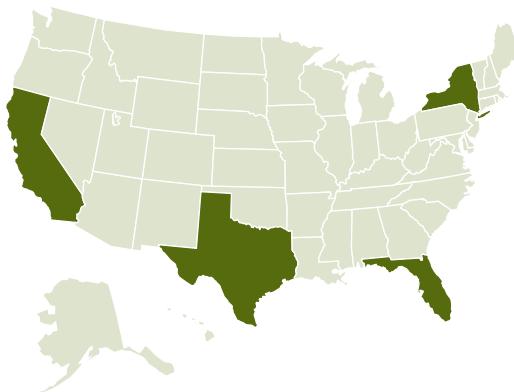
## PROJECTED ACTIVITIES

**2QFY99** Limited user test II (LUT II) scheduled.

**3QFY99** Full-rate production (FRP) decision scheduled.

## PRIME CONTRACTOR(S)

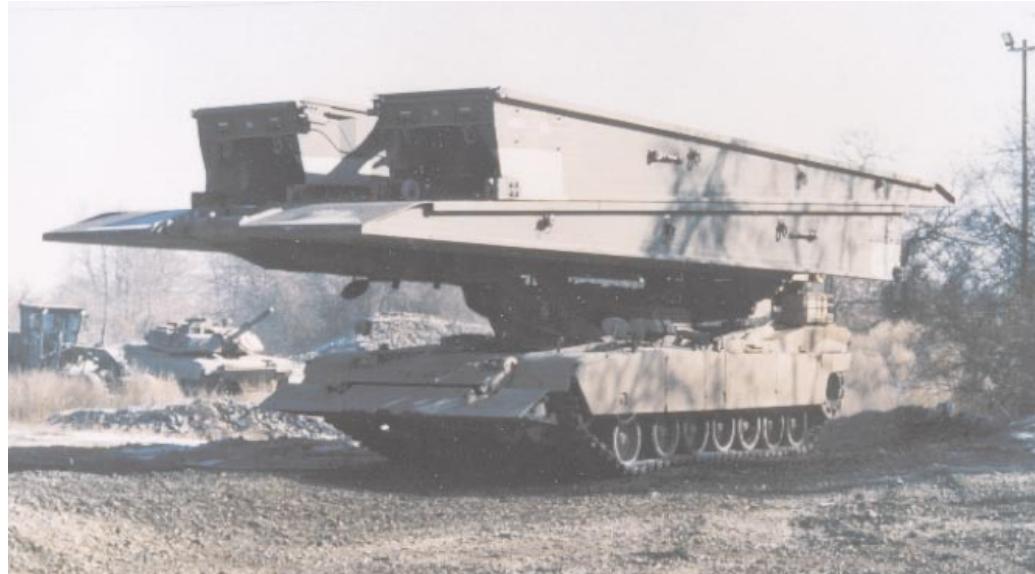
Raytheon Systems Corporation (McKinney, TX)



\* See appendix for list of subcontractors



# Wolverine



## MISSION

Provide combat assault, gap-crossing bridging support for forward, heavy-maneuver forces.

## DESCRIPTION AND SPECIFICATIONS

The Wolverine launcher is mounted on an M1A2 Abrams System Enhancement Program (SEP) chassis and is operated by a two-man crew. The bridge is twenty-six meters long and can span gaps up to twenty-four meters. It will support a Military Load Class (MLC) seventy ton crossing at sixteen kph. The bridge is launched from under armor in five minutes and retrieved in less than ten minutes.

The Wolverine will increase maneuver-force mobility by allowing units to rapidly transit gaps such as tank ditches, road craters, and partially damaged bridge sections. This rapid movement also increases the maneuver force's survivability by reducing the time spent in vulnerable areas waiting to cross. The current Armored Vehicle Launched Bridge (AVLB) only supports Abrams tank units using a caution crossing at reduced-gap length (15 m) and reduced crossing speeds and MLC weight.

## 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

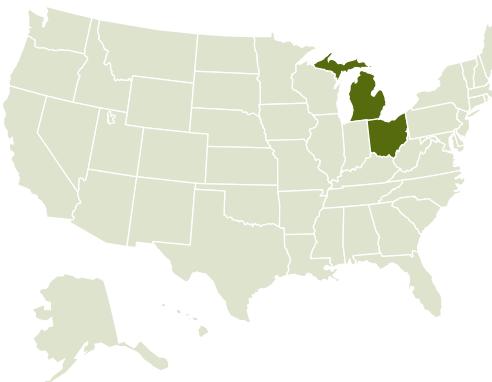
The Wolverine program is currently in transition from engineering to manufacturing in the engineering and manufacturing development (EMD) phase of the lifecycle model. The first of six manufacturing pilot vehicles has just finished build and is in contractor test. This vehicle will also be used during the extended logistics review (January–April 1999) to validate technical manuals, and repair procedures. The remaining five pilots will be delivered in FY99 and be used for live fire testing (FY99–00) and initial operational test and evaluation (IOTE) in FY00. The low-rate initial production (LRIP) contract was signed April 9, 1998, with the first vehicle delivery in August 1999. The LRIP vehicles will be fielded to the first digitized division (FDD) in 4QFY00.

## PROJECTED ACTIVITIES

<b>FY99–00</b>	The remaining five pilots will be delivered in FY99 and be used for live fire testing (FY99–00) and IOTE in FY00.
<b>4QFY00</b>	The LRIP vehicles will be fielded to the FDD.
<b>1Q–2QFY99</b>	Contractor testing.
<b>2Q–3QFY99</b>	Extended logistics review.
<b>4QFY99–1QFY00</b>	Live fire test and evaluation.
<b>2Q–3QFY00</b>	Combined developmental testing/operational testing (DT/OT).

## PRIME CONTRACTOR(S)

General Dynamics (Land Systems Division)  
(Sterling Heights, MI)



\* See appendix for list of subcontractors



## XMT Joint Lightweight 155 mm Howitzer (LW155)



## MISSION

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

## DESCRIPTION AND SPECIFICATIONS

The XM777 Joint Lightweight 155 mm Howitzer (LW155) is a joint Marine Corps/Army program, in which the Marine Corps funds the howitzer research, development, testing, and evaluation (RDT&E) and leads in production, while the Army funds the RDT&E for the digital fire control system (DFCS) 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 US 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, DFCS, 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, displace:** 2–3 min, 1–2 min

**Maximum range:** 30–40 km (assisted)

**Rate-of-fire:** 5–8 rd/min max, 2 rd/min sustained

**Ground mobility:** Current 5-Ton truck, FMTV, MTVR

**Air mobility:** MV-22, CH53D/E, CH47D

**155 mm compatibility:** All fielded and developing munitions

**Digital fire control:** Self-locating and pointing; on-board firing data computation; digital and voice communications; self-contained power supply.

## 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, under authority of a U.S./U.K. EMD Memorandum of Understanding signed in September 1998. Staffing is underway to incorporate Italy into the cooperative program during FY99. Future cooperative production agreements with both allies are likely.

## PROGRAM STATUS

The XM777 LW155 program is currently eighteen months into a four-year EMD phase. Textron Marine and Land Systems (TMLS) of New Orleans was awarded the initial LW155 contract with Vickers Shipbuilding & Engineering, Ltd. (VSEL), the system developer, as a subcontractor. Industry and government leaders recently agreed on a coordinated plan to novate the EMD contract and have VSEL assume the role of prime contractor by the end of 1998. VSEL's plan is to manufacture and assemble 70% of the XM777 in the United States.

## PROJECTED ACTIVITIES

**FY00** First XM777 prototype delivery scheduled.

**1QFY02** Milestone III scheduled.

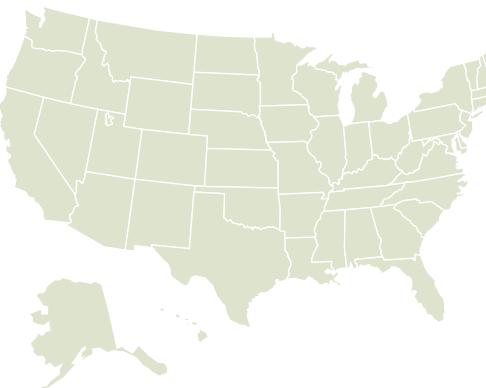
**1QFY03** Marine Corps initial operational capability (IOC).

**FY04** Army production begins.

**FY05** IOC.

## PRIME CONTRACTOR(S)

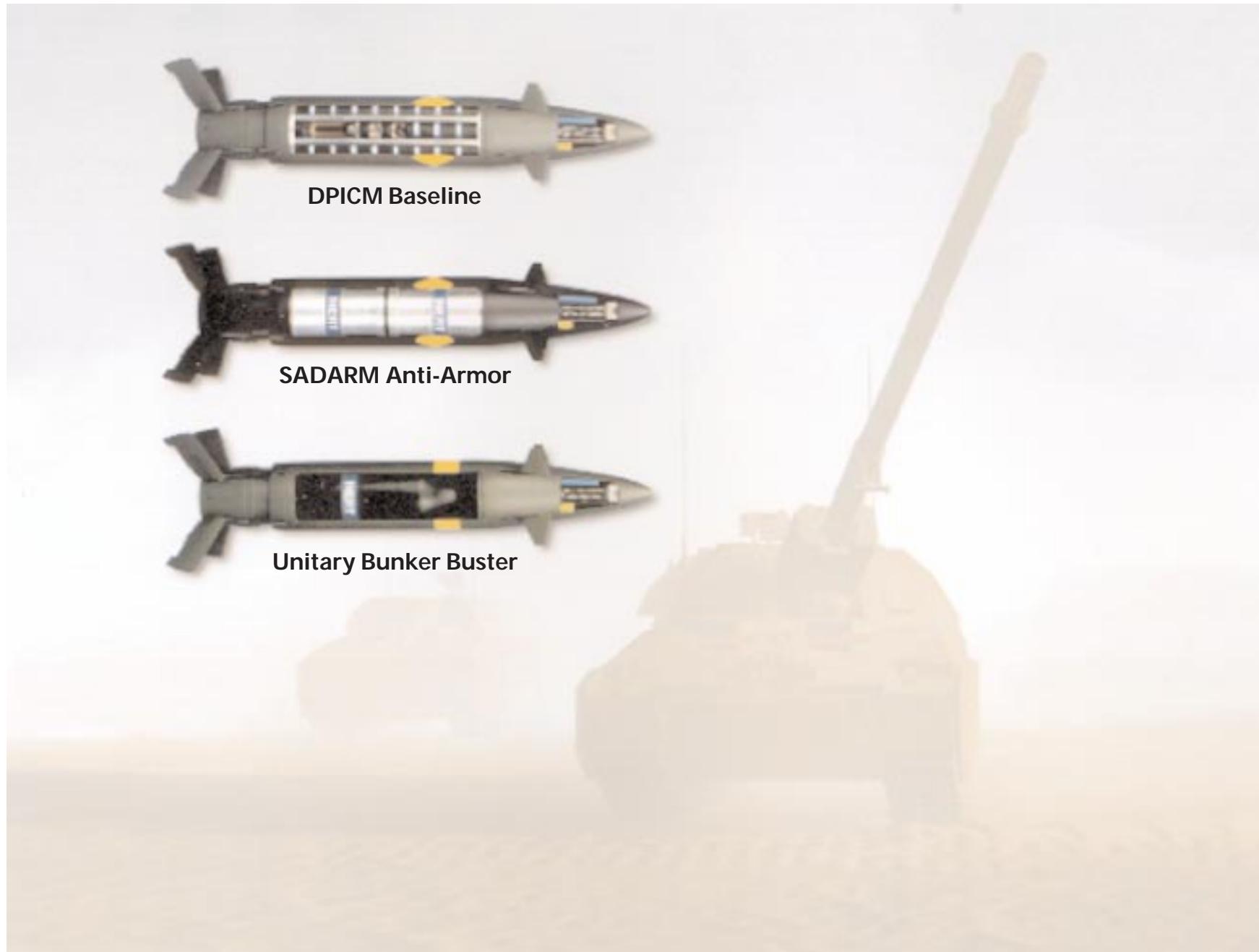
Vickers Shipbuilding & Engineering, Ltd. (United Kingdom)



\* See appendix for list of subcontractors



## X<sup>M</sup>982 155 mm Extended Range Artillery Projectile Family



## MISSION

Permit 155 mm artillery to engage deeper targets to include control points, air-defense sites, logistical resupply and refuel areas, and assembly areas while retaining the ability of close-in attack.

## DESCRIPTION AND SPECIFICATIONS

The XM982 155 mm Extended Range Artillery Projectile Family is a guided, fin-stabilized, extended-range 155 mm fire-and-forget projectile that uses Global Positioning System (GPS) satellites and an onboard Inertial Navigation System (INS) to deliver a Dual Purpose Improved Conventional Munition (DPICM), Sense and Destroy Armor (SADARM), or a Unitary Penetrator Warhead to a precise location. It is effective in all weather and terrain. The XM982 contains a fuzing system that is inductively set by either an Enhanced Portable Inductive Artillery Fuze Setter (EPIAFS) or Crusader's inductive automated fuze setter. Target, platform locations, and GPS specific data are inductively entered into the projectile's mission computer, located in the nose of the projectile.

Once the DPICM projectile arrives at the desired location, the cargo canister is expelled and a bladder inflates, dispensing the DPICM grenades radially. On impact, detonation occurs with a shape charge jet directed downward while the body simultaneously bursts into small fragments to provide anti-personnel effects. Those grenades that fail to initiate on ground impact will self-destruct several seconds later. The XM982 gun-hardened, modular projectile is also designed to accommodate two Product Improved SADARM submunitions or a Unitary Warhead that will penetrate 8 inches of reinforced concrete.

**Caliber:** 155 mm

**Weight:** 106 lb

**Range:** 37 km (from M109A6, M198 and XM777 howitzers), 47 km (from Crusader)

**Number of submunitions:** 64 DPICMs/rd

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

No foreign military sales.

## PROGRAM STATUS

XM982 DPICM is in the first year of Engineering and Manufacturing Development (EMD). XM982 DPICM entered EMD on January 23, 1998, with a contract to Raytheon Systems Company (RSC). The contract also includes unfunded options for SADARM EMD, Unitary warhead EMD, and Low-Rate Production (LRP) programs. These options are planned for execution in FY02. XM982 DPICM contractor development testing is ongoing now through 2QFY00.

## PROJECTED ACTIVITIES

**3QFY00** Technical testing.

**1QFY02** XM982 DPICM LRP.

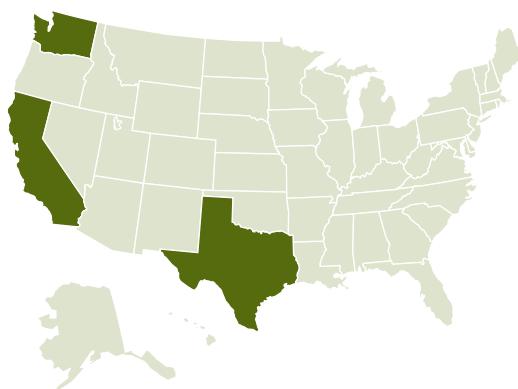
**4QFY03** XM982 DPICM Milestone III.

**4QFY03** XM982 DPICM Initial Operational Capability (IOC).

**1QFY04** XM982 DPICM Full-Rate Production (FRP).

## PRIME CONTRACTOR(S)

Raytheon Systems Company (Lewisville, TX)



\* See appendix for list of subcontractors



### **DIRECT FIRE LETHALITY (DFL) ADVANCED TECHNOLOGY DEMONSTRATION (ATD) (1998–2002)**

The Direct Fire Lethality (DFL) ATD focuses on enhancements to the Abrams tank main armament, to improve hit and kill capability against future threats in both stationary and moving firing conditions. The DFL ATD consists of two major efforts: an advanced Kinetic Energy (KE) cartridge, and Advanced Drive and Weapon Stabilization (ADAWS).

The advanced KE cartridge effort investigates the following:

- A novel penetrator to defeat explosive reactive armor (ERA), with a 40% increase in lethality over the M829A2; and
- An axial/radial thruster capability to improve ammunition system accuracy up to 70% at extended ranges.

The ADAWS effort investigates gearless turret azimuth and gun elevation drive technology, and an optical fiber muzzle reference sensor. The objective is to increase the gun pointing accuracy for vehicles on the move and to reduce Operational and Support (O&S) costs. The DFL ATD will provide the Army with state-of-the-art tank armament for fielding in FY05. It also provides advanced technologies for other turreted-weapon platform applications.

### **ENHANCED FIBER OPTIC GUIDED MISSILE (EFOGM) ADVANCED TECHNOLOGY DEMONSTRATION (ATD) (1994–1999)**

The EFOGM is the primary “killer” within the “hunter/standoff killer” concept of the Rapid Force Projection Initiative (RFPI) and the OSD-approved RFPI Advanced Concept Technology Demonstration (ACTD). The EFOGM system is a multi-purpose, precision kill weapon system. Its primary mission is to engage and defeat threat-armored combat vehicles, other high-value ground targets, and hovering or moving rotary wing aircraft that may be masked from line-of-sight direct-fire weapon systems. In addition, the system can be used to surgically strike with minimal collateral damage. EFOGM is a day/night, adverse weather capable system that allows the maneuver commander to extend the battle space beyond line of sight to ranges up to 15 kilometers. The system consists of a gunner’s station, tactical missile, and fiber optic data link. The missile can navigate to the target area; the gunner can intervene at any time to lock on and engage any detected targets. The gunner views the flight path and target via a seeker on the missile, linked to the gunner’s video console. The missile to be

demonstrated will incorporate an IR imaging seeker, a variety of advanced targeting functions, and a global positioning system (GPS)-based inertial measurement unit for accurate targeting. Beginning in 4QFY98, EFOGM will participate in the RFPI ACTD at Fort Benning, GA.

### **LOW COST PRECISION KILL ADVANCED TECHNOLOGY DEMONSTRATION (ATD)**

The joint AMCOM MRDEC/AVRDEC Low Cost Precision Kill (LCPK) Science and Technology Objective (STO) will demonstrate a low cost (< \$10K), accurate [~1m Circular Error Probability (CEP)] 2.75 inch guided rocket that provides a stand-off range (6 km), surgical strike capability against specified soft point targets. Utilizing a small, strapdown laser seeker, off the shelf inertial devices and low cost control mechanization, a high single shot probability of kill will be achieved. The LCPK will reduce cost/kill by 2x–4x, minimize collateral damage, and increase stowed kills by 4x–20x. A stable airframe with 90% reduction in guidance section spin rates will be demonstrated via wind tunnel and ballistic flights and a 10x reduction in 2.75 rocket dispersions will be demonstrated via control test vehicle (CTV) flights. The ~1m CEP accuracy will be demonstrated via guided test vehicle (GTV) flights from ground and AH-64 aircraft.



### MINE HUNTER/KILLER (MH/K) ADVANCED TECHNOLOGY DEMONSTRATION (ATD) (1998–2001)

The Mine Hunter/Killer (MH/K) ATD will demonstrate a mounted conceptual vehicular system that semi-autonomously detects, locates, and neutralizes land mines at a high operational tempo, without exposing personnel to the threat. MH/K technologies will be adaptable to light vehicle platforms, and to medium or heavy armored vehicles. The MH/K system will perform route clearance missions in support of mounted or dismounted combat maneuver forces, and maneuver support forces, during Major Theater Wars (MTW), Smaller Scale Contingencies (SSC), and Support and Sustainment Operations (S&SO). The MH/K system will automatically detect and locate metallic and non-metallic anti-tank mines. The position/location information will be used to direct a neutralizer at each individual mine, and to prompt the operator to engage and neutralize the target. The classification and location data will also be communicated to other tactical units. Standoff detection sensors to be evaluated include forward-looking infrared (FLIR), forward-looking ground penetrating radar (GPR), passive millimeter wave, and conventional mine detection systems on small tethered vehicles. Standoff neutralization devices to be evaluated include direct-attack projectiles, multiple fragment and shaped-charge, top-attack munitions, emerging directed-energy beams, and explosive systems. The ATD supports the Ground Stand-off Mine Detection System and Breacher P3I.

### PRECISION GUIDED MORTAR MUNITION (PGMM) ADVANCED TECHNOLOGY DEMONSTRATION (ATD) (1995–2001)

The Precision Guided Mortar Munition (PGMM) is an affordable, 120 mm, 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 the



survability of U.S. Infantry by enabling the defeat of fortified and urban targets, without requiring the Infantry to attack them at close range. Using a precision round with a small burst radius to defeat targets reduces damage to surrounding structures and minimizes noncombatant casualties.

# Essential Research and Development/Leap-Ahead

Focused investment in Science and Technology (S&T) is essential to developing and maintaining the capabilities needed to ensure success on future battlefields. S&T programs support the incremental improvement of current systems. They are also the source of “leap-ahead” technologies, which have the potential to provide a significant, even revolutionary, improvement over present capabilities. Science and Technology investment is critical to developing and maintaining future Information Dominance and Overmatch Capabilities.

S&T funding is guided by a set of over 200 Science and Technology Objectives (STOs). STOs state a specific, measurable scientific advancement to be achieved by a given fiscal year. They are used to focus and stabilize the Army's S&T program, and assist the Army leadership in providing clear guidance to S&T organizations. Examples of STOs include Advanced Mobility Systems for armored vehicles and Advanced Mine Detection Sensors to reduce individual and vehicle vulnerability to mines.

S&T categories include Basic Research (6.1), Applied Research (6.2), and Advanced Technology Development (6.3). Basic Research includes all efforts of scientific study and experimentation with a high potential to improve warfighting capabilities. Applied Research efforts are those directed toward the solution of

specific military problems, excluding major development projects. Finally, Advanced Technology Development programs are efforts which have moved into the development of hardware ready for operational testing. Major current S&T programs include the Tactical High Energy Laser (THEL), Advanced Tank Armament System, and Crusader.

Targeted investment of S&T funding is critical to maximizing the return from the limited resources available. The Army's Science and Technology program seeks to leverage technological developments of the other Services, government agencies, industry, and academia. Aside from its own S&T efforts, the Army supports the six Joint Strategic Research Objectives (SROs), which include Biominetics, Nanoscience, Smart Structures, Broad Band Communications, Intelligent Systems, and Compact Power Sources.

The Army's Science and Technology program is the foundation of its long-term modernization strategy. As such, it is an essential element in the United States' ability to dominate land warfare in the next century. We must therefore continue to support those investments that provide the solutions to tomorrow's technology requirements.

Concept Exploration

Program Definition and Risk Reduction

Engineering and Manufacturing Development

Production, Fielding/Deployment, and Operational Support

## PROGRAM DEFINITION AND RISK REDUCTION:

Advanced Tank Armament System (ATAS)

## CONCEPT EXPLORATION:

Future Scout and Cavalry System ATD

Joint LACMD Elevated Netted Sensors Systems (JLENS)

Line-of-Sight Anti-Tank (LOSAT)

Medium Extended Air Defense System (MEADS)

Enhanced Coastal Traffability and Sea State Mitigation (ECT/SSM) ATD

Objective Crew Served Weapon (OCSW) ATD

Objective Individual Combat Weapon (OICW) ATD

National Missile Defense (NMD)

## ENGINEERING AND MANUFACTURING DEVELOPMENT:

Brilliant Anti-Armor Submunition (BAT)

Tactical High Energy Laser (THEL)

# Advanced Tank Armament System (ATAS)



## MISSION

Provide next-generation armament system technologies for Abrams main battle tank and other direct fire weapon system platforms. The program will increase lethality and accuracy at extended ranges and enable the crew to engage targets easier and faster.

## DESCRIPTION AND SPECIFICATIONS

The current Advanced Tank Armament System (ATAS) program is working on two potential improvements: a longer-barrel cannon for the Abrams and extended range fire control system improvements for all direct fire platforms.

The increase in muzzle velocity due to the longer barrel will improve the kinetic energy and the lethality of current tank ammunition. There will be a significant increase in available battlespace on future battlefields as tank rounds will have greater range and penetration. This translates into greater killing power for the tank.

Automatic target detection and tracking software decrease the time to acquire and engage enemy targets. Firing accuracy can be greatly enhanced by the addition of an Improved Muzzle Reference System, advanced fire control solutions, state-of-the-art lead predictors and improved gun servos and actuators. These improvements will enable the tank crew to quickly and accurately engage and destroy enemy targets at extended ranges.

## FOREIGN COUNTERPART

Several countries already include ATAS components in their tank fleets. The French LeClerc incorporates a long-barrel 120 mm cannon and autoloader. The German Leopard is introducing a long barrel cannon. The Israeli Merkava employs Auto Target Trackers (ATT) to improve gun accuracy.

## FOREIGN MILITARY SALES

The U.S. continues to sell Abrams tanks to selected allies. The ATAS program can provide added value to these potential sales with the longer gun and fire control improvements.

## PROGRAM STATUS

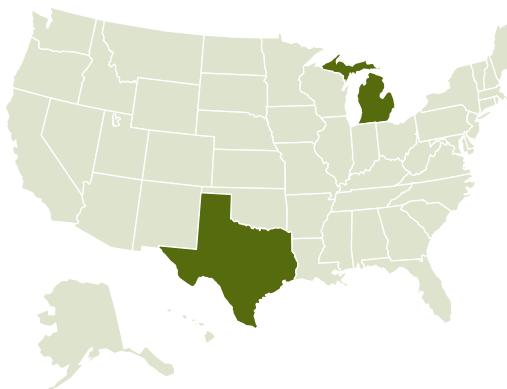
Near-term efforts focus on evaluating the L55 German (long) gun tube and testing the ATT, the Electronic Muzzle Reference Sensor (EMRS), and gun barrel coatings. Benet Labs (Watervliet, NY) is evaluating actual L55 hardware; General Dynamics Land Systems (GDLS) has been awarded an L55/M256E1 Integration Contract. ATT has been integrated into the tank gunner's position on a test vehicle. Testing at GDLS is underway with completion scheduled for October 1998. Testing to date has been successful. Laboratory and accuracy testing is underway at Aberdeen Proving Ground, MD, on EMRS. Testing to date has been successful and should be completed by September 1998.

## PROJECTED ACTIVITIES

- L55:** Contract to purchase three German production tubes for test and evaluation is in process. Award 1QFY99.
- ATT:** Additional user testing at Aberdeen Proving Ground, MD in November 1999.
- EMRS:** Durability testing during FY99.  
Continue coating development.

## PRIME CONTRACTOR(S)

- Vehicle Integration:** GDLS (Sterling Heights, MI)
- Fire Control System:** Raytheon (TI) Systems (Plano, TX)
- L55 Gun Tubes:** Rheinmetall (Ratingen, Germany)



\* See appendix for list of subcontractors



## Brilliant Anti-Armor Submunition (BAT)



UNITED STATES ARMY

## MISSION

Provide a submunition with an autonomous, deep-attack capability for the Army Tactical Missile System (ATACMS) missile.

## DESCRIPTION AND SPECIFICATIONS

The Brilliant Anti-Armor Submunition (BAT) uses acoustic and infrared (IR) sensors to autonomously search for, detect, track, engage and destroy moving tanks and other armored vehicles. These sensors provide the autonomous capability that makes this submunition "brilliant." The BAT can accommodate large target location ambiguities without post-launch guidance. The BAT submunition's modular design complements manufacturing, producibility, repairability, and maintainability efforts. The P3I BAT submunition is a preplanned product improvement to the BAT submunition. It provides enhanced acquisition capability and an improved warhead for use against expanded target sets that include cold, stationary targets, heavy multiple launch rocket systems, and surface-to-surface missile transporter erector launchers. The P3I BAT introduces a dual-mode seeker, an enhanced warhead for increased lethality, and a global positioning system for improved target location accuracy.

**Length:** 36 in

**Diameter:** 5.5 in

**Weight:** 44 lb

**Seekers:** BAT: acoustic and IR; P3I BAT: acoustic, millimeter wave radar, and imaging IR

**Payload:** Tandem-shaped warhead

**Guidance:** Autonomous

**Delivery Vehicles:** ATACMS Block II and IIA

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

**BAT:** Contractor development test (CDT) flights were completed in March 1998. Tactical BAT submunitions successfully hit moving tanks in two ATACMS Block II pre-production test (PPT)

flights. A tactical BAT submunition hit a stopped tank in the first production qualification test (PQT) flight, and multiple BAT submunitions have impacted moving armored vehicles in subsequent PQT flights. **P3I BAT:** Captive flight test (CFT) No. 1 was successfully completed in February 1998.

## PROJECTED ACTIVITIES

### BAT

- Complete engineering and manufacturing development (EMD).
- Complete functional configuration audit (FCA).
- Continue flight testing as part of ATACMS Block II PQT and development test/operational test (DT/OT) flights.
- An ATACMS Block II-BAT low-rate initial production (LRIP) Defense Acquisition Board (DAB) review will be conducted in February 1999.

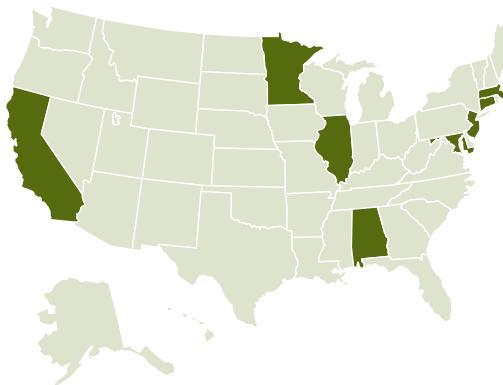
### P3I BAT

- Complete program definition and risk reduction (PDRR).
- Conduct CFT and recoverable P3I BAT testing.
- Conduct cost as an independent variable (CAIV) decision in FY01.

## PRIME CONTRACTOR(S)

**BAT:** Northrop Grumman (Hawthorne, CA; Rolling Meadows, IL [after EMD]; Huntsville, AL).

**P3I BAT:** Northrop Grumman (Hawthorne, CA).



\* See appendix for list of subcontractors



## Joint LACMD Elevated Netted Sensors Systems (JLENS)



## MISSION

Provide Over-the-Horizon (OTH) wide-area surveillance and precision-tracking (Fire Control Quality) data; support the primary mission area of Land Attack Cruise Missile Defense (LACMD), using the Air-Directed Surface-to-Air Missile (ADSAM) concept; support secondary mission areas of Attack Operations and Battlefield Communications.

## DESCRIPTION AND SPECIFICATIONS

Joint Land Attack Cruise Missile Defense (LACMD) Elevated Netted Sensors Systems (JLENS) is a theater-based system, employed at the Corps level or above. It consists of advanced, elevated, netted sensors and communication systems with specific application to LACMD. The JLENS deployed system will improve battlefield commanders' ability to support wide-area defense against the emerging threat of land attack cruise missiles. It expands the battlespace for current Air Defense systems (PATRIOT, Navy Standard Missile, AMRAAM, Medium Extended Air Defense System, and Forward Area Air Defense System) and future Air Defense Systems. Sensor netting is achieved through integration with Navy Cooperative Engagement Capability (CEC). JLENS will also contribute to the production and distribution of a Single Integrated Air Picture (SIAP), and to combat identification and classification (Combat ID). It will support Attack Operations with a Ground Moving Target Indicator capability and support expanded Battlefield Communications with a communications relay capability.

**Surveillance:** 225–280 km

**Precision Track Illuminator:** 80–150 km

**Combat ID:** TYPE; **Altitude:** 10K–15Kft

**BMC4I:** JTIDS/CEC; **Basing:** Land/Sea (Barge)

**Mobility:** Air/Sea/Land, Road Mobile

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

The Army has reiterated its requirement for JLENS, determined that the cruise missile threat is real, and that JLENS is the most cost-effective system available for Cruise Missile Defense. JLENS has been included in the Joint Theater Air and Missile Defense Architecture and Master Plan. The Army has approved the

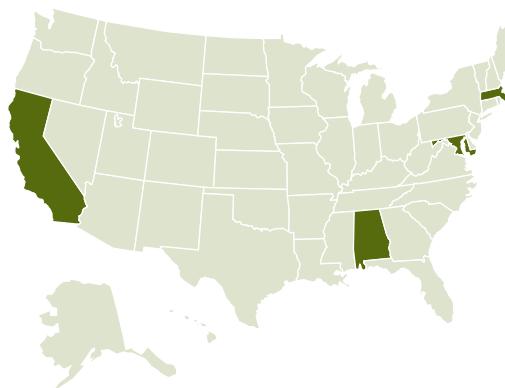
JLENS ORD and the JLENS Feasibility Study has been completed. Successful award of the JLENS prime contract to H&R Company (Raytheon Systems Company) occurred on January 30, 1998. The system participated successfully in Roving Sands '98, using the Extended Air Defense Simulation (EADSIM). JLENS contributed to Active Defense, to increasing battlefield situational awareness, and the capability to send track data/messages to PATRIOT, THAAD, AEGIS and SHORAD units. The data was used in simulated engagements to destroy a cruise missile track. Development of the 16-module, high-power, light-weight, air-cooled CEC antenna was successful; also successful was the demonstration of the CEC Relay capability during Fleet Battle Experiment-Charlie (16 module CEC antenna, equipment and 15M Aerostat). The CEC Relay was between Eisenhower Battle Group, USMC MACS-24 and Fleet Combat Training Center, Atlantic.

## PROJECTED ACTIVITIES

- Incremental ADSAM capability demonstrations, FY99–01, FY03, FY05.
- ASCIET '99, Comms Relay (CEC, EPLRS, SINCGARS).
- Roving Sands '99, area surveillance for LACMD, system modeling and simulation, FY99.
- PATRIOT/CEC engage on remote (EOR) exercise, FY00.
- Risk Reduction efforts with other government agencies involved in ADSAM Demonstrations.

## PRIME CONTRACTOR(S)

Raytheon Systems Company (Bedford, MA; El Segundo, CA)



\* See appendix for list of subcontractors



## Line-of-Sight Anti-Tank (LOSAT)



## MISSION

Provide a high volume of lethal, accurate missile fire, effective against heavy armor systems, at ranges exceeding tank main gun range, to help remedy the early-entry-force lethality shortfall against heavy armor.

## DESCRIPTION AND SPECIFICATIONS

The Line-of-Sight Anti-Tank (LOSAT) weapon system consists of kinetic-energy missiles (KEM), and a Second Generation Forward Looking Infrared (FLIR)/TV acquisition sensor, mounted on an air-mobile HMMWV chassis. Key LOSAT advantages include: the overmatch lethality of KEM (defeats all predicted future armored-combat vehicles and hardened high-value targets, including bunkers and reinforced urban structures); its deployability, including sling load and air drop; and its 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; it provides 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 TOW

**Crew:** 3

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

LOSAT was initiated as a DoD-approved Advanced Concept Technology Demonstration (ACTD) program in FY98 to meet the following goals: position the technology for future acquisition decisions; demonstrate subsystem capabilities in flight tests and dirty battlefield environments; evaluate the utility of the LOSAT technology for the early-entry forces; demonstrate an integrated HMMWV-based LOSAT system in flight test and advanced warfighting experiments; and evaluate affordability issues. The ACTD program is a cost-effective way to assess the operational

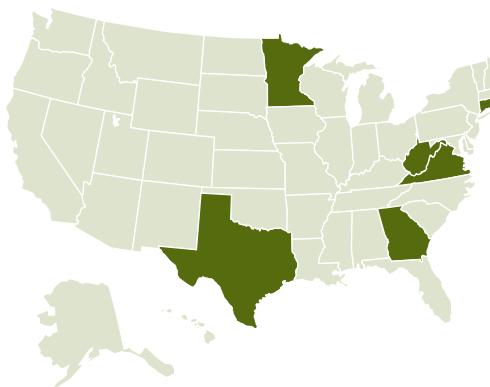
value of LOSAT to the early-entry force, through deployment with the XVIII Airborne Corps. At the same time, longer-term Army After Next applied research efforts continue for a small Compact Kinetic Energy Missile. The work in this program element is consistent with the *Army Science and Technology Master Plan* and the *Army Modernization Plan*. This Program is dedicated to conducting proof-of-principle field demonstrations and tests of technologies to meet specific military needs. The ACTD contract was awarded in April 1998. Work on this Program is conducted through the CCAWS Project Office in Huntsville, AL.

## PROJECTED ACTIVITIES

- Conduct design analyses of Fire Unit Electro-Optical System and Carbon Dioxide Pulsed Laser.
- Complete initial design and review of missile mechanical design, and initiate ACTD prototype material purchases to be used in testing.
- Complete initial design and review of Fire Unit mechanical design, and initiate ACTD prototype material purchases to be used in testing.
- Conduct hardware-in-the-loop design/closed loops simulation; evaluation/verification of new hardware/software designs.
- Initiate design/fabrication of prototype tooling and test equipment.

## PRIME CONTRACTOR(S)

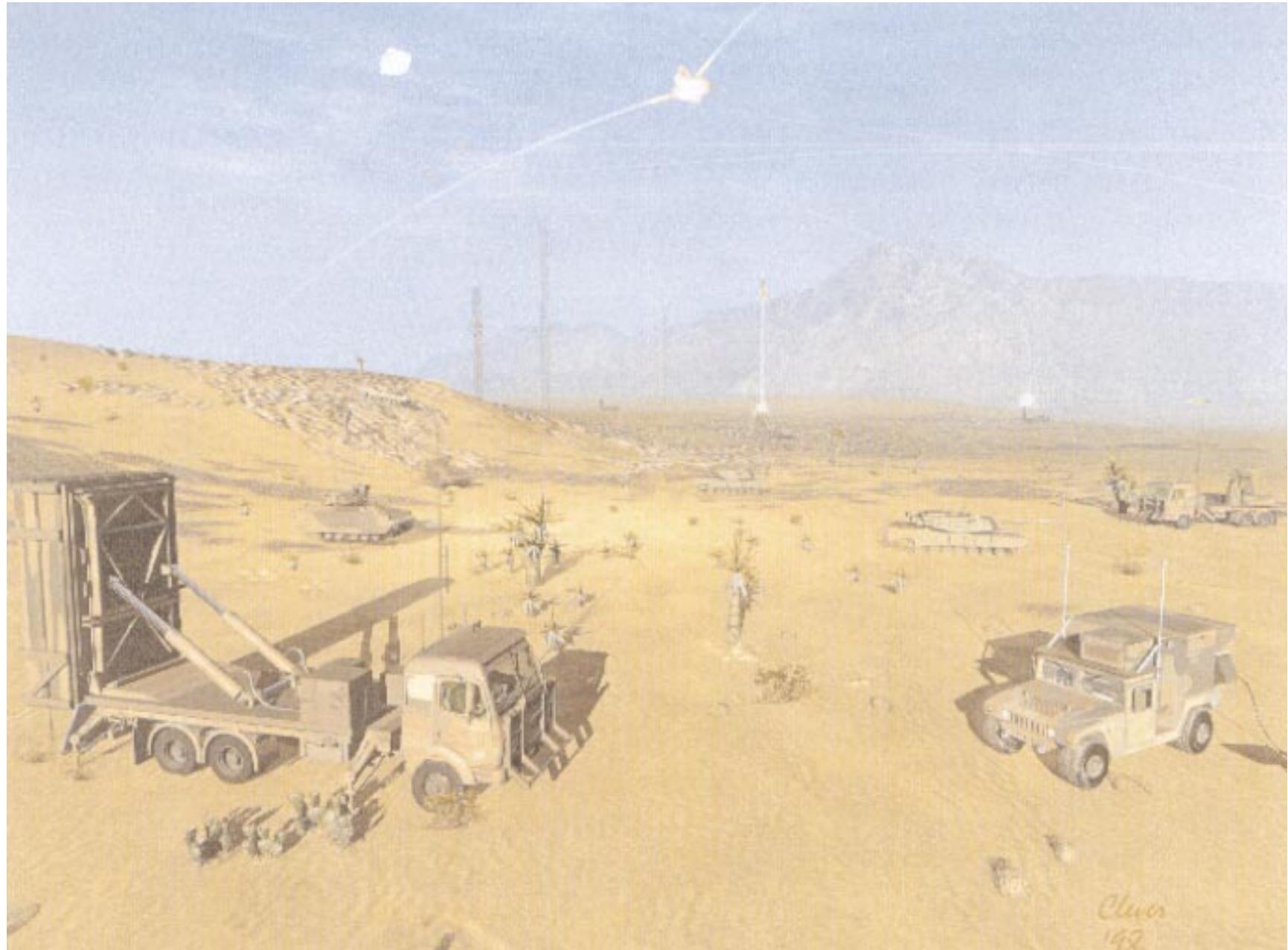
Lockheed Martin Vought Systems (Dallas, TX)



\* 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 utilize 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 (BMC4I). MEADS improved seeker/sensor components and its ability to link with 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 TBM, cruise missile, unmanned aerial vehicle, TASMs, rotary, and fixed wing threats. The MEADS will provide:

- Defense against multiple and simultaneous attacks by SRBMs, 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

Germany: Taktisches Luftverteidigungs System (TLVS).

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

MEADS entered into the current project definition and validation (PD-V) phase, 1QFY98. The system design review was conducted, 3QFY99. Technical proposals were received for the design and development phase, 3QFY98.

## PROJECTED ACTIVITIES

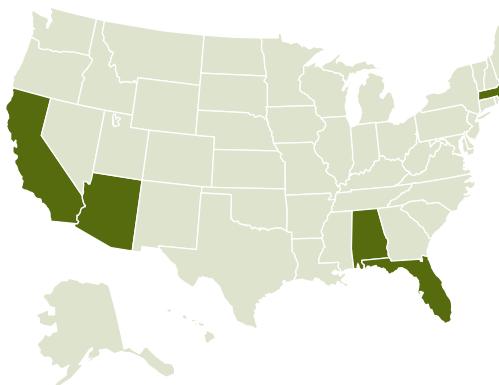
- 1QFY99** Complete PD-V phase; down-select to one international contractor team for the design and development phase.
- 3QFY99** Sign the international Memorandum of Understanding for the design and development phase.

## PRIME CONTRACTOR(S)

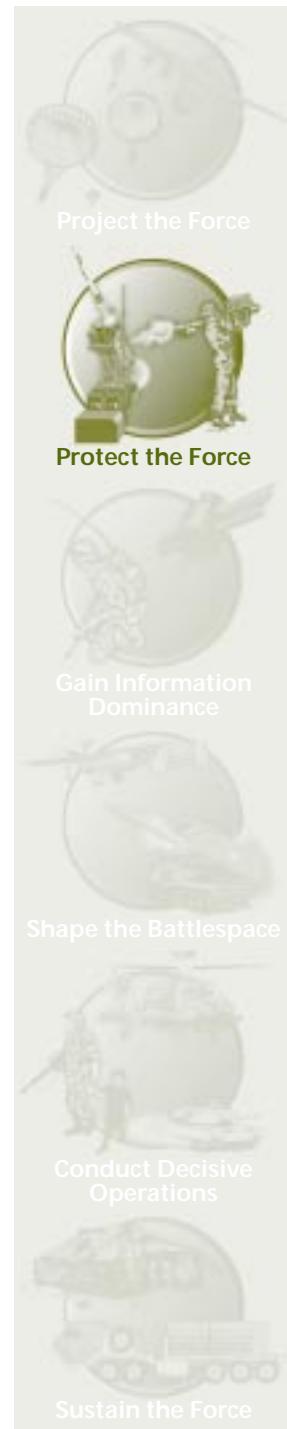
The two international contractor teams competing during the PD-V phase are:

**MEADS Inc.** This consortium comprises U.S. contractor Raytheon Systems Co. (joint venture), and European contractors DASA (Germany), Siemens (Germany), and Alenia (Italy).

**MEADS International Inc.** This consortium comprises U.S. contractor Lockheed Martin Integrated Systems and the same three international contractors.



\* See appendix for list of subcontractors



## National Missile Defense (NMD)



## MISSION

Protect the United States against limited strategic ballistic missile attacks.

## DESCRIPTION AND SPECIFICATIONS

The National Missile Defense (NMD) system will interoperate with external early warning (EW) sensors (DSP/SBIRS and EW Radars), and the United States Space Command (USSPACECOM) Command and Control Center via CINC Battle Management Command Control and Communications (BMC3). The Army elements of the NMD system include:

- Ground-based exo-atmospheric, hit-to-kill interceptors.
- A ground-based, phased-array, national defense radar (for surveillance, track, object classification, and kill assessment).
- Site BMC3 (for human-in-control, engagement planning, top-level decision making, and system communications).

The NMD system may require new X-Band early warning radars (XBR) to provide an effective early capability to protect all fifty states prior to SBIRS-Low availability. An NMD engagement is initiated based on early warning sensors that detect and designate hostile ballistic missile launches towards the U.S. 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 booster, a kill vehicle 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. If required, the intercept is monitored by the radar and EW sensors for kill assessment or further battle management action.

## FOREIGN COUNTERPART

Russia: Moscow ABM System.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

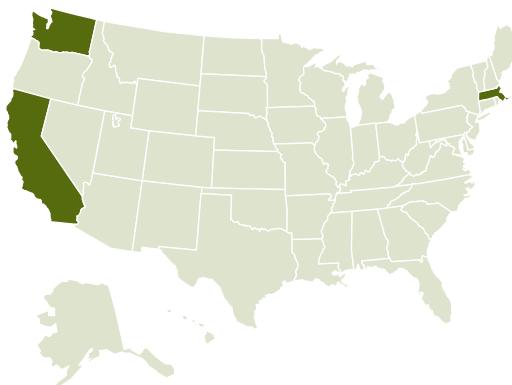
The NMD Lead System Integration (LSI) contract to complete development and integration of the NMD elements was awarded in April 1998. The commercial-off-the-shelf booster approach for GBI was selected in July 1998. Two successful flight tests of GBI Exoatmospheric Kill Vehicle (EKV) sensors have been conducted from the U.S. Army Kwajalein Atoll (USAKA). The selection of the primary EKV contractor was made in November 1998. The prototype GBR is currently in operation at USAKA for element and system testing. Initial builds of the BMC3 were successfully tested during the EKV sensor flight tests. The prototype IFICS has been fabricated and tested, in preparation for shipping to USAKA for further element and system testing.

## PROJECTED ACTIVITIES

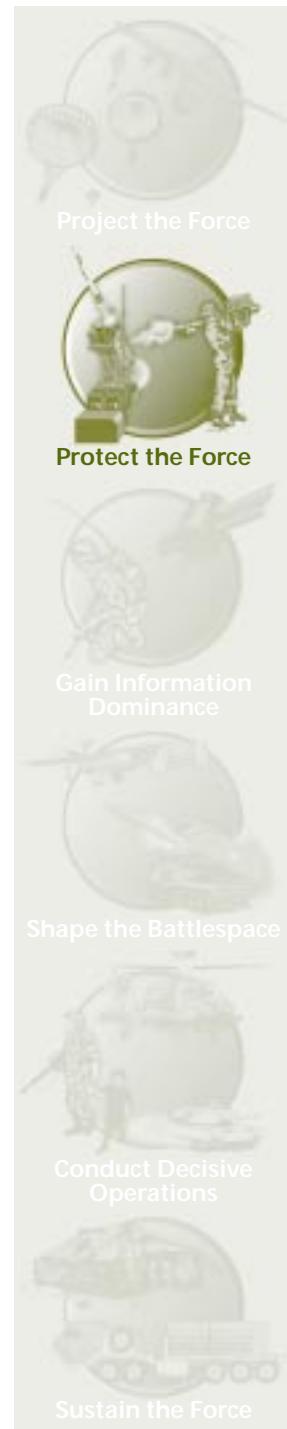
**3-4QFY99** EKV intercept flight tests (GBR-P and BMC3 in shadow mode) in June and September 1999.

## PRIME CONTRACTOR(S)

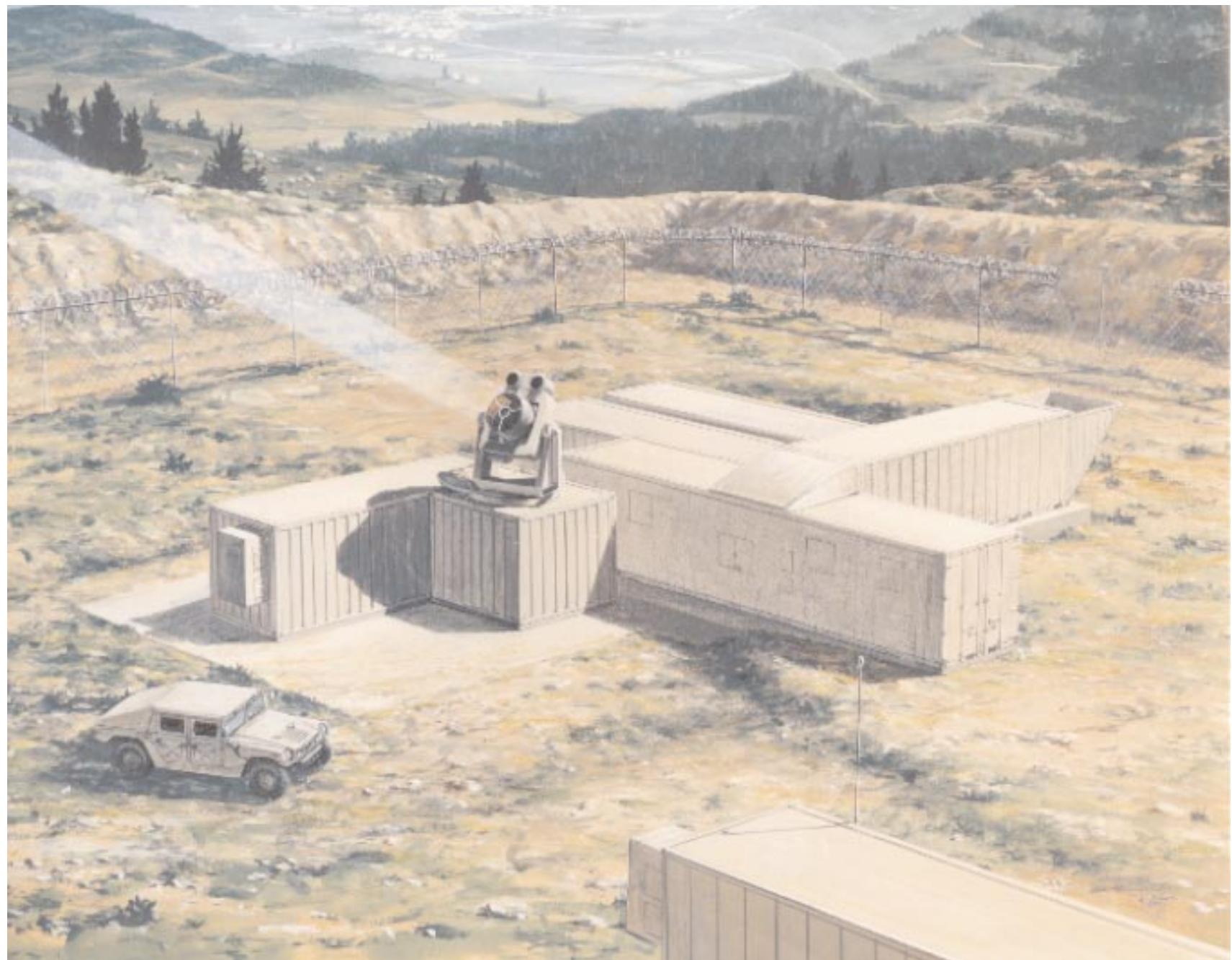
- |              |                                                      |
|--------------|------------------------------------------------------|
| <b>LSI:</b>  | Boeing North America                                 |
| <b>EKV:</b>  | Raytheon Missile System Co.                          |
| <b>PLV:</b>  | Lockheed Martin (Lockheed Missile and Space Company) |
| <b>GBR:</b>  | Raytheon Missile System Co.                          |
| <b>BMC3:</b> | Boeing LSI, subcontractor TRW                        |



\* See appendix for list of subcontractors



# Tactical High Energy Laser (THEL)



## MISSION

Evaluate the effectiveness of a Tactical High Energy Laser (THEL) in negating the threat posed by Katyusha and other short-range artillery rockets.

## DESCRIPTION AND SPECIFICATIONS

The THEL Advanced Concept Technology Demonstration (ACTD) demonstrator mission provides for an early operational assessment of the acquisition and close-in engagement problems associated with the evolving air threat of short- to medium-range targets within the Air Defense Architectures. The objective is to significantly enhance the defensive coverage to combat forces and theater-level assets.

The THEL ACTD demonstrator will be a deuterium fluoride chemical laser with a minimum of sixty seconds of continuous total run time. The Pointer Tracker/Beam Control system will be capable of providing +200 degree coverage in azimuth and -5 to 95 degree coverage in elevation, and be able to accept cueing from external sensors in existing air defense architectures. The demonstrator, including the laser device, pointer tracker, support equipment, and command, control, communication, and intelligence subsystems, will consist of modules enclosed in standard shipping containers that are road- and air-transportable. The THEL demonstrator will also be configured for field setup and testing at the High Energy Laser Systems Test Facility and remote locations in Israel, and demonstrate equivalent system performance to ACTD phase one criteria at Capistrano Test Site, Capistrano, CA.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

The U.S./Israel THEL Memorandum of Agreement was amended in December 1997 to include field testing of the demonstrator at White Sands Missile Range, NM. The prime contract for system development was modified in January 1998 to include field testing of the demonstrator through rocket shootdowns.

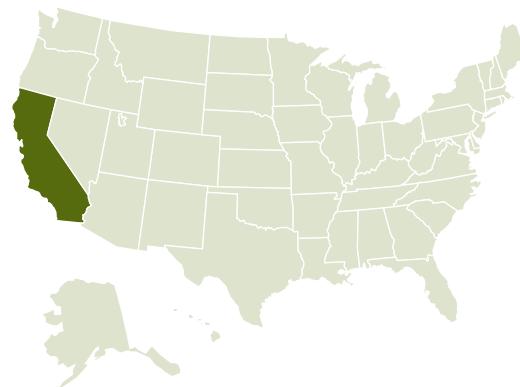
Command, control, communication and intelligence subsystem tests were completed in June 1998 at WSMR using Israeli fire control radar to track Katyusha rockets in flight. Laser and Pointer/tracker subsystems testing began in September 1998 at prime contractor facilities.

## PROJECTED ACTIVITIES

- 2QFY99** System integration and functional testing at WSMR.
- 3QFY99** Field testing at WSMR completed; transportable THEL weapon system shipped to Israel.

## PRIME CONTRACTOR(S)

TRW, Space & Laser Program Division (Redondo Beach, CA)



\* See appendix for list of subcontractors



### **ENHANCED COASTAL TRAFFICABILITY AND SEA STATE MITIGATION (ECT/SSM) ADVANCED TECHNOLOGY DEMONSTRATION (ATD) (2000-2002)**

This ATD is an critical component of the DoD effort to obtain a robust Sea State 3 Logistics-Over-the-Shore (LOTS) capability in response to stated CINC requirements. The ECT/SSM ATD will demonstrate the impact of recently developed technology for Joint Logistics-Over-the-Shore (JLOTS) operations, and includes:

- A Rapidly-Installed Breakwater System (RIBS) that enables Sea State 3 operability at offshore 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 cargo from large vessels to lighters for transfer to the coast during Sea State 3 conditions. RIBS 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 RIBS. The RIBS would create a sheltered area within its lee in which Sea State 3 conditions (significant wave heights from 0.9 to 1.52 m or 3.0 to 5.0 ft) are reduced to Sea State 2 (significant wave heights less than 0.9 m ) or lower.
- Demonstrate improved techniques for rapidly stabilizing beach soils from off-load sites to inland road networks.

To accomplish this, a RIBS will be deployed during a scheduled Joint Task Force Exercise (JTFEX) 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.

### **FUTURE SCOUT AND CAVALRY SYSTEM ADVANCED TECHNOLOGY DEMONSTRATION (ATD) (1998-2002)**

Vehicles such as the High Mobility Multipurpose Wheeled Vehicle and Cavalry Fighting Vehicle, which currently perform the scout mission, were not initially designed to be scout vehicles. They are deficient in the following capabilities:

- Adequately acquiring threat information, locating targets, and synchronizing fires;
- Performing security missions;
- Identifying targets in all weather conditions and during periods of limited or obscured vision;
- Identifying air and ground targets beyond visual range;
- Detecting hazards;
- Operating in nuclear, biological and chemical (NBC) conditions; and
- Integrating information for battlefield decision making.

Since the United Kingdom (U.K.) has a similar need, the U.S. and U.K. are pursuing a joint demonstration program to provide the foundation for a Future Scout and Cavalry System (FSCS) that is operationally ready, survivable, mobile, deployable, lethal, and able to perform this mission. This ATD responds to both the U.S. and U.K. users' requirements, as stated in a Combined Operational Requirements Document, by demonstrating the technical feasibility and operational potential of an affordable system optimized for the scout role. This ATD will develop the necessary interfaces to ensure compatibility among the scout technologies. The U.S./U.K. cooperative strategy calls for the competitive award of two ATD contracts. The demonstrators will be sufficiently robust so that the traditional demonstration and validation phase can be omitted, saving time and dollars. Affordability will be an important part of the program. The ATD will also permit the user to refine the FSCS requirements prior to entering the engineering and manufacturing development phase.

### **OBJECTIVE CREW SERVED WEAPON (OCSW) ADVANCED TECHNOLOGY DEMONSTRATION (ATD) (1999–2002)**

The Objective Crew Served Weapon (OCSW) ATD will demonstrate the technological maturity and operational utility of a highly lethal, lightweight, two-man portable, crew-served weapon with 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 lbs/kill basis, compared to current crew-served weapon systems. With its high-explosive, precision, airbursting



munitions, the OCSW system will provide revolutionary overmatch lethality. It 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. The OCSW system 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.

### **OBJECTIVE INDIVIDUAL COMBAT WEAPON (OICW) ADVANCED TECHNOLOGY DEMONSTRATION (ATD) (1998–1999)**

The OICW will demonstrate the next generation Infantry weapon that will replace selected M16 Rifles, M4 Carbines and M203 Grenade Launchers. The modular, dual barrel OICW combines the lethality of novel 20 mm air-bursting munitions, 5.56 mm NATO ammunition and a full-solution fire control system (containing an accurate laser rangefinder, ballistic computer, direct view optics, video sight, electronic compass, environmental sensors, target tracker and thermal capability) to affect decisively violent and suppressive target effects and produce a leap ahead in small arms performance. The OICW's high explosive air-bursting munition will be capable of defeating both exposed and defilade targets (those are targets that are taking cover behind structures, terrain features and/or vehicles)—this represents anew capability which the M16 has no chance of meeting. The OICW will provide an overmatch in system effectiveness to include an increase in stand off range by a factor of two out to 1,000 meters, effective day/night operation, and significant improvements in lethality and target effects (probability of incapacitation and suppression) while substantially increasing the versatility and survivability of the Soldier. The OICW development team consists of the U.S. Government technical and joint service user community, and a “world class” contractor team led by Alliant Techsystems. The contractor team will build a limited number of hardware deliverables for the FY99 ATD Safety, Technical, and User Operational Evaluation testing. This revolutionary, ergonomically designed and integrated weapon system also represents the lethality block upgrade for the Land Warrior Program.



# Recapitalization

The Army must continuously devote significant resources to ensure that its equipment remains safe to operate, can be efficiently maintained, and provides soldiers with reliable and effective systems to go to war. Recapitalization is the on-going maintenance and repair of the Army's current fleets of trucks, trailers, tracked vehicles, communications equipment, and other systems. The intent is to economically sustain current platforms, rather than develop a significant improvement in capability.

Recapitalization of existing systems is accomplished through replacement, extended service programs (ESP), pre-planned product improvements (P3I), depot rebuilds, and technology insertion. This combination of new procurement, major maintenance, and selective upgrades allows the Army to bring new systems into the force where necessary and extend the service life of older equipment. It is the baseline investment for maintaining the Army's weapon systems and allows the procurement of systems to be economically feasible.



Concept Exploration

Program Definition and Risk Reduction

Engineering and Manufacturing Development

Production, Fielding/Deployment, and Operational Support

## ENGINEERING AND MANUFACTURING DEVELOPMENT:

Advanced Quick Fix (AQF)  
Battlefield Combat Identification System (BCIS)  
CH-47 Chinook/Improved Cargo Helicopter (ICH)  
Force Provider (FP)

## PRODUCTION, FIELDING/DEPLOYMENT, AND OPERATIONAL SUPPORT:

Armored Security Vehicle (ASV)  
Black Hawk  
Command and Control Vehicle (C2V)  
Deployable Medical Systems (DEPMEDS)  
Force Provider (FP)  
Heavy Equipment Transporter System (HETS)  
High Mobility Multipurpose Wheeled Vehicle (HMMWV)  
Inland Petroleum Distribution System (IPDS)  
M113 Family of Vehicles (FOV)  
Paladin  
Palletized Load System (PLS)  
Reverse Osmosis Water Purification Unit (ROWPU)  
Single Channel Ground and Airborne Radio System (SINCGARS)  
Smoke Generator (M56 Coyote)  
Smoke Generator (M58 Wolf)



## Advanced Quick Fix (AQF)



## MISSION

Intercept, precisely locate, and identify enemy conventional and low probability of intercept (LPI) communications and non-communications emitters.

## DESCRIPTION AND SPECIFICATIONS

The Advanced Quick Fix (AQF) is an evolutionary, open-architecture system that satisfies the Army's requirement to conduct tactical ground Communications Intelligence (COMINT), Electronic Intelligence (ELINT), and electronic support against enemy communications. The AQF enhances the commander's ability to outmaneuver and destroy the enemy by locating threat command-and-control, fire-control, and air-defense centers. The AQF's airborne signal-intercept and precision emitter-location system intercepts and identifies threat emitters. Its leap-ahead technology exploits COMINT and ELINT against enemy LPI signals and conventional signals.

The AQF interoperates with the Ground-Based Common-Sensor-Light (GBCS-L) limited production urgent (LPU) systems, enabling division commanders to intercept, precisely locate, and identify enemy conventional and LPI communications and non-communications emitters. The AQF uses the EH-60L Black Hawk helicopter.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

AQF initial operational test and evaluation (IOTE) was cancelled. Fielding is occurring to provide interim support to units receiving GBCS-L units. Follow-on AQF development begins FY99.

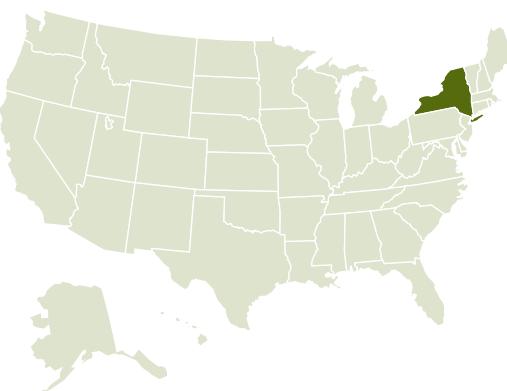
## PROJECTED ACTIVITIES

**3QFY99** AQF development test/operational test (DT/OT) scheduled.

**FY00** Fielding to 82nd ABN Division.

## PRIME CONTRACTOR(S)

Lockheed Martin Federal Systems (Owego, NY)



\* 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 over the entire continuum of war, and for operations other than war.

## DESCRIPTION AND SPECIFICATIONS

The Armored Security Vehicle (ASV) will be fielded to Corps Support MP Companies engaged in the above missions. It is a turreted, light-armored, all-wheeled drive vehicle that provides increased ballistic and landmine mine protection to the MP. Its primary weapon is the MK19 Grenade Machine Gun, and the M2 .50 caliber machine gun. The fully enclosed turret includes a day/night sight for target acquisition. The vehicle provides all-around 7.62 mm ball protection and 12.7 mm 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 155 mm at fifteen meters and 12 lb TNT mines in the wheel wells. Other survivability enhancements include gas particulate, ventilated face pieces, a multi-salvo 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

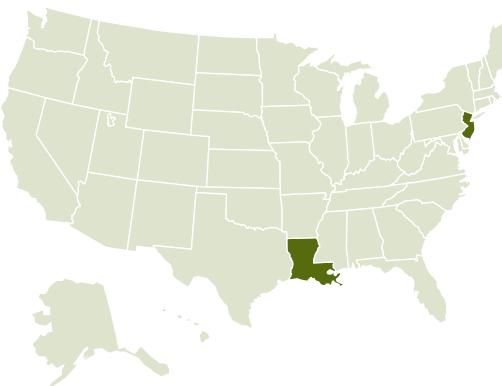
Production contract award projected for February 1999.

## PROJECTED ACTIVITIES

First vehicles will be delivered by December 1999. ASVs will also be fielded to Heavy Division MP Companies.

## PRIME CONTRACTOR(S)

Textron (Marine and Land Systems Division) (New Orleans, LA)



\* 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 (mmW), question-and-answer combat identification system capable of identifying friendly ground combat vehicles at 150–5500 meters ground-to-ground and 150–8000 meters air-to-ground. BCIS interrogation is triggered automatically by activating the shooter platform's laser rangefinder 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, omnidirectional 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 enables 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 Brigade rear area.

## FOREIGN COUNTERPART

France: Battlefield Identification Friend or Foe (BIFF).

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

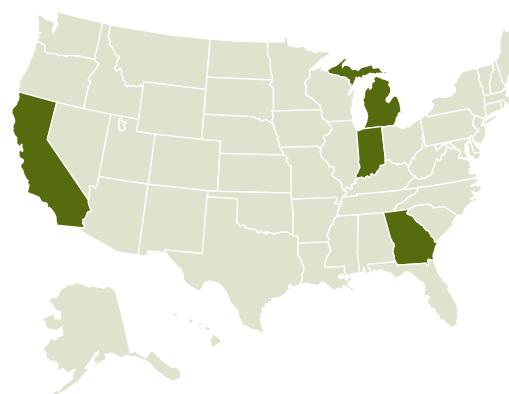
Sixty-two vehicles in the 4th Infantry Division were equipped with BCIS and participated successfully in the Task Force XXI Advanced Warfighting Experiment (AWE) at the National Training Center, 2QFY97. A military utility assessment was conducted of the system as part of the Joint Combat Identification Advanced Concept Technology Demonstration (ACTD), FY97–98. Continued development and testing of BCIS low-cost design hardware occurred in FY98. Development of installation kits for Abrams (M1A1) and Bradley (M2 ODS) began in FY98.

## PROJECTED ACTIVITIES

- FY99** Complete engineering and manufacturing development (EMD) of BCIS low-cost design hardware and begin low-rate initial production (LRIP); complete development and testing of installation kits for Abrams and Bradley.
- FY99-01** Develop and test installation kits for additional vehicle types.
- 1QFY01** First unit equipped (FUE).
- 2QFY01** Initial operational test and evaluation (IOTE)
- 4QFY01** Milestone III.

## PRIME CONTRACTOR(S)

TRW (Redondo Beach, CA); Raytheon (Ft. Wayne, IN); EMS (Atlanta, GA)



\* See appendix for list of subcontractors



# Black Hawk



## MISSION

Provide utility and assault helicopter capability.

## DESCRIPTION AND SPECIFICATIONS

The Black Hawk (UH-60) is a utility, tactical, transport helicopter that performs many missions. It is the primary helicopter for air assault, general support, and aeromedical evacuation units. Modified Black Hawks also fulfill command and control, electronic warfare, and special operations roles. The Black Hawk 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. An entire eleven-person, fully-equipped infantry squad can be lifted in a single Black Hawk, transported faster, and in most weather conditions. The Black Hawk can reposition a 105 mm howitzer, its crew of six, and up to thirty 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.

	<b>UH-60A</b>	<b>UH-60L</b>
<b>Max Gross Weight:</b>	20,250 lb	22,000 lb, 23,500 lb (External Cargo)
<b>Cruise Speed:</b>	139 kt	150 kt
<b>Endurance:</b>	2.3 hr	2.1 hr
<b>Max Range:</b>	320 nm	306 nm
<b>Crew:</b>	2 pilots, 2 crew chiefs	2 pilots, 2 crew chiefs
<b>Armament:</b>	two 7.62 mm machine guns	two 7.62 mm machine guns
<b>Payload:</b>	2,640 lb (or 11 combat equipped troops)	2,640 lb (or 11 combat equipped troops)
<b>External Load:</b>	8,000 lb	9,000 lb

## 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, Hong Kong, Japan, Jordan, Malaysia, Mexico, Morocco, Philippines, Taiwan, Turkey; Co-Production: Republic of Korea.

## PROGRAM STATUS

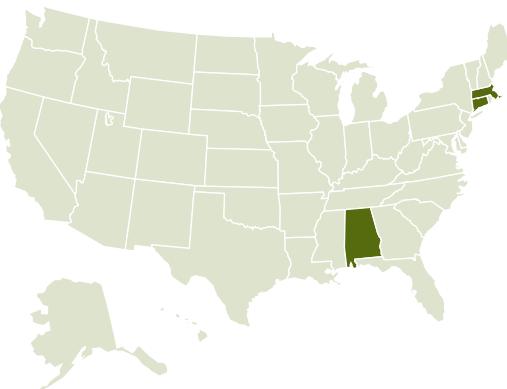
Fielding of the UH-60 began in 1978. Until 1989, the Army procured UH-60A model aircraft. Following an upgrade to the power train, the model designation changed to UH-60L in October 1989. By the end of FY98, 1525 aircraft were procured, of which 584 were UH-60Ls. The Army is currently in the third year of a five-year, multi-service contract with the Navy and Air Force. Since 1991, the five services (Army, Navy, Air Force, Marines, and Coast Guard), plus Australia, have been coordinating cost reduction efforts through the joint program management group, TEAM HAWK.

## PROJECTED ACTIVITIES

Aircraft delivery under the multi-year procurement contract. Continue UH-60Q aeromedical evacuation development effort as potential commonality baseline for UH-60 modernization. A fleet-wide study is underway to define the most cost-effective UH-60 life extension and modernization program. This study will include assessments of cockpit modernization, health-usage monitoring system (HUMS) insertion, power train improvements, and reduced logistics support costs.

## PRIME CONTRACTOR(S)

United Technologies, Sikorsky Aircraft (Stratford, CT);  
General Electric (Lynn, MA)



\* See appendix for list of subcontractors



## CH-47 Chinook/Improved Cargo Helicopter (ICH)



## MISSION

Transport weapons, ammunition, equipment, troops, and other cargo in support of combat units and operations other than war.

## DESCRIPTION AND SPECIFICATIONS

The Improved Cargo Helicopter (ICH) Program modifies the CH-47D Chinook helicopter by incorporating a new digital cockpit and changes to the airframe to reduce vibration. The cockpit modifications include a Digital Data Bus that permits installation of enhanced communications and navigation equipment for improved situational awareness, mission performance, and survivability, as well as future growth potential. Airframe vibrations, which increase operational and support (O&S) costs, and crew fatigue will be reduced by structural modifications that change the natural frequency of the airframe. A separate, but complementary effort, is the installation of more powerful and reliable T55-GA-714 engines to replace the current T55-L-712. These engines will increase power from 3,750 to 4,777 shaft horsepower, yielding an approximate 3,900 lb improvement over current high altitude/hot day lift performance. Another feature is the development of an Extended Range Fuel System (ERFS) to enable Chinook self-deployment or the forward refueling of other equipment. Other options that may be explored to reduce O&S costs are the development of a low-maintenance rotor hub and improved cargo handling equipment.

**Max Gross Weight:** 50,000 lb

**Max Cruise Speed:** 170 knots/184 miles per hour

**Troop Capacity:** 33

**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

Egypt, Greece, Taiwan; Commercial Sales: Korea, The Netherlands, Singapore, Spain, and United Kingdom.

## PROGRAM STATUS

The CH-47 ICH Program was awarded an engineering and manufacturing development (EMD) contract in May 1998. EMD will extend through FY02. The T55-GA-714A Engine Program entered into low-rate initial production (LRIP) in December 1997. The Extended Range Fuel System (ERFS) production contract was awarded on August 28, 1998.

## PROJECTED ACTIVITIES

**1QFY99** First T55-GA-714A engine deliveries.

**2QFY99** Begin deliveries of the ERFS.

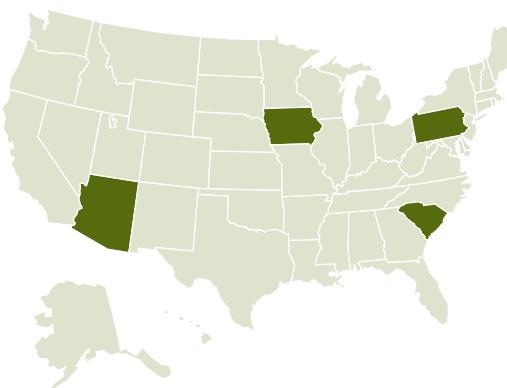
**FY03** Projected first ICH delivery.

**Late FY04/** Projected ICH first unit equipped (FUE)

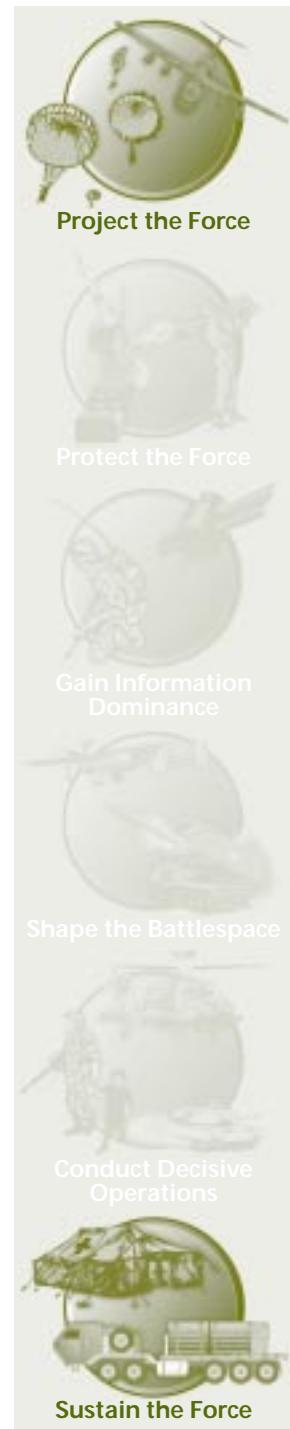
**Early FY05**

## PRIME CONTRACTOR(S)

Robertson Aviation (Tempe, AZ); Boeing Helicopter Division (Philadelphia, PA); AlliedSignal (Greer, SC; Phoenix, AZ)



\* See appendix for list of subcontractors



## Command and Control Vehicle (C2V)





## MISSION

Provide a highly mobile, survivable, and reconfigurable platform, capable of hosting current and future command, control, communications, computer, and intelligence systems for operational planning use by battalion-through-corps battle staffs in heavy-force operations.

## DESCRIPTION AND SPECIFICATIONS

The Command and Control Vehicle (C2V) has the following specifications:

**Length:** 35.4 ft

**Width:** 14.04 ft

**Height:** 12.72 ft

**Weight:** 56,000–66,000 lb, combat loaded

**Power Train:** 600 hp Cummins V093T diesel engine with GM-Allison HMPT-500-3EC hydromechanical automatic transmission

**Cruising Range:** 275 mi

**Road Speed:** 40 mph

**Crew:** Variable (maximum of 9)

**Armament:** 7.62 mm, M240 series machine gun

**Distribution:** Corps-battalion

**Models/Vars:** Platform for the Armored Medical Treatment Vehicle (planned)

## FOREIGN COUNTERPART

China: Type 85 ACV, WZ-506, Type 90 CV; Commonwealth of Independent States: BTR-50PU, MT-LBU, BMP-1 Kshm; France: AMX-10PC, AMX VTT/PC; Germany: Tpz1 FuFu (Fuchs); United Kingdom: MCV-80 Warrior CV, FV-432C.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

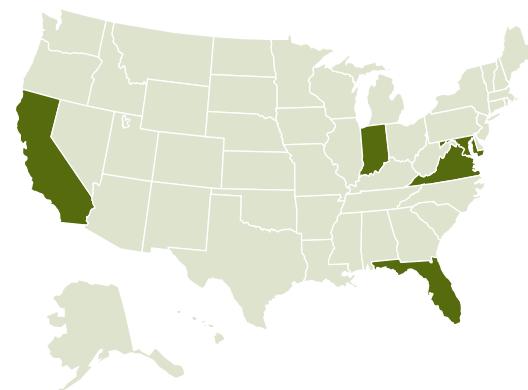
The C2V is conducting live fire testing and production verification testing at Yuma Proving Grounds (YPG) and Aberdeen Proving Grounds (APG).

## PROJECTED ACTIVITIES

**4QFY99** The C2V will undergo initial operational testing and evaluation (IOTE) in conjunction with the FBCB2 IOTE.

## PRIME CONTRACTOR(S)

United Defense, L.P. (Rosslyn, VA); L3 Communications (MMS prime contractor)



\* See appendix for list of subcontractors

# Deployable Medical Systems (DEPMEDS)



## MISSION

Provide world class healthcare through deployable hospitals with standard state of the art medical care equipment.

## DESCRIPTION AND SPECIFICATIONS

The Deployable Medical Systems (DEPMEDS) family is comprised of medical equipment packaged into standardized modules for use by all Services. There are three types of deployable Army hospitals under the Army's Medical Force 2000 reorganization: Combat Support Hospitals, Field Hospitals, and General Hospitals. Each is comprised of different configurations of standard DEPMEDS modules, such as operating rooms, laboratories, x-ray units, and wards.

The DEPMEDS hospital sets standardize the use, throughout the Army and DoD, of the latest medical technology and equipment, expendable supplies, major non-medical support, Tent Extendible Modular Personnel Tents, tactical shelters, chemically hardened heating and air conditioning, water distribution and waste water collection systems.

The hospital sets can be deployed under all climatic conditions. The fifty Army hospital sets will eliminate serious shortages of field medical equipment and achieve major advances in equipping the Total Army. Gaining units have received their DEPMEDS equipment in one package under the Total Package Fielding concept. This was the largest Total Package Fielding effort ever undertaken by the Army Medical Department. Sustainment and modernization continues. System characteristics vary by type of hospital set. All provide combat health support, are maintainable and relocatable, have modular configuration and quad-service compatibility, and are transportable by strategic air.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

Six Mobile Army Surgical Hospitals (MASH) units were sold to Saudi Arabia during Operation Desert Storm.

## PROGRAM STATUS

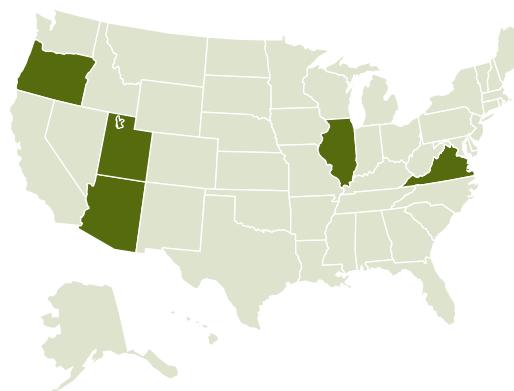
The Joint Readiness Clinical Advisory Board (JRCAB) ensures compatibility among the Services. Fielding began in 4QFY87 and is completed. Ongoing equipment acquisition strategies correct battlefield deficiencies identified by Army Division Commanders, as Operation Desert Storm lessons-learned, for both clinical and platform problems.

## PROJECTED ACTIVITIES

Currently, Force XXI Medical Reengineering Initiative (MRI) hospitals are being configured by a combination of modernization and conversion. In addition, resources incrementally digitize the Army Medical Department field medical force structure within radiology and communication capabilities.

## PRIME CONTRACTOR(S)

A large number of contractors are involved in providing the 3,400-plus medical and non-medical components of DEPMEDS. These components are assembled into modules and hospital sets by the Defense Logistics Agency, Defense Depot (Ogden, UT).



\* See appendix for list of subcontractors



## Force Provider (FP)



## MISSION

Provide Base Camp Life Support for soldiers in: theater of operations with limited infrastructure, rest and refit; intermediate staging base operations; theater reception/redeployment support missions; base camps; humanitarian aid; disaster relief; peacekeeping; and enforcement missions.

## DESCRIPTION AND SPECIFICATIONS

The basic building block for the Force Provider (FP) system is the Tent Extendable Modular Personnel (TEMPER) shelter with external forced-air heating and cooling, similar to home heating ventilation air conditioning systems. The FP modular unit is designed to support 550 soldiers. The modular design can support battalion to brigade size (or larger) units operating in all climate types. Low-temperature operations require the addition of a winterization kit. FP comes complete with water storage and distribution, and wastewater storage and disposal systems.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

Two modules were delivered in September 1998. Six were uploaded aboard a pre-positioned ship, USNS Gordon. Six were deployed in support of Operation Joint Endeavor: two in Bosnia; four returned to CONUS for refurbishment. There are two pre-planned product improvements (P3I)—Containerized Batch Laundry and Containerized Latrine—in production.

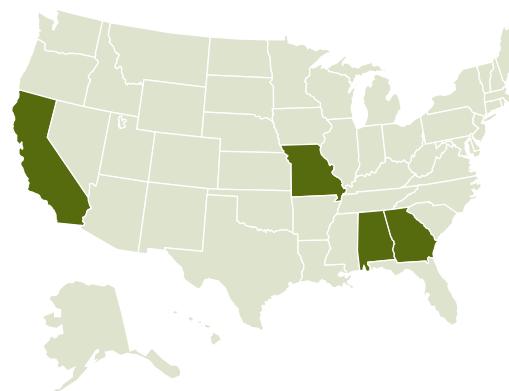
## PROJECTED ACTIVITIES

**2QFY99** Two modules and one Cold Weather Kit delivery scheduled.

**3QFY99** Two modules delivery scheduled.

## PRIME CONTRACTOR(S)

DoD Depot (Atlanta, GA); WESTAR Corporation (St. Louis, MO); UNICOR (Lompoc, CA)



\* See appendix for list of subcontractors



# Heavy Equipment Transporter System (HETS)





## MISSION

Deploys, transports, recovers, and evacuates a combat-loaded M1 series tank or other vehicles of similar weight.

## DESCRIPTION AND SPECIFICATIONS

The Heavy Equipment Transporter System (HETS) consists of the M1070 truck tractor and M1000 semitrailer (70 ton). They are being procured under separate acquisition programs. The new HETS transports 70-ton payloads, primarily M1 series tanks. It operates on highways worldwide with permits, secondary roads, and cross-country. The 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.

**Speed:** 40–45 mph on highway (25–30 mph with 70 ton payload)

**Range:** 300 mi

**Transport:** C-5 and C-17 aircraft

**Mobility:** 95% on road; 5% off road

**RAM:** 3,000 mean miles between hardware mission failure for both tractor and trailer

## 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 purchased thirty-seven trailers. The approved configuration will vary from the U.S. version.

## PROGRAM STATUS

Approximately 1600 systems have been fielded, as of September 1998. Efforts are underway to adapt tractor insert commercial technology enhancements; improve reliability, maintainability and safety; and meet current EPA/DOT laws. The results will be used to update performance specifications for new re-procurement.

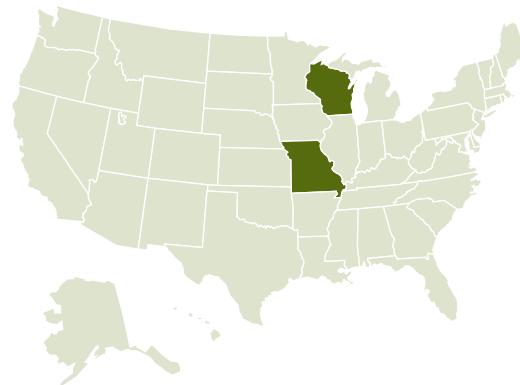
## PROJECTED ACTIVITIES

- Currently drafting acquisition strategy for follow-on contracts, based on competitive solicitation in FY00.
- Future fieldings slated for newly activating Cargo Transfer and National Guard Transportation Companies, as well as prepo-afloat stocks.

## PRIME CONTRACTOR(S)

**Tractor:** Oshkosh Truck (Oshkosh, WI)

**Trailer:** Systems & Electronics (St. Louis, MO)



\* 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 4,400 lb payload 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 4,400 lb variant 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 and Air Force requirements. The HMMWV program is complementary to the Commercial Utility Cargo Vehicle. The HMMWV replaced the .25 ton Jeep, the M718A1 Ambulance, .5 ton Mule, 1.25 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 EPA emissions update, commercial bucket seats, three-point seat belts, four-speed transmissions and, in some cases, turbo-charged engines, and air conditioning. In response to peacekeeping missions, an up-armored HMMWV was developed to provide increased ballistic and blast protection, primarily for the Military Police (MP). In addition, the Project Manager (PM) developed a Scout HMMWV that is configured with a night vision device, a global positioning system, gun mounts, and SINCGARS radios.

In 1995, the PM 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 will approach 5000 lb, including the crew. Its primary mission is that of an up-armored vehicle for the Scouts and the MP. This vehicle will also serve 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

The HMMWV has been sold through FMS to twenty-nine countries.

## PROGRAM STATUS

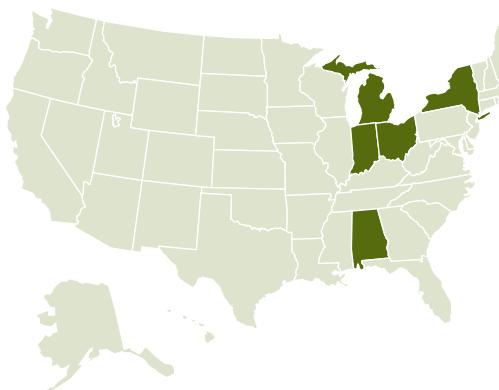
Production in support of U.S. Army, Air Force, Marine Corps and FMS requirements continues, under a 5-Year Requirements Contract, through FY00.

## PROJECTED ACTIVITIES

- 1QFY99** Scheduled type classification (TC) and Material Release (MR) of the XM 1114 (up armor) variant.
- 2QFY99** Scheduled completion of a detailed Analysis of Alternatives (AOA), which will form the basis of the Light Tactical Vehicle fleet modernization strategy for the future.

## PRIME CONTRACTOR(S)

AM General (South Bend, IN); O'Gara-Hess & Eisenhardt Armoring Co. (Fairfield, OH)



\* See appendix for list of subcontractors



# Inland Petroleum Distribution System (IPDS)



## MISSION

Provide capability for inland distribution of bulk fuels to U.S. and Allied Forces in theaters of operation.

## DESCRIPTION AND SPECIFICATIONS

Each Inland Petroleum Distribution System (IPDS) Tactical Petroleum Terminal (TPT) provides receipt, issue, and 3,780,000 gallons of storage capacity for bulk fuels and equipment, for connection to pipelines, or to the Navy's Offshore Petroleum Discharge System (OPDS). IPDS Pipeline Systems consist of five-mile sets of rapidly deployable aluminum pipe and 800-GPM-rated mainline pumps for fuel transport and distribution.

All systems are modular, for maximum design and installation flexibility, and are prepackaged in 20-ft ISO containers for optimum handling and movement by all transportation modes. The systems are installed and operated by Engineer and Quartermaster units that receive annual training. The system's design permits the handling of multiple grades of fuel, and the receipt and issue by pipeline, rail, and truck for responsive force sustainment. The IPDS is Operational Project Stock material stored principally at Sierra Army Depot, CA, with additional forward positioning at Sagami, Japan, and aboard prepositioned ships.

## FOREIGN COUNTERPART

Russian: TUM 100 and 150 Tactical Petroleum Distribution System.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

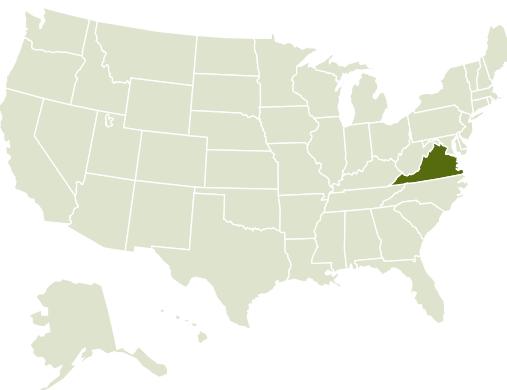
Ongoing procurement of IPDS components.

## PROJECTED ACTIVITIES

Replenish operational project stocks.

## PRIME CONTRACTOR(S)

Radian (Alexandria, VA) (Systems Integrator)



\* See appendix for list of subcontractors



## M113 Family of Vehicles (FOV)



## 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. The M113A3 FOV has the following specifications:

**Length:** 25.02 ft

**Width:** 12.69 ft with side skirts

**Height:** 9.66 ft

**Weight:** 27,150 lb combat loaded

**Power Train:** 275 hp, 6V53T Detroit Diesel engine with Allison X200-4A hydrokinetic, automatic transmission

**Cruising Range:** 300 mi

**Road Speed:** 41 mph

**Crew:** variable (maximum of 13)

**Armament:** 50 caliber, M2A2 heavy machine gun

**Distribution:** Corps-Company

**Current Models:** M58 Smoke Generator Carrier, M548A2/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, OPFOR Surrogate Vehicle

## 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, Botswana, Egypt, Greece, Israel, Lebanon, Norway, Portugal, Saudi Arabia, and Spain.

## PROGRAM STATUS

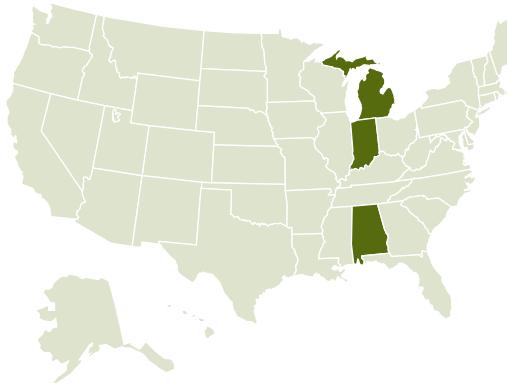
In FY98, the M113 FOV Product Manager (PM) continued the procurement and application of upgrade kits/GFM for A3 conversions of 357 vehicles; six variants. The PM also continued the conversion of older variants to new configurations: that is, the M106A2 to the M1064A3 Mortar Carrier, and the M577A2 to the M1068A3 SICPS.

## PROJECTED ACTIVITIES

- Complete upgrade of all remaining variants in Force Package 1 and 2 to the A3 configuration by FY04 and FY07 respectively.
- Continue to incorporate new features, as required, to sustain the effectiveness and relevance of the FOV, especially in support of Force XXI and the Army After Next.

## PRIME CONTRACTOR(S)

Anniston Army Depot (ANAD) (Anniston, AL);  
United Defense, L.P.-Steel Product Division (Anniston, AL)



\* See appendix for list of subcontractors



# Paladin



## MISSION

Provide primary indirect fire support to heavy divisions and armored cavalry regiments.

## DESCRIPTION AND SPECIFICATIONS

Similar to earlier M109 models, the Paladin is a fully tracked, armored vehicle with a 155 mm howitzer. The Paladin includes an on-board ballistic computer and navigation system, secure radio communications, an improved cannon and gun mount, automatic gun positioning, automotive improvements, improved ballistic and nuclear-biological-chemical protection, driver's night vision capability, and built-in test equipment. Compared to the earlier M109s, the Paladin has improved responsiveness, survivability, lethality, and reliability.

**Range:** 30 km (with rocket-assisted projectile); 24 km (with unassisted projectile)

**Rate of Fire:** Maximum—4 rd/min for 3 min;  
Sustained—1 rd/min

**Main Armament:** M284 155 mm cannon

**Secondary Armament:** .50-caliber machine gun or MK19  
40mm Grenade MG

**Weight:** 32 tons (combat loaded)

## FOREIGN COUNTERPART

United Kingdom: AS90; France: 155 GCT; Germany: PzH 2000;  
Israel: Slammer.

## FOREIGN MILITARY SALES

Signed letter of agreement with Kuwait on November 1, 1998 for delivery of two battalions of Paladins and supporting equipment.

## PROGRAM STATUS

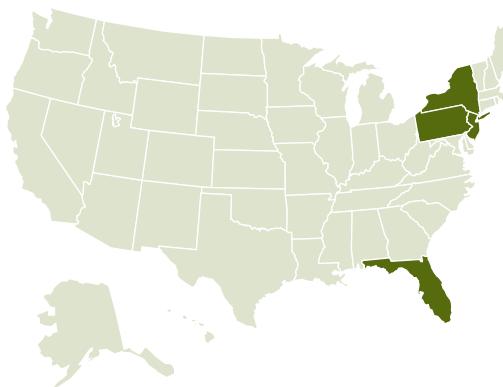
Low-rate production began in September 1991, and achieved a first unit equipped in April 1993. A full-rate production (FRP) contract was awarded in April 1993. Currently, 886 howitzers have been delivered, all ahead of schedule. The Army will acquire 950 Paladins as a product improvement of the current M109A2/A3 howitzer. A portion of the remaining M109 howitzer fleet have received the M109A5 upgrade, which includes some automotive and crew nuclear-biological-chemical protection improvements, and Paladin's M284 cannon and gun mount.

## PROJECTED ACTIVITIES

- Production will continue through mid-1999.
- Paladin fieldings to U.S. Army National Guard Units include the following:  
**FY99:** UT, NM, WV, SC, and WI  
**FY00:** MS, TN, LA, TN, GA, and NC  
**FY01:** SC, AL, ID, and WA

## PRIME CONTRACTOR(S)

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



\* See appendix for list of subcontractors



## Palletized Load System (PLS)





## MISSION

Perform line haul, local haul, unit resupply, and other missions in the tactical environment, to support modernized and highly mobile combat units.

## DESCRIPTION AND SPECIFICATIONS

The Palletized Load System (PLS) is being deployed as the primary component of the maneuver-oriented ammunition distribution system (MOADS). The PLS consists of the following: a 16.5 ton payload prime mover (10x10) with an integral load-handling system, providing self-load/unload capability; a 16.5 ton payload trailer; and demountable cargo beds, referred to as flattracks. The PLS truck is equipped with the central tire inflation system, which significantly improves off-road mobility. It maintains interoperability with comparable British, German, and French systems, through the use of a common flattrack, as specified in the current quadripartite agreement. Based on Congressional direction, an intermodal flattrack (with features that enhance transportability and stacking) has completed production (5,000 M1 Flattracks).

The Containerized Roll-in/out Platform (CROP) is an A-frame type flattrack, which fits inside a twenty-foot International Standards Organization (ISO) container. A Container Handling Unit (CHU) will also be fielded to PLS trucks assigned to transportation and ammunition units, and to forward support battalions. This enables the PLS to pick up and transport twenty-foot ISO containers without using a flattrack. The self-propelled field artillery units will receive PLS trucks equipped with a materiel-handling crane to deal with individual pallets of ammunition. The PLS-Enhanced (PLS-E) Program procures the Movement Tracking System (MTS), providing the PLS with GPS capability and two-way digital messaging.

**Truck Payload:** 16.5 ton

**Trailer Payload:** 16.5 ton

**Flattrack Dimensions:** 8 x 20 ft

**Engine Type:** Diesel

**Transmission:** Automatic

**Number of Driven Wheels:** 10

**Range:** 255 mi

## FOREIGN COUNTERPART

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

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

Approximately 2934 PLS trucks, 1626 PLS trailers, and 15,047 flattracks have been fielded as of September 1998. Alternate missions currently under development or in initial production include the following:

- Engineer Mission Modules for Combat Engineers (Dump Body, Bituminous Distributor and Concrete Mobile).
- Petroleum Distribution Support (3000–3500 Gallon Fuel Racks for Retail Supply, THAAD Missile System and Quartermaster Fuel Farm).

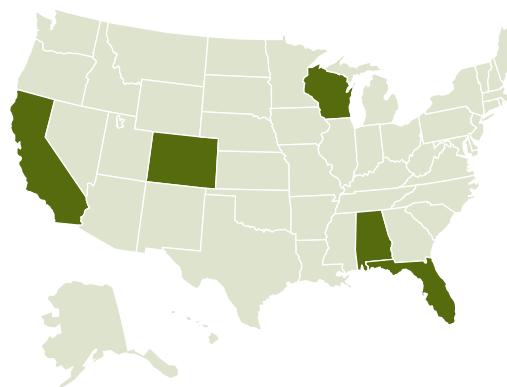
## PROJECTED ACTIVITIES

**2QFY99** CROP and CHU first unit equipped (FUE); competitive award of PLS-E Requirements.

**FY05** Continued fielding of PLS Trucks and Trailers through FY05.

## PRIME CONTRACTOR(S)

Oshkosh Truck (Oshkosh, WI-Truck and CHU; Bradenton, FL-Trailer); Summa Technologies (Huntsville, AL-CROP); Hyundai Precision America (San Diego, CA-CROP); ARINC (Colorado Springs, CO-PLS-E)



\* See appendix for list of subcontractors

## Reverse Osmosis Water Purification Unit (ROWPU)





## MISSION

Provide potable water from any water source.

## DESCRIPTION AND SPECIFICATIONS

The 3000-gallon per hour (gph) Reverse Osmosis Water Purification Unit (ROWPU) is the Army's primary water purifier at the Echelon Above Corps level. The 3000 gph ROWPU will treat fresh, brackish, and seawater sources, as well as NBC contaminated waters. The system is housed in 8 x 8 x 20 ft ISO containers, and mounted on an M871A2 trailer. It is hauled by an M932 truck, and is C-130 and C-141 air transportable. It is also marine, rail, and highway transportable. The 3000 gph ROWPU can operate throughout the entire range of the basic climatic category, as defined in AR 70-38. The system can be set up by three soldiers and operated by one soldier.

The unit employs state-of-the-art reverse osmosis (RO) technology and can produce 3000 gph from a freshwater source and 2000 gph from a seawater source. The water produced meets Tri-Service drinking water standards. The Office of the Surgeon General (OTSG) has recommended RO technology as the preferred method of protecting the soldier from waterborne diseases. The 3000 gph ROWPU treatment consists of chemical addition, multimedia, and cartridge filtration, for removal of suspended solids, followed by RO treatment for removal of dissolved salts, metals, and organics. In cases of suspected NBC source-water contamination, post treatment using granular-activated carbon and ion exchange is available on the ROWPU. The system is powered by a 60 kW generator set.

## FOREIGN COUNTERPART

Canada: ADROWPU.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

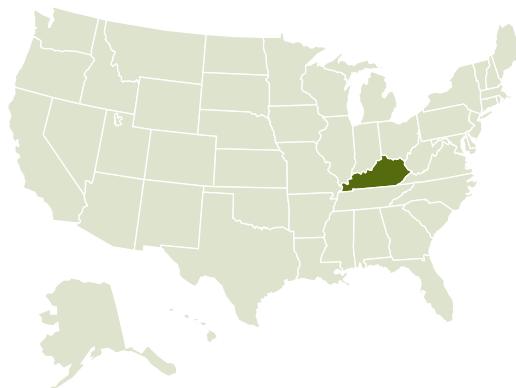
The ROWPU is in production.

## PROJECTED ACTIVITIES

Continue fielding.

## PRIME CONTRACTOR(S)

KECO Industries (Florence, KY)



\* See appendix for list of subcontractors

# Single Channel Ground and Airborne Radio System (SINCGARS)



## 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 the 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 (COMSEC) is integrated in currently produced versions of the ground and airborne radios. The System Improvement Program (SIP) models provide upgrades to enhance operational capability in the tactical internet (TI) environment. The Advanced System Improvement Program (ASIP) models—of a reduced size and weight—provide further enhancements to operational capability in the TI 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, Greece, Italy, Kuwait, Morocco, Saudi Arabia, SHAPE Tech Center (NATO), Spain, Special Defense Acquisition Fund (pre-purchased export model assets for FMS).

## PROGRAM STATUS

The final production contract option for Army quantities was awarded in 2QFY98. The Army acquisition objective (AAO), at that time, of 227,619 Ground and Airborne radios has been met. Approximately 164,285 radios have been fielded. Technical and Customer Testing of the Advanced System Improved (ASIP) SINCGARS concluded in 1QFY99. The FY00-05 Budget Estimate Submission contains funding sufficient to complete the fieldings of the current ASIP SINCGARS on contract. Currently,

the Signal Center at Fort Gordon is pursuing a Warfighter Rapid Acquisition Process (WRAP) initiative to integrate Global Positioning System (GPS) into the ASIP.

## PROJECTED ACTIVITIES

**FY99** A program funding plus-up of \$44M in FY99 permits acquisition of a portion of the 11,351 increase to the Ground radio AAO.

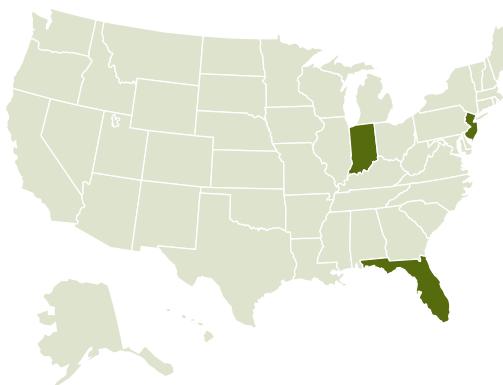
**2QFY99** Begin delivery of ASIP radios, which will permit continuation of the VRC-12 series radio swap-out.

**2QFY99-1QFY00** Fielding of the first digitized division (FDD) is expected to commence in 2QFY99 and conclude in 1QFY00.

**FY01** Expected completion of the VRC-12 series radio swap-out.

## PRIME CONTRACTOR(S)

International Telephone and Telegraph (Fort Wayne, IN); General Dynamics Land Systems (Tallahassee, FL); Engineering and Professional Services Inc, (Eatontown, NJ); Nations, Inc. (Eatontown, NJ)



\* See appendix for list of subcontractors



## Smoke Generator (M56 Coyote)



## MISSION

Deny the enemy information, protect our forces, and dominate the maneuver battle, by generating large-area obscuration in the visual through infrared regions of the electro-magnetic 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 a particulate material is provided for 30 minutes, to blind infrared sensors.

**Turbine engine-powered visual screening (fog oil):**  
0–1.33 gallons per minute

**Infrared screening (graphite):** 1–10 lb per minute

## FOREIGN COUNTERPART

Countries that use former Soviet doctrine emphasize extensive use of smoke during tactical exercises. Many nations, especially those in the Middle East, are beginning to realize the benefits of smoke and have developmental programs in this area.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

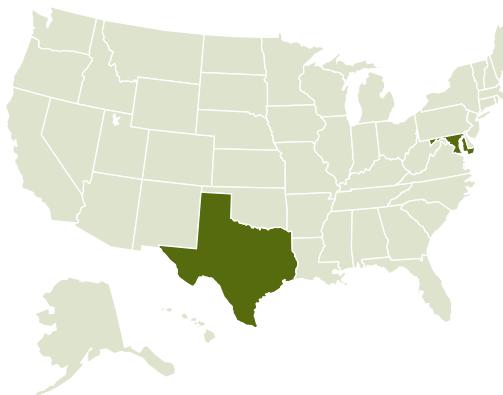
The M56 was type classified-standard in September 1994. Production began in 1995. A training release was approved in May 1997, and systems were fielded to the Chemical and Ordnance Schools for training. A conditional release was approved for U.S. Army Forces Command (FORSCOM) in September 1998. The first unit equipped (FUE) was accomplished at Ft. Bragg in October 1998.

## PROJECTED ACTIVITIES

- FY00** Complete fielding of all systems procured between FY95 and FY00; A drivers vision enhancer will be added to the systems beginning in FY00.
- FY01** A new competitive contract will be awarded to continue the production effort.
- FY01–04** A millimeter wave obscurant preplanned product improvement development effort will be conducted, followed by production and integration.

## PRIME CONTRACTOR(S)

Robotic Systems Technology (Westminster, MD);  
Raytheon (Dallas, TX)



\* See appendix for list of subcontractors



## Smoke Generator (M58 Wolf)



## MISSION

Deny the enemy information, protect our forces, and dominate the maneuver battle, by generating mobile large-area obscuration screens in the visual through infrared regions of the electro-magnetic spectrum.

## DESCRIPTION AND SPECIFICATIONS

The M58 is a large-area smoke generator system that is mounted on the M113A3 Armored Personnel Carrier (APC). The M113A3 incorporates an upgraded engine and transmission, external fuel tanks, and new driver's station. These improvements give the M58 sufficient mobility to operate with the M1, M2 and M3 heavy combat vehicles it is designed to protect. The system also supplies a Driver's Thermal Viewer to allow the driver to see through his own visual smoke clouds and a Gas Particle Filter Unit for operation in a nuclear, chemical or biological contaminated area. The M58 provides mobile obscurant screens of at least 90 minutes of visual and 30 minutes of infrared protection at maximum flow rates. Longer screens are possible at lower material flow rates.

**Visual Screening (fog-oil):** 0-1.33 gallons per minute

**Infrared Screening (graphite):** 1-10 lb per minute

## FOREIGN COUNTERPART

Countries that use former Soviet doctrine emphasize extensive use of smoke during tactical exercises. Many nations, especially those in the Middle East, are beginning to realize the benefits of smoke and have developmental programs in this area.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

The M58 was type classified in August 1995. Production began in 1996. A training release was approved in January 1998 and systems were fielded to the Chemical School. FORSCOM release and fielding began in July 1998.

## PROJECTED ACTIVITIES

**4QFY99** Eighth U.S. Army fielding is planned for September 1999.

**FY00-01** A systems integration program will be conducted to reconfigure the M58 smoke generator components onto a different vehicle chassis, capable of meeting the needs of the Army After Next.

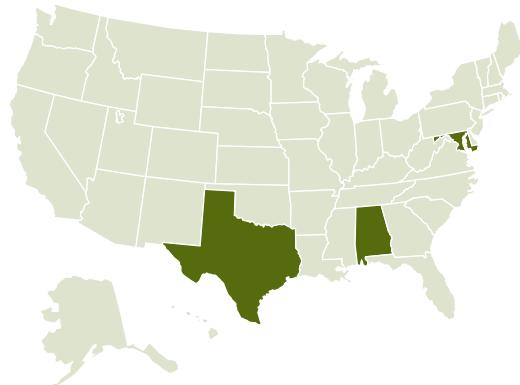
**FY01-04** A millimeter wave obscurant preplanned product improvement development effort will be conducted, followed by production.

## PRIME CONTRACTOR(S)

**Smoke Generating System:** Robotic Systems Technology (Westminster, MD)

**Driver's Thermal Viewer:** Raytheon (Dallas, TX)

**M58 Conversion:** Anniston Army Depot (Anniston, AL)



\* See appendix for list of subcontractors

# Contributing Capabilities

Contributing Capabilities are programs that directly contribute to one or more of the Army's patterns of operation as identified in *Army Vision 2010*, but which are not specifically identified in other investment components. These systems improve the mobility and lethality of Army forces, enhancing their ability to dominate future battlefields.



## CONCEPT EXPLORATION:

Behavioral and Social Sciences Performance and Training R&D

Medical R&D

National Automotive Center

National Rotorcraft Technology Center

Corps of Engineers R&D

## PRODUCTION, FIELDING/DEPLOYMENT, AND OPERATIONAL SUPPORT:

Biological Vaccine Program/Joint Vaccine Acquisition Program (JVAP)

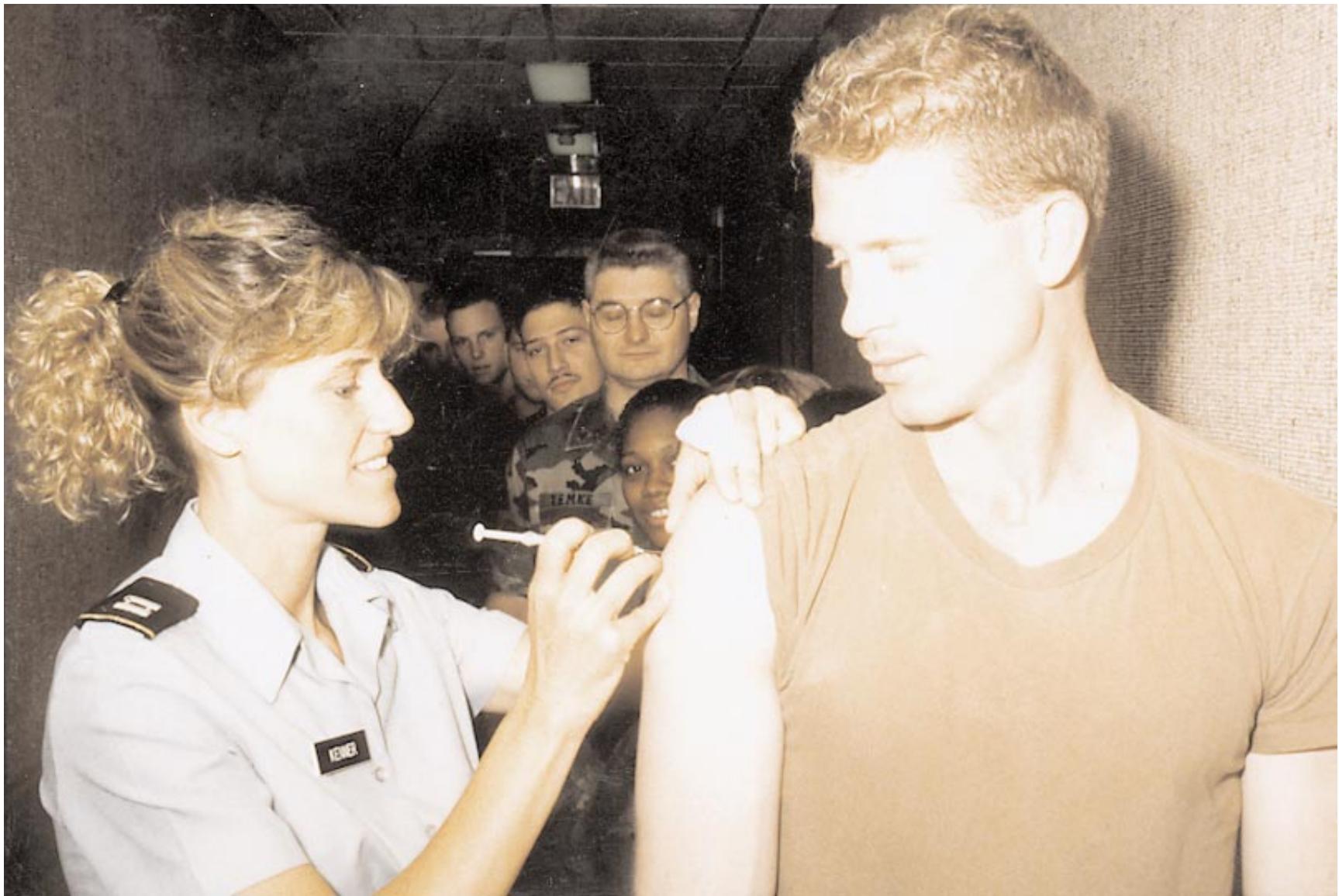
Family of Medium Tactical Vehicles (FMTV)

Forward Repair System–Heavy (FRS-H) (WRAP Candidate)

Soldier Support Systems



## Biological Vaccine Program/Joint Vaccine Acquisition Program (JVAP)



## MISSION

Provide biological defense vaccines for protection of U.S. forces against the hostile use of biological warfare (BW) agents—bacteria, toxins, and viruses—that will meet Food and Drug Administration (FDA) regulatory requirements for licensed products.

## DESCRIPTION AND SPECIFICATIONS

The Biological Vaccine Program/Joint Vaccine Acquisition Program (JVAP) is responsible for the transfer of biological defense vaccine from research laboratories to the Prime Systems Contractor, for development, testing and production of vaccines to protect U.S. forces against validated BW threats. These vaccines will provide protection against aerosol-delivered biological warfare agents, and will be licensed by the Food and Drug Administration. Thirteen anti-BW vaccines will be developed. The development process will include the following: process development, manufacture of pilot lots, development of surrogate animal efficacy studies, non-clinical testing, Phase I, IIa, IIb clinical trials, submission of biological license applications, vaccine production and maintenance of the vaccine stockpile.

## FOREIGN COUNTERPART

No known foreign counterparts.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

A cost-plus-award-fee contract was awarded to DynPort LLC as the Prime System Contractor in November 1997.

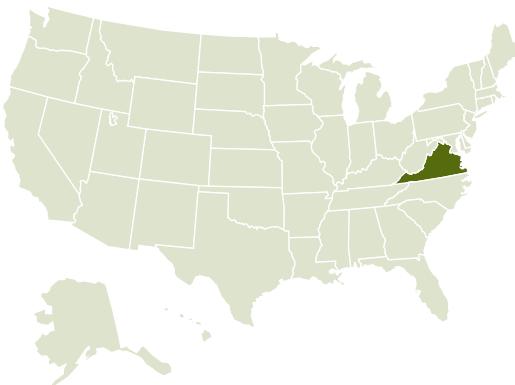
## PROJECTED ACTIVITIES

Advanced development, licensure by the Food and Drug Administration (FDA), and production of biological defense (BD) vaccines for initial stockpiles, to be available to immunize U.S. forces against validated biological warfare (BW) threat agents. These efforts will include:

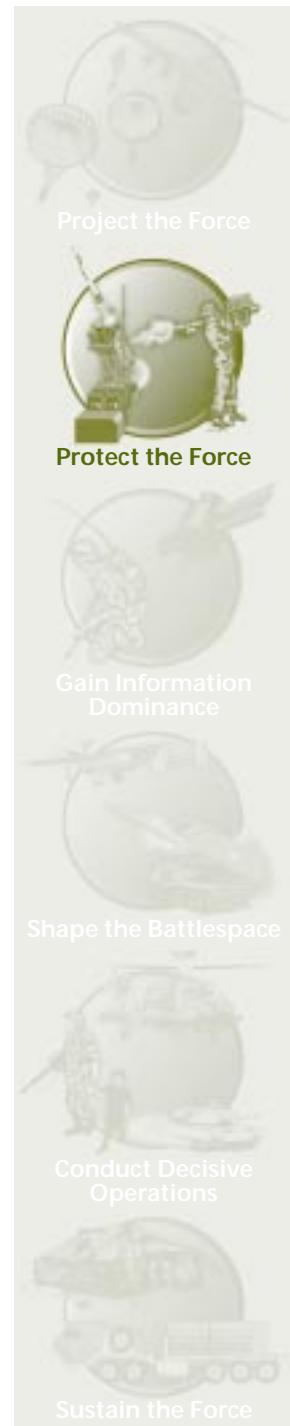
- **Q-Fever Vaccine:** Continue engineering and manufacturing development (EMD) efforts in FY99; continue stability testing and clinical trials in FY00; complete license application in FY01.
- **Vaccinia Vaccine:** Initiate EMD efforts in FY99; conduct pilot lot pre-clinical and clinical trials in FY00; conduct stability testing, efficacy testing and clinical trials in FY01.
- **Botulinum A, B, E, F Vaccines:** Continue pilot lot pre-clinical and clinical trials for Botulinum A and B vaccines; begin clinical, efficacy testing and stability testing of Botulinum E and F vaccines in FY00. These efforts will continue in FY01.

## PRIME CONTRACTOR(S)

DynPort LLC (Reston, VA)



\* See appendix for list of subcontractors



## Family of Medium Tactical Vehicles (FMTV)



## 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. 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: cargo (with and without materiel-handling equipment), tractor, wrecker, and dump truck.

Van and tanker variants of the MTV will be developed concurrent with the production of other models. 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 will replace overaged and maintenance-intensive trucks currently in the medium tactical vehicle fleet.

	LMTV "A1" Cargo	MTV "A1" Cargo
<b>Payload:</b>	5,000 lb	10,000 lb
<b>Towed Load:</b>	12,000 lb	21,000 lb
<b>Engine:</b>	JP8	JP8
<b>Transmission:</b>	Automatic	Automatic
<b>Horsepower:</b>	275	330
<b>Drive:</b>	4x4	6x6

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

Saudi Arabia, Egypt, and Thailand have FMS actions in progress.

## PROGRAM STATUS

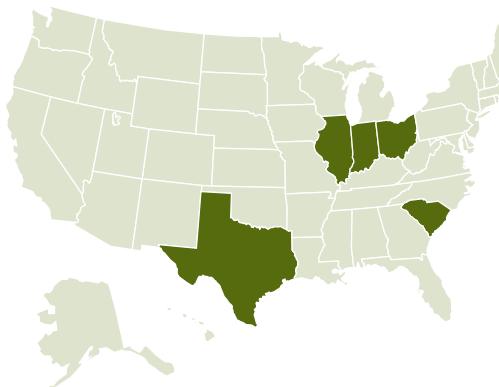
First unit equipped was at Ft Bragg, NC, on January 30, 1996. Units equipped with FMTVs include those at Ft Campbell, KY; Ft Drum, NY; Ft Stewart, GA; Ft Huachuca, AZ; Ft Hood, TX; Ft Lewis, WA; and Hawaii. The Army has awarded a new four-year, multi-year plus option year contract with Stewart and Stevenson (S&S), beginning with FY98 requirements. This new contract is for the "A1" version of the FMTV, which includes a 1998 EPA certified engine, upgraded transmission, electronic data bus, an Anti-lock Brake System (ABS) and Interactive Electronic Technical Manuals.

## PROJECTED ACTIVITIES

- Fielding will continue to the Army's highest priority "first-to-fight" units.
- Fielding under the first multi-year contract with S&S Services is scheduled to be completed in FY99.
- Production verification testing (PVT) of the "A1" version of the FMTV is scheduled to be completed by the middle of calendar year 1999. This version will include the improved components that made up the drive line fix validated by test.
- The Army recently awarded the Phase I, Pre-production FMTV second source contracts to Oshkosh Truck Corporation and AM General Corporation. Each contractor will build three A1 trucks to compete in a run off competition.

## PRIME CONTRACTOR(S)

Stewart and Stevenson Services (Houston, TX)



\* See appendix for list of subcontractors



## Forward Repair System–Heavy (FRS-H) (WRAP Candidate)



## MISSION

Provide a forward, mobile maintenance/repair vehicle to return heavy force systems to an operational condition.

## DESCRIPTION AND SPECIFICATIONS

The Forward Repair System-Heavy (FRS-H) is a “must-have” enabler for Force XXI and is a new start in FY00. The FRS-H is a high-mobility, forward maintenance system that reduces man-hours for maintenance personnel, enabling conversion to the Force XXI design. The FRS-H will minimize the current practice of using recovery vehicles—the 5-Ton Wrecker and the M88—for maintenance lift (e.g. removing engines), and replace the M113A2/A3 Armored Personnel Carrier for transporting maintenance equipment. The current practice causes a severe shortage of recovery assets. Force XXI, with its expanded battlespace, only increases the need for dedicated recovery assets.

The FRS-H consists of a PLS truck for mobility. It is overhead lift capable and it has a mission module that contains the tools, diagnostic equipment, and repair parts needed to return heavy forces systems to battle, or into a self-recovery mode. The emphasis in developing the system is on procuring non-developmental components.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

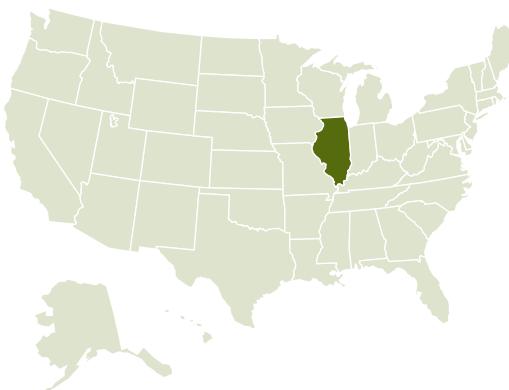
The program concept calls for PM HTV to contract with Rock Island Arsenal (RIA) to produce the mission module. PM HTV will issue PLS Trucks from ongoing production. This accelerates the fielding of FRS by one year. PLS trucks that are diverted to FRS in the first year are paid back, starting in FY01.

## PROJECTED ACTIVITIES

- 1QFY99** Expected award, pending funding release.
- 3QFY99** Delivery of five FRSs for start of Developmental Testing through June 1, 1999.
- 4QFY99** Field twenty FRSs to the first unit equipped (FUE), the 4th Forward Support Battalion, and 4th Infantry Division.

## PRIME CONTRACTOR(S)

Expected contractor: Rock Island Arsenal (Rock Island, IL).



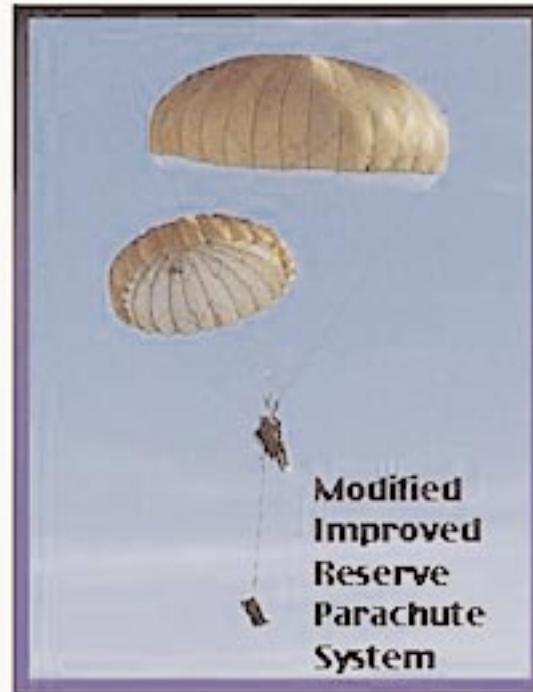
\* See appendix for list of subcontractors



## Soldier Support Systems



**Lightweight Maintenance Enclosure**



**Modified  
Improved  
Reserve  
Parachute  
System**



**Laundry Advanced System**



**Containerized Kitchen**

## MISSION

Directly support the soldier in an operational or tactical environment with systems such as cargo and personnel air-drop systems, laundries, showers, non-powered heaters, rigid and softwall shelters, and field feeding systems.

## DESCRIPTION AND SPECIFICATIONS

Examples of Soldier Support Systems being fielded include the Lightweight Maintenance Enclosure (LME), Modified Improved Reserve Parachute System (MIRPS), Laundry Advanced System (LADS) and Containerized Kitchen (CK). The LME is a highly mobile maintenance/repair shelter for tracked and wheeled vehicles, used across the battlefield under all climatic conditions. The MIRPS provides increased reliability over the T-10R parachute, due to a new spring-deployed pilot chute that provides more positive reserve inflation in the event of a main canopy malfunction. The LADS consists of laundry-processing and water recycling equipment mounted on an ISO-certified flatrack, complete with a generator mounted on an M871 thirty foot trailer and towed by a 5-ton tractor. The CK provides 550 soldiers with three meals a day. It consists of existing military standard equipment and commercial components, integrated into an expandable twenty inch container, mounted on a tactical trailer, and towed by the 5-ton medium tactical vehicle cargo truck. Intensive management ensures that these systems are afforded equal priority with higher profile weapon systems under development; it also concentrates scarce resources on user priorities, while fielding systems faster and cheaper.

## FOREIGN COUNTERPART

No known foreign counterpart.

## FOREIGN MILITARY SALES

None.

## PROGRAM STATUS

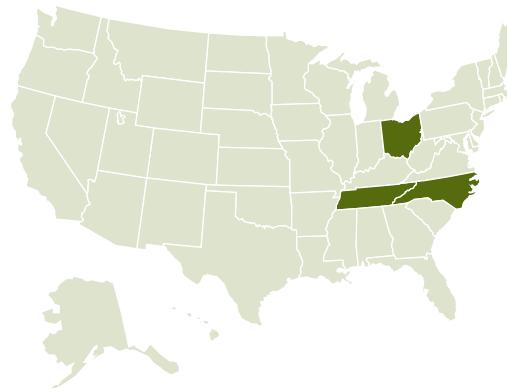
LME is undergoing field unit evaluation. The MIRPS is being fielded. The LADS is undergoing testing; and the CK is under production contract solicitation.

## PROJECTED ACTIVITIES

- 1QFY99** LME—Milestone III full-rate production (FRP) decision.
- 3QFY99** LADS—first article test.
- 4QFY99** CK—test and evaluation.

## PRIME CONTRACTOR(S)

Camel Manufacturing Company (Caryville, TN); Irvin Industries (Hope Mills, NC); Guild Associates (Dublin, OH)



\* See appendix for list of subcontractors



# Contributing Capabilities R&D

## BEHAVIORAL AND SOCIAL SCIENCES PERSONNEL PERFORMANCE AND TRAINING RESEARCH AND DEVELOPMENT PROGRAM

The U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) conducts the Army's Personnel Performance and Training Research and Development (R&D) program that directly supports the soldier—the ultimate “smart weapon.” It provides the scientific basis for: shaping policy and programs to attract, train, and retain quality men and women for a smaller, more versatile force; and developing quality leaders with appropriate battle command skills for the future digitized battlefield. ARI also tracks soldiers’ on-the-job performance and takes the pulse of the Army through soldier surveys to assist policy-making, training, and job design. ARI’s program supports today’s smaller Army to ensure that its strength, quality, and readiness levels can meet the demands of a rapidly changing world. Key to this challenge is selecting, classifying, training, and retaining quality soldiers, so that the best people are in the right jobs. Soldiers who are well trained and satisfied with their jobs, career opportunities, and the quality of Army life, save significant recruiting, training, and supporting dollars.

Weapons, advanced technology, information systems, and digitized equipment are only as effective as their human operators. In fact, systems often lack efficiency or effectiveness because the human dimension was not considered as a factor early in the research, development, and acquisition cycle. ARI’s behavioral and social science research is about this human dimension. ARI’s current R&D program is designed to:

- Improve battle commanders’ thinking, reasoning, and problem-solving skills with the new digitized C4I systems;
- Identify the skills and attributes that quality soldiers and leaders need to perform effectively on the 21st Century battlefield;
- Determine the best use of live, virtual, and constructive simulations to maximize learning and minimize costs;
- Develop prototype simulation-based training programs to improve individual and unit performance; and
- Develop training strategies and tools so that the Reserve Component can conduct effective mission training within tight time and resource constraints.

The ARI R&D program supports, among others, the Combined Arms Training Strategy, Advanced Warfighting Experiments (AWEs), *Army Vision 2010*, the *Army Science and Technology Master Plan*, and the *Army Modernization Plan*. It provides cost-effective personnel performance

and training techniques, programs, and strategies to ensure that the human dimension of warfighting keeps pace with changes in technology and doctrine as the Army implements Force XXI initiatives and moves toward the Army After Next.

## 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 through the projection of life-saving medical expertise to the front lines. The major goals of the Army Combat Health Support (CHS) science and technology (S&T) program are threefold: first, to prevent illness and injury; second, to sustain optimum military effectiveness; and third, to treat casualties. The greatest payoff from the investment in medical S&T comes from identifying medical countermeasures that eliminate and treat health hazards. These include biomedical technologies, information and materiel, environmental injury, operational stress and aggressor weapons.

### Combat Casualty Care

*Life Support for Trauma and Transport (LSTAT)* was approved by the U.S. Food and Drug Administration for human use on June 29, 1998. LSTAT is a NATO, stretcher-based, mini-intensive care unit that incorporates resuscitative and life-sustaining capabilities for field surgery and med-



ical support during evacuation. Northrop Grumman developed the LSTAT concept with assistance from the Walter Reed Army Institute of Research and the Defense Advanced Research Projects Agency. The Army owns the patent for LSTAT. The Army, Air Force and Marines are working with Northrop Grumman on operational testing and evaluation of the system, and plans for joint service use.

LSTAT provides sophisticated trauma care closer than ever to a battlefield or accident scene; patients can be quickly stabilized in the field before and during transport to a hospital by ground vehicles, helicopters, fixed-wing aircraft or ships. LSTAT incorporates a number of onboard devices for medical care, including the following:

- Instruments to monitor heart and breathing rates, determine blood chemistry, and administer oxygen;
- A ventilator to provide breathing support;
- An infusion pump to deliver drugs or fluids;
- A suction pump to clear congested airways or the abdomen; and
- An automated external defibrillator to revive a patient.

Patient medical data is recorded onboard the LSTAT unit and can be transmitted to the hospital or trauma center via data links.

**Fibrin Bandage.** Army medical researchers and clinicians working in conjunction with the American Red Cross have developed a dry fibrin sealant bandage that will 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. Devices or techniques that slow or control bleeding, and are usable far forward on the battlefield have the greatest potential to save lives.

The new bandage is made from the last two proteins in the human blood coagulation cascade, freeze-dried on an absorbable backing. The resulting bandage measures about four by four inches and is a quarter of an inch thick. It has the stiff consistency of a meringue baked on a piece of cloth. The bandage is applied with direct pressure, crushing the meringue into the wound where it quickly dissolves and coagulates. The pressure slows bleeding and maintains high local concentrations of the active ingredients. The clot "sets" within a minute. 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. This research demonstrates the potential for the far forward use of these dressings by medics, buddies, and forward surgical teams.

**Extended Blood Shelf-life.** Army contractors at the University of Cincinnati have developed and demonstrated a nine-week storage system for liquid red blood cells. The system is fully compatible with current military and civilian blood bank and transfusion medicine practice. The Army has filed a patent application for the system. The extended shelf life will enable the military to maintain greater supplies of blood in forward locations while reducing losses from outdated. The civilian community will benefit by saving several hundred thousand units of blood per year. Additionally, the extended shelf life will enable civilian agencies to provide more blood to remote areas, smooth out seasonal shortages, and make autologous blood systems more effective. The U.S. Army built the world's first blood bank at Cambrai in 1917 and fielded three-week blood in WWII, Korea, and Vietnam. The Army developed five-week blood storage and supported the basic research for six-week blood. The current five- and six-week blood storage systems were approved by the FDA in 1979 and 1981, respectively.

**Prototype Armored Medical Evaluation Vehicle (AMEV)** is intended to replace the M113A2/A3 Armored Ambulance as the medical evacuation platform in heavy battalions. The AMEV uses excess depot M2A0 Bradley Fighting Vehicles (BFVs) that have the turret removed, and the roof squared off and raised thirteen inches. As a BFV variant, the AMEV overcomes the shortfalls of the M113 identified during Operation Desert Shield/Storm. It has the mobility, survivability, and maintainability equivalent to the supported force. Medical capability includes on-board oxygen, suction, storage of essential medical items and equipment, and the capacity to carry four litter patients, four ambulatory patients, and a crew of three. Design work on the AMEV began in October 1997, and the concept model was unveiled at the U.S. Army Medical Evacuation Conference in February 1998. A prototype AMEV was delivered to the 4th Infantry Division on September 16, 1998 for evaluation and participation in the National Training Center (NTC) rotation 99-05, in March 1999. Based on feedback from the unit and from NTC lessons learned, the AMEV will be modified as necessary in preparation for a Concept Experimentation Program (CEP) test in September 1999.

# Contributing Capabilities R&D



## Advanced Technology/Telemedicine

**The Personal Information Carrier (PIC)** is a small, electronic storage device that will be used for recording, storing and transmitting part or all of an individual's computer-based patient record. Ultimately the PIC will contain records of all the patient's medical encounters (inpatient, outpatient, emergency, mental health), including test results and images. Low-rate initial production (LRIP) of the Personal Information Carrier (PIC) is expected to begin in the first half of calendar year 1999. A large-scale operational test of the PIC will begin in June 1999. After successful completion of the test, production and deployment of the PIC will begin in Fall 1999. The preliminary results from technical feasibility testing of seven candidate PIC technologies at the Electronic Proving Ground, Fort Huachuca, AZ, were very positive. Most of these commercial-off-the-shelf products have not been hardened to withstand the severe testing. Data from these tests will be used to refine requirements, and a request for proposals will be issued soon. The PIC candidate selected as a result of the RFP will be the one produced in the LRIP in 1999.

## Infectious Disease Research

The Military Infectious Diseases Research Program, a joint Army-Navy program, has been highly successful in discovering, testing, and fielding products designed to protect military personnel against infectious diseases, usually the most common cause of military casualties. In recent years, vaccines to prevent Japanese encephalitis, a disabling

infection of the brain that occurs throughout Asia, and hepatitis A, a worldwide cause of infectious hepatitis, have been licensed. Drugs for treatment or prevention of malaria, mefloquine, and halofantrine were both developed at the Walter Reed Army Institute of Research.

Presently, the program leads the world in discovering drugs and vaccines for prevention of malaria, vaccines to prevent bacterial diarrhea, vaccines for dengue, and many other potentially important products. A unique system of laboratories to study tropical diseases, discover new products, and produce pilot lots of drugs and vaccines for clinical trials, makes this program particularly efficient in producing new products to protect soldiers against real threats.

## Medical Chemical and Biological Defense

Several initiatives in the Medical Chemical and Biological Defense Research Program respond to shortfalls in the area of medical countermeasures against chemical and biological warfare threats. For the chemical threat agents, the advanced anticonvulsant research efforts identified two prospective agents that may be administered in a single intra-muscular dose for soldier/buddy use. These stop ongoing convulsive seizures and protect against nerve agent-induced, seizure-related brain damage. Another significant development in medical chemical defense is the introduction of the prototype for a real-time, portable, non-invasive oximeter that provides determinations of methemoglobin levels in individuals. Induction of methemoglobin is recognized as a prophylaxis and a treatment for cyanide exposure, but can reduce the oxygen-carrying capacity of the blood. This device enables professionals to evaluate the adequacy of protection against and treatment for cyanide exposure.

The laboratories of USAMRMC continue to improve and/or develop pre- and post-exposure medical countermeasures against biological threat agents. Starting in 1998, however, the advanced development arm of vaccine research has followed a new path. The Joint Vaccine Acquisition Program, under the auspices of the Joint Program Office for Biological Defense, selected a prime systems contractor. The prime contractor is responsible for taking biological defense vaccines from the tech-base developers (USAMRMC) and developing these vaccines for licensure, production and storage. In the area of training, the Medical Management of Biological Casualties Course was offered for a second year by satellite broadcast.

This year's course had over 17,000 participants enrolled in the initial broadcast, September 22–24, 1998. Use of this medium greatly expands the ability of USAMRMC to respond to the increasing demands for training in this area for DoD and non-DoD medical personnel. An additional effort involves the area of rapid diagnostics; here, collabora-

tive work is underway with laboratories of the USAMRMC, the U.S. Navy, the Department of Energy, and the Defense Advanced Research Projects Agency.

### Congressionally-Directed Research

The USAMRMC continues to manage DoD medical research programs mandated by Congress. More than \$500 million has been applied to breast cancer research, through more than 1,000 contracts and grants awarded on a peer review basis. Using funds appropriated by Congress in FY98 and FY99, the USAMRMC will continue peer-reviewed programs for basic research in breast, ovarian and prostate cancer; osteoporosis; and neurofibromatosis.

**Gulf War Illness** The USAMRMC is currently managing approximately 45 projects worth \$40 million, in addition to other in-house efforts, on Gulf War illness research. Since 1994, peer review panels have requested and reviewed:

- Projects for epidemiological studies in human subjects;
- Studies of possible long-term or delayed clinical effects of low-level exposures to chemical warfare agents;
- Studies of causal relationships between symptoms experienced by Gulf War veterans and possible exposures to hazardous material, chemical warfare agents, stress, and potentially hazardous combinations of inoculations and investigational drugs; and
- Studies of historical war syndromes with chronic, non-specific symptoms and physiological outcomes.

### NATIONAL AUTOMOTIVE CENTER (NAC)

The National Automotive Center (NAC) leverages commercial industry's large investment in automotive technology research and development, and initiates shared technology programs focused on benefiting military ground vehicle systems. The NAC, located at the Tank Automotive and Armaments Command (TACOM), is part of the Tank-Automotive Research, Development and Engineering Center (TARDEC). The NAC serves as the catalyst linking industry, academia and government agencies as a clearinghouse for the development and exchange of automotive technologies. The NAC executes collaborative research and development (R&D) contracts and other initiatives. 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 to include mobility, electronics, logistics, safety and environmental protection. The goals are two-fold:

- Improve the performance and endurance of ground vehicle fleets; and
- Reduce ground vehicle design, manufacturing, production, operating, and sustainment costs.

Two-way industry/government technology transfer is pursued under the Cooperative Research and Development Agreements (CRADAs). The activities of the NAC are supported by other Government agencies via a linkage created under Memoranda of Agreement. These linkages permit the NAC to consolidate the collective expertise of federal government departments such as Energy, Transportation, Commerce, and other DoD agencies.

In FY97, the NAC implemented ten new collaborative automotive technology contracts with industry and academia. Through FY97, a total of fifty-six such contracts will have been implemented. As a result of an FY96 cooperative agreement with Ford, Chrysler and General Motors, the NAC implemented a work effort on critical technology for four-stroke, direct-injection (4SDI) diesel engines. To date, the NAC has implemented forty individual CRADAs to investigate automotive and manufacturing issues. In March 1997, a CRADA was implemented with Focus: HOPE, located in Detroit, MI, to bring greater flexibility and agility to the production of components for military and commercial vehicles, through the use of state-of-the-art agile manufacturing technologies. A major goal for the NAC in the future is to implement a plan to increase fuel efficiency for the Army's fleet of combat and tactical vehicles.

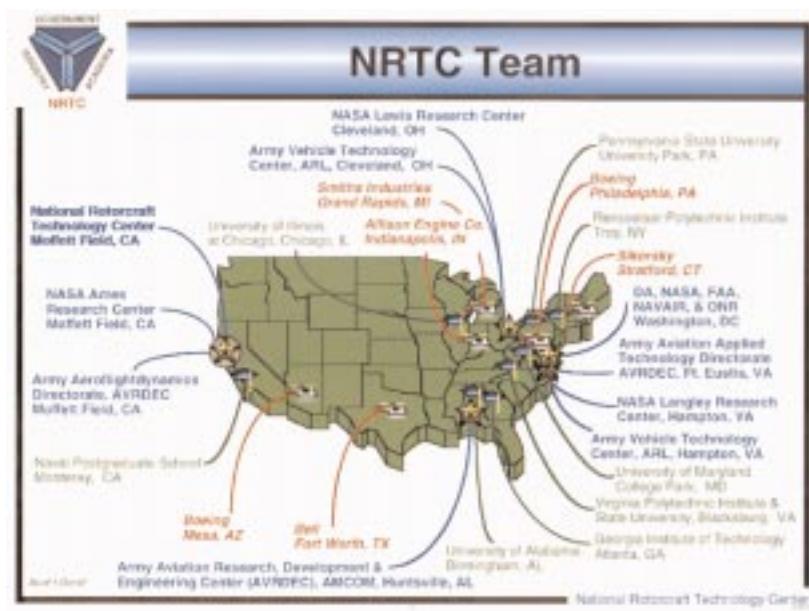
The NAC's research arm, the Automotive Research Center (ARC), has contracted with the University of Michigan as lead contractor for basic research initiatives in the following: vehicle terrain dynamics; vehicle hardware/human interface simulation; modeling and simulation of vehicle structures; advanced propulsion simulation; and systems integration issues and design.

### 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;

# Contributing Capabilities R&D



- 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; these organizations are joined by a Memorandum of Agreement. 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 Allison Engines and Smiths Industries. Associate Members from academia include Rensselaer Polytechnic Institute, the Naval Postgraduate School, and the University of Alabama. Academia also participates through the integration of the Rotorcraft Center of Excellence (RCOE) Program into NRTC. The current RCOEs include the 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 to be undertaken in its program, 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.

## CORPS OF ENGINEERS RESEARCH AND DEVELOPMENT

The United States Army Corps of Engineers (USACE) Research and Development (R&D) program supports warfighters across the spectrum of conflict in all elements and in all weather conditions. The object of USACE's R&D efforts is to provide America's warfighters with the best equipment, planning tools, and informational resources possible. The USACE R&D Laboratory system is located at four sites: Hanover, NH; Champaign, IL; Alexandria, VA; and Vicksburg, MS. The laboratory system employs 2,100 people and executes a \$400 million program annually.

Under the leadership and direction of the USACE R&D Directorate, research and engineering studies are conducted on a variety of topics related to combat engineering, infrastructure support and maintenance, and environmental quality and stewardship. R&D comprises scientific and engineering investigations ranging from basic and applied research, to problem identification, and to final implementation of the R&D product. The laboratory system maintains state-of-the-art expertise in all technology areas and performs the following missions:

- Develop mapping, terrain analysis, and image processing systems and techniques.
- Support the Army's effort to design, construct, operate and maintain its infrastructure.
- Devise methods for living, working, fighting and navigating in the world's cold regions.

- Develop improvements in water-related structures, hydraulics, and geotechnical, coastal and environmental engineering.

USACE is also working to provide the engineer on the ground with the ability to resolve the tough technical challenges encountered by the smaller engineer force of today and the future. One method is through TeleEngineering. TeleEngineering is an ongoing major initiative to establish an engineering “telepresence” to support deployed engineers. TeleEngineering will provide connectivity between deployed engineers and the appropriate subject matter experts (either in CONUS or OCONUS) that will allow implementation of new technologies, or the application of computational capability beyond the capabilities existing within the theater of operations. In addition to its contribution to resolving battlespace challenges, TeleEngineering will be an additional mechanism for rapid technology transfer from the R&D community to the field.

Technology transfer is an integral part of the process of bringing products of USACE R&D programs to the attention of other DoD and Federal agencies, state and local governments, and private industry. Technology transfer can assist other groups in making maximum use of these technologies. Thus, research products developed to meet warfighter needs can benefit the Nation. Specific examples of USACE work are described below.

**1. 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 CONUS and operational employment within the theater of operations. Improved reliability will be achieved by development of advanced design, analysis, and evaluation procedures for airfields and pavements, as well as improved construction, maintenance, and repair systems. Advanced analytical pavements models will be developed. These realistically depict the effects of current and future generation aircraft loads, new and/or indigenous construction material properties, and the impact of severe temperature and moisture conditions—including permafrost—on the predicted performance of permanent and expedient airfields and pavements. 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. As a result of this research, DoD will reduce its pavements costs (approximately \$72M/yr in FY95 dollars), increase pavements reliability (approximately twenty percent), and reduce pavement construction efforts within the theater of operations (approximately ten percent).

**2. Survivability and Protective Structures.** The goal of the Army's Survivability and Protective Structures' Science and Technology program is to perform 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 multispectral 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 the prediction of blast loads (blast shielding effects from barriers and buildings), structural response (including progressive structural collapse for a wide variety of structural types), hazards to personnel, and expedient design/retrofit methods for increased survivability, including structural hardening and camouflage, concealment, and deception. Integral to the force protection research is the use of high-performance computing to simulate blast loading and structural response, the application of indigenous and/or lightweight advanced composite materials, and the development of expedient survivability procedures.



A PC-based software program, Anti-Terrorist (AT) Planner, is being developed to assist the military commander and his staff in assessing the vulnerability of installations to vehicle bombs and developing protective measures. It 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. It 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 for retrofitting windows and walls of existing buildings have been developed. The window retrofit involves the application of 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.

# Contributing Capabilities R&D

To understand the detailed cause and effect relationships associated with blast-induced loading in complex geometry, 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 300 processors at the DoD Major-Shared Resource Center in Vicksburg, MS, compute explosive detonations, airblast and ground shock propagation, and 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 consisting 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 the aviation assets.



A computerized Simplified Survivability Assessment (SSA) procedure is being developed to aid the engineer officer in planning and implementing the survivability mission. There are four functional areas in the SSA:

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 give 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 savings in time will result from using the SSA for planning survivability missions, and the engineer officer will have readily available information on weapons effects and design procedures.

**3. 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 technologies and engineering capabilities, weeks are required for engineers to iteratively 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. It will enable the force to use innovative methods/procedures, with indigenous construction materials, to rapidly establish the network of LOCs required to support force projection and sustainment of deployed forces. Theater bridges are critical nodes within this LOC network, and technologies will be developed to enable rapid assessment of bridge military load class, and determination of retrofit/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/maintain LOCs necessary to support sustainment operations.

Present LOTS operations are limited to Sea-state 2 or less; this falls short of the DoD requirement of LOTS operations in Sea-state 3, and places an unacceptable limitation on our ability to project the force.

The primary limit to throughput in these operations is the exchange of cargo from large ships to lighters for transfer to the coast. The excessive wave heights and energy in conditions greater than Sea-state 2 generates sufficient ship-to-ship differential movement to preclude that exchange. There is a critical need for a means to provide relatively calm areas in which these operations can be conducted during Sea-state 3 conditions. A Rapidly Installed Breakwater System (RIBS), designed to absorb wave energy and reduce wave heights, has been developed. It is designed to effectively attenuate Sea-state 3 wave energies sufficiently to reduce the ship-to-ship differential movement, and to allow cargo discharge. The RIBS, along with soil stabilization technologies to stabilize beach sands and soft soils for roads, material storage areas, heliports, and other horizontal operating surfaces associated with LOTS operations, will be demonstrated in the Enhanced Coastal Trafficability and Sea-State Mitigation ATD.

**4. Terrain.** Rapid mapping technology focuses on rapidly extracting and properly attributing features of importance to the warfighter. Currently, the products generated from digital terrain data become outdated soon



after their production and, if made in advance, may not cover the areas of interest in detail sufficient to fully support ground forces, special operations, and simulation and modeling. The ability to produce a high-resolution geospatial database, in a timely manner, will provide information superiority during the planning, preparation, and execution of military operations. Integrated, automated geospatial feature generation and attribution software will be developed. Feature data will be generated and attributed from a variety of disparate sources. The software will ensure that the following are handled in a coherent package: multi-imagery formats; varying scale, spatial and thematic accuracy; temporal data; and high resolution and high density data. The results of this project will significantly improve the detail of land-cover classification maps and overlays, and decrease the time required to extract feature attributes. The software will have the following capabilities:

- Process SAR (Synthetic Aperture Radar) and IFSAR (Interferometric SAR) feature data into the Digital Stereo Photogrammetric Workstation (DSPW);
- Automated feature extraction capability from spectral imagery and SAR;
- Automated feature extraction techniques from spectral, SAR, and electro-optical sources into the DSPW;
- Automated feature attribution capability based on terrain reasoning software; and
- Automated feature extraction and attribution capability on the DSPW.

**5. 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. USACE and its various partners have several ongoing efforts that will assist in proper application of numerous sensor platforms through mission rehearsal and planning tools, operational guidance, and environmental effects data for field commanders, combat developers, and material developers. Recent accomplishments and on-going research initiatives include the following:

Weapon systems containing infrared and passive/active millimeter wave sensors are dramatically affected by terrain and weather effects (including cold temperatures, snow, ice, and frozen ground). Physics-based modeling capabilities and 3D terrain visualization tools are merging under the 3D Dynamic Multi-Spectral Synthetic Scene Visualization STO, to create terrain and weather-dependent IR and MMW terrestrial backgrounds for synthetic environments and sensor performance tem-



plates. This mission planning and rehearsal tool will provide commanders and staff with unparalleled situational awareness to conduct detailed IPB's, 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.

An intrusion detection system's (IDS) probability of detection ( $P_d$ ) depends highly on the operating environment (terrain, weather, operating parameters, illumination, nearby structures, and so on). USACE is currently developing operational guidance and IDS performance parameters that will significantly reduce security lapses by providing guidance for the proper placement and utilization of various sensors within an intrusion detection system.

**6. Training Lands.** Training land management system research will develop an improved knowledge base of cause-effect relationships and an integrated set of models that can work together to provide predictive capability for decision support that integrates training and testing actions and environmental processes. The results will provide an approach to simulating impacts of military operations on the natural resource base and predicting thresholds for sustainable use. The integrated set of models will link training and testing to the following:

- The ability of land to recover from impacts;
- Erosion and deposition processes; and
- Avoidance of impacts on protected species and sites.

The work will take advantage of existing and emerging modeling technologies in erosion processes, community ecological dynamics, and noise propagation. More importantly, the effort will define the interaction between different models, different modeling environments, and different model inputs, outputs, and data resolution. It will provide a simulation and prediction capability across the models. The increased knowledge base and advanced decision support capabilities will enable proactive and cost-effective management of lands for sustainable use, and up to fifty percent reduction of current land use constraints (at present, approximately two million acres). These efforts will also help the Army improve the readiness condition of all lands. The knowledge and modeling capability will ensure that constraints on land use are warranted, improve measures of carrying capacity, and improve the ability to plan, schedule and execute training and testing missions with the least constraint, and in a fashion that provides for the most realistic conditions.

# Contributing Capabilities R&D

## 7. Environmental Quality: *Subsurface Detection of Buried Unexploded Ordnance*

The 1997 Unexploded Ordnance (UXO) Clearance Report to Congress estimates that millions of acres throughout the United States, including 1900 Formerly Used Defense Sites (FUDS), and 130 Base Realignment and Closure (BRAC) installations, potentially contain buried UXO contamination. Current methods used to detect buried UXO result in nominally 95% of the excavated objects determined to be non-hazardous causing. Approximately 75% of the costs to remediate a UXO site is 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), tenfold 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 multisensor 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 ( $P_d$ ) levels (90–95%). This program will be coordinated directly with the Army Joint UXO Coordination Office (JUXOCO) as part of the DoD UXO Center of Excellence (UXOCOE). 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 now estimated to be \$7 billion. This places a burgeoning reduction of resources available to the warfighter. In some cases, training range activities must be substantially altered or stopped completely, due to off-site migration of the lead. Current processes to remediate these hazardous wastes typically involve dig, haul, and treat for soils, and pump and treat for groundwater. The Army believes in-situ technologies can reduce treatment costs by as much as an order of magnitude. The Army is conducting RDT&E to address these requirements, with emphasis on 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.

## APPENDICES

Army Combat Organizations

Glossary of Terms

Top Fifty Army Contractors

Contractors by System

Contractors by State

Points of Contact

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## 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 FY 1996 constant dollars, total program costs in excess of 120 million in FY 1996 constant dollars, or total life-cycle costs in excess of 360 million in FY 1996 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. An example of an acquisition phase is Program Definition and Risk Reduction. The acquisition phases for the systems described in this handbook are defined in the Introduction on page IX.

**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.

**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.

**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 fiscal year (FY) 1996 constant dollars, total program costs in excess of 120 million in FY 1996 constant dollars, or total life-cycle costs in excess of 360 million in FY 1996 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 fiscal year (FY) 1996 constant dollars or, for procurement, of more than 2.135 billion in FY 1996 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 FY 1996 constant dollars, or for procurement of more than 640 million in FY 1996 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)

**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.

**Patterns of Operation:** Published by the Chairman of the Joint Chiefs of Staff in Spring, 1996, Joint Vision 2010 (JV2010) provides an operationally-based template for the development of U.S. military forces into the next century. It describes operational concepts which must be employed by joint forces in future conflicts. Army Vision 2010 (AV2010), published in Fall 1996, is a blueprint for how the Army will build the capabilities called for in JV2010. It articulates patterns of operation which align closely with the concepts of JV2010 and demonstrate the Army's view of its role in future joint operations. AV2010 patterns of operation include:

**Project the Force:** Projecting the force entails the rapid deployment of CONUS-based forces directly to crises.

 Transported by air and naval components of the joint task force, highly mobile and versatile Army forces represent a powerful deterrent to potential enemies and provide the means of defending our interests, should deterrence fail. Key enablers of effective force projection include prepositioned equipment, forward stationed forces, strategically mobile and lethal early entry forces, global C2 capabilities, and adequate strategic lift.

**Protect the Force:** Success in future operations will require freedom of deployment, reception, staging, onward movement, and maneuver. We must protect soldiers, equipment, facilities, and other critical elements of the joint force from enemy observation and attack across the full spectrum of operating environments. We must also protect essential information functions, to include key elements of our digital command and control structure, as we strive to achieve

Information Dominance. Key enablers of force protection include improved intelligence and situational awareness, effective air and missile defense, effective NBC detection and defense, enhanced ballistic protection, increased maneuver speed and agility, and effective long-range engagement capabilities.

**Gain Information Dominance:** The Army will conduct information operations to achieve Information Dominance, which is essential to all other patterns of operation. Information Dominance provides an operational advantage to friendly forces by enabling enhanced situational and battlespace awareness. It enables the secure and effective functioning of the Army's digital command and control architecture. Simultaneously, achievement of Information Dominance by friendly forces allows the disruption of enemy C2, intelligence collection, and other critical information functions.

**Shape the Battlespace:** Successfully shaping the battlespace is closely associated with Decisive Operations in that it provides the conditions for mission success. It is the integration of various combat multipliers—deception, psychological operations, limited attacks, information warfare, mobility/ countermobility operations, precision strikes, and others—with the scheme of maneuver to overwhelm the enemy. It denies the enemy freedom of action and key capabilities while preserving those of friendly forces.



**Conduct Decisive Operations:** Decisive operations are the means by which we ultimately achieve success in that they compel an adversary to accede to our will. They may be defined in terms of victorious battles or campaigns for combat operations, or the achievement of politico-military objectives in operations other than war. Future decisive operations will be facilitated by situational awareness, heightened speed and agility, employment of precision munitions, and attainment of information dominance.



**Sustain the Force:** Successful sustainment is a critical element of any military operation, and as such, Sustain the Force is central to all other patterns of operation. Conversely, effective sustainment operations could be an objective in and of themselves, as in some humanitarian assistance operations. Future sustainment operations will be enhanced by the integration of information technologies, flexible and agile combat service support organizations, and new doctrinal concepts to provide rapid and effective logistics support to across the full spectrum of operational environments.



**For additional information on acquisitions terms, or terms not defined, please refer to:**

*AR 70-1, Army Acquisition Policy*, or

*DA PAM 70-3, Army Acquisition Procedures*.

## TOP FIFTY ARMY CONTRACTORS-FY97 RANKING

### **1. Lockheed Martin**

Advanced Quick Fix (AQF)  
Air/Missile Defense Planning and Control System (AMDPCS) (WRAP Candidate)  
All Source Analysis System (ASAS)  
Apache Longbow  
Army Data Distribution System (ADDs)  
Army Tactical Missile System (ATACMS) Blocks I/IA and II/IIA  
Close Combat Tactical Trainer (CCTT)  
Comanche  
Combat Identification for the Dismounted Soldier (CIDDS)  
Combat Service Support Control System (CSSCS)  
Command and Control Vehicle (C2V)  
Crusader  
Extended Range Multiple Launch Rocket System (ER-MLRS)  
Global Command and Control System-Army (GCCS-A)  
Ground-Based Common Sensor (GBCS)  
Guided Multiple Launch Rocket System (GMLRS)  
High Mobility Artillery Rocket System (HIMARS)  
Javelin  
Joint Biological Point Detection System (JBPDs)  
Joint LACMD Elevated Netted Sensors Systems (JLENS)  
Joint Tactical Ground Station (JTGS)  
Line-of-Sight Anti-Tank (LOSAT)  
Longbow HELLFIRE  
Maneuver Control System (MCS)  
Medium Extended Air Defense System (MEADS)  
Mortar (120 mm)  
Multiple Launch Rocket System (MLRS)  
Multi-Purpose Individual Munition/Short-Range Assault Weapon (MPIM/SRAW)  
National Missile Defense (NMD)  
Night Vision (NV) Image Intensification (I2)  
Patriot  
Sentinel

Standard Army Management Information Systems (STAMIS)  
Theater High Altitude Area Defense (THAAD) System

### **2. Raytheon**

Advanced Tank Armament System (ATAS)  
Air/Missile Defense Planning and Control System (AMDPCS) (WRAP Candidate)  
Avenger  
Bradley M2 Infantry/M3 Cavalry Fighting Vehicle (IFV/CFV)  
Brilliant Anti-Armor Submunition (BAT)  
Combat Identification for the Dismounted Soldier (CIDDS)  
Extended Range Multiple Launch Rocket System (ER-MLRS)  
Firefinder (TPQ-36 and TPQ-37/ Block II)  
Force XXI Battle Command Brigade-and-Below (FBCB2)  
Guardrail/Common Sensor (GR/CS)  
High Energy Laser System Test Facility (HELSTF)  
Javelin  
Joint LACMD Elevated Netted Sensors Systems (JLENS)  
Long Range Advanced Scout Surveillance System (LRAS3)  
Medium Extended Air Defense System (MEADS)  
MILSATCOM  
National Missile Defense (NMD)  
Patriot  
Theater High Altitude Area Defense (THAAD) System  
Thermal Weapon Sight (TWS)  
TOW Improved Target Acquisition System (ITAS)  
XM982 155mm Extended Range Artillery Projectile Family

### **3. General Dynamics**

Abrams  
Advanced Tank Armament System (ATAS)  
Battlefield Combat Identification System (BCIS)  
Crusader  
HYDRA 70 Rocket System

Single Channel Ground and Airborne Radio System (SINCGARS)  
Wolverine

### **4. General Motors**

Army Data Distribution System (ADDS)  
High Mobility Multipurpose Wheeled Vehicle (HMMWV)  
Night Vision (NV) Image Intensification (I2)  
Second Generation Forward Looking Infrared (FLIR)  
Sentinel

### **5. ITT Industries**

Army Data Distribution System (ADDS)  
Night Vision (NV) Image Intensification (I2)  
Single Channel Ground and Airborne Radio System (SINCGARS)

### **6. GTE**

Advanced Field Artillery Tactical Data System (AFATDS)  
Global Command and Control System-Army (GCCS-A)  
High-Speed Multiplexer Cards (HSMUX) (WRAP Candidate)  
Integrated System Control (ISYSCON)  
MILSATCOM  
Patriot  
Warfighter Information Network-Terrestrial (WIN-T) Switches

### **7. Boeing**

Apache Longbow  
Avenger  
Bradley Linebacker  
CH-47 Chinook/Improved Cargo Helicopter (ICH)  
Comanche  
Kiowa Warrior  
Longbow HELLFIRE

### **8. SAIC**

Advanced Field Artillery Tactical Data System (AFATDS)  
All Source Analysis System (ASAS)  
Driver's Vision Enhancer (DVE)

Global Command and Control System-Army (GCCS-A)  
Integrated Family of Test Equipment (IFTE)  
Sentinel

### **9. United Defense, L.P.**

Battlefield Combat Identification System (BCIS)  
Bradley Linebacker  
Bradley M2 Infantry/M3 Cavalry Fighting Vehicle (IFV/CFV)  
Bradley Fire Support Team (BFIST) Vehicle  
Command and Control Vehicle (C2V)  
Crusader  
Grizzly  
Hercules  
M113 Family of Vehicles (FOV)  
Multiple Launch Rocket System (MLRS)  
Paladin  
Standardized Integrated Command Post System (SICPS)

### **10. Longbow LLC (Lockheed Martin/Northrop Grumman)**

Longbow HELLFIRE

### **11. United Technologies**

Black Hawk

### **12. The Renco Group**

### **13. Northrop Grumman**

Apache Longbow  
Brilliant Anti-Armor Submunition (BAT)  
Counter Intelligence (CI) HUMINT Automated Tools Sets (CHATS)  
Integrated Family of Test Equipment (IFTE)  
Integrated Meteorological System (IMETS)  
Joint LACMD Elevated Netted Sensors Systems (JLENS)  
Joint Surveillance Target Attack Radar (Joint STARS) Common Ground Station (CGS)  
Longbow HELLFIRE  
Tactical Endurance Synthetic Aperture Radar (TESAR)

- 14. Alliant Techsystems**  
Brilliant Anti-Armor Submunition (BAT)  
HYDRA 70 Rocket System  
Selectable Lightweight Attack Munition (SLAM)  
Sense and Destroy Armor (SADARM)  
Tank Main Gun Ammunition
- 15. Stewart & Stevenson Services**  
Family of Medium Tactical Vehicles (FMTV)
- 16. FMC**
- 17. TRW**  
Airborne Reconnaissance Low (ARL)  
Air/Missile Defense Planning and Control System (AMDPCS) (WRAP Candidate)  
Battlefield Combat Identification System (BCIS)  
Combat Service Support Control System (CSSCS)  
Force XXI Battle Command Brigade-and-Below (FBCB2)  
Guardrail/Common Sensor (GR/CS)  
Integrated System Control (ISYSCON)  
Joint Collection Management Tools (JCMT)  
National Missile Defense (NMD)  
Tactical High Energy Laser (THEL)  
Theater High Altitude Area Defense (THAAD) System
- 18. Texas Instruments/Lockheed Martin Javelin Joint Venture**  
Javelin
- 19. Halliburton Company**
- 20. Dyncorp**
- 21. Computer Sciences Corp.**  
Maneuver Control System (MCS)  
MILSATCOM
- 22. Oshkosh Truck**  
Heavy Equipment Transporter System (HETS)  
Palletized Load System (PLS)
- 23. Hensel Phelps Construction**
- 24. Mitre**  
All Source Analysis System (ASAS)  
Digital Topographic Support System (DTSS) (WRAP Candidate)  
Joint Collection Management Tools (JCMT)  
Maneuver Control System (MCS)
- 25. Boeing-Sikorsky Comanche Team Joint Venture**  
Comanche
- 26. Textron**  
Armored Security Vehicle (ASV)  
Hornet  
Kiowa Warrior
- 27. Nichols Research**
- 28. Litton**  
Advanced Field Artillery Tactical Data System (AFATDS)  
Avenger  
Common Hardware Systems (CHS)  
Digital Topographic Support System (DTSS) (WRAP Candidate)  
Lightweight Laser Designator Rangefinder (LLDR)  
Night Vision (NV) Image Intensification (I2)  
Patriot  
Sense and Destroy Armor (SADARM)  
Sentinel  
Theater High Altitude Area Defense (THAAD) System
- 29. Electronic Data Systems**
- 30. Bechtel Group**
- 31. Olin**  
Mortar (120 mm)
- 32. Germany**
- 33. Bell Atlantic**
- 34. Texas Instruments**  
Abrams  
Line-of-Sight Anti-Tank (LOSAT)  
Night Vision (NV) Image Intensification (I2)  
Second Generation Forward Looking Infrared (FLIR)  
Selectable Lightweight Attack Munition (SLAM)  
Smoke Generator (M58 Wolf)
- 35. General Electric**  
Black Hawk
- 36. Mantech International**  
Digital Topographic Support System (DTSS) (WRAP Candidate)
- 37. Gencorp**
- 38. UNC Incorporated**
- 39. Government Technology Services**
- 40. Motorola**  
Brilliant Anti-Armor Submunition (BAT)  
Combat Identification for the Dismounted Soldier (CIDDS)  
Combat Synthetic Training Assessment Range (CSTAR)  
Ground-Based Common Sensor (GBCS)  
Javelin  
Joint Surveillance Target Attack Radar (Joint STARS) Common Ground Station (CGS)  
Land Warrior (LW)  
Lightweight Laser Designator Rangefinder (LLDR)  
Tank Main Gun Ammunition Thermal Weapon Sight (TWS)
- 41. Government of Canada**
- 42. Lane Industries**
- 43. AlliedSignal**  
Army Key Management System (AKMS)  
Apache Longbow  
Brilliant Anti-Armor Submunition (BAT)  
CH-47 Chinook/Improved Cargo Helicopter (ICH)  
Comanche  
Line-of-Sight Anti-Tank (LOSAT)  
Mortar (120 mm)  
Multiple Launch Rocket System (MLRS)
- 44. Allegheny Teledyne**
- 45. Thiokol**
- 46. Harbert, Bill International**
- 47. Telos**  
Maneuver Control System (MCS)
- 48. Booz Allen & Hamilton**
- 49. Primex Technologies**
- 50. BDM International**

## CONTRACTORS WITH $\geq$ 5% OF CONTRACT VALUE

### Abrams

Allison Transmission:  
Indianapolis, IN  
General Dynamics: Tallahassee, FL;  
Muskegon, MI; Warren, MI;  
Sterling Heights, MI; Lima, OH;  
Scranton, PA  
LTICO: Idaho Falls, ID  
Texas Instruments: Dallas, TX

### Advanced Field Artillery Tactical Data System (AFATDS)

GTE: Taunton, MA  
Litton: San Diego, CA  
Raytheon Systems Company:  
Fort Wayne, IN

### Advanced Quick Fix (AQF)

Lockheed Martin: Owego, NY

### Advanced Tank Armament System (ATAS)

General Dynamics:  
Sterling Heights, MI  
Raytheon (TI) Systems: Plano, TX  
Rheinmetall: Ratingen, GE

### Air/Missile Defense Planning and Control System (AMDPCS) (WRAP Candidate)

APC: Austin, TX  
Brown International: Huntsville, AL  
FAAD C2 (TRW): Huntsville, AL  
JLENS (Raytheon): Bedford, MA  
PATRIOT (Intergraph): Huntsville, AL  
THAAD (Lockheed/Martin):  
Sunnyvale, CA

### Airborne Reconnaissance Low (ARL)

California Microwave:  
Belcamp, MD  
TRW: Sunnyvale, CA

### All Source Analysis System (ASAS)

BDM: McLean, VA  
Electronic Warfare Associates:  
Herndon, VA  
Lockheed Martin: Littleton, CO  
Logicon Inc.: Arlington, VA  
MANTECH: Killeen, TX  
MITRE: McLean, VA

Sterling Software, Inc.: Vienna, VA  
Sytek: McLean, VA

### Analysis and Control Team (ACT) Enclave (WRAP Candidate)

To be determined.

### Apache Longbow

AlliedSignal: Teterboro, NJ  
Boeing: Mesa, AZ  
Lockheed Martin: Orlando, FL  
Northrop Grumman:  
Baltimore, MD; Linthicum, MD  
SCI Technologies: Huntsville, AL

### Armored Security Vehicle (ASV)

Cummins: Columbus, NJ;  
Rockwell, NJ  
Textron (Marine and Land Systems Division): New Orleans, LA

### Army Airborne Command and Control System (A2C2S)

To be determined.

### Army Data Distribution System (ADDS)-EPLRS/NTDRS

ITT (NTDRS): Fort Wayne, IN;  
Clifton, NJ  
Raytheon (EPLRS): Fullerton, CA;  
Ft Wayne, IN; Forest, MS

### Army Data Distribution System (ADDS)-JTIDS/MIDS

GEC-Marconi Hazeltine (JTIDS):  
Wayne, NJ  
MIDSCO (MIDS): Fairfield, NJ—consisting of GEC-Marconi Hazeltine (USA), Thomson-CSF (France), Italtel (Italy), Siemens (Germany), Enosa (Spain)

### Army Key Management System (AKMS)

AlliedSignal Corp.  
L3: Camden, NJ  
Group Technologies, Inc.:  
Tampa, FL

### Army Tactical Missile System (ATACMS) Block I/IA

Atlantic Research: Camden, AR

B.F. Goodrich Aerospace:  
Cedar Knolls, NJ  
Honeywell, Inc.: Clearwater, FL;  
Minneapolis, MN  
Lockheed Martin Vought Systems Corporation: Dallas, TX;  
Horizon City, TX

### Army Tactical Missile System (ATACMS) Block II/IA

Ball Telecommunications:  
Westminster, CO  
B.F. Goodrich Aerospace: Cedar Knolls, NJ  
Honeywell, Inc.: Clearwater, FL;  
Minneapolis, MN  
Lockheed Martin Vought Systems Corporation: Dallas, TX;  
Horizon City, TX  
Talley Defense Systems: Mesa, AZ

### Automatic Chemical Agent Detector/Alarm (ACADA)

Graseby Dynamics: Watford, U.K.

### Avenger

AM General: South Bend, IN  
Boeing: Huntsville, AL  
Klune: Spanish Fork, UT  
Litton Data: San Diego, CA  
Raytheon: Dallas, TX

### Battlefield Combat Identification System (BCIS)

EMS: Atlanta, GA  
General Dynamics:  
Sterling Heights, MI  
Raytheon: Fort Wayne, IN  
TRW: Redondo Beach, CA  
United Defense L.P.: San Jose, CA

### Biological Vaccine Program/Joint Vaccine Acquisition Program (JVAP)

DynPort LLC: Reston, VA

### Black Hawk

DOW-UT: Tallassee, AL  
General Electric: Lynn, MA  
United Technologies: Stratford, CT

### Bradley M2 Infantry/M3 Cavalry Fighting Vehicle (IFV/CFV)

General Dynamics:  
Sterling Heights, MI  
NEWCO: LaGrange, GA  
Orbital Science; Fairchild Defense:  
Germantown, MD  
Raytheon: McKinney, TX  
United Defense L.P.: San Jose, CA;  
York, PA; Rosslyn, VA

### Bradley Fire Support Team (BFIST) Vehicle

United Defense L.P.: San Jose, CA;  
Rosslyn, VA  
Systems Electronics: St. Louis, MO

### Bradley Linebacker

Boeing: United Defense L.P.:  
York, PA

### Brilliant Anti-Armor Submunition (BAT)

AlliedSignal: Cheshire, CT;  
Teterboro, NJ  
Alliant Techsystems: Hopkins, MN  
Northrop Grumman:  
Huntsville, AL; Hawthorne, CA;  
Rolling Meadows, IL;  
Baltimore, MD  
Physics International:  
San Leandro, CA  
Pioneer: South Windsor, CT  
Primex: San Leandro, CA  
Raytheon: Andover, MA

### CH-47 Chinook/Improved Cargo Helicopter (ICH)

Allied Signal: Phoenix, AZ  
Boeing: Philadelphia, PA  
Rockwell Collins: Cedar Rapids, IA

### Close Combat Tactical Trainer (CCTT)

ECC International: Orlando, FL  
Evans & Sutherland:  
Salt Lake City, UT  
Lockheed Martin: Orlando, FL  
Pulau Electronics: Orlando, FL

### Comanche

Allied Signal: Phoenix, AZ  
Boeing: Philadelphia, PA

Harris: Melbourne, FL  
Light Helicopter Turbine Engine Company: Indianapolis, IN  
Lockheed Martin: Orlando, FL  
Rolls Royce/Allison Engine: Indianapolis, IN  
Sikorsky: Stratford, CT  
TRW: San Diego, CA

#### **Combat Identification for the Dismounted Soldier (CIDDS)**

Lockheed Martin: Pomona, CA  
Motorola: Scottsdale, AZ  
Raytheon: El Segundo, CA

#### **Combat Service Support Control System (CSSCS)**

GTE: Taunton, MA  
Lockheed Martin: Springfield, VA  
TRW: Carson, CA

#### **Combat Synthetic Training Assessment Range (CSTAR)**

Motorola (Systems Solutions Group): Scottsdale, AZ  
Sterling Software Inc. (Federal Systems Group): McLean, VA

#### **Command and Control Vehicle (C2V)**

Airflow: Fredericktown, MD  
Brunswick: DeLand, FL  
Cummins Engine: Columbus, IN  
Lockheed Martin: San Jose, CA  
United Defense L.P.: San Jose, CA; York, PA; Rosslyn, VA

#### **Common Hardware Systems (CHS)**

GTE: Taunton, MA  
Litton: San Diego, CA

#### **Counter Intelligence/Human Intelligence (CI/HUMINT) Automated Tools Set (CHATS)**

Engineering Systems Solutions, Inc.: Frederick, MD  
Logicon, Inc.: Arlington, VA  
Sterling Software, Inc.: Vienna, VA  
Sytex: McLean, VA

#### **Crusader**

EDS: Herndon, VA  
United Defense, L.P.: Minneapolis, MN  
General Dynamics: Pittsfield, MA; Sterling Heights, MI; Burlington, VT  
Honeywell: Minneapolis, MN

#### **Deployable Medical Systems (DEPMEDS)**

Brunswick: Marion, VA  
CG Manufacturing: AZ  
Defense Logistics Agency: Ogden, UT  
Protocol: Beaverton, OR  
Rock Island Arsenal: Rock Island, IL

#### **Digital Topographic Support System (DTSS) (WRAP Candidate)**

Litton TASC, Inc.: Reston, VA  
SYTEX Corp.: McLean, VA  
MITRE Corp.: McLean, VA  
MANTECH Corp.: Copperas Cove, TX  
ILEX Corp.: Sierra Vista, AZ

#### **Driver's Vision Enhancer (DVE)**

Raytheon: Dallas, TX  
Litton Data Systems: San Diego, CA

#### **Extended Range Multiple Launch Rocket System (ER-MLRS)**

Atlantic Research: Camden, AR  
KDI: Cincinnati, OH  
Lockheed Martin Vought Systems: Camden, AR; Dallas, TX

#### **Family of Medium Tactical Vehicles (FMTV)**

Allison: Indianapolis, IN  
Caterpillar: Peoria, IL; Greenville, SC  
DW Industries: Houston, TX  
McLaughlin: Moline, IL  
Michelin: Nova Scotia, Canada  
Meritor: Newark, OH  
Scott Manufacturing: Lubbock, TX  
Stewart & Stevenson Services: Houston, TX

#### **Firefinder (TPQ-36 and TPQ-37/ Block II)**

Raytheon: El Segundo, CA

#### **Force Provider (FP)**

DoD Depot Atlanta: Atlanta, GA  
UNICOR: Lompoc, CA  
WESTAR Corp.: St. Louis, MO

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

Raytheon: El Segundo, CA  
TRW: Carson, CA

#### **Forward Area Air Defense Command, Control and Intelligence (FAADC2I)**

TRW: Redondo Beach, CA

#### **Forward Repair System-Heavy (FRS-H) (WRAP Candidate)**

Rock Island Arsenal: Rock Island, IL

#### **Global Command and Control System-Army (GCCS-A)**

GTE: Taunton, MA  
Lockheed Martin: Springfield, VA  
SAIC: Springfield, VA  
Statistica: Springfield, VA  
WANG: Springfield, VA

#### **Grenadier Beyond Line-of-Sight Reporting (BRAT) (GB) (WRAP Candidate)**

Classified

#### **Grizzly**

United Defense, L.P.: York, PA

#### **Ground-Based Common Sensor (GBCS)**

Lockheed Martin: Owego, NY  
Sanders: Nashua, NH

#### **Guardrail/Common Sensor (GR/CS)**

IBM: Owego, NY  
Raytheon: Wichita, KS  
TRW: Sunnyvale, CA  
L3COM: Salt Lake City, UT

#### **Guided Multiple Launch Rocket System (GMLRS)**

Lockheed Martin Vought Systems: Camden, AR; Dallas, TX

#### **Heavy Equipment Transporter System (HETS)**

Oshkosh Truck: Oshkosh, WI  
Systems and Electronics: St. Louis, MO

#### **High Energy Laser System Test Facility (HELSTF)**

Aerotherm Corporation: Las Cruces, NM  
Mevatec Corporation: Las Cruces, NM  
Raytheon Systems Company: Las Cruces, NM

#### **Hercules**

United Defense, L.P.: York, PA

#### **High Mobility Artillery Rocket System (HIMARS)**

Lockheed Martin Vought Systems: Camden, AR; Dallas, TX

#### **High Mobility Multipurpose Wheeled Vehicle (HMMWV)**

AM General: Mishawaka, IN; South Bend, IN  
Dana: Ft. Wayne, IN; Querataro, Mexico  
Defiance: Defiance, OH  
General Motors: Ypsilanti, MI; Moraine, OH  
Goodyear: Gadsen, AL  
Hayes: Akron, OH  
New Venture: East Syracuse, NY  
O'Gara, Hess and Eisenhardt: Fairfield, OH  
South Bend Stampings: South Bend, IN

#### **High Speed Multiplexer Cards (HSMUX) (WRAP Candidate)**

GTE: Taunton, MA

#### **Hornet**

Textron: (Textron Systems Division) Wilmington, MA

## **HYDRA 70 Rocket System**

Alliant Techsystems: Radford, VA  
 CMS: Tampa, FL  
 Defense Research: Anniston, AL  
 General Dynamics: Burlington, VT  
 Hi-Tech: Camden, AR  
 Radford Army Ammunition Plant: Radford, VA

## **Improved Chemical Agent Monitor (ICAM)**

Intellitec Division: DeLand, FL

## **Inland Petroleum Distribution System (IPDS)**

Radian: Alexandria, VA

## **Integrated Family of Test Equipment (IFTE)**

Northrop Grumman: (BSTF/CEE/EOTF)  
 Rolling Meadows, IL  
 Mitlope (SPORT): Hope Hull, AL  
 Tec-Masters (ERS): Huntsville, AL

## **Integrated Meteorological System (IMETS)**

Logicon: Arlington, VA; Tacoma, WA  
 Sytex: McLean, VA

## **Integrated System Control (ISYSCON)**

ACSI: Burlington, MA  
 BBN Systems and Technologies: Cambridge, MA  
 GTE: Taunton, MA; Raleigh, NC  
 TRW: Carson, CA

## **Javelin**

ECC International: Orlando, FL  
 Lockheed Martin: Orlando, FL  
 Motorola: Scottsdale, AZ  
 Parker Abex/National Water Lift: Dublin, GA  
 Raytheon Texas Instruments Systems: Lewisville, TX  
 Santa Barbara Research Center: Goleta, CA

## **Joint Biological Point Detection System (JBPDs)**

Lockheed Martin Librascope: Glendale, CA

## **Joint Collection Management Tools (JCMT)**

Logicon Inc.: Arlington, VA  
 MITRE: McLean, VA  
 Sytex: McLean, VA  
 TRW: Fair Lakes, VA

## **Joint LACMD Elevated Netted Sensors Systems (JLENS)**

CAS: Huntsville, AL  
 Raytheon: El Segundo, CA; Bedford, MA  
 TCOM, L.P.: Columbia, MD  
 TRW: San Bernardino, CA

## **Joint Service Lightweight Integrated Suit Technology (JSLIST)**

Battelle: Stafford, VA  
 Creative Apparel: Belfast, ME  
 Group Home Foundation: Belfast, ME  
 NCED: El Paso, TX  
 Trade Winds: Gary, IN

## **Joint Service Lightweight Stand-off Chemical Agent Detector (JSLCAD)**

Intellitec: Deland, FL

## **Joint Surveillance Target Attack Radar (Joint STARS) Common Ground Station (CGS)**

CUBIC Defense Systems: (Datalink) San Diego, CA  
 Motorola: (Common Ground Station) Scottsdale, AZ  
 Northrop-Grumman: (Aircraft) Melbourne, FL

## **Joint Tactical Ground Station (JTAGS)**

Datron: Simi Valley, CA  
 GenCorp: (Aerojet) Azusa, CA; Colorado Springs, CO  
 Gichner Systems Group: Dallastown, PA  
 Lockheed Martin: Sunnyvale, CA; Boulder, CO  
 MEVATECH: Huntsville, AL  
 Response Service and Innovation: Austin, TX  
 Silicon Graphics: Irvine, CA

## **Joint Tactical Terminal (JTT)**

Raytheon: St. Petersburg, FL

## **Joint Warning and Reporting Network (JWARN)**

Bruhn Newtech: Columbia, MD

## **Kiowa Warrior**

Allison Engines: Indianapolis, IN  
 Boeing: Monrovia, CA  
 Future Tech: Orlando, FL  
 Honeywell: Albuquerque, NM  
 Textron (Bell Helicopter): Fort Worth, TX

## **Land Warrior (LW)**

Battelle: Columbus, OH  
 GENTEX: Carbondale, PA  
 Honeywell: Minneapolis, MN  
 Raytheon: El Segundo, CA  
 Motorola: Scottsdale, AZ  
 OMEGA: Columbus, GA

## **Lightweight Laser Designator Rangefinder (LLDR)**

Cincinnati Electronics: Mason, OH  
 Litton: Apopka, FL  
 Motorola: Scottsdale, AZ

## **Line-of-Sight Anti-Tank (LOSAT)**

Alliant Tech: Cumberland, WV  
 ARC: Gainesville, VA  
 GEC Marconi: Norcross, GA  
 Honeywell: Minneapolis, MN  
 Lockheed Martin Vought Systems: Grand Prairie, TX  
 Raytheon: Dallas, TX

## **Long Range Advanced Scout Surveillance System (LRAS3)**

DRS Technology, Inc.: El Segundo, CA  
 Raytheon Texas Instruments Systems: McKinney, TX

## **Longbow HELLCIFIRE**

GEC-Marconi Hazeltine: Totowa, NJ  
 Lockheed Martin: Orlando, FL; Nashua, NH; Troy, AL  
 Northrop Grumman: Huntsville, AL; Baltimore, MD

## **M113 Family of Vehicles (FOV)**

Allison Transmission: Indianapolis, IN  
 Anniston Army Depot: Anniston, AL  
 Detroit Diesel: Detroit, MI  
 United Defense, L.P.: Anniston, AL

## **Maneuver Control System (MCS)**

CSC: Eatontown, NJ  
 GTE: Taunton, MA; (Telos)  
 Shrewsbury, NJ  
 Lockheed Martin: Tinton Falls, NJ  
 Mitre: Eatontown, NJ  
 Telos: Shrewsbury, NJ

## **Medium Extended Air Defense System (MEADS)**

The two international contractor teams competing during the PD-V Phase are:  
 MEADS Inc. (consortium consisting of U.S. contractor Raytheon Systems Co. (joint venture), and European contractors DASA (Germany), Siemens (Germany), and Alenia (Italy); and  
 MEADS International Inc. (consortium consisting of U.S. contractor Lockheed Martin Integrated Systems and the same three international contractors).

## **MILSATCOM**

Lincoln Labs: Lexington, MA  
 Raytheon: Fort Wayne, IN; Marlborough, MA; Reston, VA; Virginia Beach, VA  
 Rockwell Collins: Richardson, TX  
 S-TEL: Colorado Springs, CO  
 VIA SAT: Carlsbad, CA

## **Mortar (120 mm)**

AlliedSignal: Teterboro, NJ  
 GDOS: Burlington, VT  
 KDI: Cincinnati, OH  
 Milan Army Ammunition Plant: Milan, TN  
 Pocal Industries: Scranton, PA  
 Pine Bluff Arsenal: Pine Bluff, AK  
 Red River Army Depot: Texarkana, TX  
 SNC: Le Gardeur, Quebec, Canada

Valentec Systems: Mt. Arlington, NJ  
Watervliet Arsenal: Watervliet, NY

#### **Multiple Launch Rocket System (MLRS)**

AlliedSignal: Teterboro, NJ  
Harris: Melbourne, FL  
Lockheed Martin Vought Systems: Camden, AR; Dallas TX  
United Defense L.P.: York, PA

#### **Multi-Purpose Individual Munition/Short-Range Assault Weapon (MPIM/SRAW)**

Alliant: Rocket Center, WV  
GenCorp (Aerojet): Sacramento, CA; Socorro, NM  
Lockheed Martin: Orlando, FL;  
Syosset, NY; Archbald, PA

#### **National Missile Defense (NMD)**

Boeing North America: Seattle, WA  
Lockheed Martin: Sunnyvale, CA  
Raytheon: Bedford, MA  
TRW: Redondo Beach, CA

#### **NAVSTAR Global Positioning System (GPS)**

Rockwell Collins: Cedar Rapids, IA  
Rockwell International: Cedar Rapids, IA  
Trimble Navigation: Sunnyvale, CA; Austin, TX

#### **Night Vision (NV) Image Intensification (I2)**

Elbit Ltd: Haifa, Israel  
General Motors (Hughes Electronics): El Segundo, CA  
ITT: Roanoke, VA  
Litton Industries: Tempe, AZ; Garland, TX  
Lockheed Martin: Orlando, FL; (Lockheed-Sanders) Nashua, NH  
Phototelesis: San Antonio, TX  
Texas Instruments: McKinney, TX

#### **Nuclear, Biological, and Chemical Reconnaissance System (NBCRS)-FOX**

General Dynamics (Land Systems Division): Warren, MI  
Henschel: Germany

#### **Paladin**

Camber: Mt. Arlington, NJ  
Honeywell: St. Petersburg, FL  
Letterkenny Army Depot: Chambersburg, PA  
Sechan Electronics: Littiz, PA  
United Defense, L.P.: Chambersburg, PA; York, PA  
Watervliet Arsenal: Watervliet, NY

#### **Palletized Load System (PLS)**

ARINC: Colorado Springs, CO  
Hyundai Precision America: San Diego, CA  
Oshkosh Truck: Bradenton, FL; Oshkosh, WI  
Summa Technologies: Huntsville, AL

#### **Patriot**

Atlantic Research: Camden, AK; Gainesville, VA  
GTE: Taunton, MA  
Honeywell: Clearwater, FL; Minneapolis, MN  
Hughes Aircraft: Torrance, CA  
J.L. Rust: Albuquerque, NM  
LITTON: Williamsport, PA  
Lockheed Martin Vought Systems: Grand Prairie, TX  
Lockheed/Sanders: Merrimack, NH  
Mountaingale: Reno, NV  
Parsvant: Melbourne, FL  
Raytheon: Bedford, MA  
Rockwell: Duluth, GA  
SCI Systems: Huntsville, AL

#### **Protective Masks**

Campbell Plastics: Corona, CA  
ILC Dover: Frederica, DE  
Mine Safety Appliance: Pittsburgh, PA  
TSI: St. Paul, MN

#### **Reverse Osmosis Water Purification Unit (ROWPU)**

KECO Industries: Florence, KY

#### **Second Generation Forward Looking Infrared (FLIR)**

DRS Technology, Inc.: El Segundo, CA; Palm Bay, FL  
Raytheon TI Systems: McKinney, TX

#### **Selectable Lightweight Attack Munition (SLAM)**

Alliant Techsystems: Minneapolis, MN; Janesville, WI  
AMI Guld: Pocatello, ID  
Eagle Pitcher: Joplin, MO  
Injectamax: Escondido, CA  
Ironwood Plastics: Ironwood, MI  
Statek: Orange, CA  
Team Vantage: Minneapolis, MN  
Texas Instruments: Midland, TX

#### **Sense and Destroy Armor (SADARM)**

Alliant Techsystems: Hopkins, MN  
Alpha Industries: Woburn, MA  
Chamberlain: Scranton, PA  
GenCorp Aerojet: Azusa, CA  
LITTON: Tempe, AZ  
Teledyne: Los Angeles, CA

#### **Sentinel**

Raytheon: El Segundo, CA; Forrest, MS

#### **Single Channel Ground and Airborne Radio System (SINCGARS)**

Engineering and Professional Services Inc.: Eatontown, NJ  
General Dynamics: Tallahassee, FL  
International Telephone and Telegraph: Ft. Wayne, IN  
Nations, Inc.: Eatontown, NJ

#### **Small Arms (M4 Carbine)**

Colt's Manufacturing: Hartford, CT

#### **Small Arms (M16A4 Rifle)**

Colt's Manufacturing: Hartford, CT  
FN Manufacturing: Columbia, SC

#### **Small Arms (M240B Medium Machine Gun)**

FN Manufacturing: Columbia, SC

#### **Small Arms (M249 Squad Automatic Weapon)**

FN Manufacturing: Columbia, SC

#### **Small Arms (MK-19-3 40 mm Automatic Grenade Launcher)**

Saco Defense: Saco, ME

#### **Smoke Generator (M56 Coyote)**

Robotic Systems Technology: Westminster, MD  
Raytheon: Dallas, TX

#### **Smoke Generator (M58 Wolf)**

Anniston Army Depot: Anniston, AL  
Robotic Systems Technology: Westminster, MD  
Raytheon: Dallas, TX

#### **Soldier Support Systems**

Camel Manufacturing Company: Caryville, TN  
Guild Associates: Dublin, OH  
Irvin Industries: Hope Mills, NC

#### **Standard Army Management Information Systems (STAMIS)**

Computer Sciences Corp.: Moorestown, NJ  
Lockheed Martin: Bethesda, MD  
EDS: Fort Knox, KY  
GRCI: Tyson's Corner, VA

#### **Standardized Integrated Command Post System (SICPS)**

FMC (United Defense, L.P.): San Jose, CA  
Gichner Systems Group: Dallastown, PA  
RDA: Tacoma, WA

#### **Stinger**

Circuits Processing Technology: Oceanside, CA  
DJ Industries: Anaheim, CA  
Eagle Pitcher Industries: Joplin, MO  
Honeywell: Minneapolis, MN  
ITRI: Huntsville, AL  
Nichols Research, Inc.: Huntsville, AL  
Raytheon: Tucson, AZ; Andover, MA; Farmington, NM; Austin, TX

# Weapon Systems Contractors by System

Spectrum Control, Inc.: Tucson, AZ  
Waltco Engineering: Gardena, CA

**Striker**  
Systems and Electronics Inc (SEI)

**Tactical Endurance Synthetic Aperture Radar (TESAR)**

Northrop Grumman:  
Baltimore, MD

**Tactical Exploitation System (TES)**

Classified

**Tactical High Energy Laser (THEL)**

TRW: Redondo Beach, CA

**Tactical Operations Centers (TOCs)**

To be determined.

**Tactical Quiet Generators (TQG)**

Dewey Electronics: Oakton, NJ  
Fermont: Bridgeport, CT  
Goodman Ball: Menlo Park, CA  
KECO Industries: Florence, KY  
MCII: Dallas, TX  
Radian: Alexandria, VA

**Tactical Simulation Interface Unit (TSIU) (WRAP Candidate)**

Coleman Research Corporation:  
Huntsville, AL  
Space and Missile Defense Battle Lab (SMDBL): Huntsville AL

**Tactical Unmanned Aerial Vehicle (TUAV)**

To be determined.

**Tank Main Gun Ammunition**

Alliant Techsystems: (XM1007)  
Clearwater, FL; (M830A1,  
M829E3) Hopkins, MN  
Primex: (M829A2, M830)  
St. Petersburg, FL

**Theater High Altitude Area Defense (THAAD) System**

CRC: Huntsville, AL  
LITTON Data Systems:  
Agoura Hills, CA  
Lockheed Martin: Huntsville, AL;  
Sunnyvale, CA; White Sands, NM  
Loral IRS: Lexington, MA  
Raytheon: Bedford, MA;  
Waltham, MA  
TRW: Redondo Beach, CA

**Thermal Weapon Sight (TWS)**

Aeroflex: Farmingdale, NY  
Eclan: Midland, Ontario, Canada  
Hughes: Newport Beach, CA  
Hughes Packard Electric, Inc.:  
Irvine, CA  
Raytheon: Santa Barbara, CA;  
Dallas, TX  
SMTEK: Newbury Park, CA  
Zeiss Eltro Optronic:  
Oberkochen, Germany

**TOW Improved Target Acquisition System (ITAS)**

Cercon: Hillsboro, TX  
DY4 Systems: Ontario, Canada  
VARO: Garland, TX  
Loral: Syosset, NY  
DRS: Melbourne, FL  
Santa Barbara Research Center:  
Goleta, CA  
Raytheon Systems Co.:  
McKinney, TX

**Warfighter Information Network-Terrestrial (WIN-T) Switches**

GTE: Taunton, MA

**Warfighter Information Network-Terrestrial (WIN-T) Tech Insertion**

Canadian Marconi Company  
(HCLOS): Ville Saint-Laurent,  
Quebec, Canada  
GTE (ATM): Taunton, MA

**Wolverine**

General Dynamics (Land Systems Division): Lima, OH;  
Sterling Heights, MI  
MAN GHH: Dusseldorf, Germany

**XM777 Lightweight 155mm Howitzer (LW155)**

Vickers Shipbuilding & Engineering, Ltd: U.K.

**XM982 155mm Extended Range Artillery Projectile Family**

AlliedSignal: Redmond, WA  
IEC: Anaheim, CA  
Primex Aerospace: Redmond, WA  
Raytheon: Lewisville, TX



## CONTRACTORS WITH $\geq 5\%$ OF CONTRACT VALUE

### ALABAMA

**Air/Missile Defense Planning and Control System**

Brown International: Huntsville, AL  
TRW: Huntsville, AL  
Intergraph: Huntsville, AL

**Apache Longbow**

SCI Technologies: Huntsville, AL

**Avenger**

Boeing: Huntsville, AL

**Black Hawk**

DOW-UT: Tallassee, AL

**Brilliant Anti-Armor Submunition (BAT)**

Northrop Grumman: Huntsville, AL

**High Mobility Multipurpose Wheeled Vehicle (HMMWV)**

Goodyear: Gadsen, AL

**HYDRA 70 Rocket System**

Defense Research: Anniston, AL

**Integrated Family of Test Equipment (IFTE)**

Miltope (SPORT): Hope Hull, AL  
Tec-Masters (ERS): Huntsville, AL

**Joint LACMD Elevated Netted Sensors Systems (JLENS)**

CAS: Huntsville, AL

**Joint Tactical Ground Station (JTGS)**

MEVATECH: Huntsville, AL

**Longbow HELLCIFIRE**

Lockheed Martin: Troy, AL  
Northrop Grumman: Huntsville, AL

**M113 Family of Vehicles (FOV)**

Anniston Army Depot:  
Anniston, AL  
United Defense, L.P.: Anniston, AL

**Palletized Load System (PLS)**

Summa Technologies:  
Huntsville, AL

**Patriot**

SCI Systems: Huntsville, AL

**Smoke Generator (M58 Wolf)**

Anniston Army Depot:  
Anniston, AL

**Stinger**

IITRI: Huntsville, AL  
Nichols Research, Inc.:  
Huntsville, AL

**Tactical Simulation Interface Unit (TSIU)**

Coleman Research Corporation:  
Huntsville, AL  
Space and Missile Defense Battle Lab (SMDBL): Huntsville AL

**Theater High Altitude Area Defense (THAAD) System**

Coleman Research Corporation:  
Huntsville, AL  
Lockheed Martin: Huntsville, AL

### ARIZONA

**Apache Longbow**

Boeing: Mesa, AZ

**Army Tactical Missile System (ATACMS) Block II/IIA**

Talley Defense Systems: Mesa, AZ

**CH-47 Chinook/Improved Cargo Helicopter (ICH)**

AlliedSignal: Phoenix, AZ

**Comanche**

AlliedSignal: Phoenix, AZ

**Combat Identification for the Dismounted Soldier (CIDDS)**

Motorola: Scottsdale, AZ

**Combat Synthetic Training Assessment Range (CSTAR)**

Motorola: Scottsdale, AZ

**Deployable Medical Systems (DEPMEDS)**

CG Manufacturing: AZ

**Digital Topographic Support System (DTSS)**

ILEX Corp.: Sierra Vista, AZ

**Javelin**

Motorola: Scottsdale, AZ

**Joint Surveillance Target Attack Radar (Joint STARS) Common Ground Station (CGS)**

Motorola (Common Ground Station): Scottsdale, AZ

**Land Warrior (LW)**

Motorola: Scottsdale, AZ

**Lightweight Laser Designator Rangefinder (LLDR)**

Motorola: Scottsdale, AZ

**Night Vision (NV) Image Intensification (I2)**

Litton Industries: Tempe, AZ

**Sense and Destroy Armor (SADARM)**

Litton Industries: Tempe, AZ

**Stinger**

Raytheon: Tucson, AZ  
Spectrum Control, Inc.: Tucson, AZ

### ARKANSAS

**Army Tactical Missile System (ATACMS) Block I/IA**

Atlantic Research: Camden, AR

**Extended Range Multiple Launch Rocket System (ER-MLRS)**

Lockheed Martin Vought Systems:  
Camden, AR

**Guided Multiple Launch Rocket System (GMLRS)**

Lockheed Martin Vought Systems:  
Camden, AR

**High Mobility Artillery Rocket System (HIMARS)**

Lockheed Martin Vought Systems:  
Camden, AR

**HYDRA 70 Rocket System**

Hi-Tech: Camden, AR

**Mortar (120 mm)**

Pine Bluff Arsenal: Pine Bluff, AR

**Multiple Launch Rocket System (MLRS)**

Atlantic Research: Camden, AR  
Lockheed Martin Vought Systems:  
Camden, AR

**Patriot**

Atlantic Research: Camden, AR

### CALIFORNIA

**Advanced Field Artillery Tactical Data System (AFATDS)**

Litton: San Diego, CA

**Air/Missile Defense Planning and Control System**

Lockheed/Martin: Sunnyvale, CA

**Airborne Reconnaissance Low (ARL)**

TRW: Sunnyvale, CA

**Army Data Distribution System (ADDS)-EPLRS/NTDRS**

Raytheon (EPLRS): Fullerton, CA

**Avenger**

Litton Data: San Diego, CA

**Battlefield Combat Identification System (BCIS)**

TRW: Redondo Beach, CA  
United Defense, L.P.: San Jose, CA

**Bradley M2 Infantry/M3 Cavalry Fighting Vehicle (IFV/CFV)**

United Defense, L.P.: San Jose, CA

<b>Bradley Fire Support Team (BFIST) Vehicle</b> United Defense, L.P.: San Jose, CA	<b>Guardrail/Common Sensor (GR/CS)</b> TRW: Sunnyvale, CA	<b>Multi-Purpose Individual Munition/Short-Range Assault Weapon (MPIM/SRAW)</b> GenCorp (Aerojet): Sacramento, CA	<b>Stinger</b> Circuits Processing Technology: Oceanside, CA DJ Industries: Anaheim, CA Waltco Engineering: Gardena, CA
<b>Brilliant Anti-Armor Submunition (BAT)</b> Northrop Grumman: Hawthorne, CA Physics International: San Leandro, CA Primex: San Leandro, CA	<b>Integrated System Control (ISYSCON)</b> TRW: Carson, CA	<b>National Missile Defense (NMD)</b> Lockheed Martin: Sunnyvale, CA TRW: Redondo Beach, CA	<b>Tactical High Energy Laser (THEL)</b> TRW: Redondo Beach, CA
<b>Comanche</b> TRW: San Diego, CA	<b>Javelin</b> Santa Barbara Research Center: Goleta, CA	<b>NAVSTAR Global Positioning System (GPS)</b> Trimble Navigation: Sunnyvale, CA	<b>Tactical Quiet Generators (TQG)</b> Goodman Ball: Menlo Park, CA
<b>Combat Identification for the Dismounted Soldier (CIDDS)</b> Lockheed Martin: Pomona, CA Raytheon: El Segundo, CA	<b>Joint Biological Point Detection System (JBPDs)</b> Lockheed Martin Librascope: Glendale, CA	<b>Night Vision (NV) Image Intensification (I2)</b> General Motors (Hughes Electronics): El Segundo, CA	<b>Theater High Altitude Area Defense (THAAD) System</b> Litton Data Systems: Agoura Hills, CA Lockheed Martin: Sunnyvale, CA TRW: Redondo Beach, CA
<b>Combat Service Support Control System (CSSCS)</b> TRW: Carson, CA	<b>Joint LACMD Elevated Netted Sensors Systems (JLENS)</b> Raytheon: El Segundo, CA TRW: San Bernardino, CA	<b>Palletized Load System (PLS)</b> Hyundai Precision America: San Diego, CA	<b>Thermal Weapon Sight (TWS)</b> Hughes: Newport Beach, CA Hughes Packard Electric, Inc.: Irvine, CA Raytheon: Santa Barbara, CA SMTEK: Newbury Park, CA
<b>Command and Control Vehicle (C2V)</b> Lockheed Martin: San Jose, CA United Defense, L.P.: San Jose, CA	<b>Joint Surveillance Target Attack Radar (Joint STARS) Common Ground Station (CGS)</b> CUBIC Defense Systems (Datalink): San Diego, CA	<b>Patriot</b> Hughes Aircraft: Torrance, CA	<b>TOW Improved Target Acquisition System (ITAS)</b> Santa Barbara Research Center: Goleta, CA
<b>Driver's Vision Enhancer (DVE)</b> Litton Data Systems: San Diego, CA	<b>Joint Tactical Ground Station (JTAGS)</b> Datron: Simi Valley, CA Lockheed Martin: Sunnyvale, CA GenCorp (Aerojet): Azusa, CA Silicon Graphics: Irvine, CA	<b>Protective Masks</b> Campbell Plastics: Corona, CA	<b>XM982 155mm Extended Range Artillery Projectile Family</b> IEC: Anaheim, CA
<b>Firefinder (TPQ-36 and TPQ-37 Block II)</b> Raytheon: El Segundo, CA	<b>Kiowa Warrior</b> Boeing: Monrovia, CA	<b>Second Generation Forward Looking Infrared (FLIR)</b> DRS Technology, Inc.: El Segundo, CA	<b>COLORADO</b>
<b>Force Provider (FP)</b> UNICOR: Lompoc, CA	<b>Land Warrior (LW)</b> Raytheon: El Segundo, CA	<b>Selectable Lightweight Attack Munition (SLAM)</b> Injectamax: Escondido, CA Statek: Orange, CA	<b>All Source Analysis System (ASAS)</b> Lockheed Martin: Littleton, CO
<b>Force XXI Battle Command Brigade-and-Below (FBCB2)</b> Raytheon: El Segundo, CA TRW: Carson, CA	<b>Long Range Advanced Scout Surveillance System (LRAS3)</b> DRS Technology, Inc.: El Segundo, CA	<b>Sense and Destroy Armor (SADARM)</b> GenCorp Aerojet: Azusa, CA Teledyne: Los Angeles, CA	<b>Army Tactical Missile System (ATACMS) Block II/IIA</b> Ball Telecommunications: Westminster, CO
<b>Forward Area Air Defense Command, Control and Intelligence (FAADC2I)</b> TRW: Redondo Beach, CA	<b>MILSATCOM</b> VIA SAT: Carlsbad, CA	<b>Standardized Integrated Command Post System (SICPS)</b> United Defense, L.P.: San Jose, CA	
	<b>Multiple Launch Rocket System (MLRS)</b> Atlantic Research: Los Angeles, CA		

# Weapon Systems Contractors by State

## **Joint Tactical Ground Station (JTGS)**

GenCorp (Aerojet): Colorado Springs, CO  
Lockheed Martin: Boulder, CO

## **MILSATCOM**

S-TEL: Colorado Springs, CO

## **Palletized Load System (PLS)**

ARINC: Colorado Springs, CO

## **CONNECTICUT**

### **Black Hawk**

United Technologies: Stratford, CT

### **Brilliant Anti-Armor Submunition (BAT)**

AlliedSignal: Cheshire, CT  
Pioneer: South Windsor, CT

### **Comanche**

Sikorsky: Stratford, CT  
Line-of-Sight Antitank (LOSAT)  
AlliedSignal: Cheshire, CT

### **Small Arms (M4 Carbine)**

Colt's Manufacturing: Hartford, CT

### **Small Arms (M16A4 Rifle)**

Colt's Manufacturing: Hartford, CT

### **Tactical Quiet Generators (TQG)**

Fermont: Bridgeport, CT

## **DELAWARE**

### **Protective Masks**

ILC Dover: Frederica, DE

## **FLORIDA**

### **Abrams**

General Dynamics: Tallahassee, FL

### **Apache Longbow**

Lockheed Martin: Orlando, FL

## **Army Key Management System (AKMS)**

Group Technologies, Inc.: Tampa, FL

## **Army Tactical Missile System (ATACMS) Block I/IA**

Honeywell, Inc.: Clearwater, FL

## **Close Combat Tactical Trainer (CCTT)**

ECC International: Orlando, FL  
Lockheed Martin: Orlando, FL  
Pulau Electronics: Orlando, FL

### **Comanche**

Harris: Melbourne, FL  
Lockheed Martin: Orlando, FL

## **Command and Control Vehicle (C2V)**

Brunswick: DeLand, FL

## **HYDRA 70 Rocket System**

CMS: Tampa, FL

## **Improved Chemical Agent Monitor (ICAM)**

Intellitec Division: DeLand, FL

### **Javelin**

ECC International: Orlando, FL  
Lockheed Martin: Orlando, FL

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

Intellitec: DeLand, FL

## **Joint Surveillance Target Attack Radar (Joint STARS) Common Ground Station (CGS)**

Northrop-Grumman (Aircraft): Melbourne, FL

## **Joint Tactical Terminal (JTT)**

Raytheon: St. Petersburg, FL

### **Kiowa Warrior**

Future Tech: Orlando, FL

## **Lightweight Laser Designator Rangefinder (LLDR)**

Litton: Apopka, FL

## **Longbow HELLMIRE**

Lockheed Martin: Orlando, FL

## **Multiple Launch Rocket System (MLRS)**

Harris: Melbourne, FL

## **Multi-Purpose Individual Munition/Short-Range Assault Weapon (MPIM/SRAW)**

Lockheed Martin: Orlando, FL

## **Night Vision (NV) Image Intensification (I2)**

Lockheed Martin: Orlando, FL

### **Paladin**

Honeywell: St. Petersburg, FL

## **Palletized Load System (PLS)**

Oshkosh Truck: Bradenton, FL

### **Patriot**

Honeywell: Clearwater, FL  
Parsvant: Melbourne, FL

## **Single Channel Ground and Airborne Radio System (SINCGARS)**

General Dynamics: Tallahassee, FL

## **Second Generation Forward Looking Infrared (FLIR)**

DRS Technology: Palm Bay, FL

## **Tank Main Gun Ammunition**

Alliant Techsystems (XM1007): Clearwater, FL  
Primex (M829A2, M830): St. Petersburg, FL

## **TOW Improved Target Acquisition System (ITAS)**

DRS: Melbourne, FL

## **GEORGIA**

### **Battlefield Combat Identification System (BCIS)**

EMS: Atlanta, GA

### **Bradley M2 Infantry/M3 Cavalry Fighting Vehicle (IFV/CFV)**

NEWCO: LaGrange, GA

### **Force Provider (FP)**

DoD Depot Atlanta: Atlanta, GA

### **Javelin**

Parker Abex/National Water Lift: Dublin, GA

### **Line-of-Sight Anti-Tank**

GEC Marconi: Norcross, GA

### **Longbow HELLMIRE**

Boeing: Duluth, GA

### **Patriot**

Rockwell: Duluth, GA

## **IDAHO**

### **Abrams**

LITCO: Idaho Falls, ID

### **Selectable Lightweight Attack Munition (SLAM)**

AMI Gould: Pocatello, ID

## **ILLINOIS**

### **Brilliant Anti-Armor Submunition (BAT)**

Northrop Grumman: Rolling Meadows, IL

### **Deployable Medical Systems (DEPMEDS)**

Rock Island Arsenal: Rock Island, IL

### **Family of Medium Tactical Vehicles (FMTV)**

Caterpillar: Peoria, IL  
McLaughlin: Moline, IL

<b>Forward Repair System-Heavy (FRS-H)</b> Rock Island Arsenal: Rock Island, IL	<b>High Mobility Multipurpose Wheeled Vehicle (HMMWV)</b> AM General: Mishawaka, IN; South Bend, IN Dana: Ft. Wayne, IN South Bend Stampings: South Bend, IN	<b>KENTUCKY</b> <b>Reverse Osmosis Water Purification Unit (ROWPU)</b> KECO Industries: Florence, KY	<b>Command and Control Vehicle (C2V)</b> Airflow: Fredericktown, MD
<b>Integrated Family of Test Equipment (IFTE)</b> Northrop Grumman (BSTF/CEE/EOTF): Rolling Meadows, IL	<b>Tactical Quiet Generators (TQG)</b> KECO Industries: Florence, KY	<b>LOUISIANA</b> <b>Armored Security Vehicle (ASV)</b> Textron: New Orleans, LA	<b>Counter Intelligence/Human Intelligence (CI/HUMINT) Automated Tools Set (CHATS)</b> Engineering Systems Solutions, Inc.: Frederick, MD
<b>INDIANA</b>	<b>Joint Service Lightweight Integrated Suit Technology (JSLIST)</b> Trade Winds: Gary, IN	<b>MAINE</b> <b>Joint Service Lightweight Integrated Suit Technology (JSLIST)</b> Creative Apparel: Belfast, ME Group Home Foundation: Belfast, ME	<b>Joint LACMD Elevated Netted Sensors Systems (JLENS)</b> TCOM, LP: Columbia, MD
<b>Abrams</b> Allison Transmission: Indianapolis, IN	<b>Kiowa Warrior</b> Allison Engines: Indianapolis, IN	<b>Single Channel Ground and Airborne Radio System (SINCGARS)</b> International Telephone and Telegraph: Ft. Wayne, IN	<b>Joint Warning and Reporting Network (JWARN)</b> Bruhn Newtech: Columbia, MD
<b>Advanced Field Artillery Tactical Data System (AFATDS)</b> Raytheon Systems Company: Fort Wayne, IN	<b>M113 Family of Vehicles (FOV)</b> Allison Transmission: Indianapolis, IN	<b>IOWA</b> <b>CH-47 Chinook/Improved Cargo Helicopter (ICH)</b> Rockwell Collins: Cedar Rapids, IA	<b>Longbow HELLFIRE</b> Northrup Grumman: Baltimore, MD
<b>Army Data Distribution System (ADDS)-EPLRS/NTDRS</b> ITT (NTDRS): Fort Wayne, IN Raytheon (EPLRS): Ft. Wayne, IN	<b>MILSATCOM</b> Raytheon: Fort Wayne, IN	<b>MARYLAND</b> <b>NAVSTAR Global Positioning System (GPS)</b> Rockwell Collins: Cedar Rapids, IA Rockwell International: Cedar Rapids, IA	<b>Smoke Generator (M56 Coyote)</b> Robotic Systems Technology: Westminster, MD
<b>Avenger</b> AM General: South Bend, IN	<b>IOWA</b>	<b>Airborne Reconnaissance Low (ARL)</b> California Microwave: Belcamp, MD	<b>Smoke Generator (M58 Wolf)</b> Robotic Systems Technology: Westminster, MD
<b>Battlefield Combat Identification System (BCIS)</b> Raytheon: Fort Wayne, IN	<b>CH-47 Chinook/Improved Cargo Helicopter (ICH)</b> Rockwell Collins: Cedar Rapids, IA	<b>Apache Longbow</b> Northrop Grumman: Baltimore, MD; Linthicum, MD	<b>Standard Army Management Information Systems (STAMIS)</b> Lockheed Martin: Bethesda, MD
<b>Comanche</b> Light Helicopter Turbine Engine Company: Indianapolis, IN Rolls Royce/Allison Engine: Indianapolis, IN	<b>NAVSTAR Global Positioning System (GPS)</b> Rockwell Collins: Cedar Rapids, IA Rockwell International: Cedar Rapids, IA	<b>Bradley M2 Infantry/M3 Cavalry Fighting Vehicle (IFV/CFV)</b> Orbital Science, Fairchild Defense: Germantown, MD	<b>Tactical Endurance Synthetic Aperture Radar (TESAR)</b> Northrop Grumman: Baltimore, MD
<b>Command and Control Vehicle (C2V)</b> Cummins Engine: Columbus, IN	<b>KANSAS</b> <b>Guardrail/Common Sensor (GR/CS)</b> Raytheon: Wichita, KS	<b>Brilliant Anti-Armor Submunition (BAT)</b> Northrop Grumman: Baltimore, MD	<b>MASSACHUSETTS</b> <b>Advanced Field Artillery Tactical Data System (AFATDS)</b> GTE: Taunton, MA
<b>Family of Medium Tactical Vehicles (FMTV)</b> Allison: Indianapolis, IN			

# Weapon Systems Contractors by State

## Air/Missile Defense Planning and Control System

Raytheon: Bedford, MA

## Black Hawk

General Electric: Lynn, MA

## Brilliant Anti-Armor Submunition (BAT)

Raytheon: Andover, MA

## Combat Service Support Control System (CSSCS)

GTE: Taunton, MA

## Crusader

General Dynamics: Pittsfield, MA

## Extended Range Multiple Launch Rocket System (ER-MLRS)

Raytheon: Tewksbury, MA

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

GTE: Taunton, MA

## High Speed Multiplexer Cards (HSMUX)

GTE: Taunton, MA

## Hornet

Textron (Textron Systems Division): Wilmington, MA

## Integrated System Control (ISYSCON)

ACSI: Burlington, MA  
BBN Systems and Technologies: Cambridge, MA  
GTE: Taunton, MA

## Joint LACMD Elevated Netted Sensors Systems (JLENS)

Raytheon: Bedford, MA

## Maneuver Control System (MCS)

GTE: Taunton, MA

## MILSATCOM

Lincoln Labs: Lexington, MA  
Raytheon: Marlborough, MA

## National Missile Defense (NMD)

Raytheon: Bedford, MA

## Patriot

GTE: Taunton, MA  
Raytheon: Bedford, MA

## Sense and Destroy Armor (SADARM)

Alpha Industries: Woburn, MA

## Stinger

Raytheon: Andover, MA

## Theater High Altitude Area Defense (THAAD) System

Loral IRS: Lexington, MA  
Raytheon: Bedford, MA; Waltham, MA

## Warfighter Information Network-Terrestrial (WIN-T) Switches

GTE: Taunton, MA

## Warfighter Information Network-Terrestrial (WIN-T) Technology Insertion

GTE (ATM): Taunton, MA

## MICHIGAN

### Abrams

General Dynamics: Muskegon, MI; Sterling Heights, MI; Warren, MI

## Advanced Tank Armament System (ATAS)

General Dynamics: Sterling Heights, MI

## Battlefield Combat Identification System (BCIS)

General Dynamics: Sterling Heights, MI

## Bradley M2 Infantry/M3 Cavalry Fighting Vehicle (IFV/CFV)

General Dynamics: Sterling Heights, MI

## Crusader

General Dynamics: Sterling Heights, MI

## M113 Family of Vehicles (FOV)

Detroit Diesel: Detroit, MI

## Nuclear, Biological, and Chemical Reconnaissance System (NBCRS)-FOX

General Dynamics: Warren, MI

## Selectable Lightweight Attack Munition (SLAM)

Ironwood Plastics: Ironwood, MI

## Wolverine

General Dynamics: Sterling Heights, MI

## MINNESOTA

## Army Tactical Missile System (ATACMS) Block I/IA

Honeywell, Inc.: Minneapolis, MN

## Army Tactical Missile System (ATACMS) Block II/IIA

Honeywell, Inc.: Clearwater, FL; Minneapolis, MN

## Brilliant Anti-Armor Submunition (BAT)

Alliant Techsystems: Hopkins, MN

## Crusader

Honeywell: Minneapolis, MN  
United Defense, L.P.: Minneapolis, MN

## Land Warrior (LW)

Honeywell: Minneapolis, MN

## Line-of-Sight Anti-Tank (LOSAT)

Honeywell: Minneapolis, MN

## Patriot

Honeywell: Minneapolis, MN

## Protective Masks

TSI: St. Paul, MN

## Selectable Lightweight Attack Munition (SLAM)

Alliant Techsystems: Minneapolis, MN  
Team Vantage: Minneapolis, MN

## Sense and Destroy Armor (SADARM)

Alliant Techsystems: Hopkins, MN

## Stinger

Honeywell: Minneapolis, MN

## Tank Main Gun Ammunition

Alliant Techsystems (M830A1, M829E3): Hopkins, MN

## MISSISSIPPI

## Army Data Distribution System (ADDS)-EPLRS/NTDRS

Raytheon (EPLRS): Forest, MS

## Multiple Launch Rocket System (MLRS)

Vickers: Jackson, MS

## Sentinel

Raytheon: El Segundo, CA; Forrest, MS

## MISSOURI

## Bradley Fire Support Team (BFIST) Vehicle

Systems Electronics: St. Louis, MO

## Heavy Equipment Transporter System (HETS)

Systems and Electronics: St. Louis, MO

## Force Provider (FP)

WESTAR Corp.: St. Louis, MO

## Selectable Lightweight Attack Munition (SLAM)

Eagle Pitcher: Joplin, MO

## Stinger

Eagle Picher Industries: Joplin, MO

<b>Striker</b> Systems and Electronics Inc. (SEI): St. Louis, MO	MIDSCO (MIDS): Fairfield, NJ—consisting of GEC-Marconi Hazeltine (USA), Thomson-CSF (France), ItalTEL (Italy), Siemens (Germany), Enosa (Spain)	<b>Standard Army Management Information Systems (STAMIS)</b> Computer Sciences Corp.: Moorestown, NJ	<b>High Mobility Multipurpose Wheeled Vehicle (HMMWV)</b> New Venture: East Syracuse, NY
<b>MONTANA</b> None			<b>Mortar (120 mm)</b> Watervliet Arsenal: Watervliet, NY
<b>NEBRASKA</b> None			<b>Multi-Purpose Individual Munition/Short-Range Assault Weapon (MPIM/SRAW)</b> Lockheed Martin: Syosset, NY
<b>NEVADA</b>			<b>Paladin</b> Watervliet Arsenal: Watervliet, NY
<b>Patriot</b> Mountaingale: Reno, NV			<b>Thermal Weapon Sight (TWS)</b> Aeroflex: Farmingdale, NY
<b>NEW HAMPSHIRE</b>			<b>TOW Improved Target Acquisition System (ITAS)</b> Loral: Syosset, NY
<b>Ground-Based Common Sensor (GBCS)</b> Sanders: Nashua, NH			<b>NORTH CAROLINA</b>
<b>Longbow HELLMATE</b> Lockheed Martin (Lockheed-Sanders): Nashua, NH			<b>Integrated System Control (ISYSCON)</b> GTE: Raleigh, NC
<b>Night Vision (NV) Image Intensification (I2)</b> Lockheed Martin (Lockheed-Sanders): Nashua, NH			<b>Soldier Support Systems</b> Irvin Industries: Hope Mills, NC
<b>Patriot</b> Lockheed/Sanders: Merrimack, NH			<b>OHIO</b>
<b>NEW JERSEY</b>			<b>Abrams</b> General Dynamics: Lima, OH
<b>Apache Longbow</b> AlliedSignal: Teterboro, NJ			<b>Extended Range Multiple Launch Rocket System (ER-MLRS)</b> KD: Cincinnati, OH
<b>Armored Security Vehicle (ASV)</b> Cummins: Columbus, NJ; Rockwell, NJ			<b>Family of Medium Tactical Vehicles (FMTV)</b> Meritor: Newark, OH
<b>Army Data Distribution System (ADDS)-EPLRS/NTDRS</b> ITT (NTDRS): Clifton, NJ			<b>High Mobility Multipurpose Wheeled Vehicle (HMMWV)</b> Defiance: Defiance, OH General Motors: Moraine, OH Hayes: Akron, OH
<b>Army Data Distribution System (ADDS)-JTIDS/MIDS</b> GEC-Marconi Hazeltine (JTIDS): Wayne, NJ			
	<b>Army Key Management System (AKMS)</b> L3: Camden, NJ	<b>Tactical Quiet Generators (TQG)</b> Dewey Electronics: Oakton, NJ	
	<b>Army Tactical Missile System (ATACMS) Block I/IA</b> B. F. Goodrich Aerospace: Cedar Knolls, NJ	<b>NEW MEXICO</b>	
	<b>Army Tactical Missile System (ATACMS) Block II/IIA</b> B. F. Goodrich Aerospace: Cedar Knolls, NJ	<b>High Energy Laser System Test Facility (HELSTF)</b> Aeroterm Corporation: Las Cruces, NM Mevatec Corporation: Las Cruces, NM Raytheon Systems Company: Las Cruces, NM	
	<b>Brilliant Anti-Armor Submunition (BAT)</b> AlliedSignal: Teterboro, NJ	<b>Kiowa Warrior</b> Honeywell: Albuquerque, NM	
	<b>Longbow HELLMATE</b> GEC-Marconi Hazeltine: Totowa, NJ	<b>Multi-Purpose Individual Munition/Short-Range Assault Weapon (MPIM/SRAW)</b> GenCorp (Aerojet): Socorro, NM	
	<b>Maneuver Control System (MCS)</b> CSC: Eatontown, NJ GTE (Telos): Shrewsbury, NJ Lockheed Martin: Tinton Falls, NJ Mitre: Eatontown, NJ Telos: Shrewsbury, NJ	<b>Patriot</b> J.L. Rust: Albuquerque, NM	
	<b>Mortar (120 mm)</b> AlliedSignal: Teterboro, NJ Valentec Systems: Mt. Arlington, NJ	<b>Stinger</b> Raytheon: Farmington, NM	
	<b>Multiple Launch Rocket System (MLRS)</b> AlliedSignal: Teterboro, NJ	<b>Theater High Altitude Area Defense (THAAD) System</b> Lockheed Martin: White Sands, NM	
	<b>Paladin</b> Camber: Mt. Arlington, NJ	<b>NEW YORK</b>	
	<b>Single Channel Ground and Airborne Radio System (SINCGARS)</b> Engineering and Professional Services Inc.: Eatontown, NJ Nations, Inc.: Eatontown, NJ	<b>Advanced Quick Fix (AQF)</b> Lockheed Martin: Owego, NY	
		<b>Ground-Based Common Sensor (GBCS)</b> Lockheed Martin: Owego, NY	
		<b>Guardrail/Common Sensor (GR/CS)</b> IBM: Owego, NY	

# Weapon Systems Contractors by State

O'Gara, Hess and Eisenhardt:  
Fairfield, OH

**Land Warrior (LW)**  
Battelle: Columbus, OH

**Lightweight Laser Designator Rangefinder (LLDR)**  
Cincinnati Electronics: Mason, OH

**Mortar (120 mm)**  
KDI: Cincinnati, OH

**Multiple Launch Rocket System (MLRS)**  
KDI: Cincinnati, OH

**Soldier Support Systems**  
Guild Associates: Dublin, OH

**Wolverine**  
General Dynamics: Lima, OH

## OREGON

**Deployable Medical Systems (DEPMEDS)**  
Protocol: Beaverton, OR

## PENNSYLVANIA

**Abrams**  
General Dynamics: Scranton, PA

**Bradley M2 Infantry/M3 Cavalry Fighting Vehicle (IFV/CFV)**  
United Defense, L.P.: York, PA

**Bradley Linebacker**  
United Defense, L.P.: York, PA

**CH-47 Chinook/Improved Cargo Helicopter (ICH)**  
Boeing: Philadelphia, PA

**Comanche**  
Boeing: Philadelphia, PA

**Command and Control Vehicle (C2V)**  
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)**  
Gichner Systems Group:  
Dallastown, PA

**Land Warrior (LW)**  
GENTEX: Carbondale, PA

**Mortar (120 mm)**  
Pocal Industries: Scranton, PA

**Multiple Launch Rocket System (MLRS)**  
United Defense, L.P.: York, PA

**Multi-Purpose Individual Munition/Short-Range Assault Weapon (MPIM/SRAW)**

Lockheed Martin: Archbald, PA

**Paladin**  
Letterkenny Army Depot:  
Chambersburg, PA  
Sechan Electronics: Littiz, PA  
United Defense, L.P.:  
Chambersburg, PA; York, PA

**Patriot**  
Litton: Williamsport, PA

**Protective Masks**  
Mine Safety Appliance:  
Pittsburgh, PA

**Standardized Integrated Command Post System (SICPS)**  
Gichner Systems Group:  
Dallastown, PA

## SOUTH CAROLINA

**Family of Medium Tactical Vehicles (FMTV)**  
Caterpillar: Greenville, SC

**Small Arms (M16A4 Rifle)**  
FN Manufacturing: Columbia, SC

**Small Arms (M240B Medium Machine Gun)**  
FN Manufacturing: Columbia, SC

**Small Arms (M249 Squad Automatic Weapon)**  
FN Manufacturing: Columbia, SC

## TENNESSEE

**Mortar (120 mm)**  
Milan Army Ammunition Plant:  
Milan, TN

**Multiple Launch Rocket System (MLRS)**  
Teledyne: Lewisburg, TN

**Soldier Support Systems**  
Camel Manufacturing Company:  
Caryville, TN

## TEXAS

**Abrams**  
Texas Instruments: Dallas, TX

**Advanced Tank Armament System (ATAS)**  
Raytheon (TI) Systems: Plano, TX

**Air/Missile Defense Planning and Control System**  
APC: Austin, TX

**All Source Analysis System (ASAS)**  
MANTECH: Killeen, TX

**Army Tactical Missile System (ATACMS) Block I/IA**  
Lockheed Martin Vought Systems:  
Dallas, TX; Horizon City, TX

**Army Tactical Missile System (ATACMS) Block II/IA**  
Lockheed Martin Vought Systems:  
Dallas, TX; Horizon City, TX

**Avenger**  
Raytheon: Dallas, TX

**Bradley M2 Infantry/M3 Cavalry Fighting Vehicle (IFV/CFV)**  
Raytheon: McKinney, TX

**Digital Topographic Support System (DTSS)**  
MANTECH Corp.: Copperas Cove, TX

**Driver's Vision Enhancer (DVE)**  
Raytheon: Dallas, TX

**Extended Range Multiple Launch Rocket System (ER-MLRS)**  
Lockheed Martin Vought Systems:  
Dallas, TX

**Family of Medium Tactical Vehicles (FMTV)**  
DW Industries: Houston, TX  
Scott Manufacturing: Lubbock, TX  
Stewart & Stevenson Services:  
Houston, TX

**Guided Multiple Launch Rocket System (GMLRS)**  
Lockheed Martin Vought Systems:  
Dallas, TX

**High Mobility Artillery Rocket System (HIMARS)**  
Lockheed Martin Vought Systems:  
Dallas, TX

**Javelin**  
Raytheon Texas Instruments  
Systems: Lewisville, TX

**Joint Service Lightweight Integrated Suit Technology (JSLIST)**  
NCED: El Paso, TX

**Joint Tactical Ground Station (JTAGS)**  
Response Service and Innovation:  
Austin, TX

<b>Kiowa Warrior</b> Textron (Bell Helicopter): Fort Worth, TX	<b>Smoke Generator (M58 Wolf)</b> Raytheon: Dallas, TX	<b>Mortar (120 mm)</b> GDOS: Burlington, VT	<b>Deployable Medical Systems (DEPMEDS)</b> Brunswick: Marion, VA
<b>Line-of-Sight Anti-Tank (LOSAT)</b> Lockheed Martin Vought Systems: Dallas, TX Raytheon Systems Co.: Dallas, TX	<b>Stinger</b> Raytheon: Austin, TX	<b>VIRGINIA</b>	<b>Digital Topographic Support System (DTSS)</b> Litton TASC, Inc.: Reston, VA MITRE Corp.: McLean, VA SYTEK Corp.: McLean, VA
<b>Long Range Advanced Scout Surveillance System (LRAS3)</b> Raytheon Texas Instruments Systems: McKinney, TX	<b>Tactical Quiet Generators (TQG)</b> MCII: Dallas, TX	<b>All Source Analysis System (ASAS)</b> BDM: McLean, VA Electronic Warfare Associates: Herndon, VA Logicon Inc.: Arlington, VA MITRE: McLean, VA Sterling Software, Inc.: Vienna, VA Sytex: McLean, VA	<b>Global Command and Control System-Army (GCCS-A)</b> Lockheed Martin: Springfield, VA SAIC: Springfield, VA Statistica: Springfield, VA WANG: Springfield, VA
<b>MILSATCOM</b> Rockwell Collins: Richardson, TX	<b>Thermal Weapon Sight (TWS)</b> Raytheon: Dallas, TX	<b>Biological Vaccine Program/ Joint Vaccine Acquisition Program (JVAP)</b> DynPort LLC: Reston, VA	<b>HYDRA 70 Rocket System</b> Alliant Techsystems: Radford, VA Radford Army Ammunition Plant: Radford, VA
<b>Mortar (120 mm)</b> Red River Army Depot: Texarkana, TX	<b>TOW Improved Target Acquisition System (ITAS)</b> Cercon: Hillsboro, TX VARO: Garland, TX Raytheon Systems Co.: McKinney, TX	<b>Bradley M2 Infantry/M3 Cavalry Fighting Vehicle (IFV/CFV)</b> United Defense, L.P.: Rosslyn, VA	<b>Inland Petroleum Distribution System (IPDS)</b> Radian: Alexandria, VA
<b>Multiple Launch Rocket System (MLRS)</b> Lockheed Martin Vought Systems: Dallas, TX	<b>XM982 Extended Range 155mm Projectile</b> Raytheon: Lewisville, TX	<b>Bradley Fire Support Team (BFIST) Vehicle</b> United Defense, L.P.: Rosslyn, VA	<b>Integrated Meteorological System (IMETS)</b> Logicon: Arlington, VA Sytex: McLean, VA
<b>NAVSTAR Global Positioning System (GPS)</b> Trimble Navigation: Austin, TX	<b>UTAH</b>	<b>Combat Service Support Control System (CSSCS)</b> Lockheed Martin: Springfield, VA	<b>Joint Collection Management Tools (JCMT)</b> Logicon Inc.: Arlington, VA MITRE: McLean, VA Sytex: McLean, VA TRW: Fair Lakes, VA
<b>Night Vision (NV) Image Intensification (I2)</b> Litton Industries: Garland, TX Phototelesis: San Antonio, TX Texas Instruments: McKinney, TX	<b>Avenger</b> Klune: Spanish Fork, UT	<b>Combat Synthetic Training Assessment Range (CSTAR)</b> Sterling Software, Inc.: McLean, VA	<b>Joint Service Lightweight Integrated Suit Technology (JSLIST)</b> Battelle: Stafford, VA
<b>Patriot</b> Lockheed Martin Vought Systems: Grand Prairie, TX	<b>Close Combat Tactical Trainer (CCTT)</b> Evans & Sutherland: Salt Lake City, UT	<b>Command and Control Vehicle (C2V)</b> United Defense, L.P.: Rosslyn, VA	<b>Line-of-Sight Anti-Tank (LOSAT)</b> ARC: Gainesville, VA
<b>Second Generation Forward Looking Infrared (FLIR)</b> Raytheon TI Systems: McKinney, TX	<b>Deployable Medical Systems (DEPMEDS)</b> Defense Logistics Agency: Ogden, UT	<b>Counter Intelligence/Human Intelligence (CI/HUMINT) Automated Tools Set (CHATS)</b> Logicon, Inc.: Arlington, VA Sterling Software, Inc.: Vienna, VA Sytex: McLean, VA	<b>MILSATCOM</b> Raytheon: Reston, VA; Virginia Beach, VA
<b>Selectable Lightweight Attack Munition (SLAM)</b> Texas Instruments: Midland, TX	<b>Guardrail/Common Sensor (GR/CS)</b> L3COM: Salt Lake City, UT	<b>Crusader</b> EDS: Herndon, VA	
<b>Smoke Generator (M56 Coyote)</b> Raytheon: Dallas, TX	<b>VERMONT</b>		

**Night Vision (NV) Image Intensification (I2)**

ITT: Roanoke, VA

**Patriot**

Atlantic Research: Gainesville, VA

**Tactical Quiet Generators (TQG)**

Radian: Alexandria, VA

## WASHINGTON

**Integrated Meteorological System (IMETS)**

Logicon: Tacoma, WA

**National Missile Defense (NMD)**

Boeing: Seattle, WA

**Standardized Integrated Command Post System (SICPS)**

RDA: Tacoma, WA

**XM982 155mm Extended Range Artillery Projectile Family**

AlliedSignal: Redmond, WA

Primex Aerospace: Redmond, WA

## WEST VIRGINIA

**Line-of-Sight Anti-Tank (LOSAT)**

Alliant Tech: Cumberland, WV

**Multi-Purpose Individual Munition/Short-Range Assault Weapon (MPIM/SRAW)**

Alliant: Rocket Center, WV

## WISCONSIN

**Heavy Equipment Transporter System (HETS)**

Oshkosh Truck: Oshkosh, WI

**Palletized Load System (PLS)**

Oshkosh Truck: Oshkosh, WI

**Selectable Lightweight Attack Munition (SLAM)**

Alliant Techsystems: Janesville, WI

## OTHER COUNTRIES

### CANADA

**Family of Medium Tactical Vehicles (FMTV)**

Michelin: Nova Scotia, Canada

**Mortar (120 mm)**

SNC: Le Gardeur, Quebec, Canada

**Thermal Weapon Sight (TWS)**

Eclan: Midland, Ontario, Canada

**TOW Improved Target Acquisition System (ITAS)**

DY4 Systems: Ontario, Canada

**Warfighter Information Network-Terrestrial (WIN-T) Tech Insertion**

Canadian Marconi Company: (HCLOS) Ville Saint-Laurent, Quebec, Canada

### GERMANY

**Advanced Tank Armament System (ATAS)**

Rheinmetall: Ratingen, Germany

**Nuclear, Biological, and Chemical Reconnaissance System (NBCRS)-FOX**

Henschel: Germany

**Thermal Weapon Sight (TWS)**

Zeiss Eltro Optronic: Oberkochen, Germany

**Wolverine**

MAN GHH: Dusseldorf, Germany

### ISRAEL

**Night Vision (NV) Image Intensification (I2)**

Elbit Ltd.: Haifa, Israel

### MEXICO

**High Mobility Multipurpose Wheeled Vehicle (HMMWV)**

Dana: Querataro, Mexico

### UNITED KINGDOM

**Automatic Chemical Agent Detector/Alarm (ACADA)**

Graseby Dynamics: Watford, U.K.

**XM777 Lightweight 155mm Howitzer (LW155)**

Vickers Shipbuilding & Engineering, Ltd.: U.K.



## 1999 WEAPON SYSTEMS POINTS-OF-CONTACT

<b>Abrams</b> Project Manager Abrams Tank System ATTN: SFAE-GCSS-AB Warren, MI 48397-5000	<b>Analysis and Control Team (ACT) Enclave</b> Project Manager Intelligence Fusion (PM Intel Fusion) ATTN: SFAE-C3S-INT 1616 Anderson Road McLean, VA 22102-1616	<b>Automatic Chemical Agent Detector/Alarm (ACADA)</b> Project Manager NBC Defense Systems ATTN: AMSCB-PM-NN Aberdeen, MD 21010-5423	<b>Bradley M2 Infantry/M3 Cavalry Fighting Vehicle (IFV/CFV)</b> Product Manager Bradley Fighting Vehicle System ATTN: SFAE-GCSS-W-BV Warren, MI 48397-5000
<b>Advanced Field Artillery Tactical Data System (AFATDS)</b> Project Manager AFATDS ATTN: SFAE-C3S-FS Ft. Monmouth, NJ 07703	<b>Apache Longbow</b> Product Manager Longbow Apache ATTN: SFAE-AV-AAH Bldg. 5681 Redstone Arsenal, AL 35898	<b>Avenger</b>	<b>Brilliant Anti-Armor Submunition (BAT)</b> Product Manager ATACMS BLK II-BAT ATTN: SFAE-MSL-AB Redstone Arsenal, AL 35898
<b>Advanced Quick Fix (AQF)</b> Project Manager Signals Warfare ATTN: SFAE-IEW-SG-AQF Fort Monmouth, NJ 07703-5303	<b>Armored Security Vehicle (ASV)</b> Project Manager Light Tactical Vehicles ATTN: AMSTA-DSA-LV Warren, MI 48397-5000	<b>Battlefield Combat Identification System (BCIS)</b> Product Manager Combat Identification ATTN: SFAE-IEW-CID Building 563 Avenue of Memories Ft. Monmouth, NJ 07703	<b>CH-47D Chinook/Improved Cargo Helicopter (ICH)</b> Project Manager Cargo Helicopters ATTN: SFAE-AV-CH Bldg. 5681 Redstone Arsenal, AL 35898
<b>Advanced Tank Armament System (ATAS)</b> Project Manager Tank Main Armament Systems (PM-TMAS) ATTN: SFAE-GCSS-TMA Picatinny Arsenal, NJ 07806-5000	<b>Army Airborne Command and Control System</b>	<b>Biological Vaccine Program/ Joint Vaccine Acquisition Program (JVAP)</b> Joint Program Office for Biological Defense Systems ATTN: SFAE-BD/Skyline #3 5201 Leesburg Pike Falls Church, VA 22041-3203	<b>Close Combat Tactical Trainer (CCTT)</b> Project Manager Combined Arms Tactical Trainer ATTN: AMSTI-CCTT 12350 Research Parkway Orlando, FL 32826-3276
<b>Air/Missile Defense Planning Control System (AMDPCS)</b> Project Manager Air Defense Command and Control Systems (PM ADCCS) ATTN: SFAE-C3S-AD Redstone Arsenal, AL 35898-5600	<b>Army Battle Command System (ABCs)</b>	<b>Black Hawk</b> Project Manager Utility Helicopters U.S. Army Aviation and Missile Command ATTN: AMSAM-DSA-UH (BLD 5308) Redstone Arsenal, AL 35898	<b>Comanche</b> Project Manager Comanche ATTN: SFAE-AV-RAH (Bldg. 5681) Redstone Arsenal, AL 35893-5010
<b>Airborne Reconnaissance Low (ARL)</b> Project Manager Signals Warfare ATTN: SFAE-IEW&S-SG Bldg. 296, Main Post Fort Monmouth, NJ 07703-5040	<b>Army Data Distribution System (ADDS)</b> Project Manager TRCS ATTN: SFAE-C3S-TRC Ft. Monmouth, NJ 07703	<b>Bradley Fire Support Team (BFIST) Vehicle</b> Product Manager Bradley Fire Support Team ATTN: SFAE-GCSS-BV Warren, MI 48397-5000	<b>Combat Identification for the Dismounted Soldier (CIDDS)</b> Product Manager Combat Identification ATTN: SFAE-IEW-CID Building 563 Avenue of Memories Ft. Monmouth, NJ 07703
<b>All Source Analysis System (ASAS)</b> Product Manager ATTN: SFAE-C3S-INT 1616 Anderson Rd. McLean, VA 22102-1616	<b>Army Key Management System (AKMS)</b> Project Manager Warfighter Information Network (Terrestrial) (PM WIN-T) ATTN: SFAE-C3S-WIN Bldg. 744 Ft. Monmouth, NJ 07703-5506	<b>Bradley Linebacker</b> Product Manager Bradley Linebacker ATTN: SFAE-GCSS-BV Warren, MI 48397-5000	<b>Combat Service Support Control System (CSSCS)</b> Product Manager CSSCS ATTN: SFAE-C3S-STR 6052 Meade Rd., Suite 103 Ft. Belvoir, VA 22060
	<b>Army Tactical Missile System (ATACMS)</b> Project Manager Army TACMS ATTN: SFAE-MSL-AB Redstone Arsenal, AL 35898-5650		

<b>Combat Synthetic Training Assessment Range (CSTAR)</b> Product Manager Air and Command Training Systems ATTN: AMTSI-ACTS 12350 Research Parkway Orlando, FL 32826-3276	<b>Digital Topographic Support System (DTSS)</b> Project Director Combat Terrain Information Systems (PD CTIS) U.S. Army Topographic Engineering Center ATTN: CETEC-PD-T 7701 Telegraphic Road Alexandria, VA 22310-3864	<b>Force XXI Battle Command Brigade-and-Below (FBCB2)</b> Project Manager Force XXI Battle Command Brigade and Below (PM FBCB2) ATTN: SFAE-C3S-FB Bldg. 2525 Fort Monmouth, NJ 07703-5408	<b>Guardrail/Common Sensor (GR/CS)</b> Project Manager Signals Warfare ATTN: SFAE-IEW&S-SG Bldg. 296, Main Post Fort Monmouth, NJ 07703-5040
<b>Command and Control Vehicle (C2V)</b> Product Manager Platforms ATTN: SFAE-C3S-AT Fort Monmouth, NJ 07703	<b>Driver's Vision Enhancer (DVE)</b> Project Manager NV/RTA 10221 Burkeb Road, Suite 430 Ft. Belvoir, VA 22060-5806	<b>Forward Area Air Defense Command, Control and Intelligence (FAADC2I)</b> Project Manager ADCCS ATTN: SFAE-C3S-AD Redstone Arsenal, AL 35898	<b>Guided Multiple Launch Rocket System (GMLRS)</b> Project Manager Multiple Launch Rocket System ATTN: SFAE-MSL-ML Redstone Arsenal, AL 35898
<b>Common Hardware/Software (CHS)</b> Project Manager ATCCS ATTN: SFAE-C3S-AT Fort Monmouth, NJ 07703-5402	<b>Extended Range Multiple Launch Rocket System (ER-MLRS)</b> Project Manager Multiple Launch Rocket System ATTN: SFAE-MSL-ML Redstone Arsenal, AL 35898	<b>Forward Repair System-Heavy (FRS-H)</b> Project Manager Heavy Tactical Vehicles ATTN: AMSTA-DSA-HT Warren, MI 48397-5000	<b>Heavy Equipment Transporter System (HETS)</b> Project Manager Heavy Tactical Vehicles ATTN: AMSTA-DSA-HT Warren, MI 48397-5000
<b>Counter Intelligence/Human Intelligence (CI/HUMINT) Automated Tools Set (CHATS)</b> Project Manager Intelligence Fusion (PM Intel Fusion) ATTN: SFAE-C3S-INT Redstone Arsenal, AL 35898-5600	<b>Family of Medium Tactical Vehicles (FMTV)</b> Project Manager FMTV ATTN: SFAE-GCSS-W-MTV Warren, MI 48397-5000	<b>Global Command and Control System-Army (GCCS-A)</b> Product Manager GCCS-A ATTN: SFAE-C3S-STR Fort Monmouth, NJ 07703	<b>Hercules</b> Project Manager Hercules ATTN: AMSTA-DSA-CM Warren, MI 48397-5000
<b>Crusader</b> Project Manager Crusader ATTN: SFAE-GCSS-CR Picatinny Arsenal, NJ 07806-5000	<b>Firefinder (TPQ-36 and TPQ-37/Block II)</b> Project Manager Firefinder ATTN: AMSEL-DSA-FF Ft. Monmouth, NJ 07703	<b>Grenadier Beyond Line-of-Sight Reporting (BRAT) (GB)</b> Director Army Space Program Office ATTN: SMDC-AO 7701 Telegraph Road, Building 2592A Alexandria, VA 22315	<b>High Energy Laser System Test Facility (HELSTF)</b> Project Manager Light Tactical Vehicles ATTN: AMSTA-DSA-LT Warren, MI 48397-5000
<b>Deployable Medical Systems (DEPMEDS)</b> Commander U.S. Army Medical Material Agency ATTN: MCMR-MM-R Frederick, MD 21702-5001 HQ, U.S. Army Aviation and Troop Command 4300 Goodfellow Boulevard. ATTN: AMSAT-W-TV St. Louis, MO 63120-1798	<b>Force Provider (FP)</b> Product Manager U.S. Army Soldier Systems Command ATTN: AMCPM-FP 100 Kansas Street Natick, MA 01760	<b>Grizzly</b> Product Manager Grizzly ATTN: AMSTA-DSA-CM Warren, MI 48397-5000	<b>High Mobility Multipurpose Wheeled Vehicle (HMMWV)</b> Project Manager Light Tactical Vehicles ATTN: AMSTA-DSA-LT Warren, MI 48397-5000
		<b>Ground-Based Common Sensor (GBCS)</b> Project Manager Signals Warfare ATTN: SFAE-IEW-SG-GBCS Fort Monmouth, NJ 07703-5303	<b>High-Speed Multiplexer Cards (HSMUX)</b> Project Manager Warfighter Information Network (Terrestrial) (PM WIN-T) ATTN: SFAE-C3S-WIN Bldg. 744 Fort Monmouth, NJ 07703-5506
			<b>Highly Mobile Artillery Rocket System (HIMARS)</b> Project Manager MLRS ATTN: SFAE-MSL-ML Redstone Arsenal, AL 35896

<b>Hornet</b> Project Manager Mines, Countermine, and Demolitions ATTN: AMSTA-DA-ME Picatinny Arsenal, NJ 07806-5000	<b>Javelin</b> Project Manager Javelin ATTN: SFAE-MSL-AM Redstone Arsenal, AL 35898-5720	<b>Joint Service Lightweight Stand-off Chemical Agent Detector (JSLCAD)</b> Project Manager NBC Defense Systems ATTN: AMCPM-NN Aberdeen Proving Ground, MD 21010-5423	<b>Kiowa Warrior</b> Product Manager Kiowa Warrior ATTN: AMSAM-DSA-ASH Bldg. 5308 Sparkman Center Redstone Arsenal, AL 35898
<b>HYDRA 70 Rocket System</b> Product Manager 2.75 Inch Rocket Systems U.S. Army Industrial Operations ATTN: AMSIO-PM-R Rock Island, IL 61299-6000	<b>Joint Biological Point Detection System (JBPDs)</b> Project Manager NBC Defense Systems ATTN: AMCPM-NN Aberdeen Proving Ground, MD 21010-5423 Office of Program Director NBC Defense ATTN: AMSCB-BD Aberdeen Proving Ground, MD 21010-5423 Joint Program Office for Biological Defense Systems ATTN: SFAE-BD/Skyline #3 Falls Church, VA 22041-3203	<b>Joint Surveillance Target Attack Radar System (Joint STARS) Common Ground Station (CGS)</b> Project Manager Joint STARS ATTN: SFAE-IEW&S-JS Ft. Monmouth, NJ 07703-5304	<b>Land Warrior (LW)</b> <b>Lightweight Laser Designator/Rangefinder (LLDR)</b>
<b>Improved Chemical Agent Monitor (ICAM)</b> Project Manager NBC Defense Systems ATTN: AMSCB-AM-NN Aberdeen Proving Ground, MD 21010-5423	<b>Joint Collection Management Tools (JCMT)</b> Project Manager Intelligence Fusion (PM Intel Fusion) ATTN: SFAE-C3S-INT Redstone Arsenal, AL 35898-5600	<b>Joint Tactical Ground Station (JTGS)</b> Program Executive Office Missile Defense ATTN: SFAE-GPL-TMD-SS-P P.O. Box 1500 Huntsville, AL 35807-3801	<b>Line-of-Sight Anti-Tank (LOSAT)</b> Project Manager LOSAT ATTN: SFAE-ASM-LS Redstone Arsenal, AL 35898-8051
<b>Inland Petroleum Distribution System (IPDS)</b> U.S. Army Tank-Automotive and Armaments Command Product Manager Petroleum and Water Systems AMSTA-DSA-TA-PW, Bldg. 210 Warren, MI 48397-5000	<b>Joint LACMD Elevated Netted Sensors Systems (JLENS)</b> Project Manager U.S. Army Space and Missile Defense Command P.O. Box 1500 Huntsville, AL 35807	<b>Joint Tactical Terminal (JTT)</b> Product Manager JTT/CIBSM ATTN: SFAE-IEW&S-JS Ft. Monmouth, NJ 07703-5304	<b>Long Range Advanced Scout Surveillance System (LRAS3)</b>
<b>Integrated Family of Test Equipment (IFTE)</b> Product Manager Automatic Test Support Systems ATTN: AMSAM-DSA-TMDE-A Redstone Arsenal, AL 35898-5400	<b>Joint Service Lightweight Integrated Suit Technology (JSLIST)</b> Project Manager JSLIST 10401 Totten Road, Suite 121 Fort Belvoir, VA 22060	<b>Joint Warning and Reporting Network (JWARN)</b> Project Manager NBC Defense Systems ATTN: AMCPM-NN Aberdeen Proving Ground, MD 21010-5423 Office of Program Director NBC Defense ATTN: AMSCB-BD Aberdeen Proving Ground, MD 21010-5423 Joint Program Office for Biological Defense Systems ATTN: SFAE-BD/Skyline #3 Falls Church, VA 22041-3203	<b>Longbow HELLMIRE</b> Product Manager Longbow HELLMIRE Missile Systems ATTN: SFAE-MSL-HD Redstone Arsenal, AL 35898-5610
<b>Integrated Meteorological System (IMETS)</b> Project Manager Intel Fusion 1616 Anderson Road ATTN: SFAE-C3S-INT McLean, VA 22102			<b>M113 Family of Vehicles (FOV)</b> Product Manager U.S. Army Tank, Automotive and Armaments Command ATTN: AMSTA-DSA-TA-CV Warren, MI 48397-5000
<b>Integrated System Control (ISYSCON)</b> Product Manager Common Management System ATTN: SFAE-C3S-WIN Ft. Monmouth, NJ 07703			<b>Maneuver Control System (MCS)</b> Product Manager MCS ATTN: SFAE-C3S-AT Ft. Monmouth, NJ 07703-5405
			<b>Medium Extended Air Defense System (MEADS)</b> Product Manager MEADS P.O. Box 1500 ATTN: SFAE-AMD-SM Huntsville, AL 35807

<b>MILSATCOM</b> Project Manager MILSATCOM ATTN: SFAE-C3S-MSA Ft. Monmouth, NJ 07703	<b>Night Vision (NV) Image Intensification (I2)</b> Project Manager NV/RSTA ATTN: SFAE-IEW&S-NV 10221 Burbeck Road, Suite 430 Ft. Belvoir, VA 22060-5806	<b>Second Generation Forward Looking Infrared (FLIR)</b> Project Manager GEN II FLIR 10221 Burbeck Road, Suite 430 Ft. Belvoir, VA 22060-5806	<b>Grenade Launcher, M249 Squad Automatic Weapon)</b> Product Manager Small Arms U.S. Army Armament Research, Development, and Engineering Center ATTN: AMSTA-DSA-SA Picatinny Arsenal, NJ 07806-5000
<b>Mortar (120 mm)</b> Product Manager U.S. Armament Research, Development, and Engineering Center ATTN: AMSTA-DSA-MO Picatinny Arsenal, NJ 07806-5000	<b>NBC Reconnaissance System (NBCRS)-Fox</b> Project Manager NBC Defense System ATTN: AMSCB-PM-NN Aberdeen Proving Ground, MD 21010-5423	<b>Selectable Lightweight Attack Munition (SLAM)</b> Project Manager Mines, Countermine, and Demolitions ATTN: AMSTA-DA-MC Picatinny Arsenal, NJ 07806-5000	<b>Smoke Generator (M56 Coyote)</b> Product Manager Smoke/Obscurants ATTN: AMSCB-PM-SMK Aberdeen Proving Ground, MD 21010-5423
<b>Multi-Purpose Individual Munition/Short-Range Assault Weapon (MPIM/SRAW)</b> Product Manager MPIM/SRAW ATTN: AMSAM-DSA-MP Redstone Arsenal Huntsville, AL 35898-5290	<b>Paladin</b> Product Manager Paladin/FAASV ATTN: AMSTA-DSA-PF Picatinny Arsenal, NJ 07806-5000	<b>Sense and Destroy Armor (SADARM)</b> Project Manager Artillery Munition Systems ATTN: SFAE-GCCS-ARMS Picatinny Arsenal, NJ 07806-5000	<b>Smoke Generator (M58 Wolf)</b> Product Manager Smoke/Obscurants ATTN: AMSCB-PM-SMK Aberdeen Proving Ground, MD 21010-5423
<b>Multiple Launch Rocket System (MLRS)</b> Project Manager MLRS ATTN: SFAE-MSL-ML Redstone Arsenal, AL 35896	<b>Palletized Load System (PLS)</b> Project Manager Heavy Tactical Vehicles ATTN: AMSTA-DSA-HT Warren, MI 48397-5000	<b>Sentinel</b> Product Manager Sentinel ATTN: SFAE-IEW&S-SE Redstone Arsenal, AL 35898-5796	<b>Soldier Support Systems</b> Product Manager Soldier Support ATTN: AMSSC-PM Soldier Systems Center Kansas Street Natick, MA 01760-5004
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<b>NAVSTAR Global Positioning System (GPS)</b> Product Manager GPS ATTN: AMSEL-DSA-GPS Ft. Monmouth, NJ 07703	<b>Protective Masks</b> Project Manager NBC Defense Systems ATTN: AMSCB-PM-NN Aberdeen Proving Ground, MD 21010-5423	<b>Reverse Osmosis Water Purification Unit (ROWPU)</b> U.S Army Tank-Automotive and Armaments Command Product Manager Petroleum and Water Systems AMSTA-DSA-TA-PW, Bldg. 210 Warren, MI 48397-5000	

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**Striker**

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**Tactical Simulation Interface Unit (TSIU)**

**Tactical Unmanned Aerial Vehicle (TUAV)**

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**XM982 155mm Extended Range Artillery Projectile Family**

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