



# United States Army



Future Combat Systems  
**FCSS**  
One Team — The Army / DARPA / Industry



## Weapon Systems 2003



## To The Reader:

As this handbook goes to press The Army stands at the threshold of a new era. Fighting and winning the war on terrorism and committed to operations around the globe, The Army is busier than we have ever been. Even while at war, we are transforming—aggressively reaching forward to the future.

The current technology that we are leveraging predicts the greater capabilities we can achieve with our Science and Technology investments—greater responsiveness, deployability, agility, versatility, lethality, survivability, and sustainability. As the fielding of the first Stryker Brigade Combat Teams demonstrates, we are revolutionizing acquisition processes while executing a balanced Transformation strategy. We are selectively recapitalizing and modernizing today's capabilities to extend our combat overmatch—staying ready to defend our homeland, keeping the peace in areas important to the Nation, and winning the war against global terrorism. Stryker Brigade Combat Teams—our Interim Force—will bridge the current operational gap between our rapidly-deployable light forces and our later-arriving heavy forces, much of which will be superseded by the Objective Force in 2010. By that time, the Objective Force—organized, equipped, and trained for ground dominance, cyber-warfare, and space exploitation—will provide the Nation with the capabilities it must have to remain the global leader, the strongest economy in the world, and the most respected and feared military force.

In the pages that follow, you will see just a few of the weapon systems that The Army will continue to depend on, now and into the future, as our Soldiers fulfill The Army's nonnegotiable contract with the American people to fight and win our Nation's wars, decisively. We hope that you find this handbook a valuable and informative resource.



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# How to Use this Book

## 2.75 Inch Rocket System/Advanced Precision Kill Weapon System (APKWS)

United States Army

**Mission**  
Provides on-ground suppression, illumination and direct and indirect fire to defeat area targets and personnel targets of close and extended ranges (Hydra 70). In addition to an onboard precision strike capability (Advanced Precision Kill Weapon System (APKWS)) to be employed against soft or lightly armored point targets and targets in urban terrain to complement heliborne and organic assets through the addition of a semi-active laser guidance sensor to the Hydra 70.

**Description and Specifications**  
The Hydra 70 Rocket System is a family of 2.75" air-launched, unguided all-weather-capable rockets, employed by its parent, aerial spraying forces, fuel wing, and rotary wing aircraft. The highly modular rockets incorporate several different mission items all weatherheads, including high explosive, multipurpose submunition (MPS), MPSH practice round, and phosphorus smoke, thermite, volatile illumination flare, and infrared flares. See flow (exact specifications for APKWS may vary until appropriate design is selected).

**Dimensions:** 2.75"  
**Weight:** 22-25 lbs (depending on warhead)  
**Length:** 10-12" (depending on warhead)  
**Range:** 100-6,000 meters

The APKWS will provide a line-of-sight precision strike capability as a complement to the current organic assets, including missiles, and various on-ground and aerial weapons to destroy targets not suited for heavier anti-air weapons or outside the range of heliborne support. The APKWS will be a mid-to long-range weapon that will provide direct hits, and provide point target accuracy, reducing collateral damage. The APKWS will be used as a direct strike weapon during all attack and reconnaissance missions, to destroy light armor, vehicles, structures, barriers, light shipping, air defenses, military operations in urban terrain (MOUT) targets, and required enemy personnel. It will be capable of being used as an indirect fire weapon when coordinated with a remote designating team.

As a direct fire weapon, the APKWS will provide close support of ground forces conducting fire that enters the vertical axis of these maneuver forces. High precision and reduced collateral damage make the APKWS particularly suitable for operations in built-up and populated areas. As an indirect fire weapon designated for a remote ground team, the system will serve as an additional weapon capability for integration-capable units.

The APKWS will be compatible with existing laser designator systems on the AH-64/A and AH-66 Apache Warrior helicopters as well as the RAH-66 Comanche.

**Dimensions:** 2.75"  
**Weight:** 22-25 lbs  
**Length:** 10-12"  
(Exact specifications may vary until appropriate APKWS design is selected.)

**Foreign Counterpart**  
Hydra 70 Rocket: 5.6 inches air-launched rocket.  
APKWS: No known foreign counterpart.


**Foreign Military Sales**  
Hydra 70: Never used by NATO and various NATO members.  
APKWS: None.

**Program Status**  
**Hydra 70:**  
• Fully tested system, being operational requirements for testing and use research.  
**APKWS:**  
• FY02: Completing low-cost precision kill advanced technology demonstration.  
• FY03: System development and demonstration (SDR) phase.

**Projected Activities**  
**Hydra 70:**  
• FY02: Follow-on production contract scheduled.  
**APKWS:**  
• FY03: Block 1: Mission 9 decision, SDR, Dec 02.  
• FY05: Mission 1.

**Contractors**  
**Hydra 70:**  
Prime Systems (General Dynamics, Advanced and Technical Products (GATAP)) (Burlington, VT);  
Crown Aircraft Technology (Burlington, VT);  
Warhead and Rocket LAR (GATAP) (Gardner, MA);  
Rums: Airco Manufacturing (Pittsfield, MA);  
Go and Rocket General Dynamics (Andover, MA).

**APKWS:**  
General Dynamics (Burlington, VT);  
Airco Manufacturing (Pittsfield, MA);  
Alliant Technology (Stafford, VA);  
General Dynamics (Advanced and Technical Products, Christian, IL);  
Crown Aircraft (Stafford, VA);  
S&W (Shawnee, MO) or Raytheon (Darien, AZ) (FY03).



Weapon Systems 2003

Each system's **Acquisition Phase** is highlighted. Terms are explained in the glossary.

The **US Outline** map highlights those states where the top five contractors develop the components of the program.

The top five **Contractors**, in terms of value of the program, are listed with the localities in which the program is executed. Generally, the prime contractor is listed first.





## Introduction: Safeguarding the Present, Ensuring the Future

The security environment the United States faces in the early decades of the 21st century is characterized by remarkable instability: weak states; stateless and transnational terrorists; religious zealots; ethnic strife; economic uncertainty; unstable, opportunistic dictatorships that covet weapons of mass destruction; and Cold War remnants, such as chemical, biological, nuclear, and high explosive weapons, held by governments that may not be able to adequately control them.

Currently, the US Armed Forces are fully engaged in the war against terrorism, as well as operations around the globe that demand their fullest capabilities, from conventional warfighting and special operations actions to nontraditional support and sustainment operations, peace enforcement, peacekeeping, and humanitarian assistance.

Not only do the Armed Forces have the daunting responsibility to safeguard the nation and our national interests in the face of these and other uncertainties, but theirs is also the non-negotiable pact with the American people to fight and win the nation's wars. At the same time, the Armed Forces have the mandate to transform, to ensure the future while safeguarding the present.

### Change in a Time of Change

The most dangerous challenges will likely come from a combination of state, non-state, and transnational foes possessing a global reach. The use of military power or violence will remain an integral factor in the international arena. Therefore any crisis has the potential to escalate into a situation with implications for US security interests. As such, the present environment demands innovation and even revolution—and the Army has, for the last several years, both simultaneously and enthusiastically pursued its duties and its Transformation. As the next few decades progress, the Army will remain the pre-eminent land force the world has ever known, but one that is increasingly flexible, adaptable, and always ready to accept and fulfill all missions assigned to it by the President, the Secretary of Defense, and the nation.

The Army's decision to transform itself into a more responsive and capable force was the result of the recognition that the end of the Cold War had already rearranged the shape of requirements facing the US military. Subsequent events reinforced the need for change. The blossoming and maturation of information technology presented both the imperative and the opportunity to adapt organizations and equipment to face the challenges of the 21st century.

Since Army Transformation began in 1999, a new National Security Strategy, published in September 2002, and a supporting National Military Strategy and



associated defense operational goals have provided additional focus and impetus to Army efforts already underway to achieve a future force capable of meeting operational needs across the full range of missions. The Army remains committed to transforming itself into a future force, the Objective Force, that will be strategically responsive and dominant, and will harness technological advancements to a modernized Army. Achieving the Objective Force in a timely manner requires the Army to invest in significant science and technology (S&T) efforts and to make key decisions on which technologies to develop and incorporate into future equipment for our Soldiers.

This also necessitates the development and continual enhancement of new ways of acquiring and fielding equipment and technology. The Army has achieved success with Software Blocking (SWB) and Unit Set Fielding (USF), both of which enable a more organic, systematic, and streamlined approach to the acquisition and fielding of materiel and technology.

Transformation to these new ways of doing the business of warfighting and defending our interests necessitates that the Army focus the majority of its investments on the future. Simultaneously, however, present realities demand that we sustain a decisive win capability and maintain a high state of readiness as part of the Joint Force.

# Introduction

These imperatives mean that the Army must continue to invest sufficient but limited resources in today's force—the Legacy Force—by selectively recapitalizing key systems and modernizing those few systems needed to maintain combat superiority, while focusing investment in the Objective Force.

## The Army's Role in the National Military Strategy and Joint Operations

The Army expects that the majority of missions will be joint in nature, and, as such, the Army is and will remain the primary provider of land forces to the Joint Force Commander (JFC) for most future missions. Close cooperation among the Services to produce joint interoperability and deployability, coupled with a dynamic program of training and experimentation in peacetime, will be indispensable for the success of the Army's Transformation as well as the respective modernization plans of the other Services. Where possible, cooperative programs with other Services and in a joint framework will be fully supported.

In addition to the imperative for successful joint cooperation, the Army also recognizes that many if not most future missions will be characterized by multinational cooperation. Coalitions have defined most major military operations in the recent past, from the Gulf War to the Balkan missions to Operation Enduring Freedom in Afghanistan, and the likelihood is for this trend to continue in the future. As a result, the Army views effective international cooperation as an important element in making Transformation successful in both its process and eventual application on future

battlefields. Such cooperation will focus on two key and complementary components—multinational force compatibility or interoperability, and security cooperation.

## Critical Operational Goals

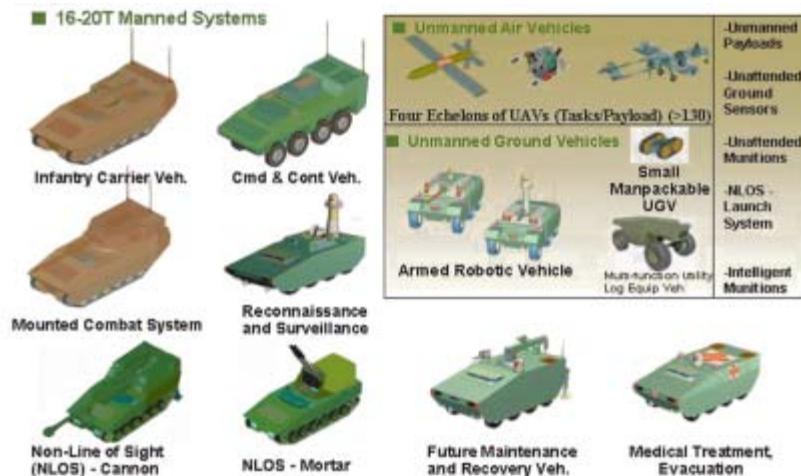
The Quadrennial Defense Review (QDR) of 2001 called upon the Services to transform themselves to meet future challenges and to preserve military preeminence. The defense strategy unveiled in 2001 identified four major mission areas as benchmarks to guide force planning. These included the missions to:

- Defend the United States (enduring first priority).
- Deter aggression and coercion forward in critical regions (Europe, Northeast Asia, the East Asian littoral, and the Middle East/Southwest Asia).
- Swiftly defeat aggression in two overlapping major conflicts while preserving for the President the option to call for a decisive victory in one of those conflicts—including the possibility of regime change or occupation.
- Conduct a limited number of smaller-scale contingency operations.

Providing the necessary capabilities to fulfill these missions guides the Army's efforts, but also constrains the Army's ability to simultaneously transform rapidly. Balancing these objectives—for fulfilling near-term missions and longer-term change—is both a constant challenge and essential requirement for the Army.

In addition, the defense strategy included six critical operational goals to focus transformation efforts. These six goals, sometimes referred to as the DoD Transformation Goals, encompassed the following:

- Protecting critical bases of operations (US homeland, forces abroad, allies and friends) and defeating chemical, biological, radiological, nuclear, and enhanced high explosive (CBRNE) weapons and their means of delivery.
- Projecting and sustaining US forces in distant anti-access or area-denial environments and defeating anti-access and area-denial threats.
- Denying enemies sanctuary by providing persistent surveillance, tracking, and rapid engagement with high-volume precision strike, through a combination of complementary air and ground capabilities, against critical mobile and fixed targets at various ranges and in all weather and terrain.
- Assuring information systems in the face of an attack and conducting effective information operations.
- Enhancing the capabilities and survivability of space systems and supporting infrastructure.



- Leveraging information technology and innovative concepts to develop an interoperable, Joint command, control, communications, computers, intelligence, surveillance and reconnaissance (C4ISR) architecture and capability that includes a tailorable Joint operational picture.

The Army's comprehensive plan to transform itself has already set in motion specific and concrete support for achieving these goals by ensuring the Army has the requisite capability to decisively defeat the enemy on the future battlefield with forces that are strategically responsive, deployable, agile, versatile, lethal, survivable, and sustainable.

Through the development of its Objective Force, the Army will provide significant support to accomplishing these goals by preserving key existing capabilities, such as that for forced entry and tactical assault, and adding major improvements that will capitalize on new technologies to enhance the overall effectiveness of the force.

### Objective Force Characteristics

The Objective Force is the Army's main effort and ultimate Transformation goal. It is the future force that will achieve the characteristics described in the Army Vision—responsiveness, agility, deployability, versatility, lethality, survivability, and sustainability—and will be capable of dominating at every point on the spectrum of operations. It will minimize or even eliminate the distinction between heavy and light forces.

These characteristics of the Objective Force are complementary features that together produce an overall capability greater than the individual capabilities they describe. In turn, they provide the analytical foundation for developing the concepts, doctrine and systems that will constitute the Objective Force.

**Responsive.** The Objective Force must be responsive to allow the Army to meet frequent contingency requirements with any element of the force. Forces deployed must be prepared to accomplish their mission regardless of the environment, the nature or scope of the proposed operation or other commitments.

**Agile.** Army forces must be able to shift intensity of operations without augmentation, a break in contact, or additional training. The Objective Force must replicate the agility of today's forces to shift seamlessly from offensive to defensive and back again, but in a much broader context.

**Deployable.** To achieve this responsiveness, Objective Force units must be deployable, or capable of rapid strategic movement to create the opportunity to avert conflict through deterrence. Deployability includes a platform lighter than 20 tons and capable of fitting a "C-130 (like)" envelope to facilitate having a combat brigade on the ground within 96 hours after liftoff, a division within 120

hours and five divisions within 30 days.

**Versatile.** Versatility is the inherent capacity of Objective Force formations to operate and dominate at any point on the spectrum of military operations.

**Lethal.** Objective Force lethality will exceed that of today's conventional heavy forces. Through technological improvements in weaponry and munitions, the Objective Force will have the capability to destroy enemy formations at longer ranges, with smaller calibers, greater precision, and more devastating target effects.

**Survivable.** The Objective Force will take advantage of technologies that provide maximum protection and survivability at the individual soldier level. Objective Force survivability will be linked to its inherently offensive orientation, as well as its speed and lethality, by seeing, understanding, and acting first.

**Sustainable.** Our forces must retain the capability to continue operations longer than any adversary the Army confronts. Sustainability means that the Army must continue to find ways to exploit advanced technologies and reduce the logistics footprint and related costs of our support structure.

### The Interim Force

The Interim Force will fill an existing strategic and operational capability gap and will combine some of the best characteristics of the current heavy, light and Special Operations Forces. Organized into Stryker Brigade Combat Teams, this force will provide combatant commanders with a rapidly deployable, tactically superior force to meet operational requirements of the joint team. These units will





be infantry-centric and equipped with the latest in C4ISR capabilities to enhance their joint synergy and versatility. Interim Force units are designed to be operationally effective at both the low end of the spectrum—peacekeeping and small-scale contingencies—as well as the high end of the spectrum where they will be effective in Major Combat Operations (MCOs). They will also serve as an indispensable vanguard for the future Objective Force by validating operational and organizational concepts, training and leader development initiatives, and deployment scenarios.

## Stryker Brigade Combat Teams

The Interim Force is based on the foundation of a Stryker Brigade Combat Team (SBCT) equipped with a family of Stryker armored vehicles, lightweight artillery, and other available advanced technology. This technology will include Land Warrior Soldier systems that will be integrated into the SBCTs and significantly enhance the common situational awareness for soldiers. With a total of six SBCTs, the Army will offer the joint and multinational force commander increased operational and tactical flexibility to execute any required fast-paced mission using units deployable in C-130 or equivalent aircraft.

The SBCT's two core qualities are increased mobility (strategic, operational, and tactical) and its ability to achieve decisive action through dismounted infantry assault. Its core operational capabilities rest upon increased operational and tactical mobility, enhanced situational understanding, combined arms integration down to company level, and increased Infantry strengths for close combat in urban and complex terrain.

The Army will program resources to field six SBCTs. The first two SBCTs, 3rd Brigade, 2nd Infantry Division and the 1st Brigade, 25th Infantry Division, are expected to

complete their transformation no later than Fiscal Year 2003 (FY03) and FY04, respectively, with the ongoing fielding of the new Stryker vehicles.

In July 2001, the Army announced the next four brigades to transform into SBCTs: the 172nd Infantry Brigade (Separate) at Fts Richardson and Wainwright, Alaska; the 2nd Armored Cavalry Regiment (Light) at Ft Polk, Louisiana; 2nd Brigade, 25th Infantry Division (Light), at Schofield Barracks, Hawaii; and the 56th Brigade of the 28th Infantry Division (Mechanized), Pennsylvania Army National Guard. In 2002 the Army announced that one of the six SBCTs will be stationed in Baumholder, Germany by 2007.

As part of the Interim Force transformation process, a Stryker-equipped battalion-sized element will undergo training and initial operational testing and evaluation to determine system suitability and effectiveness. Innovative applications and technology insertion in supporting forces will complete the SBCT package and enable initial operational capabilities for the first SBCT by May 2003.

These Stryker brigades will increase the momentum of Army Transformation to the Objective Force, a force that is more strategically responsive and dominant at every point of the operational spectrum. The Army continues to refine the appropriate mix of organizations and capabilities needed in the Interim Force. This includes consideration of an Interim Cavalry Regiment that combines the deployability of a SBCT with the operational capabilities of a traditional cavalry regiment.

## The Legacy Force

Today's Army—our Legacy Force—guarantees both current warfighting readiness as well the ability to transform successfully to the Objective Force. This will remain the case for the next 15 years as the Army begins fielding the Objective Force units by the end of this decade and gradually transfers the mantle of readiness responsibility to these new units of action. In order to preserve adequate operational readiness during this period, the Army must continue to invest sufficiently in its current force through a program of selective recapitalization and limited modernization. These constrained investments are essential in order to ensure that the Army still retains military superiority during the Transformation process and likewise reduces the increase in operating and support costs associated with aging weapon systems.

The resources directed toward the Legacy Force will be the minimal amount needed to maintain combat overmatch over any potential enemy in order to devote all necessary resources to the research and development of the Objective Force.

An important element of the Legacy Force is the requirement for an offensive or counteroffensive capability for use in a major conflict. Assembling the ground force required for decisive counteroffensive operations anywhere in the world calls for a three-division corps along with an armored cavalry regiment. To meet this need, the Army is selectively modernizing and recapitalizing portions of III Corps (designated



as the Army's Counterattack Corps). Additionally, forward-deployed and early-deploying contingency forces will be recapitalized and selectively modernized as needed with available resources. Reserve Component forces will maintain capabilities compatible with the units that they support.

## Conclusion

Army Transformation must successfully structure, organize, and equip the Army for the challenges of the 21st century, but it must also account for and assure dominance in the present Legacy Force and the nascent Interim Force. These are ambitious undertakings, and will not be achieved without well-analyzed investments, in both financial and intellectual terms. The 2003 Weapon Systems Handbook describes some of the investments being made today to ensure the readiness of the Army in the present and future. That Objective Force, the trained, committed soldiers who will fill the ranks of the Army of tomorrow, will rely on these current and future systems as they defend our nation and its global interests well into the 21st century.



# Modernization



In support of the overall goal of Transforming the Army into a more responsive and capable force for the future, the Army has developed a coordinated and comprehensive strategy of focusing all its efforts and programs on equipping and organizing forces. This strategy can be described best as one of “balanced modernization,” which seeks to develop and field combat-capable units through an appropriate mix of selective procurement and fielding of new equipment (modernization), rebuilding and upgrading of key existing equipment (recapitalization), and preserving needed elements of current equipment (maintenance). As instruments for the most efficient use of these various means, the Army also has two important processes—Unit Set Fielding and Software Blocking—that are designed to ensure achievement of the greatest combat capability across the force throughout the overall modernization process.

The Modernization Strategy also consists of the following three components, which help define a clearer focus for its implementation:

- Science and Technology (S&T) efforts to enable timely fielding of the Objective Force and, in particular, the Future Combat Systems, which will be the foundation of that force.
- Fielding of immediate operational capabilities in a more responsive yet still lethal force by organizing and equipping brigade-sized units outfitted with a series of new interim combat vehicles, the Stryker.
- Maintaining and improving essential warfighting capabilities of the existing forces needed to preserve appropriate military superiority for all possible missions.

The Army’s limited modernization efforts for the Legacy Force focus primarily on those systems that will not only benefit the warfighter today but will also have a direct applicability to the Objective Force over the longer term. Modernization has two major components.

The first component are those systems that are a part of the near-term Legacy Force and will transition to the Objective Force (e.g., the Family of Medium Tactical Vehicles). The second component are those systems being built specifically for the Objective Force but that can be employed today (e.g., Tactical Unmanned Aerial Vehicles (TUAV) and High Mobility Artillery Rocket System (HIMARS).

The Army ultimately will have a common organizational design for all components—Active, Guard, and Reserve—built around a new generation of systems that are deployable on C-130-like aircraft, with optimum deployment on C-17 aircraft and fast sealift. The result will be a more strategically responsive Army that is more capable of dominance along the full spectrum of military operations in a joint and combined environment.

## 2.75 Inch Rocket System/Advanced Precision Kill Weapon System (APKWS)



## Mission

Provide air-to-ground suppression, illumination and direct and indirect fires to defeat area materiel and personnel targets at close and extended ranges (Hydra-70), in addition to air-launched precision strike capability (Advanced Precision Kill Weapon System [APKWS]) to be employed against soft or lightly armored point targets and targets in urban terrain to complement Hellfire and unguided rockets through the addition of a semi-active laser guidance sensor to the Hydra-70.

## Description and Specifications

The Hydra-70 Rocket System is a family of 2.75" air-launched, fire-and-forget, unguided all-weather-capable rockets, employed by tri-service, special operating forces, fixed wing, and rotary wing aircraft. The highly modular rockets incorporate several different mission-oriented warheads, including high explosive, multipurpose submunition (MPSM), MPSM practice round, red phosphorus smoke, flechette, variable illumination flare, and infrared illumination flare. (Exact specifications for APKWS may vary until appropriate design is selected)

**Diameter:** 2.75"

**Weight:** 23–27 lbs (depending on warhead)

**Length:** 55–70" (depending on warhead)

**Range:** 300–8,000 meters

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

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

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

**Diameter:** 2.75"

**Weight:** ~35 lbs

**Length:** ~75"

(Exact specifications may vary until appropriate APKWS design is selected.)

## Foreign Counterpart

**Hydra-70:** Russian S-8 80mm air-launched rocket

**APKWS:** No known foreign counterpart

## Foreign Military Sales

**Hydra-70:** Widely used by NATO and various FMS customers

**APKWS:** None

## Program Status

### Hydra-70:

- Fully fielded system; buying replenishment requirements for training and war reserve.

### APKWS:

- FY03** Completing low-cost precision kill advanced technology demonstration.
- FY03** System development and demonstration (SDD) phase.

## Projected Activities

### Hydra-70:

- FY05** Follow-on production contact scheduled.

### APKWS:

- FY03** Block I Milestone B decision, SDD, Dec 02.
- 4QFY05** Milestone C.

## Contractors

### Hydra-70:

Prime Systems: General Dynamics Armament and Technical Products (GDATP) (Burlington, VT)

Grain: Alliant Techsystems (Radford VA)

Warhead and Rocket LAP: GDOTS (Camden, AR)

Fuzes: Action Manufacturing (Philadelphia, PA)

Fin and Nozzle: General Dynamics, (Anniston, AL)

### APKWS:

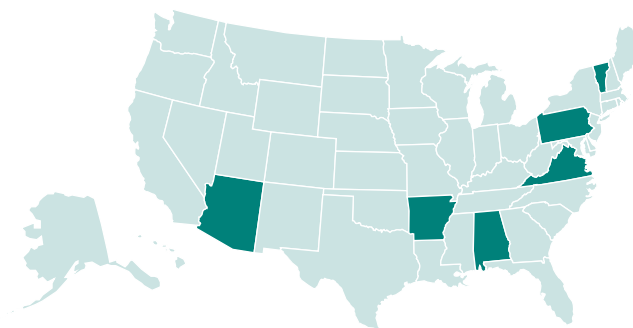
General Dynamics (Burlington, VT)

Action Manufacturing (Philadelphia, PA)

Alliant Techsystems (Radford, VA)

General Dynamics Ordnance and Tactical Systems, (Anniston, AL; Camden AR)

BAE (Nashua, NH) or Raytheon (Tucson, AZ) TBD FY03





## Advanced Field Artillery Tactical Data System (AFATDS)





## Mission

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

## Description and Specifications

The Advanced Field Artillery Tactical Data System (AFATDS) provides the multi-service (Army and Marine Corps) automated Fire Support Command, Control, and Communication (C3) portion of the Army Battle Command System (ABCS). AFATDS enables the maneuver commander to plan and execute attacks using the optimal weapon-target pairing combinations. It provides the maximum exploitation of fire support assets available on the battlefield by providing integrated, automated support for planning, coordinating, and controlling all fire support assets (field artillery, mortars, close air support, naval gunfire, attack helicopters, and offensive electronic warfare) and for executing counterfire, interdiction, and suppression of enemy targets for all fire support operations.

AFATDS will utilize the joint common operating environment and the Army technical architecture to support the First Digitized Division/Corps and Army warfighter experiments. AFATDS will interoperate with the other ABCS battlefield functional areas as well as the Navy and Air Force's current and evolving weapon and control systems. AFATDS will interoperate with the German, French, British, and Italian fire support systems.

## Foreign Counterpart

France: Atlas; Germany: Adler; Italy: SIR; Norway: Odin; United Kingdom: Bates

## Foreign Military Sales

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

## Program Status

- **1QFY01** AFATDS '99 Limited user test.
- **3QFY02** AFATDS '99 (6.3) Materiel release.

## Projected Activities

- **3QFY04** AFATDS 7.0 Limited user test.
- **3QFY05** AFATDS 7.0 Materiel release.
- **3QFY06** AFATDS 8.0 Limited user test.
- **1QFY07** AFATDS 8.0 Materiel release.

## Contractors

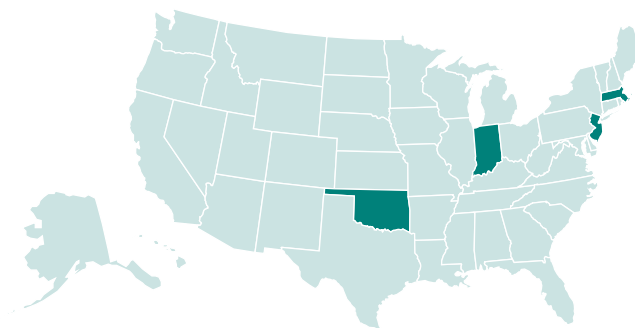
**Software:** Raytheon (Ft Wayne, IN)

**Hardware:** General Dynamics (Taunton, MA)

**Technical:** CSC (Tinton Falls, NJ)

**New Equipment Training:** EPS (Lawton, OK)

**Testing:** Titan Systems (Lawton, OK)



## Advanced Tactical Parachute System (ATPS)



## Mission

Provide a state-of-the-art troop parachute and reserve to reduce the jumper's rate of descent, thus reducing the occurrence of injury.

## Description and Specifications

The main canopy of the Advanced Tactical Parachute System (ATPS) is a highly modified version of a cross/cruciform planform and has an increased inflated diameter of 14 percent compared to the T-10 system and a 28 percent increase in surface area. The main parachute weighs 36.5 lbs. Unlike our current reserve parachute system, the ATPS reserve is a center-pull deployment system. The reserve canopy is a derivative of the proven aeroconical design that includes apex scoop pockets at the top of the reserve canopy and skirt-assist lines at the system's hem to promote fast opening of the reserve system during low-speed malfunctions. The reserve parachute weighs 14.7 lbs. The ATPS harness, due to higher placement of the D-rings, is designed to displace opening shock away from the jumper's lumbar region and spread this force equally along the long axis of a jumper's body.

Special Features:

- ATPS main canopy - Slider ensures controlled and consistent openings.
- ATPS reserve canopy - Deployed using either hand deployment techniques.
- ATPS harness - Improved fit/comfort and reserve opening loads exerted along long axis of the body.

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

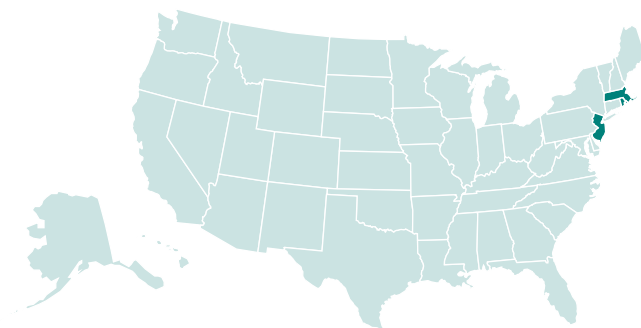
- **3QFY02** Purchase long lead operational testing (OT) hardware.
- **1-3QFY02** Developmental testing (DT) mannequin jumps.
- **4QFY02** DT live jump.

## Projected Activities

- **1-2QFY03** Assess parachute performance.
- **3QFY03** Modify test items.
- **4QFY03** thru 3QFY04 Test.
- **1QFY05** MDA Review - Milestone C.
- **3QFY05** Fielding begins

## Contractors

Para-Flite (Pennsauken, NJ); GEO-Centers (Newton, MA); TRG (East Providence, RI)





## Mission

Provide missile warning and electronic countermeasures against infrared (IR) guided missiles.

## Description and Specifications

The AN/ALQ-212 Advanced Threat Infrared Countermeasures (ATIRCM) is a modular system consisting of the AN/AAR-57 Common Missile Warning System (CMWS), IR jam head, improved countermeasure dispenser, and improved countermeasure munitions.

The CMWS system provides automatic, passive missile detection, threat declaration, crew warning, software reprogramming, false alarm suppression, and cues to other on-board systems, such as dispensers, which may be utilized for flare decoys. ATIRCM adds active, directional countermeasures via a laser, an arc lamp, and an improved countermeasures dispenser (ICMD).

As a modular system, the ATIRCM/CMWS can be installed in various configurations:

- With the CMWS only, to provide missile warning
- With the CMWS and the ICMD to decoy/defeat threat missiles
- With the laser and arc-lamp jam head to create a complete multi-response system to defeat the full threat array.

System weight: CMWS and ICMD only - 55.7 lbs; with ATIRCM - 130.1 lbs

Current plans include integration and deployment of selected configurations on AH-64, UH-60, and CH-47 platforms beginning FY03.

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

United Kingdom

## Program Status

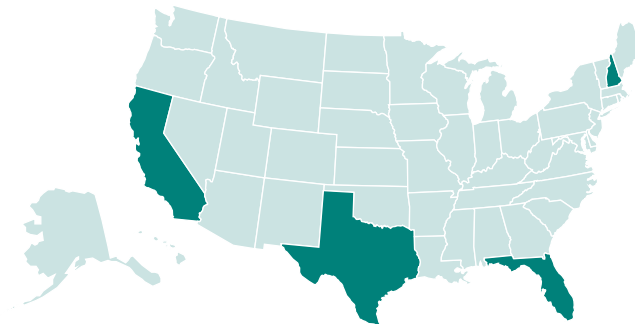
ATIRCM/CMWS is currently an Army-only program. The full system has completed contractor flight qualification, government development tests, and CMWS has completed integrated testing (DT/OT). ATIRCM/CMWS has completed the engineering and manufacturing development phase of the life cycle and CMWS limited production is ongoing.

## Projected Activities

- **2QFY03** Begin low-rate initial production of ATIRCM.
- **3QFY03** Special operations aviation (SOA) CMWS first unit equipped.
- **2QFY04** CMWS full-rate production begins.
- **2QFY05** ATIRCM full-rate production begins.

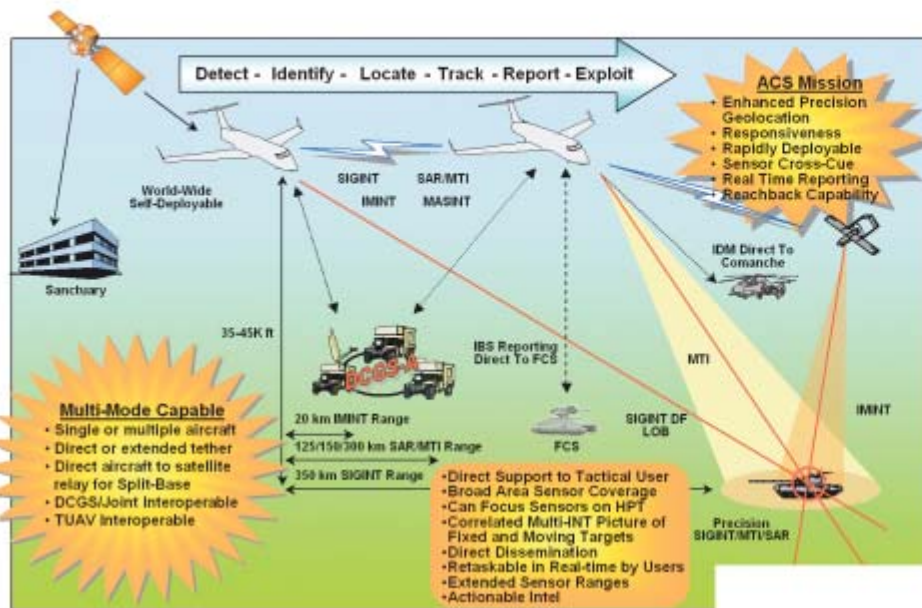
## Contractors

BAE Systems (Nashua, NH; Austin, TX); Northrop Grumman (Winter Haven, FL); Raytheon (Goleta, CA)





# Aerial Common Sensor (ACS)



## Mission

Provide an Objective Force system that will merge and enhance the sensor capabilities of the legacy intelligence, surveillance, and reconnaissance (ISR) platforms (Airborne Reconnaissance Low [ARL] and Guardrail Common Sensor [GRCS]) into a single multi-intelligence, manned, airborne system. The first ACS is scheduled for fielding in FY09 and the final system in FY17. ACS will provide rapid and responsive ISR coverage to meet Army Transformation goals.

## Description and Specifications

Aerial Common Sensor (ACS) is an Objective Force airborne intelligence collection and dissemination system, and is required to satisfy the Army's critical need for a worldwide, rapidly self-deployable, airborne ISR capability that can immediately begin operations when arriving in theater. ACS provides the objective force commander with dedicated, persistent, wide-area coverage of the battlespace enabling extended range precision fires with near real-time SIGINT, precision geo-location, IMINT, and MASINT capabilities. All five current Aerial Exploitation Battalions (GRCS and ARL) will be replaced with ACS systems.

The ACS acquisition strategy consists of migrating current fielded systems' components (downsized ground station and datalinks) towards an ACS configuration while simultaneously evaluating the sensors and platform. The ACS will:

- Provide a multi-intelligence system capable of supporting warfighter requirements across the full spectrum of operations, from early/denied entry to crisis resolution.
- Provide critical intelligence and combat information to/from the unit of employment/unit of action and the component commander, via Distributive Common Ground System-Army.
- Provide a critical precision SIGINT linkage into the Joint Airborne Network.
- Be fully interoperable with joint and national collectors, ground processing facilities and dissemination systems, meeting transformational, joint Web-centric/networked, situational awareness requirements.
- Provide an open and common architecture ensuring paced technology growth with FCS and against emerging threat capabilities
- Provide a larger area of coverage to support Objective Force operational geometrics and the greater lethality range of new weapons systems including ATACMS Block 2 and Comanche.
- Transform Army airborne ISR from a strategic-lift-intensive, maximum-deployment-time asset to a minimum-lift, minimal-deployment-time, global asset.
- Be mission tailorable and scalable, providing real-time sensor-to-shooter information "in the crew seat."

## Foreign Counterpart

Numerous countries possess airborne electronic warfare systems, but none achieves the multi-INT, timeliness, assured support, and direction-finding (targeting) accuracy capabilities of ACS.

## Foreign Military Sales

None

## Program Status

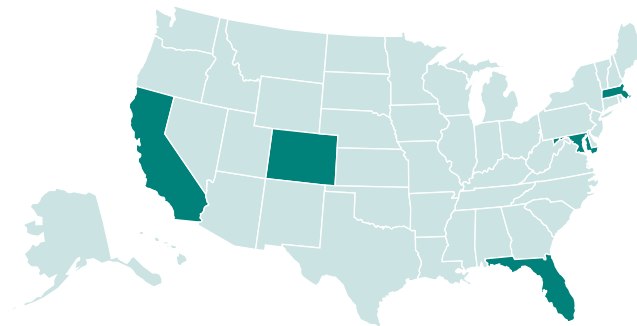
- Completing concept exploration phase.
- ACS component advanced demonstration (CAD) contracts awarded (two competitive teams).

## Projected Activities

- **3QFY03** CAD demonstrations.
- **4QFY03** Milestone B decision review.

## Contractors

Lockheed Martin (Denver, CO); Northrop Grumman (Baltimore MD, Melbourne FL); TRW (McClellan, CA); Raytheon (Marlborough MA)





### *Integrate Equipment, Aircraft and Aircrew*

#### **Aircrew Integrated Helmet System (AIHS)**

- Advanced composite construction
- Custom fit
- Dual Visor Assembly
- Maintained by Unit ALSE Shop
- Maxillofacial Shield (MFS)
- Communications Ear Plug (ECP)

#### **AIR WARRIOR BLOCK 1**

- **Survival Equipment Subsystem**
  - Survival Gear Carrier, Body Armor, Thigh Holster
- **NBC Protection**
  - M45 Mask Blower, modified Chemical Protective Undergarment
- **Microclimate Cooling System (MCS)**
  - Microclimate Cooling Garment and Cooling Unit
- **Modular Integrated Helmet Display System (MIHDS)**
- **Over Water Mission**
  - Integrated Raft, Survival Egress Air (SEA), Low Profile Flotation Collar
- **Clothing Items**
  - Modified ABDU
- **Quick Disconnect Wiring Assembly (OH-58D)**



#### **Laser Eye Protection (LEP)**

- Polycarbonate Ballistic Visor
- Green 2 wavelength visor/spectacles
- Brown 3 wavelength visor/spectacles
- Clear Laser Eye Protection (CLEPIR)
  - Night Vision Goggles compatible
  - Spectacles for HGU-56/P and Apache helmets
  - 4 wavelengths of protection
  - Transmittance >75%
  - Joint Advanced Laser Eye Protection (JALEPV)

#### **AIR WARRIOR BLOCK 2**

- Combat Survivor Evader Locator (CSEL)
- Combat Identification
- Joint Protective Aircrew Ensemble (JPACE)
- Joint Service Aircrew Mask (JSAM)
- Chemical Sock and Glove
- Improved Laser Eye Protection
- Advanced Night Vision Goggle (95° FOV)
- Advanced Anti-Exposure System
- Aircraft Wireless Intercom System (AWIS)
- Electronic Data Manager (EDM)

## Mission

Improve the lethality, survivability, mobility, and sustainment of Army aircrew in combat by integrating all aviation life support equipment and mission equipment into an aircrew ensemble that enhances aircrew cockpit synergy and aircraft mission capability.

## Description and Specifications

Air Warrior (AW) is a new generation aircrew ensemble that provides advanced life support, ballistic protection, and nuclear, biological, and chemical (NBC) protection in rapidly tailorable, mission-configurable modules. Previously, the separate development and application of Aviation Life Support Equipment resulted in a layered, non-integrated assemblage of protective/survival gear normally carried or worn by the aircrew member. The AW concept is being developed with interoperability in mind and has leveraged several joint service technology efforts.

The system consists of components effectively integrated to maximize safe aircraft operation and human performance while not encumbering the aircrew. These components will include the microclimate cooling system, NBC protection, body armor, survival items for escape and evasion, overwater survival items, and an interface to the aircraft platform. Improvements to the AW system will be provided via a block approach (a time-phased, evolutionary acquisition program) to solve equipment shortcomings. The AW is leveraged with the Land Warrior Program. The AW Modular Integrated Helmet Display System (MIHDS) will be a Block 3 Advanced Capabilities program that becomes the baseline for the Objective Force Warrior Helmet. The AW system is the key ingredient to closing the performance gap that exists today between the aircrew and the aircraft. AW is answering the aviation warfighter challenges of today and tomorrow by developing affordable, responsive, deployable, versatile, lethal, survivable, and sustainable aircrew equipment.

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

The AW program has successfully completed system Developmental and Operational Testing. The system is approaching the Milestone C Full Rate Production decision.

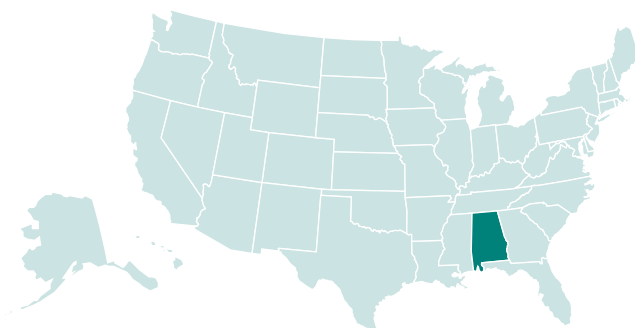
- **3QFY02** Completed Block 1 development test.
- **1QFY03** Completed Block 1 operational test.

## Projected Activities

- **2QFY03** Early production decision for Microclimate Cooling System (MCS).
- **3QFY03** Block 1 Milestone C full rate production decision.
- **2QFY04** First unit equipped (160th SOAR (A)).

## Contractors

**Prime system integrator:** US Army (Huntsville, AL)







## Mission

Provide air and missile defense (AMD) command and control capability to air defense artillery (ADA) brigades, the Army Air and Missile Defense Commands (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 the backbone of Army air defense and provides a fire control system, common air and missile defense planning, battlespace situational awareness, and joint, interoperable battle management/command, control, communications, computers and intelligence (BM/C4I) capability. It consists of sheltered systems with integrated communication equipment that provide ADA brigades with a fire control system for monitoring and controlling engagement operations by subordinate battalions via the air defense system integrator (ADSI). AMDPCS provides a common air and missile defense staff planning and battlespace situational awareness tool to achieve a common tactical and operational air picture via the Air and Missile Defense Workstation (AMDWS). The AMDWS is fielded to AMD units at all echelons of command, battery through theater. The AMDPCS provides interoperability for Army AMD forces with the standard Army Battle Command Systems (ABCS) BM/C4I, providing the air situation input to the common operational picture. AMDWS also provides interoperability with joint theater air and missile defense forces. AMDPCS provides sheltered systems for the ADA brigades and the AAMDCs and enables active, passive, and attack operations coordination with the joint forces.

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

- **3QFY97** Approved operational requirements document.
- **4QFY97** Approved as acquisition category III program.
- **FY99** Deployment of 1 ADA brigade (partial), AAMDC update, ADA school update.
- **3QFY00** AMDWS V1.1 formal delivery.
- **4QFY00** 263d South Carolina Army Reserve National Guard (SCARNG) AAMDC initial training configuration delivered.
- **1QFY01** First delivery to Stryker Brigade Combat Team (SBCT).

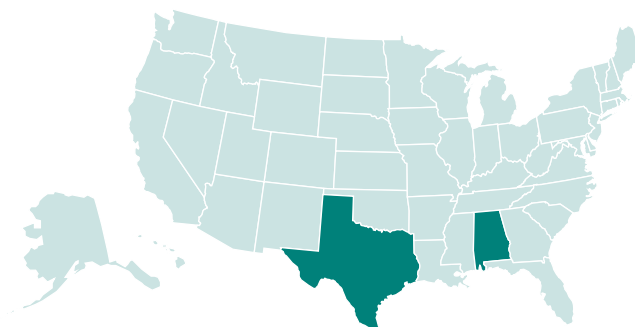
- **3QFY01** Supported DCX-1 with delivery of AMDWS V2.0 software via interim materiel release.
- **3QFY01** Awarded contracts for design, integration, and fielding of the 263rd AAMDC AMDPCS and initial design of the 31st ADA Brigade AMDPCS (a component of the First Digitized Corps).
- **4QFY01** ADSI certified for tactical digital information link (TADIL) A, TADIL B, and TADIL J message set implementation.
- **2QFY02** Contract award for development of AMDPCS for First Digitized Corps.
- **3QFY02** Deployment of 263d SCARNG AAMDC tactical configuration.

## Projected Activities

- **2QFY03** Contract award for development of AMDPCS for First Digitized Corps.
- **3QFY03** Second SBCT delivery.
- **3QFY03** AMDWS V1.1 software materiel release.
- **4QFY03** JTIC certification and release of ADSI V.12.
- **4QFY03** Complete force fielding of AMDWS V1.1c with interoperability patch.

## Contractors

TRW (Huntsville, AL; Killeen, TX; El Paso, TX); RDA (Killeen, TX); APC (Austin, TX)





## Airborne Reconnaissance Low (ARL)



## Mission

Detect, locate, and report threat activities using a variety of imagery, communications-intercept and moving-target-indicator sensor payloads.

## Description and Specifications

The Airborne Reconnaissance Low (ARL) is a self-deploying, multi-function, day/night, all-weather, reconnaissance, intelligence, echelons-above-corps asset. It consists of a modified DeHavilland DHC-7 fixed-wing aircraft equipped with communications intelligence (COMINT), imagery intelligence (IMINT), and synthetic aperture radar/moving target indicator (SAR/MTI) mission payloads. The payloads are controlled and operated via on-board open-architecture, multi-function workstations.

Intelligence collected on the ARL can be analyzed, recorded, and disseminated on the aircraft workstations in real time and/or stored on board for post-mission processing. During multi-aircraft missions, data can be shared between cooperating aircraft via ultra high frequency (UHF) air-to-air data links allowing multi-platform COMINT geolocation operations. The ARL system includes a variety of communications subsystems to support near-real-time dissemination of intelligence and dynamic retasking of the aircraft. There are currently two configurations of the ARL system:

- The ARL-COMINT (ARL-C) configuration with a conventional communications intercept and direction finding (location) payload.
- The ARL-Multifunction (ARL-M) configuration equipped with a combination of IMINT, COMINT, and SAR/MTI payload.

## Foreign Counterpart

Numerous countries possess airborne signals intelligence (SIGINT) and/or IMINT systems, but none provides the robust multi-intelligence capability of ARL.

## Foreign Military Sales

None

## Program Status

- Eight ARL systems have been fielded to date.\*
- Two ARL-Cs and two ARL-Ms are stationed at Ft Bliss, TX, and primarily support SOUTHCOM requirements; three ARL-Ms provide support to PACOM (Korea).
- Demonstrated hyperspectral imager applications and multi-INT data fusion capabilities.
- One ARL-M (#6) is currently in production to be fielded in 1QFY04.

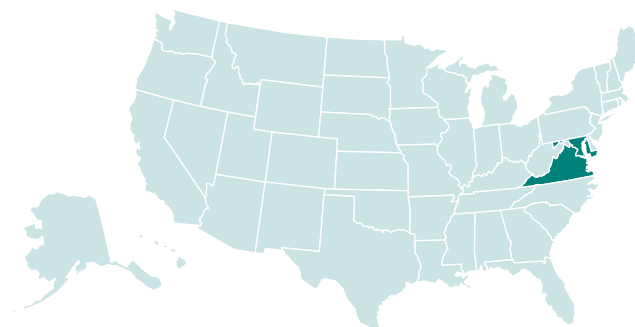
\*ARL-I crashed in 4QFY99.

## Projected Activities

- **FY03** Complete ARL-M#6 integration and flight tests.
- **FY03** Complete demand assigned multiple access and COMINT upgrades.
- **FY03** Begin aircraft survivability equipment upgrade.
- **FY03** Begin standardization of cockpit configuration on the two ARL-C platforms.
- **FY03** Conduct digital framing upgrade on ARL-M aircraft assigned to Ft Bliss, TX.
- **FY03** Complete joint tactical terminal integration.
- **FY03** Complete direct to air satellite relay installation on ARL M4.
- **FY03** Complete "P" band communications intelligence collection capability.

## Contractors

Northrop Grumman (Belcamp, MD); CACI (Berryville, VA)



## All Source Analysis System (ASAS)



**ASAS Remote Workstation**



**ACT Enclave**



**ASAS Light**



**ASAS Remote Workstation Training**



**Communications Control Set**



## Mission

Provide combat leaders the fused intelligence needed to view the battlefield and more effectively conduct the land battle from battalion to echelons above corps.

## Description and Specifications

The All Source Analysis System (ASAS) processes and analyzes all-source intelligence including non-structured threat data; automates intelligence preparation of the battlefield; produces a correlated ground picture; disseminates intelligence products; provides target nominations; manages intelligence and electronic warfare intelligence, surveillance, and reconnaissance (ISR) collection and mission; provides counterintelligence (CI) and EW mission support; provides intelligence fusion to Distributed Common Ground System-Army (DCGS-A), supports predictive intelligence analysis; interoperates with Army Battle Command System, joint, theater, and national sources. It supports all echelons and functions in all phases of military operations across the full spectrum of conflict. ASAS supports current operations and future planning.

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

ASAS has five different components: the compartmented all source workstation at the analysis control element (ACE) at division, corps, and echelons above corps; the collateral RWS desktop and laptop configuration (ASAS-L) issued down to battalion level, the High Mobility Multipurpose Wheeled Vehicle (HMMWV)-mounted remote workstation (RWS) with integrated communications (ACT-E) at brigade level; and the communications control set.

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

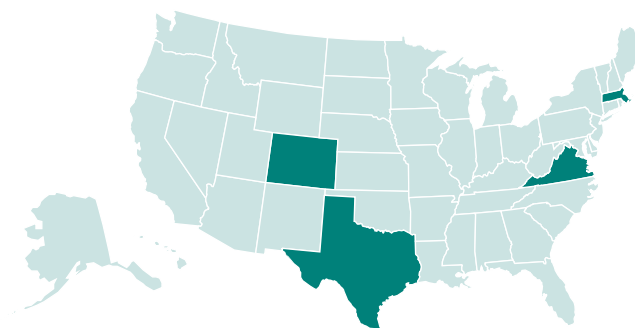
- Continued fielding ASAS Block II RWS, ASAS light and ACT-E.
- Developed and completed development test of the next iteration of ASAS light and RWS V 6.3.
- Initiated development of 7.X ASAS light capabilities.
- Continued developing Block II ACE.
- Achieved greater joint interoperability.

## Projected Activities

- Continue fielding ASAS Block II RWS, ASAS-L, and ACT-E.
- Field the next iteration of ASAS light and RWS version 6.3.
- Continue development of 7.x ASAS light capabilities.
- Continue developing and begin test cycle for downsized Block II ACE.

## Contractors

General Dynamics (Taunton, MA); Lockheed Martin (Denver, CO); Sytex, Inc. (McLean, VA); Austin Information Systems (Austin, TX); MANTECH (Killeen, TX)



## Army Airborne Command and Control System (A2C2S)



## Mission

Provide commanders, from maneuver brigade to echelons above corps, with an airborne tactical command post that affords continuous situational awareness, robust communications, and battlefield mobility.

## Description and Specifications

The Army Airborne Command and Control System (A2C2S) is the Army's premier airborne command and control (C2) system supporting echelons above corps, corps, division, and maneuver brigade commanders. The A2C2S supports C2 requirements for missions ranging from low intensity humanitarian assistance to deep operations in high intensity conflict. Hosted in a UH-60 Black Hawk, this highly mobile tactical command post enables the maneuver commander to gain and maintain situational awareness and to execute C2, either from a static remote site or while traversing the expanded battlespace of a Force XXI Division at speeds up to 300 km per hour. To provide the commander with situational awareness and C2, the A2C2S hosts selected Army Battle Command System programs and, through the Tactical Internet, allows commanders to access, manipulate, store, manage, and analyze situational awareness information, intelligence data, and mission plans.

Additionally, the A2C2S's robust communications suite includes:

- Line-of-sight combat net radios consisting of a single channel ground airborne radio system, advanced system improvement program, UHF Havequick II, civilian VHF, FM, and AM radios.
- Non-line-of-sight radios such as high frequency and satellite communications-demand assigned multiple access, as well as wide-band digital radios, e.g., near term digital radio and enhanced position location reporting system radio.
- These capabilities enable warfighters to exercise C2 of assigned and attached elements and to coordinate with adjacent, supported and supporting forces via voice and data equipment with battlefield information processing and connectivity. The A2C2S is critical to enhance the battle command group's ability to effectively perform combat unit operations and serve as a force multiplier in Army XXI and the Objective Force.

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

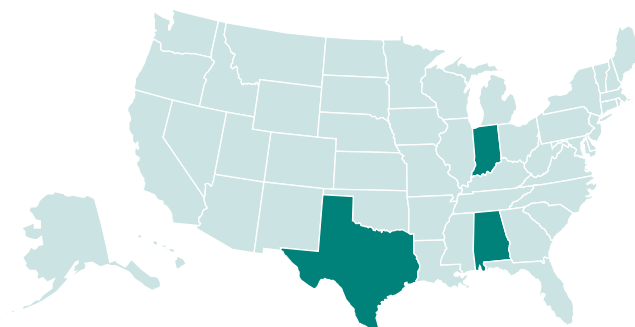
- In system integration (Block I) sub-phase of system development and demonstration phase.
- Completed preliminary design review and critical design review.
- Began integration of developmental test system.
- Accelerating three systems for early deployment.

## Projected Activities

- Prototype delivery.
- System assessment.
- Milestone C and low rate initial production.

## Contractors

Raytheon (Huntsville, AL; Waco, TX; Ft Wayne, IN); CAS (Huntsville, AL)





## Army Ammunition Program



## Mission

Provide US forces with modernized, highly capable munitions to support Legacy, Interim, and Objective forces.

## Description and Specifications

The Army's ammunition program supports Army readiness by resourcing 100 percent of Standards in Training Commission (STRAC) strategy and munitions modernization efforts. The program provides centralized management of the organic and commercial munitions industrial base, optimizing the preparedness of the national technology and industrial base. Finally, it enhances readiness by improving storage efficiency, reducing DoD's demilitarization liability, and providing a source of critical components.

The STRAC determines the quantities and type of munitions for soldiers, crews, and units to attain and sustain weapon proficiency relative to Army's readiness levels. Major elements are training-unique items, and training-standard items, which support both training and war reserve requirements. Systems include small and medium caliber mortars, tank, artillery, and other munitions.

War reserve modernization ammunition is essential to the success of Army fire support, mobility, and maneuver forces. These items support deployment stocks for the Stryker Brigade Combat Team and support the Transformation Campaign Plan.

The production base support (PBS) program ensures that investments and acquisitions are strategically aligned, and fosters increased operating efficiencies and responsiveness in the national technology and industrial base, which produces more than 200 end items and more than 300 components. Readiness in active and inactive ammunition plants is maintained through replacement of worn and obsolete equipment, correction of infrastructure deficiencies, environmental remediation, asset modernization, and reduction of operating overhead.

The conventional ammunition demilitarization program funds the disposal, demilitarization, and resource recovery and recycling of conventional ammunition. This program also funds movement of ammunition and technical support for demilitarization projects at various installations, and the commercial contracts for resource recovery and demilitarization of excess, obsolete, and unserviceable ammunition. Funding is allocated for the demilitarization of ammunition assets that have become unsafe for continued storage.

## Foreign Counterpart

Numerous

## Foreign Military Sales

Numerous foreign countries purchase US ammunition.

## Program Status

**10FY03** Program Executive Office, Ammunition (PEO Ammo), Picatinny, NJ, officially established: responsible for life cycle acquisition management of conventional ammunition, including integrating budget, acquisition strategies, R&D and life cycle management across all ammunition families. PEO Ammo organizations include Program Manager (PM)-Combat

Ammunition Systems, PM-Maneuver Ammunition Systems, PM-Close Combat Systems, and PM-Joint Services.

**FY03** Congress maintains an interest in supporting near-term readiness requirements and the production base and increased the Procurement of Ammunition; the Army budget for ammunition acquisition, training, war reserve, modernization, and conventional ammo demilitarization; and the industrial base to support the war on terrorism.

## Projected Activities

- **M829E3 (120mm) APFSDS-T Cartridge: FY03** Transition to full-rate production.
- **XM1002 (120mm) MPAT Training Cartridge: FY03** System demonstration and development (SDD); **2QFY04** Milestone C scheduled.
- **Handheld Standoff Mine Detection System: FY03** SDD; **2QFY03** Milestone C scheduled.

## Contractors

**Small Caliber Ammo:** Alliant Techsystems (Independence, MO)

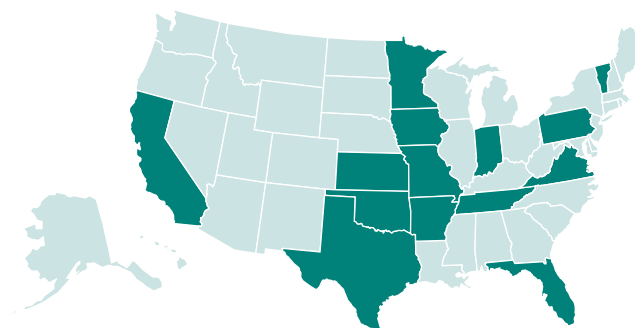
**120mm Tank Ammo:** General Dynamics Ordnance Tactical Systems (St. Petersburg, FL); Alliant Techsystems (Hopkins, MN)

**Hydra:** General Dynamics (Burlington, VT)

**MACS:** General Dynamics (Camden, AR)

**Government-Owned, Contractor-Operated Army Ammunition Plants (AAP):** Holston AAP (Kingston, TN); Iowa AAP (Middletown, IA); Kansas AAP (Parsons, KS); Lake City AAP (Independence, MO); Lone Star AAP (Texarkana, TX); Milan AAP (Milan, TN); Radford AAP (Radford, VA); Riverbank AAP (Riverbank, CA); Scranton AAP (Scranton, PA)

**Government-Owned, Government-Operated Army Ammunition Plant:** Crane Army Ammunition Activity (Crane, IN); McAlester AAP (McAlester, OK); Pine Bluff Arsenal (Pine Bluff, AR)







## Mission

Provide a mobile wireless data communications backbone for the Army's Tactical Internet; embedded situational awareness/position navigation; and a common system for Army, Air Force, Navy, and Marine Corps warfighters.

## Description and Specifications

The Enhanced Position Location Reporting System (EPLRS) supports the Army's Stryker Brigade Combat Team (SBCT). EPLRS provides data distribution and position/navigation services in near-real time for the warfighter at brigade and below level, in support of battlefield functional area hosts and the Force XXI Battle Command Brigade-and-Below (FBCB2) program. EPLRS consists of a network control station and the EPLRS radio, which 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. In addition, it uses frequency hopping, error detection, and correction with interleaving. Spread spectrum technology provides jamming resistance.

EPLRS is interoperable with US Air Force, Marine Corps and Navy. It is the Tactical Internet backbone and used by the Army Battle Command System and FBCB2 for situational awareness and command and control. Improvements to EPLRS include: message reliability, more efficient available bandwidth and field-programmable software.

### Weight of the radio:

**Vehicular:** 40 lbs (as shown)

**Manpack:** 25 lbs

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

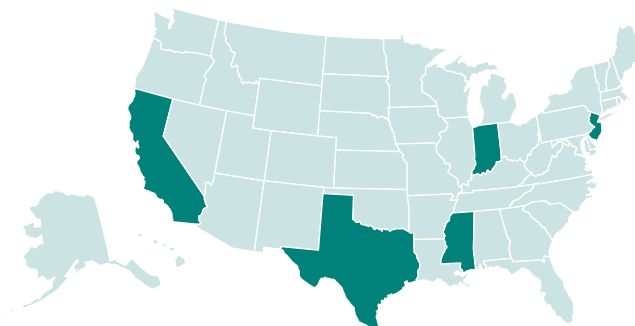
- **3QFY03** Contract award for 1,046 EPLRS radios.
- EPLRS Network Manager (ENM) progressed through several development milestones including critical design review. An ENM government operational test is on schedule for **4QFY02**.
- Fielding ongoing to the SBCT at Ft Lewis, WA. Fielded 600 to date.
- **4QFY01** EPLRS participated in the Division Capstone Exercises (DCX 1 and 2) with 500 radios in the network.
- **1QFY02** EPLRS participated in FBCB2's limited user test (Limited User Test 2a).

## Projected Activities

- **4QFY02** EPLRS operational assessment ENM.
- **1QFY03** Will participate in FBCB2 initial operational test and evaluation.
- **FY04-FY06** Continue fieldings to Counterattack Corps and SBCTs.

## Contractors

Raytheon (Fullerton, CA; Forest, MS; Ft Wayne, IN; Garland, TX); BAE Systems (W. Long Branch, NJ); Innolog (Wall Township, NJ)





## AKMS



**Ruggedized Laptop**



**Ruggedized Laptop**



**NSA Key Processor**



**Data Transfer Devices**



## Mission

Enable frequency management and communications security (COMSEC) management planners and operators to provide highly responsive, reliable, and 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, hard-copy-signal-operating instruction, and associated time- and resource-intensive courier distribution. The Local COMSEC Management System (LCMS) is the Army's position in the four-tiered Electronic Key Management System (EKMS). EKMS is a key management, COMSEC-materiel-distribution, and logistics-support system. The National Security Agency established the EKMS program to meet the following objectives:

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

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

The Data Transfer Device (DTD) is an Associated Support Item of Equipment (ASIOE). The fielded DTD is being upgraded to a new version called the Simple Key Loader (SKL).

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

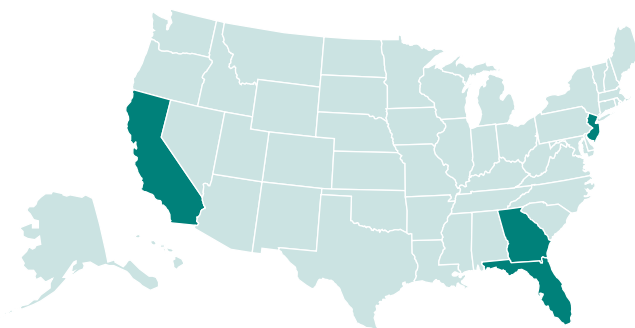
- **1QFY02** Completed fielding of LCMS release 3 software.
- **2QFY02** Commenced fielding of ACES.
- **4QFY02** Awarded SKL Phase II contract.

## Projected Activities

- **2QFY03** Conversion of LCMS to phase 4 software.
- **3QFY03** Completion of ACES fielding.
- **2QFY03** SKL Phase III production awarded.

## Contractors

Science Applications International Corporation (San Diego, CA); Booz Allen Hamilton (Eatontown, NJ); Information Systems Support, Inc. (Tinton Falls, NJ); Communications Systems Support (Augusta, GA); Sypris Electronics LLC (Tampa, FL)





## Mission

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

## Description and Specifications

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

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

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

## Foreign Counterpart

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

## Foreign Military Sales

Bahrain, Greece, South Korea, and Turkey

## Program Status

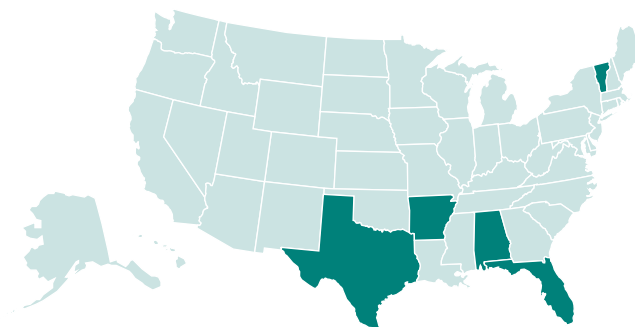
- **FY02** Completed the delivery of the ATACMS Block I FMS to Bahrain.
- **FY02** Awarded ATACMS QRU contracts for procurement of 68 missiles.
- **FY02** Awarded Korea Foreign Military Sales (FMS) contract for ATACMS Block IA.

## Projected Activities

- **FY03** Begin deliveries of ATACMS QRU missiles.
- **FY03** Begin deliveries of ATACMS Block IA FMS to Korea.
- **FY03** Award ATACMS QRU contract.

## Contractors

Lockheed Martin (Dallas, TX; Horizon City, TX); SETA (Huntsville, AL); General Electric (Clearwater, FL); Atlantic Research (Camden, AR); BFG (Vergennes, VT)





## Automatic Chemical Agent Detector/Alarm (ACADA)



## Mission

Detect nerve and blister chemical agents.

## Description and Specifications

The Automatic Chemical Agent Detector/Alarm (ACADA) is an advanced point-sampling, chemical-agent alarm system. It is capable of simultaneously detecting, identifying, and warning of standard blister and nerve agents. The ACADA is man-portable, operates independently after system start-up, and provides an audible and visual alarm. It is used by Army, Navy, Air Force, and Marine Corps units. It can provide its warning automatically, using the multiple integrated chemical agent alarm, to communicate with battlefield data transfer and warning systems. ACADA does not require a specific military operator. Auxiliary equipment includes the M279 sampler probe, which for the first time allows the capability to detect agents deposited on surfaces at cold temperatures.

**Weight:** 24 lbs (complete w/carry case, battery pack and M42 remote alarm)

**Size:** 7" x 7" x 14" detector and battery box (14 lbs)

**Detection capability:** Nerve and blister agents

**Battery life:** Approximately 15 hours at 70°F

## Foreign Counterpart

United Kingdom: GID-3.

## Foreign Military Sales

None

## Program Status

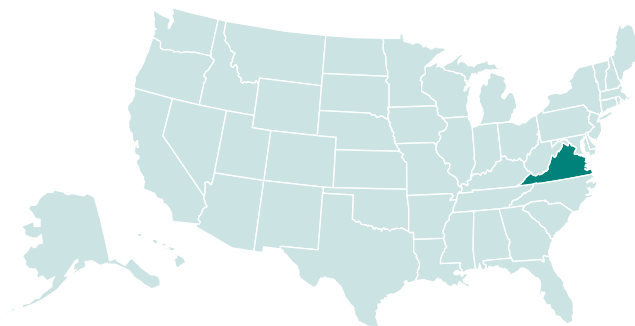
- **1QFY96** Awarded contract with priced options (through FY00).
- **3QFY97** Type-classified standard.
- **4QFY98** First unit equipped to the Army.
- **FY99** Initiated fielding to Air Force, Navy, and Marine Corps.
- **FY00-FY02** Continued fielding to Army.
- **FY01** Approved MS III for M279 sampler probe.

## Projected Activities

- **FY03** Award new production contract and reinstate production deliveries.
- **FY04** Continue production deliveries and fieldings to Army units (Stryker Brigade Combat Team requirements).

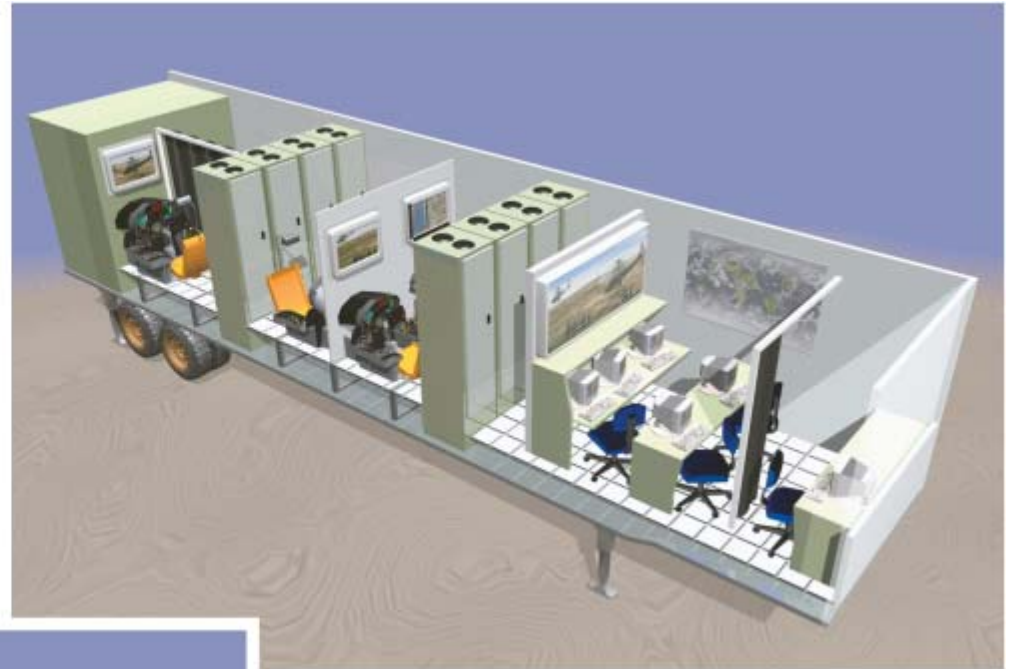
## Contractors

Graseby Dynamics, Ltd. (Waterford, U.K.); Science and Tech Research, Inc. (Fredericksburg, VA)

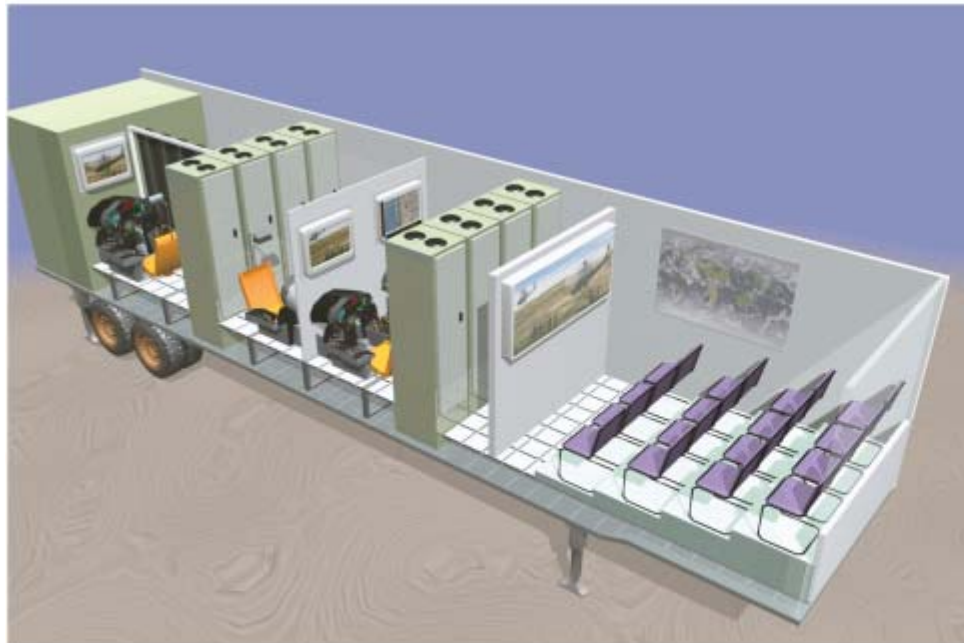




## Aviation Combined Arms Tactical Trainer (AVCATT)



AVCATT-BMC



AVCATT-AAR

## Mission

Provide collective training system to meet institutional, organizational, and sustainment aviation training requirements for Active and Reserve Army aviation units worldwide in combined arms collective training and mission rehearsal.

## Description and Specifications

The Aviation Combined Arms Tactical Trainer - Reconfigurable Manned Simulator (AVCATT-A) is a dynamic, alternative instructional concept to rehearse and participate, through networked simulation, in a unit-collective and combined-arms, simulated battlefield environment. AVCATT-A is a critical element of the Combined Arms Training Strategy, interoperating with the Close Combat Tactical Trainer by LAN connection, and supports institutional, organizational, and sustainment training. AVCATT-A is an Army aviation training system for both the Active and Reserve Components.

AVCATT-A will be Distributive Interactive Simulation-compliant, and compatible and interoperable with other Synthetic Environment Corps systems. A single suite of equipment consists of two mobile trailers housing six reconfigurable networked simulators that support the Apache, Kiowa Warrior, Chinook, Black Hawk, Comanche, and Longbow platforms. AVCATT-A supports role-player and semi-automated blue and opposing forces. After action review workstations are also provided as part of each suite. AVCATT-A is a fully mobile system, capable of utilizing commercial and generator power and is transportable worldwide. The AVCATT-A system will permit various aviation units to conduct collective task training on a real-time, computerized battlefield in a combined arms scenario. Other required elements that are present on the modern, high intensity battlefield, such as the combat support and combat service support elements, are an integral part of the simulation database. AVCATT-A is designed to provide realistic, high intensity collective and combined arms training to aviation units in the following core tasks:

Armed Reconnaissance (Area, Zone, Route)	Movement to Contact
Screen	Deliberate Attack
Covering Force Operations	Deep Attack
Joint Air Attack Team (JAAT)	Hasty Attack
Air Assault Operations	Passage of Lines
Air Movement	Heavy Lift

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

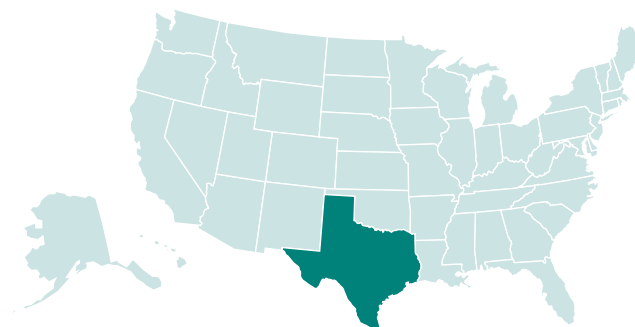
- Current funding combined with a congressional increase of \$1.05M will provide upgrades for visuals, semi-automated forces, after action review (AAR), interoperability and manned modules.
- **FY03** procurement funding provides for three suites and spares, government and support service contractor program support, engineering change proposals, and software maintenance support.
- Production will continue after a successful initial operational testing and evaluation (IOT&E).

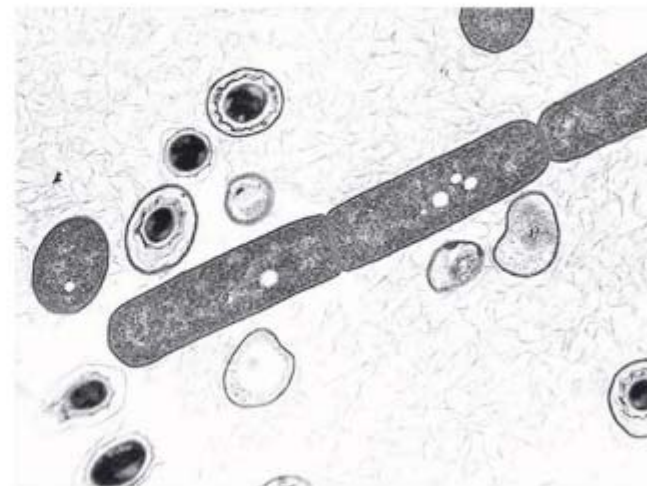
## Projected Activities

- **2QFY03** Milestone C production decision.
- **3QFY03** Operational test readiness review.
- **3-4QFY03** IOT&E.
- **4QFY03** Full rate production.

## Contractors

L-3 Communications (Arlington, TX)





## Mission

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

## Description and Specifications

Immunization of US forces with BD vaccines protects each individual against exposure to BW agents and allows commanders to continue operations. The anthrax vaccine absorbed (AVA) production program is the only FDA-licensed vaccine available for protection against anthrax. The AVA production program is responsible for the production, storage and shipment of the FDA licensed AVA vaccine.

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

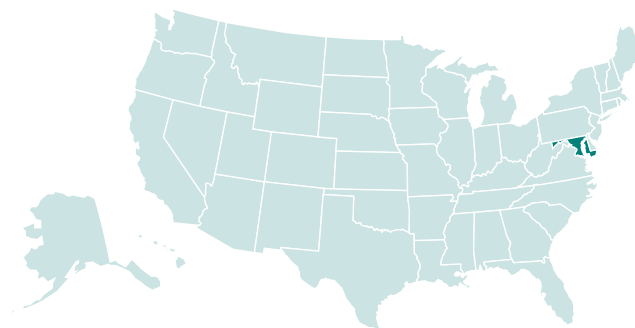
- AVA production program is meeting the DoD (Anthrax Vaccine Immunization Program Agency) requirements for anthrax vaccine.

## Projected Activities

- Continue producing AVA vaccine to meet DoD requirements.
- Contract for additional quantities of AVA to meet the needs of other government agencies for AVA.

## Contractors

DynPort LLC (Frederick, MD)









## Mission

Protect and enhance the warfighter's capability to operate in a biological warfare (BW) environment through the development, Food and Drug Administration (FDA) licensure, and production of medical biological defense (BD) products.

## Description and Specifications

Immunization of US forces with BD vaccines protects each individual against exposure to BW agents and allows commanders to continue operations. BD vaccines invented in DoD laboratories or through DoD-sponsored research grants transition to the Joint Vaccine Acquisition Program (JVAP), which is responsible for their advanced development. The JVAP uses a prime systems contractor who is responsible for all activities leading to FDA licensure and production of these vaccines and subsequently acts as the FDA-licensed manufacturer.

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

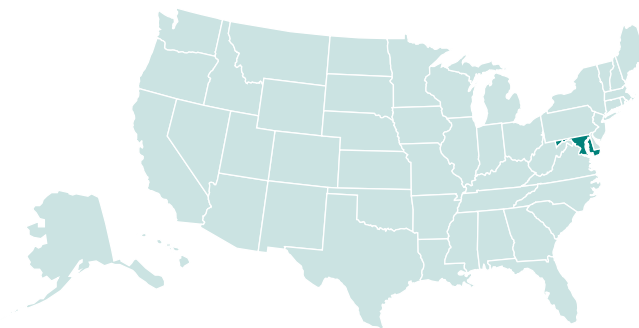
- **1QFY97** Awarded cost-plus-award-fee prime systems contract which was initiated in FY98 after sustaining a protest.
- **2QFY99** Venezuelan equine encephalitis (VEE) achieved Milestone I.
- **4QFY99** Recombinant botulinum (BOT) (A and B) vaccines achieved Milestone I.
- **FY00** Current good manufacturing practice (CGMP) pilot lot production and testing of VEE IA vaccine.
- **FY00-01** Continued developmental work for consistency model and surrogate model of tularemia vaccine; continued manufacturing development and phase I clinical trials of pilot lot for tularemia vaccine.
- **3QFY02** VEE CGMP pilot lot manufactured.
- **3QFY02** BOT CGMP pilot lot of serotype B manufactured.
- **4QFY02** VEE component advanced development.

## Projected Activities

- **2QFY03** Tularemia CGMP pilot lot manufacture.
- **4QFY03** File VEE investigational new drug (IND) application with the FDA.
- **4QFY03** File tularemia IND application with the FDA.
- **2QFY04** Filing the BOT IND application with the FDA.
- **4QFY05** BOT Milestone B (program initiation).
- **1QFY06** VEE Milestone B (program initiation).

## Contractors

DynPort LLC (Frederick, MD)





## Mission

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

## Description and Specifications

Immunization of US forces with BD vaccines protects each individual against exposure to BW agents and allows commanders to continue operations. The smallpox vaccine is part of the DoD Biological Vaccine Program/Joint Vaccine Acquisition Program and is responsible for advanced development of biological defense vaccines invented in research laboratories by using a prime contractor for activities leading to FDA licensure and production of the smallpox vaccine.

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

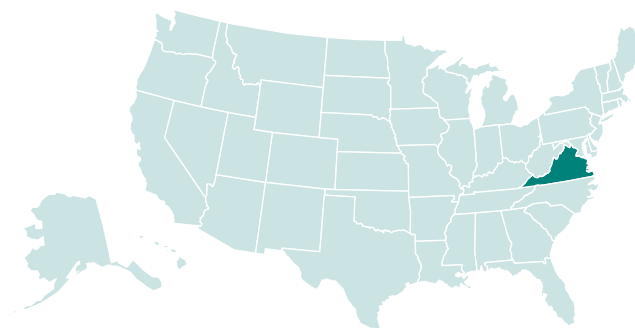
- **2QFY02** Current good manufacturing practice (CGMP) pilot lot was manufactured.
- **2QFY02** Filed the investigational new drug (IND) application with the FDA.
- **3QFY02** Started phase I clinical trial.

## Projected Activities

- **4QFY03** Start phase II/III clinical trial.

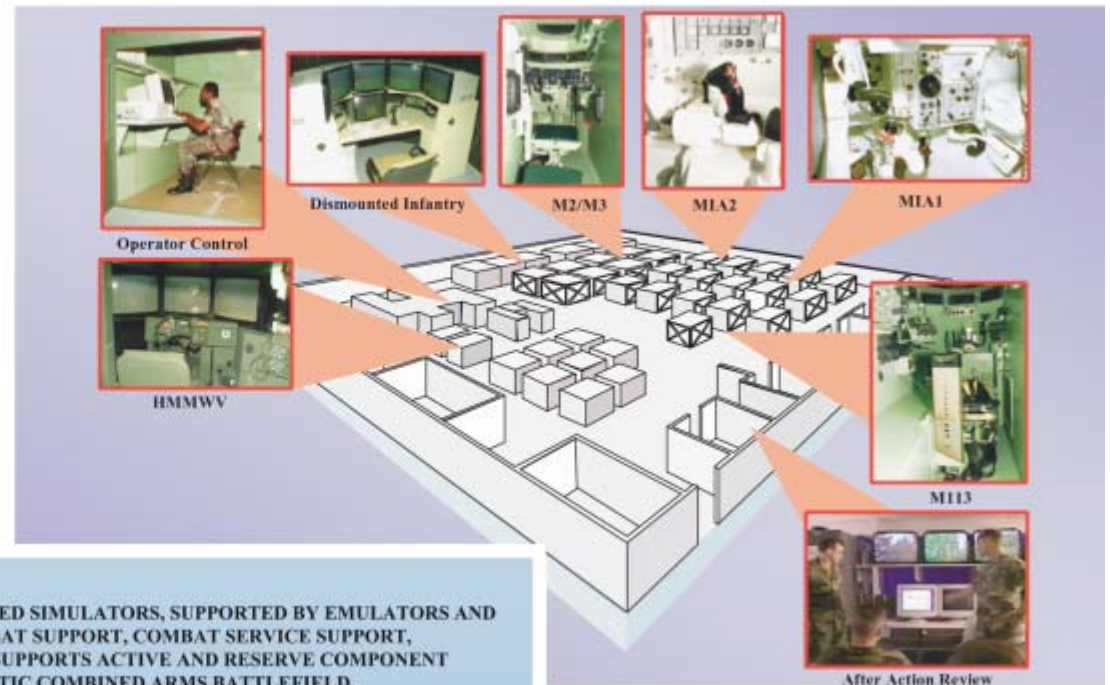
## Contractors

DynPort LLC (Reston, VA)



See appendix for list of subcontractors

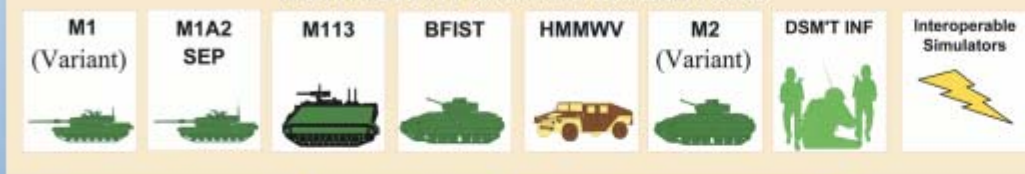
# Close Combat Tactical Trainer (CCTT)



CCTT IS A NETWORKED SYSTEM OF HIGH FIDELITY MANNED SIMULATORS, SUPPORTED BY EMULATORS AND SEMI-AUTOMATED FORCES THAT PROVIDE COMBAT SUPPORT, COMBAT SERVICE SUPPORT, AND BOTH FRIENDLY AND OPPOSING FORCES. CCTT SUPPORTS ACTIVE AND RESERVE COMPONENT COLLECTIVE TASK TRAINING ON A SYNTHETIC COMBINED ARMS BATTLEFIELD.

## CCTT SYSTEM CONFIGURATION

### HIGH FIDELITY MANNED SIMULATORS



### AFTER ACTION REVIEW



### INITIALIZATION & MAINTENANCE

- MAINTENANCE CONSOLE (MC)
- MASTER CONTROL CONSOLE (MCC)

### TACTICAL WORKSTATIONS

- MOTAR FIRE DIRECTION CENTER
- UNIT MAINTENANCE COMMAND POST
- COMBAT TRAIN (LOG) COMMAND POST
- TACTICAL AIR COMMAND POST
- FIELD ARTILLERY BN TOC
- COMBAT ENGINEER SUPPORT
- BRIGADE HQ
- BATTALION TF TOC

### SEMI-AUTOMATED FORCES (SAF) WORKSTATIONS



### TERRAIN DATABASES

- |                       |          |
|-----------------------|----------|
| - Desert (NTC)        | - Kosovo |
| - Temperate (Germany) | - Korea  |
| - Ft Hood, TX         |          |



## Mission

Provide collective training of crews, units, and staffs of armor, mechanized infantry, and cavalry within a combined arms synthetic environment.

## Description and Specifications

Close Combat Tactical Trainer (CCTT) is the first member of the Combined Arms Tactical Trainer (CATT) family of virtual, distributed interactive simulations for collective training. It supports training of armor, mechanized infantry, and cavalry units from platoon through battalion/squadron echelon, including the staff. The primary training audience operates from both full-crew simulators and mock-up command posts. Crewed simulators—M1A1, M1A1D, M1A2, M1A2SEP, M3A2, M2A2ODS/D, M2/3A2 BFV, FIST-V, BFIST, M113A3, M93 Fox, and HMMWV—are of sufficient fidelity for individuals and crews to accomplish their collective missions. Infantry platoon and squad leaders can also exit the Bradley Fighting Vehicle and move to a dismounted infantry workstation with control of virtual dismounted elements. Ft Hood CCTTs are equipped with Force XXI Battle Command Brigade-and-Below (FBCB2) in support of the Army's First Digitized Division.

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

## Foreign Counterpart

The United Kingdom Ministry of Defense is developing a counterpart system called U.K.-CATT. The United States and the United Kingdom have a memorandum of understanding that covers cooperative development of CCTT and U.K.-CATT.

## Foreign Military Sales

None

## Program Status

- Program is in fifth year of full rate production
- CCTT is operational at nine fixed sites - Ft Hood (two), Ft Knox, Ft Benning, Ft Stewart, Ft Riley, Ft Carson, Grafenwohr, and Camp Casey.

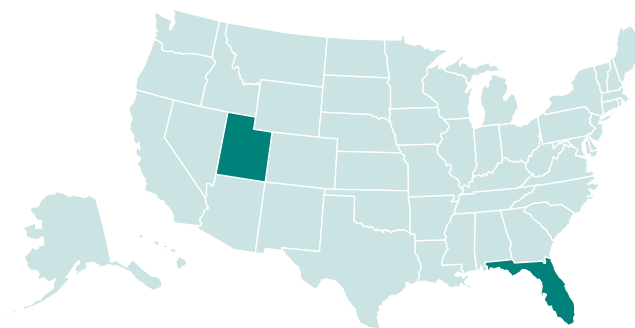
- Mobile Platoon sets have been fielded to the Army National Guard at Knoxville, TN (two), Leesburg, SC (two), Beauregard, LA (two), and Los Alamitos, CA (one).

## Projected Activities

- Continue full-rate production of CCTT modules (continental US and outside continental US) and additional mobile sets.
- **FY03** Begin development of Ft Riley homestation terrain database.
- **FY03** Support AVCATT-A interoperability.
- **FY03** Complete development of the enhanced dismounted infantry manned module, improved after action review, and FBCB2.
- **FY03 - FY04** Improve close air support and joint interoperability capabilities in CCTT.
- **FY03** and beyond: Continue CCTT weapons systems currency and interoperability efforts and continue CCTT trainer unique performance improvement (technology refreshment) upgrades.

## Contractors

Lockheed Martin (Orlando, FL); Evans & Sutherland (Salt Lake City, UT); Advanced System Technology (Orlando, FL)





## Mission

Conduct reconnaissance, security, and attack operations across the battlespace, day or night, and in adverse weather conditions.

## Description and Specifications

The Comanche (RAH-66) is the Army's next-generation helicopter, designed to perform armed reconnaissance and attack missions. The Comanche will significantly expand the Army's capability to conduct reconnaissance, security, and attack operations in all battlefield environments, day or night, and during adverse weather. Its advanced electro-optical sensors, aided-target recognition, and sensor-weapons integration will make it a critical component of the Army's Objective Force.

Comanche's digital communications capacity will enhance the Army's capability to win the battlefield information war, and allow interface with the Joint Surveillance and Target Attack Radar System and other joint sensors and weapons platforms. Comanche's design for rapid re-arm, refuel, and repair will increase the tempo of operations. With low observability, target recognition, and digitized communications, the Comanche can conduct deep, precision-strike missions against time-sensitive targets as well as provide direct support to ground maneuver forces in close battle. Comanche is a transformational weapon system that is key to achieving the capabilities required for the 21st century Army.

**Crew:** Two pilots

**Speed:** 175 knots (dash)

**Endurance:** 2.5 hours

**Armament:** 20mm turreted gun, air-to-ground rockets, and air-to-ground and air-to-air missiles.

**Mission equipment package:** Advanced electro-optical target acquisition and designation system, aided target recognition, and night pilot system and helmet-mounted display. One third of aircraft fleet will include the fire control radar (FCR); the remainder will have provisions to incorporate the FCR.

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

- Program restructured in October 2002. Initial operational capability is a 12-ship battalion scheduled for September 2009.
- Comanche is in the engineering and manufacturing development (EMD) phase of development, with one prototype aircraft in active flight test status. Developmental testing will continue with an additional five test aircraft scheduled for delivery beginning in 2005.

## Projected Activities

- **3QFY03** Weapon system critical design review.
- **2QFY05** Begin flight testing of EMD aircraft.
- **1QFY07** Low-rate initial production decision scheduled.
- **4QFY09** Battalion initial operational capability.
- **1QFY10** Milestone III decision scheduled.

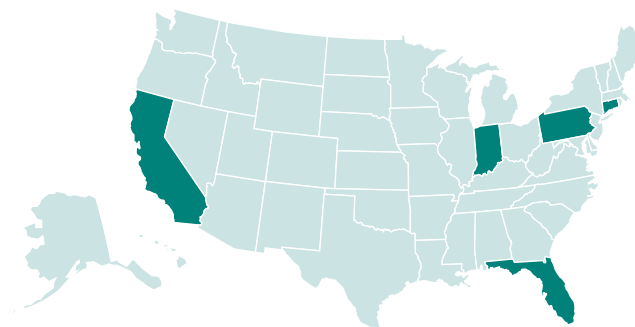
## Contractors

**Aircraft:** Boeing and Sikorsky Team (Philadelphia, PA; Stratford, CT)

**E0SS:** Lockheed Martin (Orlando, FL)

**Comm/Nav:** TRW (Redondo Beach, CA)

**Engine:** Light Helicopter Turbine Engine Company (LHTEC); Honeywell/Rolls-Royce Team (Indianapolis, IN)









## Mission

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

## Description and Specifications

The Combat Service Support Control System (CSSCS) is a decision support system that assists commanders and their staffs in planning and executing combat service support (CSS) operations. The CSSCS rapidly collects, stores, analyzes, and disseminates critical logistics, medical, and personnel information. Without CSSCS, commanders and staffs manually gather, correlate, and analyze volumes of data from the existing Standard Army Management Information Systems (STAMIS) and the Army Battle Command Systems (ABCS). 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 action.

The CSSCS is the CSS component of the ABCS, as well as a key logistical enabler in the Stryker Brigade Combat Team for the Army's Transformation efforts. It is organic to CSS battalions and headquarters staffs, within the maneuver brigades (and battalions in ABCS-equipped units), separate brigades, armored cavalry regiments, divisions, corps, and echelons above corps (EAC). The CSSCS is comprised of computer units, common operating environment software, and CSSCS-unique software. The CSSCS is deployable in a table-top configuration, with or without storage/transit cases, and can also be housed in the family of standardized integrated command post systems. The current sources of CSS data are the STAMIS, ABCS, and manual entry. The Global Combat Support System-Army will be a future data source.

## Foreign Counterpart

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

## Foreign Military Sales

None

## Program Status

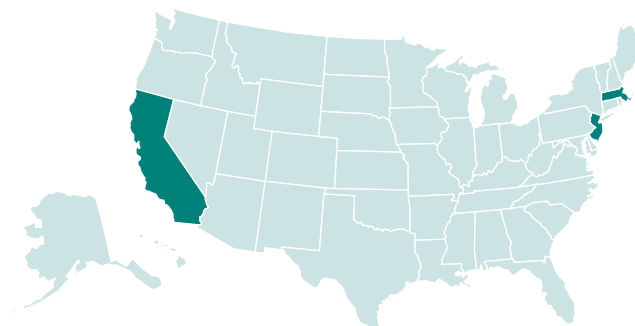
- CSSCS version 3 software provided an initial operational capability at division and corps level and included initial horizontal interoperability with ABCS systems.
- Current version 4 extends CSSCS to EAC, and provides additional capabilities. Version 4 has been fielded to III Corps, XVIII Airborne Corps and V Corps.
- Version 5 will extend CSSCS capabilities with improved logistics tracking and combat power functionality and joint, allied, and coalition forces connectivity.

## Projected Activities

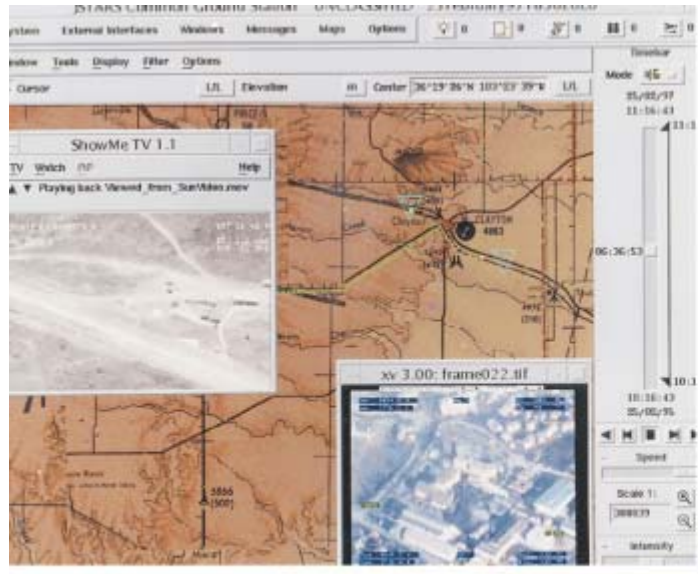
- **FY03-04** Field version 4.6.2 to III Corps, SBCT 3; V Corps, XVIII Airborne Corps and US Army Special Operations Command. Develop version 5. Support Army warfighting experiments.

## Contractors

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



## 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 Army Common Ground Station (CGS) is a key node on the digitized battlefield, receiving multiple national, theater, and tactical sensor inputs. 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.

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

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

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

## Foreign Counterpart

Britain: Astor; France: Horizon; Italy: Cresco

## Foreign Military Sales

None

## Program Status

- **3QFY02** Delivered last production CGS system.
- **4QFY02** Fielded 71 of the 96 Army CGS systems.
- **4QFY02** Initiated field upgrade of group 3 capability.

## Projected Activities

- **3QFY03** Initiate field upgrade of group 4 & 5 capability.

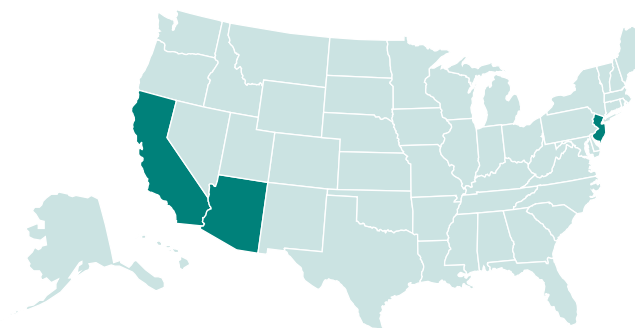
## Contractors

**CGS:** General Dynamics (Scottsdale, AZ)

**Fielding Support:** CACI (Eatontown, NJ)

**Engineering Support:** Booz Allen Hamilton (Eatontown, NJ)

**Data Link:** Cubic Defense Systems (San Diego, CA)





## Common Hardware Systems (CHS)

20" Color Flat Panel Display (CFPD)



RUGGED HANDHELD  
COMPUTER (RHC)  
Tacter-31



Compact Computer Unit-2 (CCU-2)



Versatile Computer Unit (VCU)

NOTEBOOK COMPUTER  
UNIT-RUGGED  
(NCU-R)  
Panasonic CF-72



High Capacity Computer Unit-2 (HCC-2)



## Mission

Provide common hardware systems for the Army Battle Command System programs, which include the tactical operations centers/air and missile defense command and control systems (PM TOCs/AMDCCS) as well as other Army and joint programs for use in system development and fielding.

## Description and Specifications

The Common Hardware System (CHS) program improves interoperability and connectivity and lowers life-cycle costs by standardizing battlefield command and control automation through centralized purchases of computing hardware, standardized protocols, and reusable commercial common software. The program provides CHS to more than 80 Army and DoD customers. The contractor provides worldwide repair, maintenance, and logistics support through strategically located regional support centers established to meet the needs of tactical military units. The CHS-2 contract provides the following hardware: CHS-2 rugged handheld computer (RHC); compact computer unit (CCU-2); versatile computer unit (VCU-1 and VCU-2); color flat panel displays; and notebook computer unit-rugged (NCU-R) plus high-end servers. This program provides commercial, ruggedized, and near MIL-SPEC hardware versions of computers, peripherals and networking devices. It also provides commercial industry based logistics support that meets the unique requirements of the tactical military units.

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

	<b>CHS-2(RHC)</b>	<b>CHS-2(SCU)</b>	<b>CHS-2(CCU-2)</b>	<b>CHS-2(R-PDA)</b>
<b>Processor:</b>	Pentium III	Pentium III	UltraSPARC Ili/Axi	Motorola 68328
<b>MHz clock:</b>	500	1 GHz	440	20
<b>RAM:</b>	128MB	2 GB	1GB	16-64MB
	<b>CHS-2(VCU-2)</b>	<b>CHS-2(VCU-1)</b>	<b>CHS-2(NCU-R)</b>	
<b>Processor:</b>	UltraSPARC	Ili/Axi Pentium III	Pentium III	
<b>MHz clock:</b>	440	933	1.06 GHz	
<b>RAM:</b>	1GB	1GB	512MB	

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

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

- **April 10, 1995** General Dynamics (formerly GTE) awarded CHS-2 contract, a follow-on to the CHS-1 contract.
- **September 2001** CHS-2 systems were successfully utilized during Division Capstone Exercise II (DCX-II) at Ft Hood, TX.
- **February 2002** Opened the first repair facility at Ft Lewis, WA, solely dedicated to the repair of CHS equipment.
- **August 2002** Millennium Challenge 02, National Training Center rotation, Ft Irwin, CA.

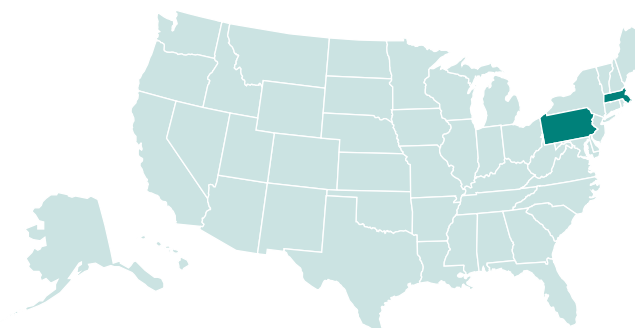
## Projected Activities

- **2QFY03** Commence CHS-2 program year 9.
- **2QFY03** CHS-3 Acquisition (RFP).
- **4QFY03** CHS-3 contract award.

## Contractors

**3D Display Electronics:** CTC (Johnstown, PA)

**CHS-2:** General Dynamics (Taunton, MA)



## Common Missile



## Mission

Provide an Objective Force missile system that provides line-of-sight, beyond-line-of-sight and non-line-of-sight capabilities, including precision strike and fire-and-forget technologies, increased range, and increased lethality for air and potential ground combat systems.

## Description and Specifications

Expanding regional threats and missile stockpile shortages require a single missile to accomplish both air and potential ground missions while providing flexibility during combat operations, enabling the best use of limited development funds. The Common Missile will provide the Comanche (RAH-66), Apache Longbow (AH-64D), US Navy F/A-18E/F Super Hornet, USMC Cobra (AH-1Z), and potential Future Combat Systems with precision strike and enhanced fire-and-forget capability, greatly increasing weapon system effectiveness and soldier and aircraft survivability. The modular design will reduce life cycle costs, including demilitarization, and allow for continuous technology insertion to ensure improvements against advancing threats.

The Common Missile will effectively engage and destroy a variety of targets including stationary and moving or re-locatable, high value threat targets as well as bunkers and other structures on the digital battlefield well into the future. The Common Missile will be designed and tested to achieve the following:

- Fire-and-forget and precision strike modes
- Increased stand-off range
- Increased survivability (both missile and platform)
- Multi-purpose warhead for increased lethality (military operations urban terrain structures, heavy armor, and patrol ships)
- Multi-mode seeker for increased countermeasures resistance
- Modularity to enable technology insertion and to facilitate demilitarization.

The Common Missile will be compatible with Legacy-to-Objective Force manned and unmanned air platforms and potential Objective Force ground platforms.

**Diameter:** 7"

**Weight:** ~ 108 lbs

**Length:** ~ 70"

## Foreign Counterpart

Cooperative Development Program with the United Kingdom

## Foreign Military Sales

None

## Program Status

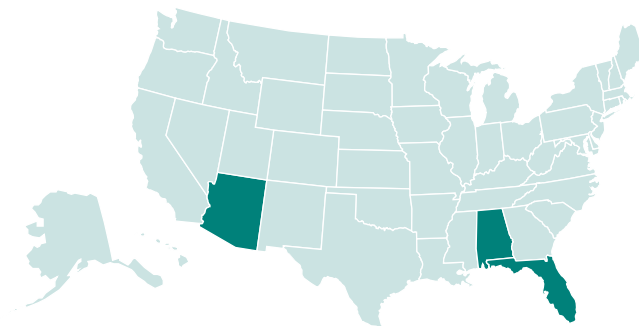
- **FY02-03** Tri-mode seeker development; controllable propulsion development; warhead development; system design and integration.
- **1QFY03** Baseline design reviews.
- DoD pre-Major Defense Acquisition Program as a Joint Program (Army lead).

## Projected Activities

- **3QFY03** System design reviews planned.
- **4QFY03** Milestone B.
- **FY04-06** System development and demonstration Block I-Spiral 1.
- **FY06-08** Block I-Spiral 2.
- **FY07-10** Low-rate initial production/full-rate production.
- **FY09-11** Initiate Block II upgrades.

## Contractors

**System Definition/Risk Reduction Contracts:** Lockheed Martin (Orlando, FL); Raytheon (Tucson, AZ); Boeing (Huntsville, AL)









## Mission

Provide base and camp construction and improvements to combatant commanders, and, for tactical commanders, a full range of mobility, countermobility, survivability, sustainment, and logistical support by Army Engineers in support of the total Army force in constructing, repairing, and maintaining fighting positions, tank ditches, mine clearing, excavation, roads, airfields, and trails, and the development and sustainment of lines of communication to support strategic and tactical maneuver of the warfighter.

## Description and Specifications

Construction equipment is typically state-of-the-art, commercially available, multi-purpose equipment with minor military modification required to meet the warfighter's needs. Construction equipment is fielded within the full spectrum of the Army's Engineer Forces. The equipment includes dozers, scrapers, road graders, water distributors, excavators, scoop loaders, engineer cranes, quarry equipment, paving, and compaction equipment.

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

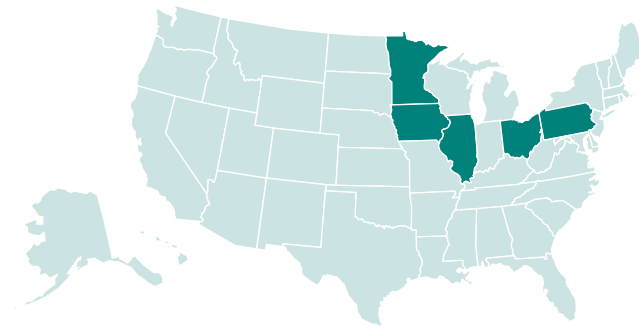
There are numerous on-going construction equipment programs in different stages of lifecycles to include R&D, production, deployment, fielding, sustainment, and service life extension programs.

## Projected Activities

On-going contract awards, testing, production, and fielding efforts.

## Contractors

Grove North America, (Shady Grove, PA); John Deere Forestry and Construction Equipment (Moline, IL); Caterpillar Defense Products (Peoria, IL, Minneapolis, MN); Cedarapids Inc. (Cedar Rapids, IA); Trimble Navigation E&C (Dayton, OH)



## Countermine



**GSTAMIDS Block 0**



**Mine Detection Vehicle (MDV)**



**Mine Protected  
Clearance Vehicle (MPCV)**



**Mongoose**

## Mission

Provide a full range of mine detection, clearance, and breaching capabilities to the maneuver force that allows the Objective Force commander to achieve assured mobility on the battlefield.

## Description and Specifications

**Airborne Standoff Minefield Detection System (ASTAMIDS).** The Block 1 ASTAMIDS uses an electro-optical/infrared sensor mounted on a Future Combat System unit of action unmanned aerial vehicle to detect and locate minefields and obstacles that impede maneuver forces. First unit equipped (FUE) in FY09.

**Handheld Standoff Mine Detection System (HSTAMIDS).** HSTAMIDS is a handheld multi-sensor mine detector that combines an advanced metal detector with a special purpose ground penetrating radar. HSTAMIDS will replace the AN/PSS-12 metal detector in engineer units. FUE in FY05.

**Ground Standoff Mine Detection System (GSTAMIDS) Block 0.** Block 0 is a system of two blast-protected vehicles and advanced mine detectors that provides a 400-meter standoff distance during anti-tank mine detection operations. FUE in FY05.

**GSTAMIDS Block 1.** Block 1 is a system of advanced countermining capabilities that will provide the Objective Force the fastest means possible to detect and clear AT mines. The exact system configuration is being determined by modeling and simulation. FUE in FY10.

**Explosive Standoff Minefield Clearer (Mongoose).** Mongoose is a rocket-deployed array of shaped-charge munitions launched across minefields and then command-detonated to clear a lane for mounted troops. Mongoose will replace the Mine Clearing Line Charge. FUE in FY06.

**Anti-Personnel Obstacle Breaching System (APOBS).** APOBS is a rocket-propelled line charge. It will provide the Army with a leap-ahead capability over the logistically burdensome Bangalore Torpedo. FUE achieved in FY02.

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

- All programs are in research and development, except APOBS which is in full rate production.

## Projected Activities

- Two-hundred HSTAMIDS will be produced and fielded in support of Operation Enduring Freedom. The Army will receive 1039 APOBS in FY03.

## Contractors

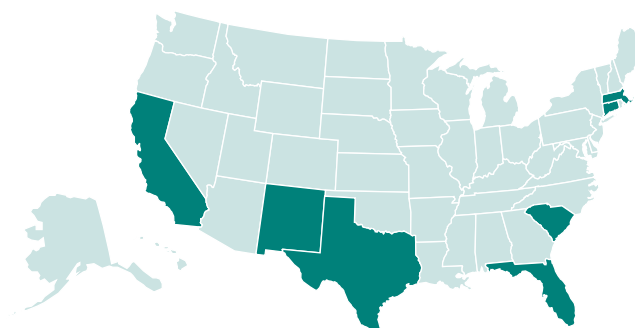
**HSTAMIDS:** CyTerra Corp. (Waltham, MA; Orlando, FL)

**GSTAMIDS Block 0:** EG&G Management Systems, Inc. (Albuquerque, NM); Technical Solutions Group, (North Charleston, SC)

**GSTAMIDS Block 1:** BAE Systems (Austin, TX); Quantum Magnetics (San Diego, CA)

**Mongoose:** BAE Systems (Austin TX)

**APOBS:** Ensign Bickford Aerospace and Defense (EBA&D) (Simsbury, CT)





## Defense Satellite Communications System (DSCS)





## Mission

Provide strategic military satellite terminals, baseband, satellite network, payload control systems, and related equipment required to satisfy long haul communications requirements of warfighters and Joint Chiefs of Staff (JCS)-validated command, control, communications, and intelligence requirements in support of the President and the Combatant Commanders.

## Description and Specifications

The Defense Satellite Communications System (DSCS) provides super-high-frequency beyond-line-of-sight communications and provides a critical conduit for intelligence information transfer to deployed forces worldwide. DSCS also provides reach-back capability to sanctuary for deployed forces (teleport and standard tactical entry point). DSCS provides the equipment US Army Space Command uses to perform its payload and network control mission on wideband satellites. DSCS also provides an anti-jam and anti-scintillation capability for key strategic forces.

Beginning in FY04, the DoD will begin to launch Wideband Gapfiller Satellites (WGS) that will provide warfighters with greatly increased capacity and a new Ka-band capability. The DSCS program includes modernization efforts to strategic terminals, baseband, and payload and network control systems required to support warfighter use of these satellites. In addition, the objective Transformation Communications (TC) satellite system proposed by the Office of the Secretary of Defense is included in this program. These modernization efforts support the Army's mission of payload and network control on wideband communications satellites and role of lead military department for joint strategic terminals, ensuring deployed warfighters access to the world's most capable military satellite communications.

## Foreign Counterpart

NATO Communications Satellite System (NATO IV and NP2K), British Military Communications Satellite System (SKYNET 5). Various other nations (France, Italy, Spain and Turkey) have launched or plan to launch X-band satellites. These systems will have limited coverage areas compared to DSCS's worldwide coverage.

## Foreign Military Sales

None

## Program Status

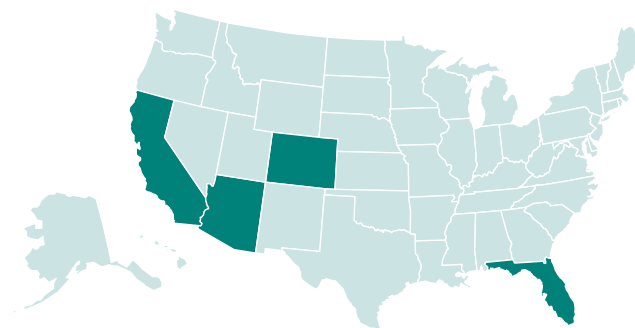
- Currently deployed worldwide. Modernization efforts to support WGS and TC continue. Installations, deinstallations, and relocations of fixed strategic ground terminals and baseband continue as required by combatant commanders and validated by JCS. Development of DSCS Integrated Management System and Communications Network Planning System software continues.

## Projected Activities

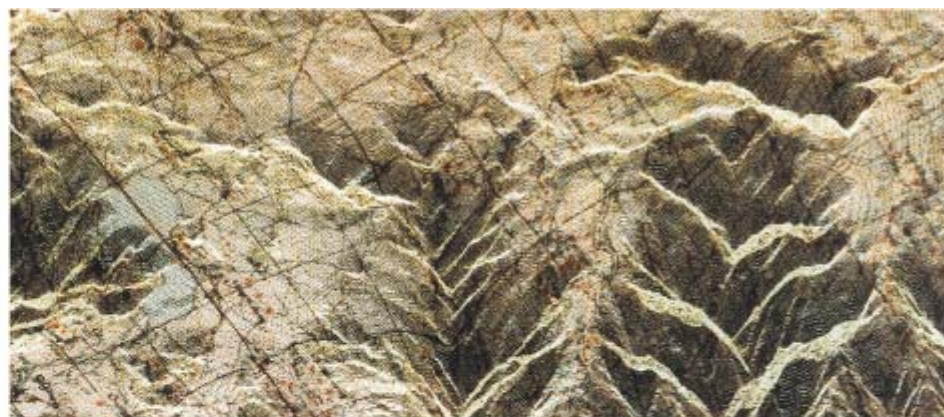
- FY03-04** Begin National Command Authority Special Communications Link upgrades. Continue modernization of DSCS Operations Control System (DOCS) into Objective DOCS (ODOCS). Begin AN/TSC-85/93 upgrades. Begin procurement of Wideband Anti-Jam Modem. Begin installation of fixed Ka-band terminals, multiplexer integration and DCSS automation system, Integrated Monitoring and Power Control Subsystem, and Gapfiller Satellite Configuration Control Element. Continue development of DSCS Integrated Management System and Communications Network Planning System software. Continue AN/GSC-52 modernization program to extend life for these terminals to 2015.

## Contractors

International Telephone and Telegraph Company (ITT) (Colorado Springs, CO); Harris Corporation (Melbourne, FL); Boeing (Canoga Park, CA); Northrop Grumman (Orlando, FL); US Army Information Systems Engineering Command (Ft Huachuca, AZ)



## Digital Topographic Support System (DTSS)



## Mission

Provide commanders at brigade through theater with timely and relevant terrain and battlespace information to support intelligence preparation of battlefield and combat operations; provide geospatial data management and terrain visualization capabilities for command and control systems and weapons platforms.

## Description and Specifications

The Digital Topographic Support System (DTSS) is a tactical combat support system capable of receiving, formatting, creating, manipulating, merging, updating, storing, and retrieving geospatial data and processing it into tactical decision aids for digital or hardcopy distribution. DTSS accepts geospatial data from the National Imagery and Mapping Agency (NIMA) and commercial and national technical means assets.

DTSS analysis capabilities include the creation of intervisibility, mobility, and line-of-sight analyses, and terrain visualization and special purpose products to support the decision-making process. DTSS has the capability to augment, modify, update, and manage geospatial data on the battlefield. DTSS also provides the updated map backgrounds and geospatial data to other automated battlefield systems through the Army Battle Command System (ABCS) map server.

DTSS uses the latest commercial hardware with a mix of custom-developed software and commercial, off-the-shelf image processing, geographic information system, and database management software. The tactically mobile system, the DTSS-Light (DTSS-L) is housed in a lightweight multipurpose shelter mounted on a High Mobility Multipurpose Wheeled Vehicle (HMMWV) and is supported by environmental control units, generators, and communications equipment from the standard Army inventory. The DTSS-Deployable (DTSS-D) consists of equipment and software, like that in the DTSS-L, mounted in transportable workstations for rapid deployment. The DTSS-D can operate in conjunction with the DTSS-L in an attached Standardized Integrated Command Post System (SICPS) tent or in a standalone, environmentally-controlled location. The DTSS-B is a garrison configuration designed to augment NIMA digital topographic data generation capabilities at the theater level. Currently in the system development and demonstration phase, the high volume map production (HVMP) system will consist of COTS printing, computing, and paper-cutting equipment mounted in an environmentally controlled 20-foot shelter carried on a standard five-ton truck. The DTSS-HVMP will provide a capability to print up to 2,500 full color, map-size hardcopy products per day at corps and theater levels.

## Foreign Counterpart

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

## Foreign Military Sales

None

## Program Status

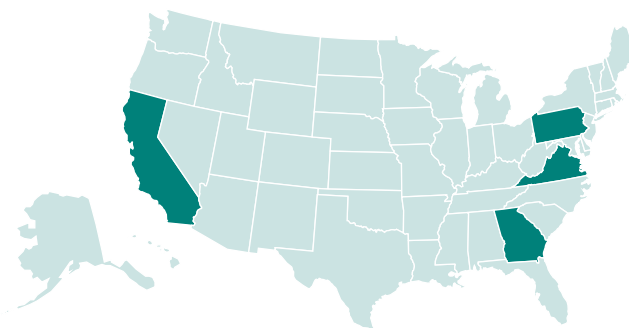
- **2QFY02** Awarded follow-on production contract for DTSS-L (16 Systems).
- **4QFY02** Procured and fielded additional 16 DTSS-L systems.
- **4QFY02** Participated in Millennium Challenge '02.
- **4QFY02** Released map server build 1.2.
- **4QFY02 - 1QFY03** Procured and fielded upgraded DTSS-B (3 systems).
- **4QFY02 - 1QFY03** DTSS-HVMP technical testing at Aberdeen Test Center.
- **1QFY03** DTSS-HVMP operational test at Ft Hood, TX.
- **1QFY03** Procure 15 DTSS-L systems for FY04 fielding

## Projected Activities

- **2QFY03** Milestone C and production contract award for DTSS-HVMP.
- **3QFY03** Re-compete five-year systems engineering and integration contract.
- **3Q-4QFY03** Procure and field an additional 16 DTSS-L systems.
- **3QFY03** Joint warrior interoperability demonstration (JWID) 2003.
- **4QFY03** Procure and field nine additional DTSS-D systems.

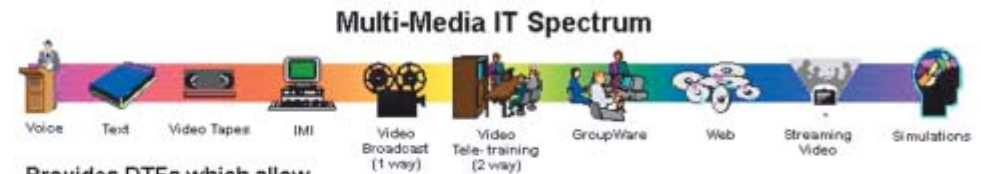
## Contractors

Northrop Grumman (Chantilly, VA); Sechan Electronics (Lititz, PA); ERDAS Inc. (Atlanta, GA); ESRI Inc. (Redlands, CA)



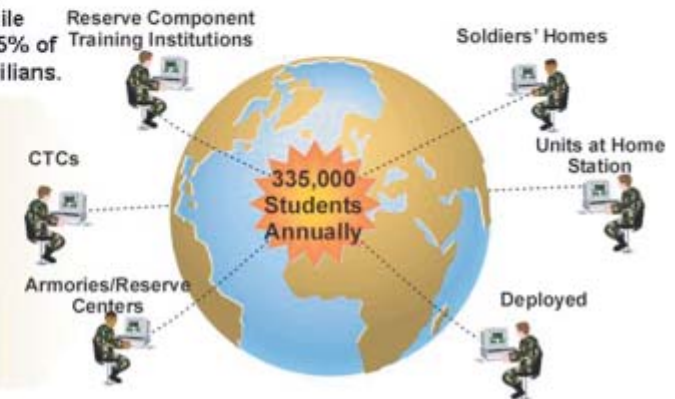


## The Distributed Learning Vision



Provides DTFs which allow training access within 50 mile radius of home station to 95% of the Army's soldiers and civilians.

Distributes courseware and other products for individual, collective, or self-development training





## Mission

Acquire and sustain hardware, software, and services enabling student access to distributed training products globally from any on-line computer.

## Description and Specifications

Distributed Learning System (DLS), formerly The Army Distance Learning Program (TADLP), was officially established in October 1997. DLS is dedicated to providing a quality distance learning system to all Army components in the most expeditious and cost-effective manner possible. DLS also provides the Army with a capability for obtaining the state of readiness necessary to accomplish the Army mission while being an economical force multiplier. Additionally, the availability of distance learning contributes to quality of life by increasing stability for both soldiers and civilians in their personal and professional lives.

As well as using digital training facilities (DTFs), Army personnel can access the globally-networked training environment from anywhere they have access to an on-line computer. In the near future, more capabilities and features will be added as technology matures.

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

- 241 DTFs have been fielded worldwide.
- **1QFY03** Program is being re-baselined due to changes in FY04-09 POM.

## Projected Activities

- **June 2003** Initial operational testing for Block 3 learning management system scheduled.

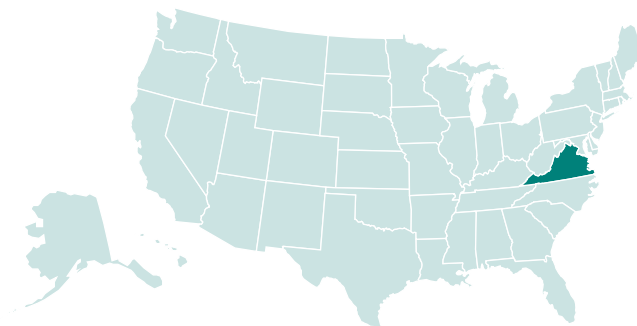
## Contractors

**Integration/Fielding:** ACS (Virginia Beach, VA)

**Communications:** Sprint (Herndon, VA)

**LMS:** IBM (Fairfax, VA)

**EMC Operations:** IBM (Fairfax, VA)





**EST 2000 Transportable Cases**

## Mission

Provide individual and crew weapon marksmanship at the squad level for collective training.

## Description and Specifications

The Engagement Skills Trainer (EST 2000) is the only small arms weapons simulator validated by the US Army Infantry School. It provides individual and crew weapon marksmanship at the squad level for collective training. The EST 2000 simulates weapon training events that lead to live-fire individual/crew weapon qualification and training events currently not resourced under the Standards in Training Commission (STRAC). EST 2000 saves current required ammunition resources, Operations and Personnel Tempo (OPTEMPO) travel time, and cost to and from ranges. Squad leaders are able to control and evaluate individual, team, and squad performance. The simulator records firing events, isolates shooter errors in aim point and weapon control, and provides visual feedback for use in corrective training. The simulated weapons in the EST 2000 are: M16A2 rifle, M4 carbine, M9 pistol, M249 machine gun, M60 machine gun, M240B machine gun, M2 machine gun, MK19 MOD3 grenade machine gun, M203 grenade launcher, M136 anti-tank weapon (AT4), and the M1200 shotgun. The EST 2000 will be used primarily as a unit/institution, indoor, multi-purpose, multi-lane, crew-served, and individual small arms simulator.

## Foreign Counterpart

**Small Arms Trainer:** United Kingdom, Sagittarius; Sweden, BT 61

## Foreign Military Sales

Israel (pending case for 6 subsystems); Colombia (pending)

## Program Status

- Entering the third year of production.
- Fielded Ft Benning, Ft Lewis (SBCT), Schofield Barracks, Ft Wainwright, Ft Bragg, Ft Leonard Wood, Ft Stewart, Training Support Activity Korea (TSAK) Carroll, TSAK Casey, TSAK Stanley, Ft Drum, USAREUR, and National Guard sites.
- **FY03** Congress provided \$7.5M for EST for the Active Army, National Guard Bureau, and the Army Reserve.

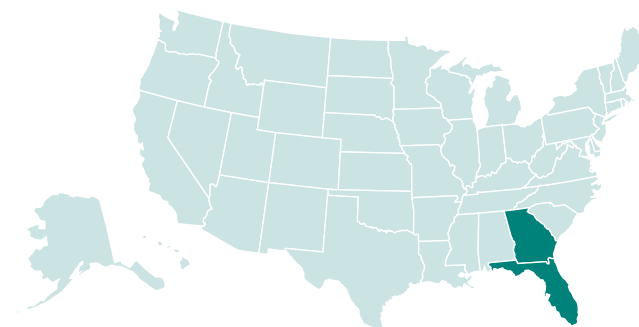
## Projected Activities

- Continue production.
- Complete lot II fielding and new equipment training.
- Complete lot III testing.
- Equipment change proposal under development to add “call for fire” capability.

## Contractors

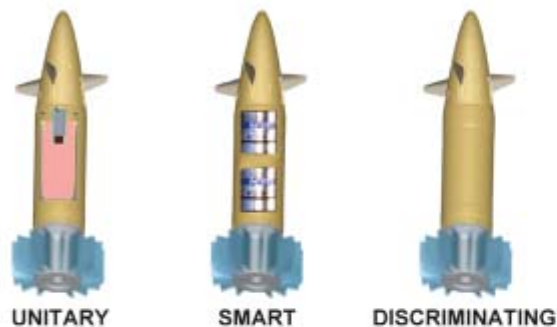
**Systems design and integration:** ECC (Orlando, FL)

**Simulated weapons:** FATS, Inc. (Suwanee, GA)

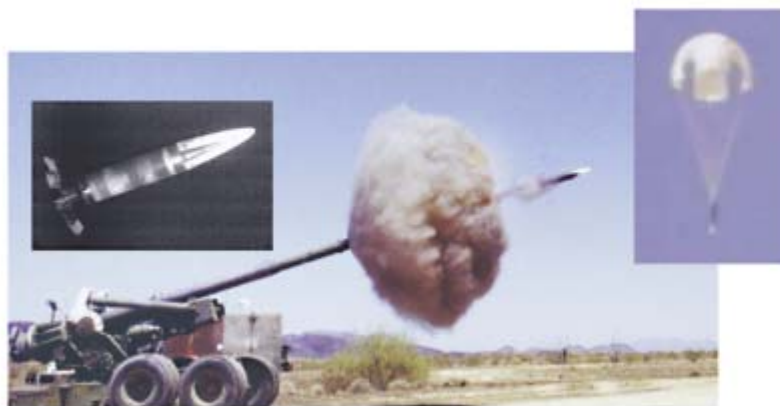
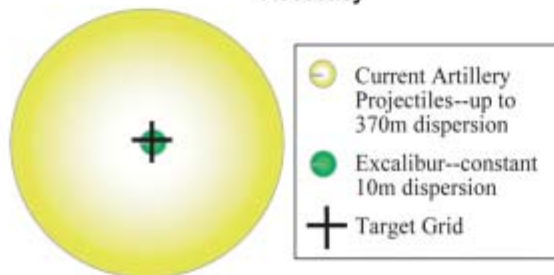


# Excalibur (XM982)

## Excalibur Family of Precision Guided Artillery Projectiles

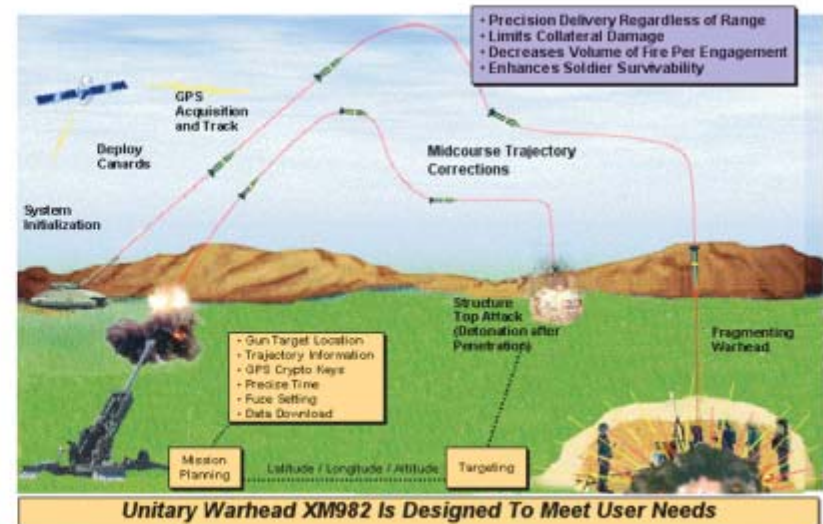


### Accuracy

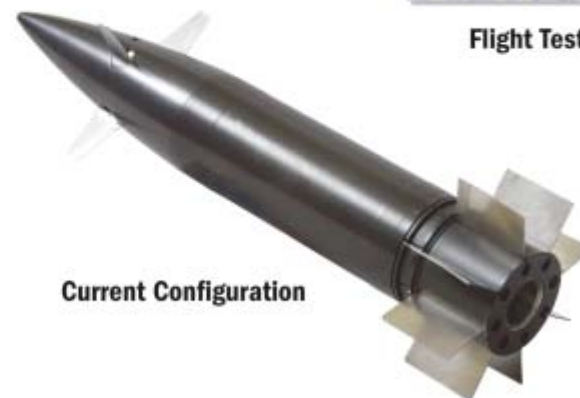


Guidance Electronics Gun Hardening Tests

## Concept of Operations



Flight Test



Current Configuration



## Mission

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

## Description and Specifications

The Excalibur XM982 is a family of 155mm, Global Positioning System (GPS)-based, fire-and-forget rounds being developed as the Army's precision artillery projectiles. The program uses a spiral development approach and will field three unique variants. The initial block will contain a unitary high explosive warhead, effective against point targets as well as personnel targets such as dismounted infantry, weapon crews, and light material targets, including air defense rockets, radars, and wheeled vehicles. Future block improvements will include smart and discriminating munitions. Smart munitions will be designed to search, detect, acquire, and engage fleeting and short-dwell targets common to open-terrain battlefields. Discriminating munitions are expected to add the capability to selectively identify and engage individual vehicular targets by distinguishing specific target characteristics.

Excalibur will use a jam-resistant internal GPS receiver to update the inertial navigation system, providing precision guidance and improved accuracy. The target, platform location, and GPS-specific data are inductively entered into the projectile's mission computer through an enhanced portable inductive artillery fuze setter or automated system on the Future Combat System - Cannon (FCS-C). Excalibur is effective in all weather and terrain. The current program develops Excalibur for fielding to the Objective Force indirect fire weapon, FCS-C, with a milestone C decision in FY06 and initial operational capability in FY08. The program management office is pursuing an acceleration of development, testing, and fielding of an initial capability to the digitized joint lightweight 155mm howitzer as early as FY06.

**Caliber:** 155mm

**Weight:** 106 lbs

**Max Range:** 35 km (XM777 digital howitzers), TBD (Future Combat System - Cannon)

**Number of submunitions:** one unitary/projectile, two sensor fuzed munitions in smart variant

## Foreign Counterpart

Congress directed the US Marine Corps in FY99 to pursue an international cooperative program with the Government of Sweden to explore a trajectory correctable munition (TCM) concept proposed by Bofors and their US partner, Science and Applied Technologies, Inc. In November 2001 the Army Acquisition Executive directed the merger of the Excalibur and the TCM programs in order to achieve

efficiency and reduce program risks. The merged projectile design, featuring the best technology from both programs, was chosen in May 2002.

## Foreign Military Sales

None

## Program Status

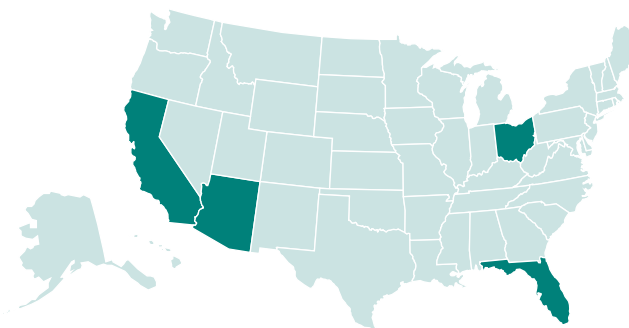
- **FY02** Transitioned development focus to FCS-C.
- **1QFY02** Awarded contract for unitary variant.
- **1QFY03** Awarded contract for merged program (Excalibur-TCM).

## Projected Activities

- **2QFY06** Milestone C.
- **1QFY08** Initial operational test and evaluation.
- **4QFY08** Achieve IOC.
- **1QFY09** Award full-rate production contract.

## Contractors

Raytheon (Tucson, AZ); Bofors Defence (UDLP) teamed with Raytheon Corporation (Karlskoga, Sweden); General Dynamics Ordnance and Tactical Systems (St. Petersburg, FL); General Dynamics Versatron (Healdsburg, CA); L-3 Communications Interstate Electronics Corporation (Anaheim, CA); L-3 KDI (Cincinnati, OH)



## 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) is a key enabler for Army Transformation. It provides unit mobility, resupply, and transportation at all organizational levels using a series of vehicles based on a common chassis, which vary by payload and mission requirements. The Light Medium Tactical Vehicle (LMTV) has a 2-1/2 ton capacity (cargo and van models). The MTV has a five-ton capacity (cargo and long-wheelbase-cargo with and without materiel handling equipment, tractor, van, wrecker, and dump truck models). Three truck variants and two companion trailers, with the same cube and payload capacity as their prime movers provide air drop capability. It operates worldwide in all weather (-50F to +120F) and terrain conditions. It serves as the weapons system platform for HIMARS and the resupply vehicle for PATRIOT and the High Mobility Artillery Rocket System (HIMARS). FMTV enhances crew survivability through the use of hard cabs, three-point seat belts, and central tire inflation capability. It provides enhanced tactical mobility and is strategically deployable in C5, C17, C130, and C141 aircraft. FMTV reduces the Army's logistical footprint by providing commonality of parts and components, reduced maintenance downtime, highest reliability, highest operational readiness rate (more than 96 percent for last 50 months), incorporates a vehicle data bus and Class V Interactive Electronic Technical Manual, and significantly lower operating and support costs than older trucks. Units are equipped with FMTVs at more than 68 different locations worldwide, and more than 15,900 trucks and 760 trailers have been fielded as of 1 Nov 02.

	LMTV A1 Cargo	MTV A1 Cargo
<b>Payload:</b>	5,000 lbs	10,000 lbs
<b>Towed load:</b>	12,000 lbs	21,000 lbs
<b>Engine:</b>	JP8 fuel	JP8 fuel
<b>Transmission:</b>	Automatic	Automatic
<b>Horsepower:</b>	275	330
<b>Drive:</b>	4 x 4	6 x 6

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

Greece, Macedonia, Saudi Arabia, Taiwan, Thailand

## Program Status

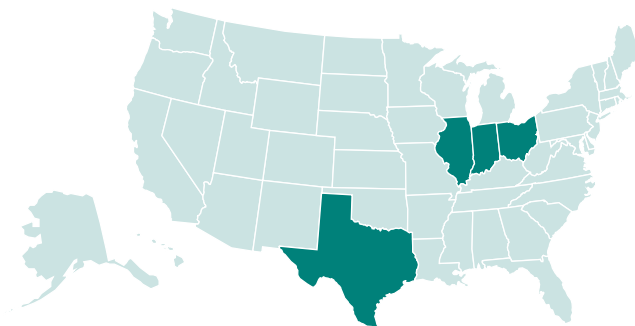
- FMTV A1 competitive rebuy phase II production request for proposal released.
- FMTV A1 competitive rebuy phase I testing completed.
- Fielding to 1st and 2nd Stryker Brigade Combat Team (SBCT) completed.
- Fielding to 3rd SBCT in process.

## Projected Activities

- Fielding will continue to the Army's highest priority first-to-fight units.
- **Mar 03** FMTV A1 competitive rebuy phase II production contract award scheduled.

## Contractors

Stewart & Stevenson TVS, LLC (Sealy, TX); Caterpillar (Moline, IL); Allison (Indianapolis, IN); Rockwell/Meritor (Newark, OH); Scott Manufacturing (Lubbock, TX)





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





## Mission

Provide integrated, on-the-move, timely, relevant battle command information to tactical combat leaders and soldiers from brigade to platform across the brigade task force.

## Description and Specifications

The Force XXI Battle Command Brigade-and-Below (FBCB2) forms the principal digital command and control system for the Army at brigade levels and below. It allows warfighters to pass orders and graphics to visualize the commander's intent and scheme of maneuver. FBCB2 is a key component of the Army Battle Command System.

The FBCB2 system is an acquisition category 1D program and is in the engineering and manufacturing development (EMD)/system development and demonstration. Applique hardware and software are integrated into the various platforms at brigade and below, as well as appropriate division and corps slices necessary to support brigade operations. The system features the interconnection of platforms through the Tactical Internet to transmit situational awareness data.

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

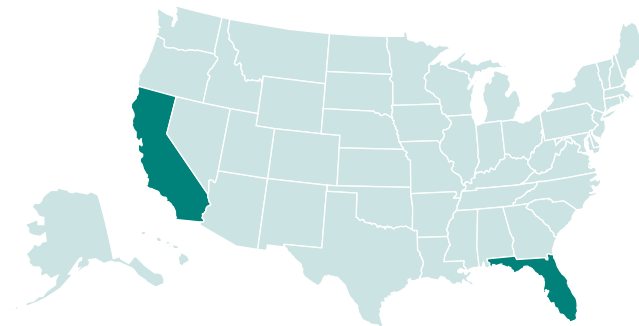
- **2QFY01** Completed field test 3.
- **3QFY01** Awarded follow-on system engineering and integration contract; participated in Division Capstone Exercise (DCX-1)/conducted limited user test (LUT) 2; delivered version 3.4 software.
- **1QFY02** Completed field test 4.
- **1QFY02** Conducted LUT 2A.
- **2QFY02** Awarded low rate initial production (LRIP) option 2 contract.
- **4QFY02** Completed field test 5.

## Projected Activities

- **1QFY03** Award LRIP contingency option.
- **2QFY03** Climatic (extreme cold) test.
- **3QFY03** Support Stryker initial operational test and evaluation (IOTE).
- **FY04** IOTE.
- **FY04** Full rate production decision review.

## Contractors

TRW (Carson, CA); AFRA (Carson, CA); L-3 (San Diego, CA); Paravant (Melbourne, FL); Raytheon (El Segundo, CA)



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



## Mission

Collect, digitally process, and disseminate real-time target cuing and tracking information, common tactical air picture, and command, control, and intelligence (C2I) information to all short range air defense (SHORAD) weapons (e.g., Avenger, Bradley Linebacker, Manportable Air Defense System (MANPADS), and joint and combined arms); provide joint C2 interoperability and horizontal integration with PATRIOT, THAAD, MEADS, and SHORAD weapon systems.

## Description and Specifications

The Forward Area Air Defense Command and Control (FAAD C2), a battle management/command, control, communications, computers, and intelligence (BM/C4I) system, provides critical, automated air track information (friendly and enemy aircraft, cruise missiles, and unmanned aerial vehicles) to support air defense weapon systems engagement operations and to provide air situation awareness to other Army Battle Command Systems (ABCSs). Unique FAAD C2 software provides mission capability by integrating FAAD C2 engagement operations software with the following systems:

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

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

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

FMS case with Egypt in process.

## Program Status

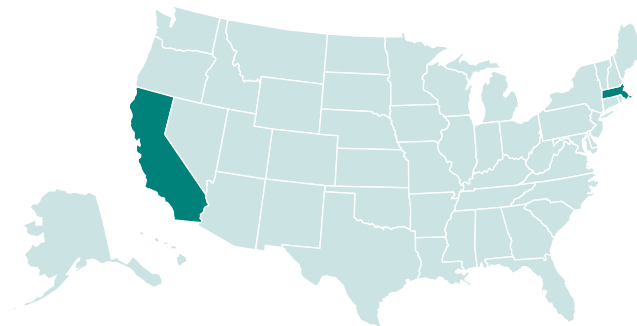
- **3QFY93** Completed Block I.
- **4QFY95** Completed Block II; awarded Block III contract.
- **3QFY99** Completed Version 5.1 software system certification test (SCT).
- **4QFY00** Completed fieldings for 10 divisions, an armored cavalry regiment, a National Guard corps Avenger battalion, and a training base set; completed version 5.2 software integration, assembly, and test.
- **2QFY01** Commenced Force XXI Battle Command Brigade-and-Below (FBCB2) limited user test (LUT); participated in FDD Division Capstone Exercise (DCX)-1 at the National Training Center, Ft Irwin, CA; materiel release of FAAD C2 version 5.1 software.
- **3QFY01** Completed version 5.2 software SCT.
- **1QFY02** Participated in DCX2 at Ft Hood.
- **2QFY02** Commence version 5.2 software LUT.

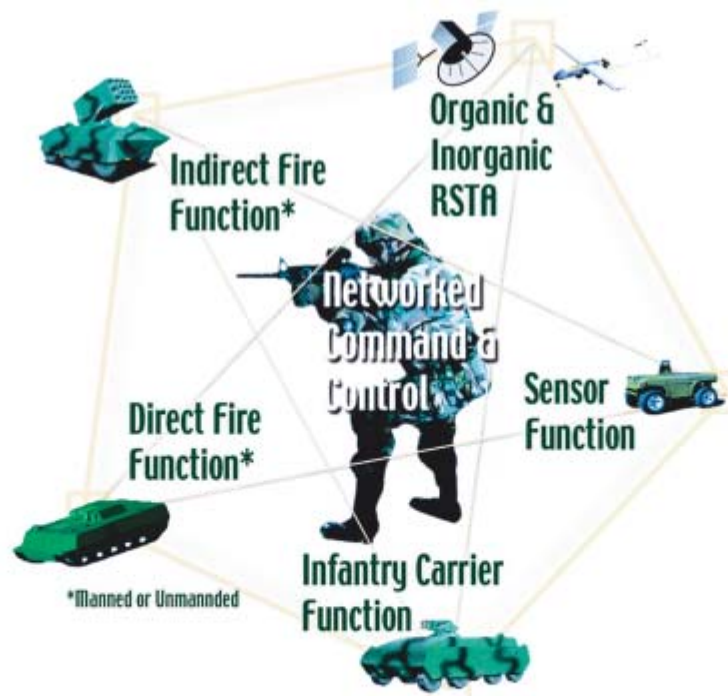
## Projected Activities

- **3QFY03** Material release version 5.2.
- **4QFY03** Initial version 5.3 delivery with beyond visual range engagement (BVRE).

## Contractors

TRW (Los Angeles, CA); General Dynamics (Taunton, MA)







## Mission

Provide the unit of action (UA) echelons with the overmatching combat power, sustainability, agility, and versatility necessary for full spectrum operations, including integration into joint warfighting environment, to see first, understand first, act first, and finish decisively—in support of joint and combined operations.

## Description and Specifications

Future Combat Systems (FCS) is the Army's top priority science and technology program. A multi-functional, multi-mission, reconfigurable system of systems that networks soldiers with commanders as well as manned and unmanned air and ground vehicles, FCS will serve as a core building block of the Army's Objective Force. Within all maneuver UA, echelons FCS will develop overmatching combat power, while maintaining sustainability, agility, and versatility. By integrating mission capabilities, including direct and indirect fire, reconnaissance, troop transport, countermobility, nonlethal effects, secure, reliable communications, and joint interoperability, FCS enables soldiers to operate as a coordinated part of a distributed, networked force. These capabilities enable innovative operational behaviors and organizational structures. The UA will demonstrate enhanced force effectiveness in executing tactical operations consisting of mounted, mounted-supported-by-dismounted, dismounted, and dismounted-supported-by-mounted. The FCS will enable soldiers in the Objective Force to perform a wide range of military activities and operations, from small-scale contingencies to stability and support operations, to major theater war. The FCS operates as part of a lightweight, overwhelmingly lethal, strategically deployable, self-sustaining, and survivable combat and combat support force.

The FCS leverages advanced technologies with the capability to incorporate future advances. This versatility will be realized through emphasis on an open architecture system concept, with an easily upgraded and tailored design approach to enable the system-of-systems to engage in different missions as needed. The program uses key promising technologies and techniques in areas such as survivability, lethal and non-lethal effects, supportability, propulsion, mobility, structures, robotics, human factors, training, and modeling and simulation. Such technologies combined with innovative concepts of operations and an open systems architecture approach support the fielding of FCS-equipped combat formations this decade.

The FCS provides a secure command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) system to harness advances in the distribution and effective use of information power. The FCS also provides direct-fire, indirect-fire, non-lethal, and troop transport capability. The FCS may consist of a combination of manned and unmanned air and ground and unattended elements.

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

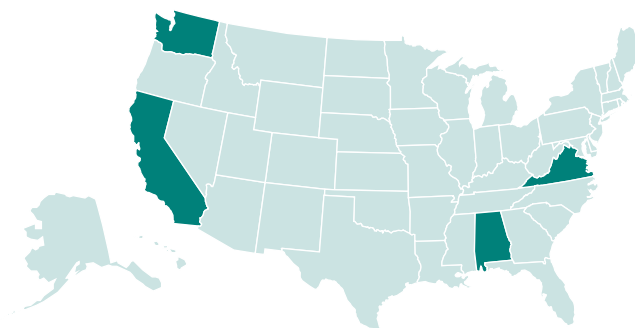
The FCS program is currently in the concept and technology development (CTD) phase, cooperatively executed by the Defense Advanced Research Projects Agency (DARPA) and the Army. On 14 March 2002 DARPA awarded an Other Transaction (OT845) agreement to Boeing to serve as Lead Systems Integrator (LSI). The Boeing Company was selected as the LSI to partner with the government in an integrated product and process development environment to develop, manage and execute the FCS program through CTD with an option for system development and demonstration (SDD).

## Projected Activities

- **3QFY03** Milestone B and formal program initiation planned. Entry into the SDD phase occurs at this milestone.
- **4QFY06** MS C.
- **FY08** First unit equipped.
- **FY10** Initial operational capability for Increment 1.

## Contractors

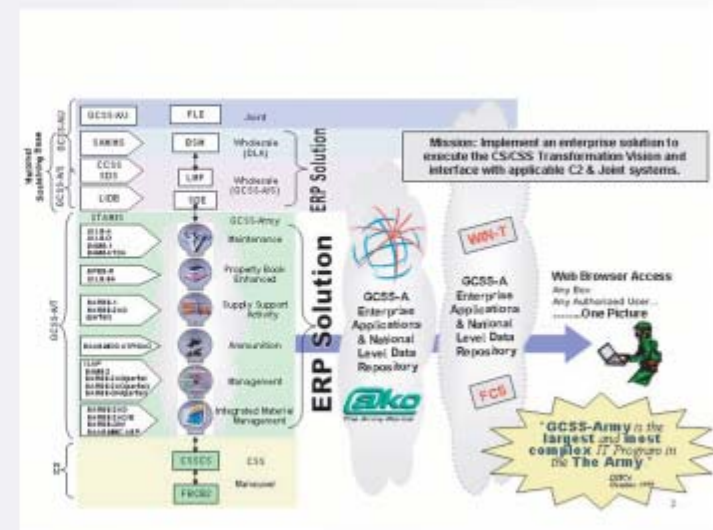
Boeing (Seattle, WA; Anaheim, CA); Science Applications International Corporation (McLean, VA); PTC (Bellevue, WA); Navigator Development (Enterprise, AL); UDLP (Santa Clara, CA)



## Architecture Overview to Which We Are Building



## Where We Are Going—ERP



## Mission

Provide the primary logistics system enabler to achieve the Army Transformation Vision of a technologically advanced, enterprise resource planning (ERP) system, capable of managing the flow of the logistics combat support/combat service support (CS/CSS) resources and information, to satisfy the Army's logistics modernization requirements.

## Description and Specifications

The Global Combat Support System-Army (GCSS-A) will modernize, integrate, and replace 13 legacy Army logistics, and interface/integrate with applicable C2 and joint systems to enhance CS/CSS transformation, and modernize the CS infrastructure.

GCSS-A/T provides commanders with the capability to anticipate, allocate, and synchronize the flow of CSS resources to equip, deploy/project, sustain, reconstitute, and re-deploy forces in support of the national military strategy. It will provide rapid, coordinated, and sustained CSS support to the Army, joint services, and allied forces within a reduced footprint.

As an enabler of near-real-time logistics management, the Web-based (DRID 54) system, supported by lightweight mobile applications, provides essential functionality for limited disconnected operation, and robust deployable communications capable of providing reach-back to a centralized data repository regardless of location, i.e., sustaining base or deployed theater, for all users at all echelons.

GCSS-A/T will meet the needs of the warfighter by providing automated information systems that will provide the right materiel at the right place and at the right time while anticipating warfighter requirements for asset visibility and control, along with timely and accurate management information. GCSS-A/T is a single integrated logistics system capable of supporting rapid force projection and battlefield functional areas of manning, arming, fixing, fueling, moving, and sustaining soldiers and their systems that are easily and economically trained and maintained.

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

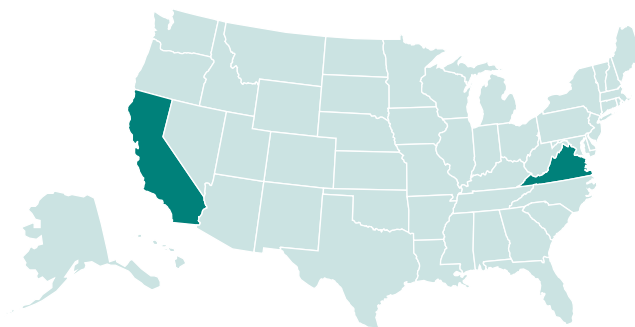
- GCSS-A/T program has adopted SAP's ERP application suite for its technical implementation.

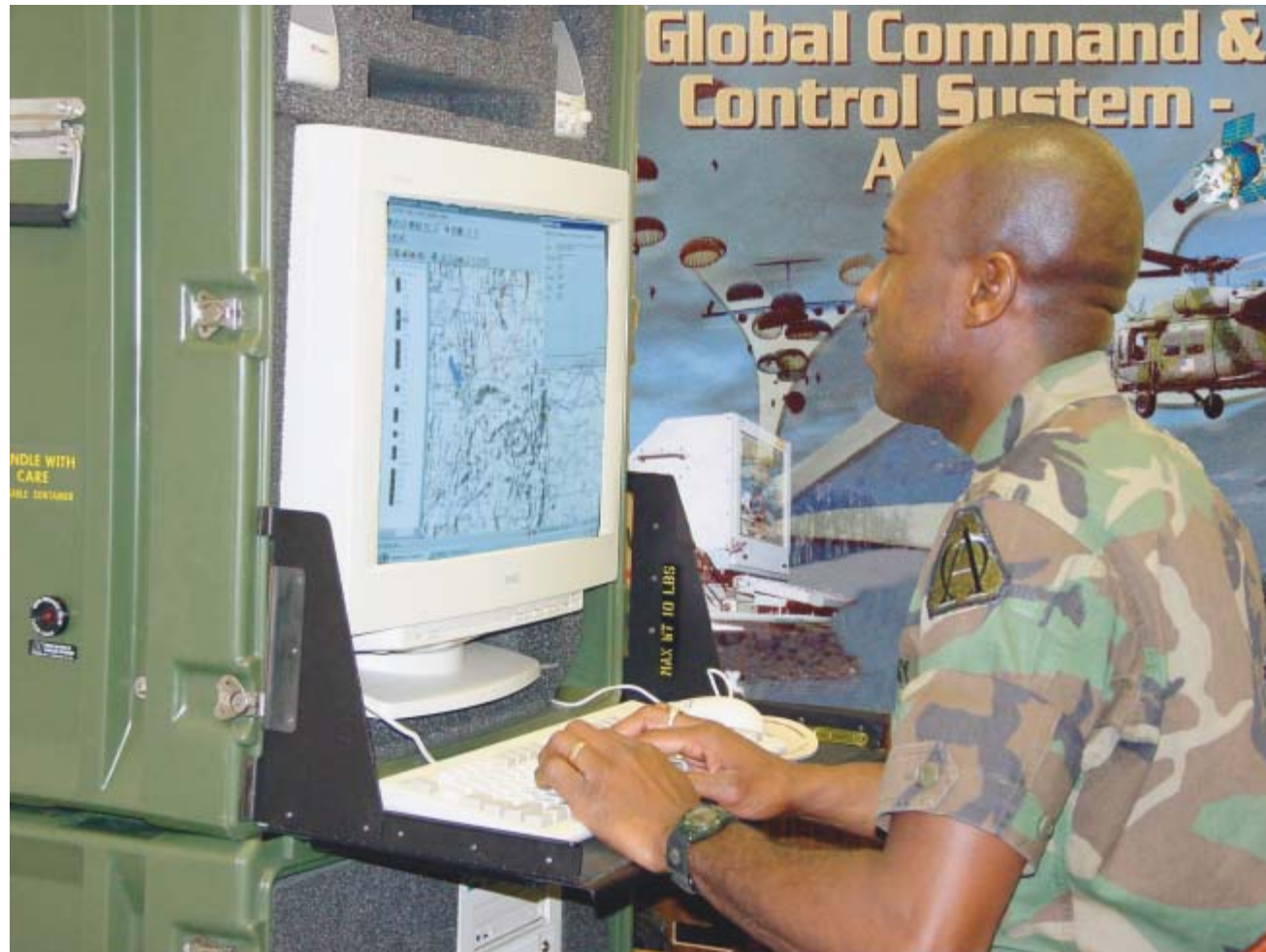
## Projected Activities

- Currently in the process of implementing a commercial, off-the-shelf, ERP solution compatible with both the Army wholesale system's and the Defense Logistics Agency's ERP solution.

## Contractors

TRW (Dominquez Hills, CA; Chester, VA)







## Mission

Provide automated command and control (C2) tools for Army strategic and theater commanders to enhance warfighter capabilities throughout the spectrum of conflict, during joint and combined operations, in support of the National Command Authority.

## Description and Specifications

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

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

The GCCS-A supports Army units from the Strategic Commanders, regional combatant commanders in the theater, and down through the joint task force commander. As part of ABCS, GCCS-A provides a seamless Army extension from the Joint GCCS system to echelons corps and below. Compatibility and interoperability is achieved by building the GCCS-A applications to operate on the common operating environment (COE), and through interfaces with other C2 systems within the Army as well as with other services.

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

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

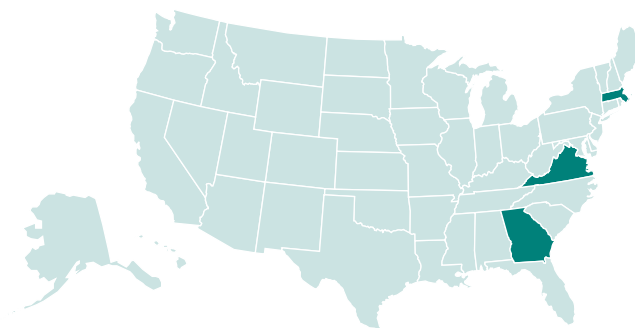
- Fielded GCCS-A to US Army Forces Command; US Army, Europe; US Army, Pacific; US Southern Command; Headquarters, Department of the Army; US Army Central Command; and the Combined Forces Command, Korea, III Corps, XVIII Corps, I Corps, V Corps.
- GCCS-A fully involved in the Army's digitization efforts.
- Completed development and initial fielding of a common theater baseline.

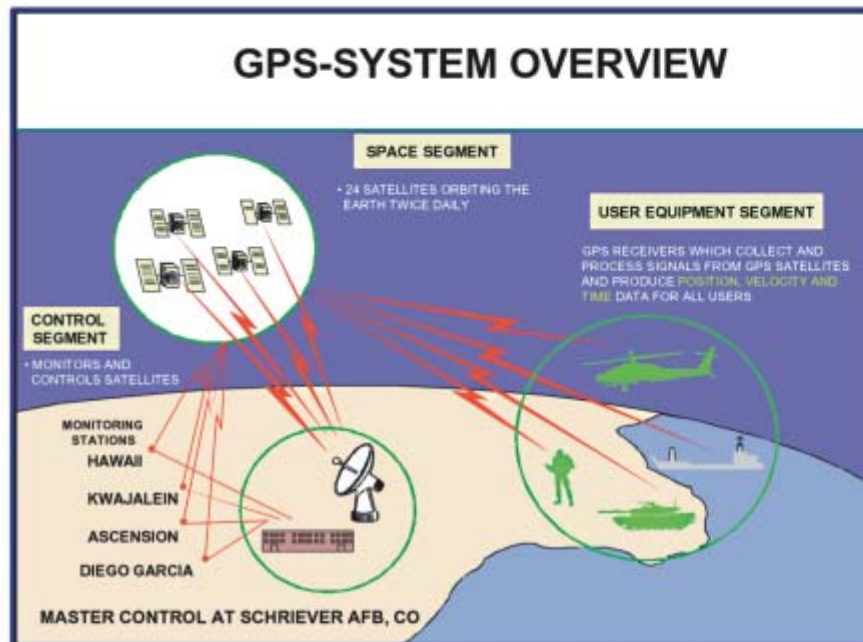
## Projected Activities

- Modify strategic and theater architectures to support joint GCCS updates.
- Continue the spiral development process in support of Army digitization and program requirements, and develop program documentation for the Milestone B for Block IV, planned for March 2003.
- Continue directed fieldings and prepare for required support for Operation Enduring Freedom.
- **FY04** Begin fielding of GCCS-A Block IV software, in order to maintain interoperability with GCCS joint Block IV.

## Contractors

Lockheed Martin (Springfield, VA); General Dynamics (Taunton, MA); FCBS (Springfield, VA); Getronics (Springfield, VA); SAIC (Atlanta, GA)





## User Equipment Segment



## Mission

Provides real-time position, velocity, and timing (PVT) data to tactical/strategic organizations.

## Description and Specifications

The Global Positioning System (GPS) is a joint service program, led by the Air Force. GPS is a space-based navigation system that distributes PVT data. It has three segments: a space segment (nominally 24 satellites), a ground control segment, and a user equipment segment. User equipment consists of receivers configured for handheld use, ground, aircraft, and watercraft applications. Military GPS receivers use the Precise Positioning Service (PPS) signal to gain enhanced accuracy and signal protection not available to commercial equipment. The primary GPS receiver in the Army today is the Precision Lightweight GPS Receiver (PLGR) with more than 83,000 in handheld, installed, and integrated applications. Future GPS user equipment will be both handheld (Defense Advanced GPS Receiver [DAGR]), designated an HTI initiative to replace most PLGRs, and platform-embedded (Ground-Based GPS Receiver Applications Module [GB-GRAM]). The Army represents more than 80 percent of the requirement for user equipment.

## Foreign Counterpart

Russia: GLONASS; Europe: GALILEO (still in planning stage)

## Foreign Military Sales

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

## Program Status

- PLGR: PM GPS procured an additional 1,600 assets to support Army Transformation efforts and other priority programs. Efforts have begun and are ongoing to develop an external protection module to mitigate a high PLGR failure rate when used improperly in vehicle integrations.
- Legacy Aircraft Systems: The standalone air GPS receiver (SAGR) (being withdrawn from service) and cargo utility GPS receiver (CUGR) are being utilized by remaining non-modernized Army aircraft.
- Additional CUGR installations are made on an as-needed basis to utilize available assets.
- Risk reduction contracts completed in FY02. In October 2002 two vendors were selected for First Article Test contracts.

## Projected Activities

### Fielding

- **FY04** Supplemental PLGR fielding continues to support Army Digitization and Transformation. All priority '02 and '03 requisitions were filled and most active component divisions were fielded to 100 percent of their authorizations.

### Modernization

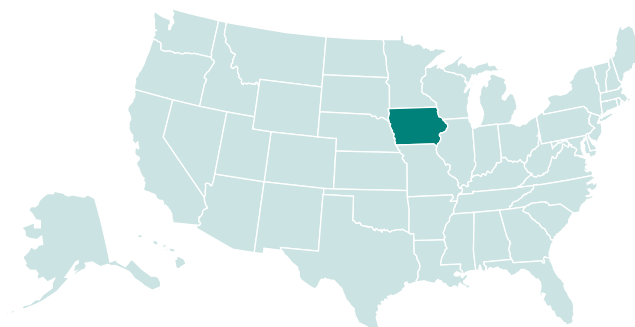
- **FY03** A single vendor for the production contract award is scheduled.
- **FY03** IDIQ production contract award scheduled for ground-based GRAM (GB-GRAM), the next generation embeddable GPS receiver. Initial deliveries support first article test and platform integration efforts.
- **FY04** Volume production deliveries of GB-GRAM are anticipated to begin.
- Development of Navigation Warfare (NAVWAR), an element of the larger GPS modernization program, continues to address GPS vulnerabilities through the use of new protection and denial technologies and new military satellite signals.

### Horizontal Technology Insertion (HTI)

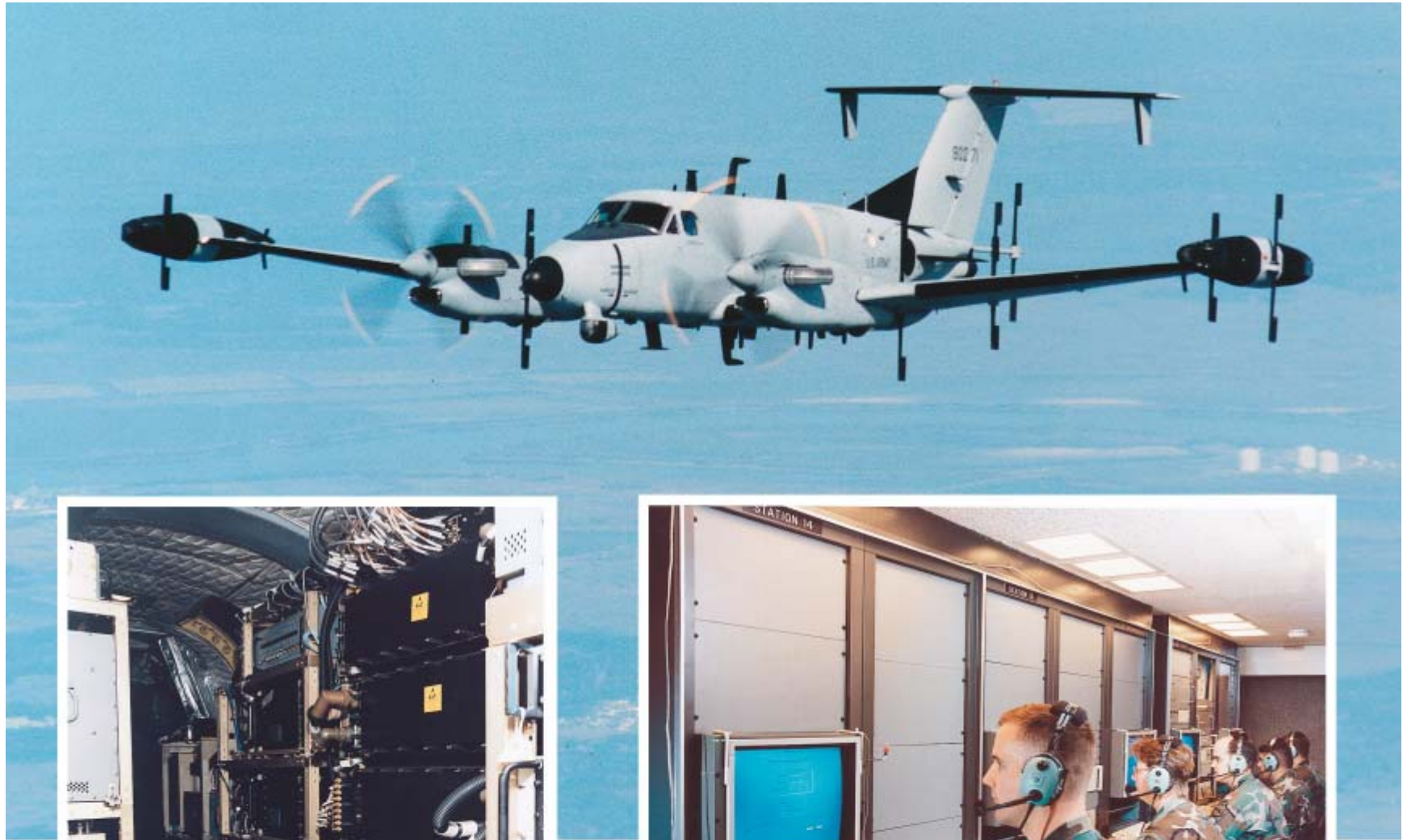
- **FY03-11** GB-GRAM will be submitted for HTI designation. Together, DAGR and GB-GRAM will introduce next-generation GPS technology to a broad range of host platforms and weapons systems.
- The GPS tactical receiver operational requirements document projects the total number of receivers required during this timeframe to exceed 650,000.

## Contractors

Rockwell Collins (Cedar Rapids, IA)









## Mission

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

## Description and Specifications

The Guardrail/Common Sensor (GR/CS) is a corps-level, fixed wing, airborne signals intelligence (SIGINT) collection and target location system. The GR/CS system supports corps, division, and joint land force component commanders by detecting, identifying, exploiting, and precisely locating threat communications, radars, and other electronic emitters throughout the corps/joint task force (JTF) area of interest. It provides information dominance to the tactical commander.

One GR/CS system is authorized per aerial exploitation battalion in the military intelligence brigade at each corps. A standard system consists of eight to 12 RC-12 aircraft that fly operational missions in sets of two or three. Ground processing is conducted in the integrated processing facility (IPF). Interoperable data links provide microwave connectivity between the aircraft and the IPF. GR/CS systems provide near real-time SIGINT and targeting information to tactical commanders throughout the corps/JTF area via the Joint Tactical Terminal (JTT), Tactical Related Applications Broadcast System (TRAPS), Tactical Reconnaissance Intelligence Exchange System (TRIXS), Tactical Information Broadcast Service (TIBS), and Integrated Broadcast Service (IBS). Key features include:

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

Planned product improvements include greater mobility and deployability via smaller “mini” IPFs and system upgrades to increase GR/CS capability to exploit a wider range of signals. The GR/CS shares technology with the Airborne Reconnaissance Low (ARL) 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

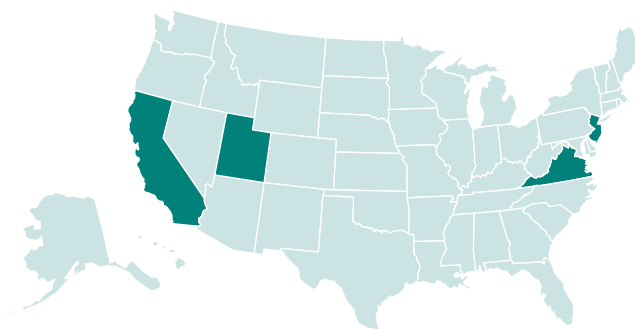
- Fielded reporting shelter #3 and conducted accreditation testing on GR/CS system 1 at 224th Mechanized Infantry Battalion.
- Completed final TIBS capability to all GR/CS systems.
- Received full materiel release for GR/CS system 2.
- Fielded the transportable medium earth terminal (TMET) for remote relay capability for system 4.

## Projected Activities

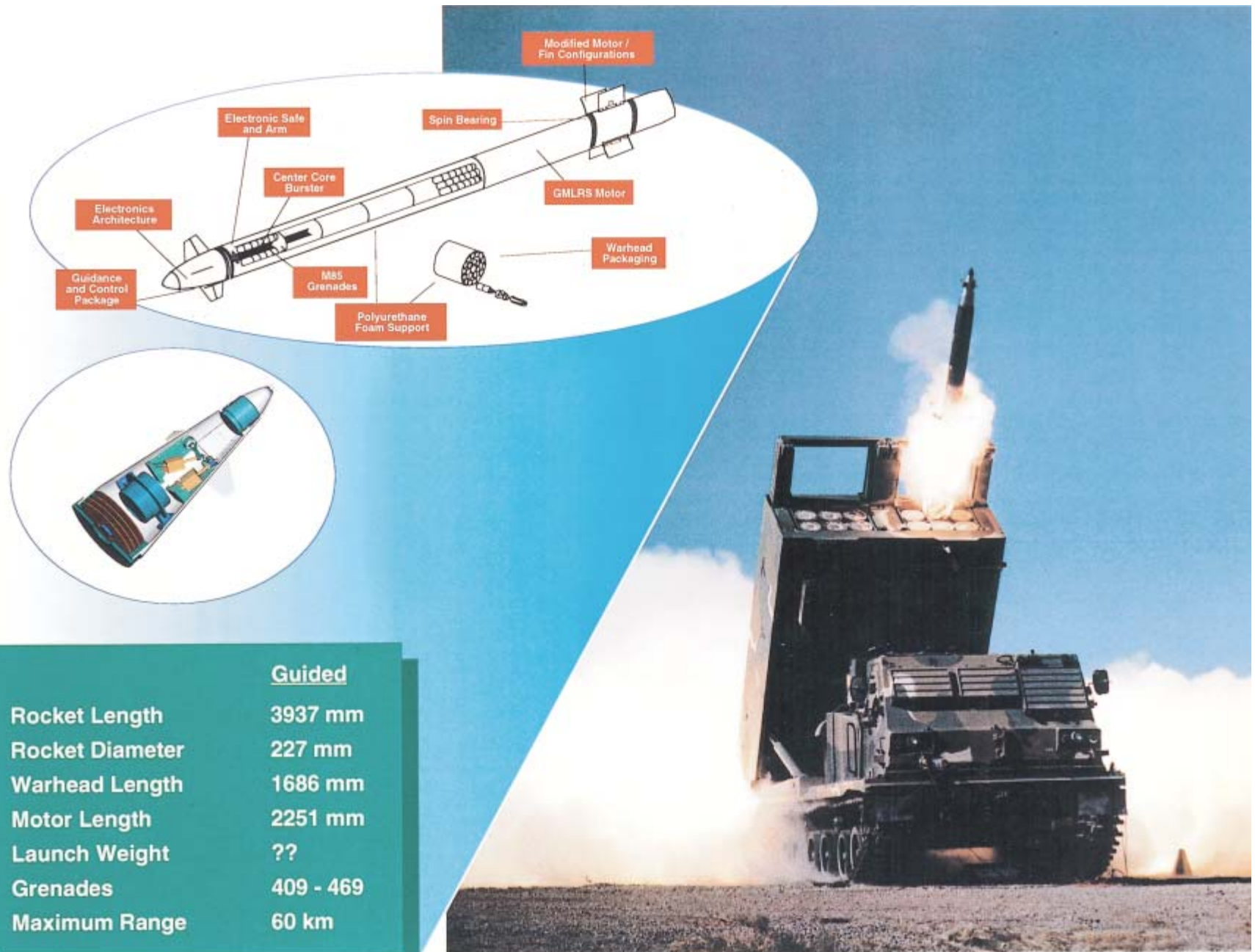
- **3QFY03** Complete system 4 remote relay upgrade with fielding the triband SATCOM terminal (TST).
- **4QFY03** Complete Guardrail information node (GRIFN) upgrade on system 1.
- **4QFY03** Complete special radio exploitation (SRE) fielding on system 2 and 4.
- **4QFY03** Complete interference cancellation system (ICS) upgrade on system 3.
- **FY03** Begin JTT upgrades for all systems and airborne tactical common data link (TCDL) installation for system 1.

## Contractors

TRW (McClellan, CA); L-3 Communications (Salt Lake City, UT); Raytheon (Falls Church, VA); CACI (Eatontown, NJ); ILEX (Shrewsbury, NJ)



## Guided Multiple Launch Rocket System (GMLRS)



	<u>Guided</u>
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, greater precision Multiple Launch Rocket System (MLRS) fires while reducing hazards to friendly maneuver forces.

## Description and Specifications

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

GMLRS munitions have greater accuracy, higher probability of kill (driven by greater accuracy), smaller logistics throughput, minimized collateral injury and minimized damage to unintended or non-military targets. There are two variants of the GMLRS: the dual-purpose improved conventional munitions (DPICM) variant (warhead consists of 404 small anti-personnel and anti-materiel grenades that are disbursed over the specific target); and the unitary variant (warhead consists of a single, 200 lb class high explosive charge that provides blast and fragmentation effects on, above, or in a specific target). These complementary capabilities cover many of the target types and target conditions expected in future conflicts.

**Propulsion:** Solid

**Guidance:** GPS-aided IMU

**Control:** 4-axis Canard

## Foreign Counterpart

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

## Foreign Military Sales

None

## Program Status

- **1994** Commenced the advanced technology demonstration (ATD) phase, which is managed by the US Army Aviation and Missile Command's Missile Research, Development, and Engineering Center.
- **3QFY98-2QFY99** Conducted five ATD flight tests.
- **4QFY98** Completed development phase international memorandum of understanding with France, Germany, Italy, and the United Kingdom.

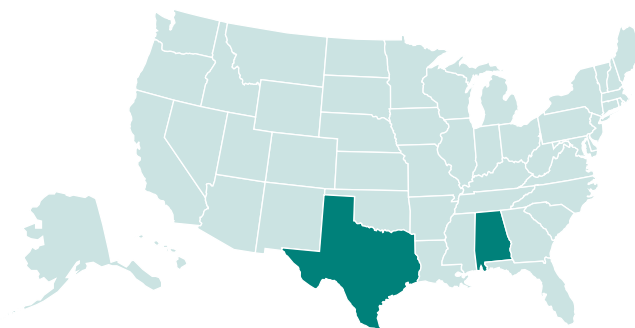
- **4QFY00** Demonstrated DPICM dispense threshold; completed rocket motor pre-flight readiness tests.
- **1QFY01** Restructured program with new guidance set; successfully completed the first ballistic flight test.
- **1-2QFY02** Conducted successful early development test.
- **4QFY02-1QFY03** Conducted production qualification test.
- **1QFY03** Final configuration audit and production readiness review conducted.

## Projected Activities

- **2QFY03** Product definition data package completion.
- **3QFY03** Low-rate initial production decision.
- **3QFY05** Initial operational test.
- **2QFY06** Milestone III decision; Initial operational capability.

## Contractors

Lockheed Martin (Dallas, TX); NTS (Huntsville, AL); CSC (Huntsville, AL)





## High Mobility Artillery Rocket System (HIMARS)





## Mission

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

## Description and Specifications

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

## Foreign Counterpart

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

## Foreign Military Sales

None

## Program Status

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

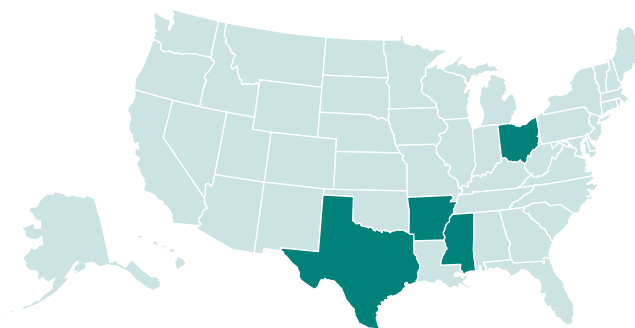
- **1QFY00** HIMARS system development and demonstration (SDD) phase began.
- Six HIMARS SDD launchers have been delivered to the Army with two additional launchers delivered to the USMC. The SDD launchers have fired all of the MLRS family of munitions to include the ATACMS Block I, IA, and II missiles. The maturation launchers demonstrated KPP's at an operational test conducted at Ft Sill in August 2002 and also successfully demonstrated C130 transportability.

## Projected Activities

- **FY02-05** Conduct developmental testing/operational testing.
- **2QFY03** Low rate initial production decision.
- **2QFY05** Battalion-level first unit equipped.

## Contractors

Lockheed Martin (Dallas, TX; Camden, AR); Stewart & Stevenson (Sealy, TX); O'Gara-Hess (Fairfield, OH); Vickers (Jackson, MS)



## Integrated Family of Test Equipment (IFTE)



## Mission

Provide mobile, general purpose, off-platform automatic test systems and rugged, compact, lightweight, man-portable, general purpose, at-platform automatic test equipment to verify the operational status of Army weapon systems and components and isolate, diagnose, and repair faults.

## Description and Specifications

The Integrated Family of Test Equipment (IFTE) is a modular test, measurement, and diagnostic equipment (TMDE) program consisting of four interrelated mobile, tactical, or man-portable systems that provide general purpose, standard automatic test equipment at all levels of maintenance. These systems allow isolation of weapon system faults to the line replaceable unit at the organizational and direct support level, both on and off the weapon system.

The Base Shop Test Facility (BSTF) (AN/TSM-191(V)3) is a suite of test equipment designed to support state-of-the-art digital, hybrid, and radio frequency systems and housed in an S-280 shelter mounted on a five-ton truck. A second shelter and truck are used for storage and transportation of test program sets (TPS). BSTF features virtual instruments for testing flexibility and new technology growth, touch-screen operator interface with color graphics display and menu-driven instructions, "pinless" unit-under-test interface, and an optical disk system for test program software and electronic technical manuals.

The Electro-Optics Test Facility (EOTF) (AN/TSM-191(V)5) is capable of testing the full range of Army electro-optical systems including laser transmitters, receivers, spot trackers, forward looking infrared systems, and television systems. Housed in an S-280 shelter mounted on a five-ton truck, it includes a second shelter and truck for TPS storage and transportation. It features VXI instrumentation, touch-screen operator interface, "pinless" unit-under-test interface, radiometric thermal source, visual source, laser source/detector, high resolution camera, reflective optical collimator, and an optical disk system for test program software and electronic technical manuals.

The Electronic Repair Shelter (ERS) provides a field-level capability to screen and repair printed circuit boards. The major subsystems of the ERS are ManTech VTS-1000 Model 99 and Huntron ProTrack I model 20 circuit card testers along with microblaster and vision enhancement systems, two PRC-2000 precision soldering stations, and a Precision Laboratory model 130D oven for curing circuit card conformal coatings. This equipment is housed in a 37-foot environmentally-controlled M991E1 semi-trailer. The Army has designated the ERS as a special repair activity and it can test and repair shop-replaceable units previously evacuated to a depot.

The Maintenance Support Device (MSD) is the latest and third-generation, multi-purpose, Army standard at-system tester used throughout DoD to test and diagnose complex electronics, engines, transmissions, central tire inflation systems, antilock brake systems, and other missile, aviation, and vehicular subsystems. It is a ruggedized, state-of-the-art, automatic test system that includes a sunlight-

readable Milbrite display, PC cards, and multiple ports for connectivity, and rechargeable Li-Ion batteries.

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

Bahrain, Croatia, Djibouti, Egypt, Greece, Israel, Jordan, Korea, Kuwait, Lithuania, Macedonia, Philippines, Portugal, Saudi Arabia, Singapore, Taiwan, Thailand, Turkey, Ukraine, Uzbekistan

## Program Status

- Production complete on BSTF and ERS.
- EOTF and MSD are in production.

## Projected Activities

Complete production and begin fielding of EOTF; continue production and fielding of MSD; complete fieldings of BSTF and ERS, initiate system development and demonstration of Next Generation Automatic Test System (AN/TSM-191(V)6).

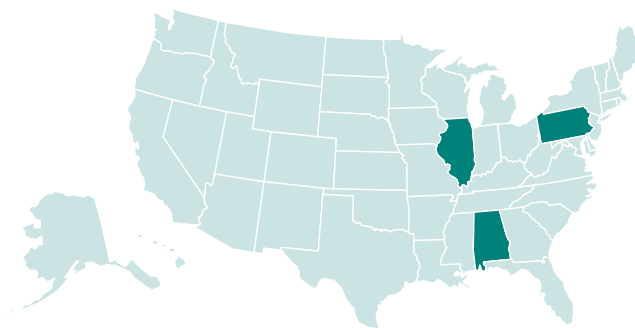
## Contractors

**EOTF:** Northrop Grumman (Rolling Meadows, IL); Kuchera Defense (Johnstown, PA)

**MSD:** Miltope Corporation (Hope Hull, AL)

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

**BSTF:** Northrop Grumman (Huntsville, AL)



## Integrated Meteorological System (IMETS)



**Vehicle Mounted Configuration**



**Shelter Operations**



**Light Configuration**



**Command Post Configuration**



## Mission

Provide commanders at all echelons with an automated tactical weather system that receives, processes, and disseminates weather forecasts, battlefield visualization, and weather-effects decision aids to all battlefield functional areas (BFAs); provide commanders at all echelons with accurate, high resolution, near-real-time weather data to conduct intelligence preparation of the battlefield (IPB).

## Description and Specifications

The Integrated Meteorological System (IMETS) is an Army-developed and -procured system operated by Air Force weather personnel and maintained within Army support channels. IMETS consists of three configurations: vehicle-mounted configuration (VMC), light configuration (LC) and command-post configuration (CPC). It provides automation and communications to Air Force combat weather teams assigned to support the Army at echelons above corps down to aviation battalions and to Army Special Operations forces.

IMETS processes and collates forecasts, observations, and climatological data to produce timely and accurate weather products (forecasts severe weather warnings for aviation and downwind forecasts/predictions for nuclear, biological, and chemical (NBC) effects, satellite imagery, weather annexes) tailored to the specific warfighter's needs. The most significant weather and environmental support tools available to warfighters are the automated tactical decision aids, which display the impact of the weather on current or planned operations for both friendly and enemy forces. This enables the warfighter to more effectively employ his forces and weapons systems to achieve success in battle.

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

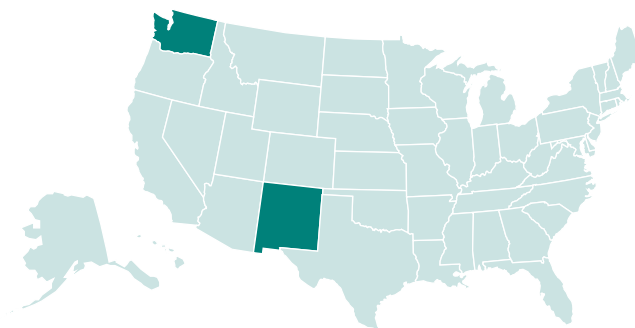
- **FY94-FY02** Fielded 33 VMCs and 11 LCs.
- Redirected IMETS in response to the operational requirements document (ORD) and realigned it with the Air Force re-engineering initiative. Scheduled to field 51 IMETS LCs in support of Operation Enduring Freedom.
- Continued development of command-post version of the weather effects workstation.

## Projected Activities

- **FY03** Complete fielding of interim 51 LCs (includes 2nd Stryker Brigade Combat Team [SBCT]); field three VMCs.
- **FY04** Field LC to 3rd SBCT; 8 VMCs to AC; refurbish and reissue 8 VMCs to RC; and place 3 IMETS System Trainers (Mockups) at selected schools. Conduct DT/OT on Objective LC and CPC.

## Contractors

Northrop Grumman (Lakewood, WA); Army Research Lab (White Sands, NM); New Mexico State University (Las Cruces, NM)



## Integrated System Control (ISYSCON) V(1)/V(2)



## Mission

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

## Description and Specifications

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

- Provide an automated capability for managing the tactical communications network.
- Enable automation-assisted configuration and management of a dynamic battlefield.

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

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

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

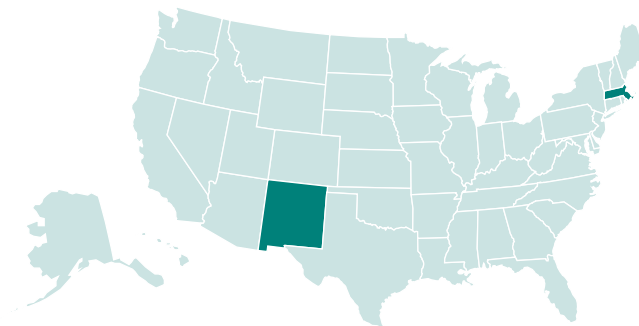
- **2QFY99** Milestone III decision approved.
- **1QFY01** Material release/fielding.
- **3QFY02** Updated operational requirements document approved by DA.
- **4QFY02** Fielded second post deployment software support baseline.

## Projected Activities

- Continue fieldings.
- Developing ACUS network management tool for echelons above corps.

## Contractors

General Dynamics (Taunton, MA; Needham, MA); Laguna Industries (Laguna, NM)



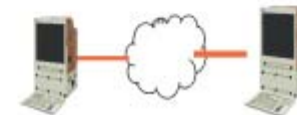




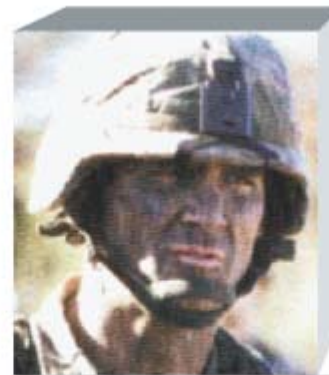
Panasonic Toughbook CF-28



SA Status



Web Technology to Disseminate Status



Task Reorganization

Local TOC Monitoring





## Mission

Provide the Signal Officer with a network management tool that will allow him to plan, disseminate, configure, initialize, monitor, and troubleshoot the Tactical Internet (TI) as well as the Tactical Operation Center (TOC), and Command Post (CP) local area networks (LANs).

## Description and Specifications

The ISYSCON (V)4/Tactical Internet Management System (TIMS) is a software system used by the signal officer at Division and below in the digitized force architecture. The ISYSCON (V)4/TIMS reuses Force XXI Battle Command, Brigade-and-Below (FBCB2) software as a foundation and adds developmental and commercial, off-the-shelf (COTS) software to plan, configure, initialize, and monitor the TI. The ISYSCON (V)4/TIMS enhances the FBCB2 system management capability.

The ISYSCON (V)4/TIMS will be developed and implemented in increments by incorporating blocked enhancements to the key performance parameter threshold baseline.

The ISYSCON (V)4/TIMS is expected to evolve into new hardware and software baseline blocked enhancements. Sensitive information LAN management capability will be added. As new systems are added to the TI, such as aviation platforms, the ISYSCON (V)4/TIMS will provide a network management interface capability. The ISYSCON (V)4/TIMS is currently scheduled for fielding to the Stryker Brigade Combat Teams (SBCTs) and III Corps.

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

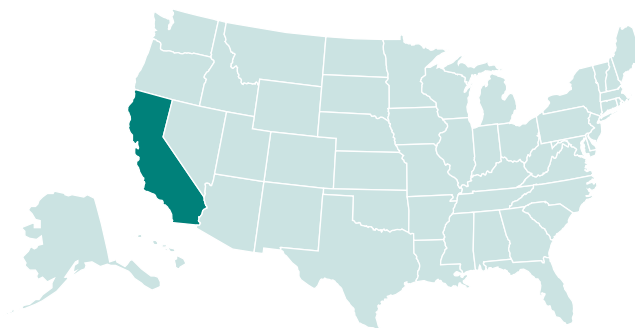
- **1QFY01** Issued to 4th Infantry Division.
- **2QFY01** 4th Infantry Division Capstone Exercise (DCX).
- **3QFY01** V2.2F acceptance testing.
- **4QFY01** Field Test 4, Block 2.
- **2QFY02** Limited User Test (LUT) 2A.
- **3QFY02** Chief of Staff, Army approved Operational Requirements Document.
- **3QFY02** Updated Acquisition Decision Memorandum.
- **4QFY02** Field Test 5, Block 4.
- **1QFY03** Issued V2.5.2 SBCT 1 and SBCT 2.

## Projected Activities

- **3QFY03** V2.5 Acceptance Test.
- **1QFY04** Field 1st Cavalry Division.

## Contractors

TRW (Los Angeles, CA)



# Javelin



## Mission

Provide a man-portable, highly lethal, and survivable, medium anti-tank weapon system to the infantry, scouts, and combat engineers.

## Description and Specifications

Javelin is the first fire-and-forget shoulder-fired anti-tank missile now fielded to the Army and Marine Corps, replacing Dragon. Javelin's unique top-attack flight mode, self-guiding tracking system, and advanced warhead design allows it to defeat all known tanks out to ranges of 2500m.

Javelin's two major modular components are a reusable command launch unit (CLU) and a missile sealed in a disposable launch tube assembly. The CLU's integrated day/night sight provides target engagement capability in adverse weather and countermeasure environments. The CLU also may be used by itself for battle-field surveillance and reconnaissance. Javelin is fielded with no specific test measurement or diagnostic equipment, allowing our forces to deploy rapidly and unencumbered.

The Javelin missile and CLU together weigh 49.5 lbs; its maximum range is in excess of 2500m. Its fire-and-forget guidance mode enables gunners to fire and then immediately take cover, greatly increasing survivability. Special features include a selectable top-attack or direct-fire mode (for targets under cover or for use in urban terrain against bunkers and buildings), target lock-on before launch, and a very limited back-blast that enables gunners to fire safely from enclosures and covered fighting positions.

Javelin's training system consists of three devices, each with a specific role. The inert missile simulation round familiarizes gunners with the physical characteristics of Javelin; the basic skills trainer is used to develop basic tactical and technical gunnery skills; and the field tactical trainer is used to refine gunnery skills and allows participation in both range training and force-on-force exercises.

Javelin's fielding to the US Army Rangers at Ft Benning met first unit equipped in June 1996. Since then, Javelin has been fielded to the 82nd Airborne; 2nd Infantry Division; 1-508th IN; US Army Rangers at Ft Lewis and Ft Stewart; the 10th Mountain Division and the first Stryker Brigade Combat Team; the 1st, 3rd, and 5th Special Forces Groups; the 101st Airborne Division; the 25th Infantry Division; the 172nd Infantry Brigade; the second Stryker Brigade Combat Team; and the 1st Cavalry Division.

## Foreign Counterpart

The Israeli Spike/Gill is 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

Norway and the United Kingdom have purchased Javelin assets to conduct test trials. The Australian Government has purchased the weapon system.

## Program Status

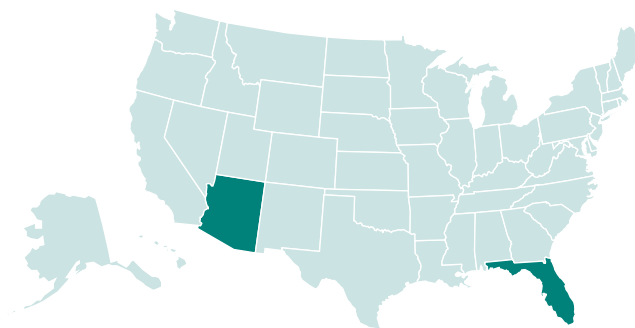
- **1QFY03** Final year of a four-year multiyear contract signed.
- Hardware deliveries and fielding to the Army continues on schedule. USMC fully fielded.

## Projected Activities

- **FY03** Field to 3rd ID, 4th ID, 3rd Stryker Brigade, 1st Armored Division.

## Contractors

A joint venture between Raytheon (Tucson, AZ) and Lockheed Martin (Orlando, FL)







## Mission

Protect and enhance the warfighter's capabilities to operate in a biological warfare (BW) environment through the development, Food and Drug Administration (FDA) licensure/clearance, and production of medical biological defense (BD) products.

## Description and Specifications

The Joint Biological Agent Identification and Diagnostic System (JBAIDS) is a reusable, modifiable, biological agent detection, identification, and diagnostic system. The system is capable of rapid, reliable, and simultaneous identification of multiple biological agents of operational concern and other pathogens of clinical significance. JBAIDS is a spiral development program. This will be a rapid development and fielding to deliver this critical technology capable of identifying bacteria, viral agents, and biological toxins to the field in the shortest time. The Block I effort will focus on militarizing and hardening critical identification and diagnostic technologies. The Block I effort comprises sample protocols, the diagnostic device, stable assays with controls, training, and logistics support.

Prior to FDA clearance, the Block I system will be fielded and used for environmental surveillance testing. The Program Executive Office (PEO) Chemical and Biological Defense (JBAIDS Office) plans to procure a commercial, off-the-shelf (COTS) or modified non-development item (NDI) system design to meet this requirement. The COTS/NDI hardware will be ruggedized and hardened to support forward medical operations for force health protection; Block I hardware will undergo environmental, reliability, development test and operational test activities in FY03. In subsequent blocks, the system will interface with electronic medical record/surveillance (Theater Medical Information Program, Defense Medical Surveillance System), and early warning and reporting (JWARN/JWARN-like) systems, improving battlespace management by enhancing commander situational awareness.

## Foreign Counterpart

No known foreign counterpart program, although foreign countries are investing in rapid biological agent devices.

## Foreign Military Sales

None

## Program Status

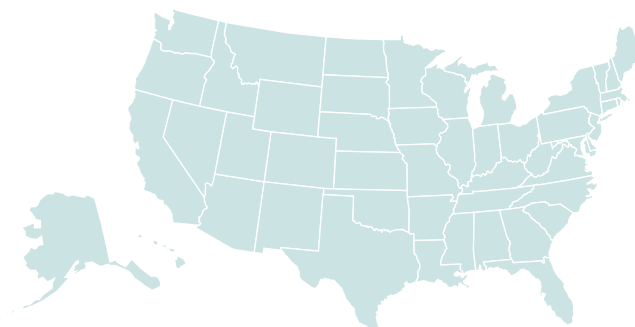
- **4QFY02** Competitive evaluation of potential technologies completed.
- **1QFY03** RFP for the Block I released.

## Projected Activities

- **2QFY03** Source selection.
- **1QFY04** Milestone C.
- **2QFY04** Initial operational testing and evaluation.
- **4QFY04** Full rate production.

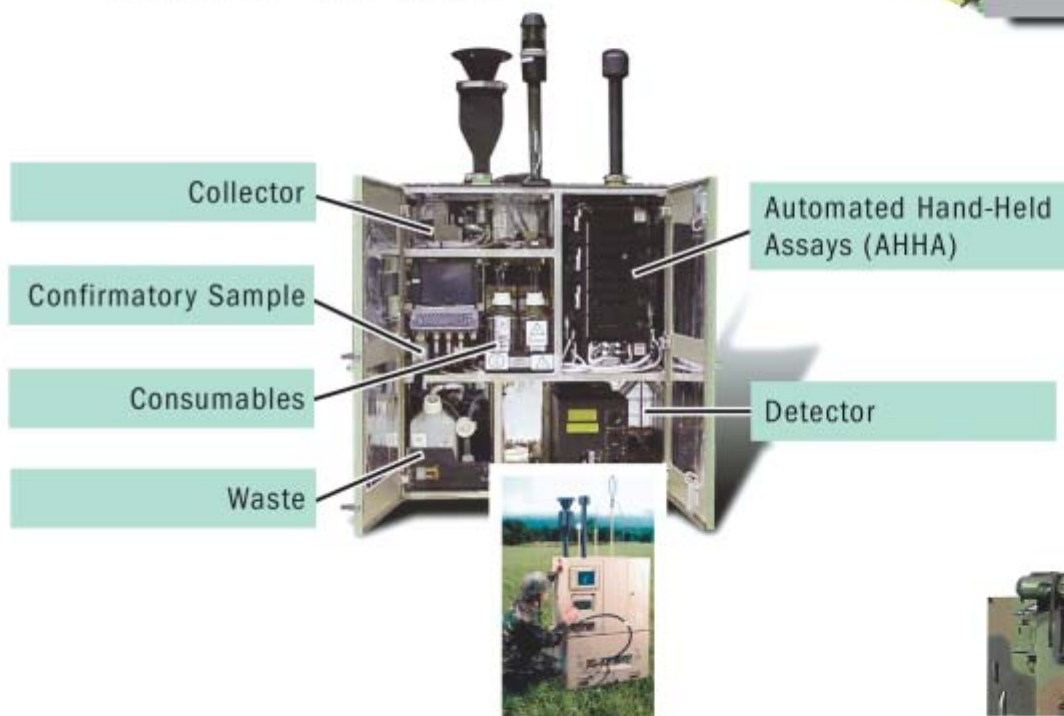
## Contractors

TBD

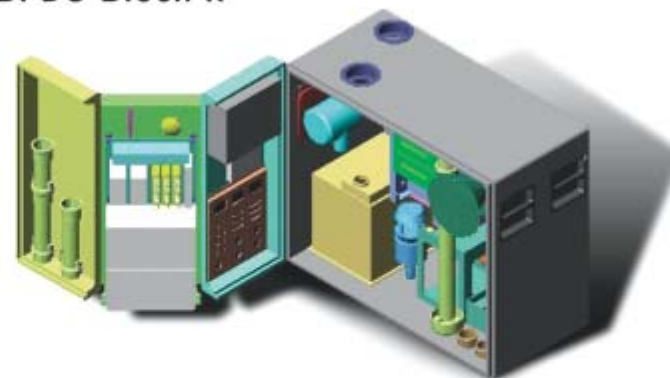


# Joint Biological Point Detection System (JBPDS)

JBPDS Bio Suite Block I



JBPDS Block II



JBPDS BIDS



## Mission

Provide rapid and fully automated detection, identification, warning, and sample isolation of high threat biological warfare (BW) agents .

## Description and Specifications

The Joint Biological Point Detection System (JBPDS) is the first joint BW agent detection program. It consists of a common biosuite that can be installed on vehicles, ships, and at fixed sites to provide biological detection and identification to all service personnel. The JBPDS is also portable, and may be used in support of bare-base or semi-fixed sites. The system is fully automated and is fully Joint Technical Architecture (JTA)-compliant. JBPDS will presumptively identify 10 BW agents simultaneously in less than 20 minutes. It will also collect a liquid sample for confirmatory analysis and identification. Planned product improvements will focus on reducing size, weight, and power consumption while increasing system reliability and the number of agents presumptively identified—up to 26 agents simultaneously.

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

## Foreign Counterpart

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

## Foreign Military Sales

None

## Program Status

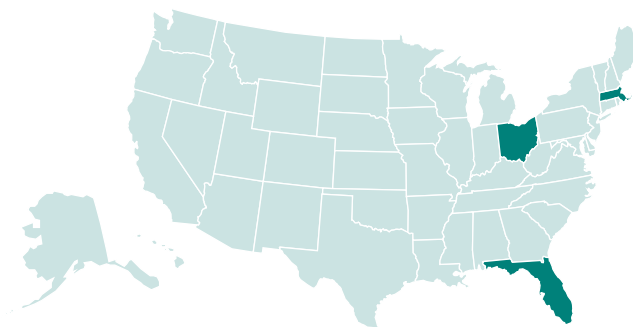
- **FY00** Completed pre-production qualification testing, operational assessment, and field trial testing.
- **1QFY01** Awarded contract for low rate initial production (LRIP).
- **4QFY01-1QFY02** Completed operational assessment - 2.
- **2QFY02** Award contract for LRIP (phase II).
- **1QFY03** Complete multi-service initial operational test and evaluation (phase I).

## Projected Activities

- **1QFY04** Complete multi-service initial operational test and evaluation (phases II-V).
- **3QFY04** Conduct Milestone III.
- **1QFY07** Full rate production.
- Product Improvements: Reduce size, weight, and power consumption; increase system reliability and the number of agents presumptively identified—up to 26 agents simultaneously.

## Contractors

**Block I:** Intellitec (Deland, FL), Battelle (Columbus, OH), MIT Lincoln Laboratories (Lexington, MA)



## Joint Chemical Agent Detector (JCAD)





## Mission

The Joint Chemical Agent Detector (JCAD) is a lightweight, portable, warfighter-mounted, chemical point warfare agent detection and identification system. It will be utilized by all Services and by all military operational specialties. JCAD will replace all current chemical point detection systems in the US inventory.

## Description and Specifications

The Joint Chemical Agent Detector (JCAD) is a multi-mission, chemical-agent point-detector currently in development for the US military. JCAD will detect, identify, quantify, alert, and report the presence of nerve, blister, and blood agents. Equipped with the JCAD pre-concentrator, it will be capable of accumulating and reporting miosis-level concentrations of one chemical agent while still providing a rapid alert response indication to high concentration exposures from multiple agents.

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

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

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

## Foreign Counterpart

Similar systems are currently in development in the United Kingdom and Finland.

## Foreign Military Sales

None

## Program Status

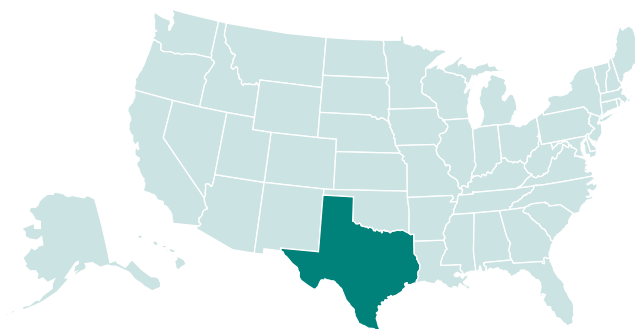
- **FY03** System development and demonstration.
- **2QFY03** Complete contractor validation testing.

## Projected Activities

- Commence five-year DoD procurement of more than 274,000 JCAD units. JCAD will eventually replace all current US inventory chemical point-detection systems.
- **2QFY04** Milestone C/low rate initial production.
- **4QFY05** Full rate production decision.

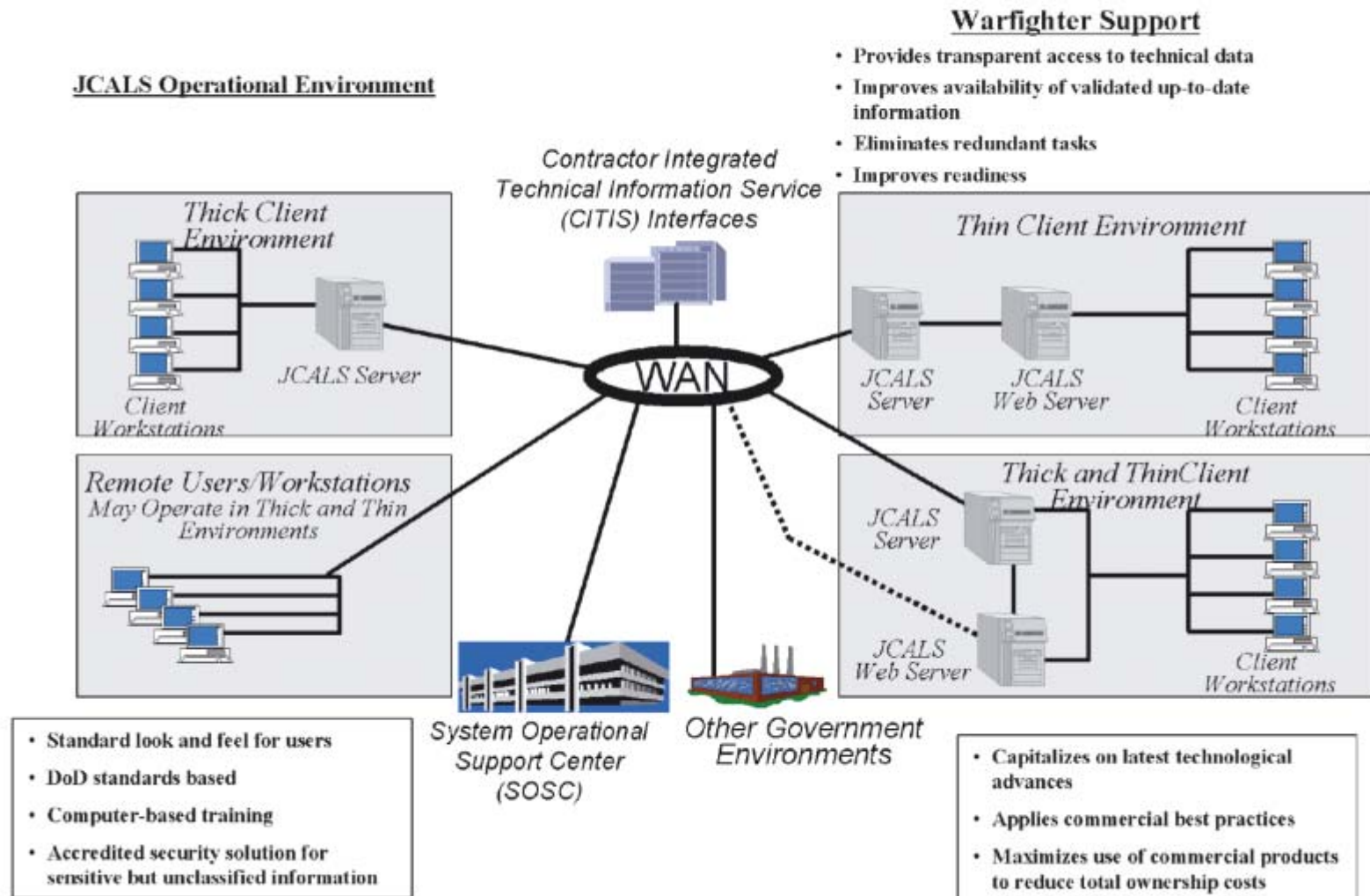
## Contractors

BAE Systems (Austin, TX)



# Architecture

### JCALS Operational Environment



## Mission

Provide a digital environment that supports reengineering of business processes associated with managing, acquiring, improving, publishing, stocking, and distributing technical manuals/technical orders.

## Description and Specifications

In addition to providing a basic infrastructure system to provide interconnectivity and data management that can be leveraged to support other acquisition and logistics support business processes, the Joint Computer-Aided Acquisition & Logistics Support (JCALS) is also:

- Web-based
- An accredited security solution
- DoD standards-based (COE, JTA, GIG compliant).

JCALS supports electronic commerce/electronic data interchange. The Global Data Management System (GDMS) provides integrated digital environment to support transparent access to data regardless of location or format.

JCALS is replacing the custom developed GDMS with a commercial, off-the-shelf hardware/software solution that will interoperate more effectively with objective logistics systems and provide better value to the department.

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

- **October 4, 2002** OSD(C3I) approved a Milestone III fielding decision for software package (SWP) 3.1.1 in an acquisition decision memorandum (ADM) signed by the ASD(C3I). The ADM directed the program to stop development with SWP 3.1.2 and enter the sustainment mode.
- The project manager is preparing a cost estimate to determine sustainment costs and to confirm that the program is affordable through the Future Years Defense Plan. The functional proponent, DUSD(L&MR), will determine whether the program should continue with plans to move to a Web-based regionalized processing solution for the entire enterprise based on the cost estimate.

## Projected Activities

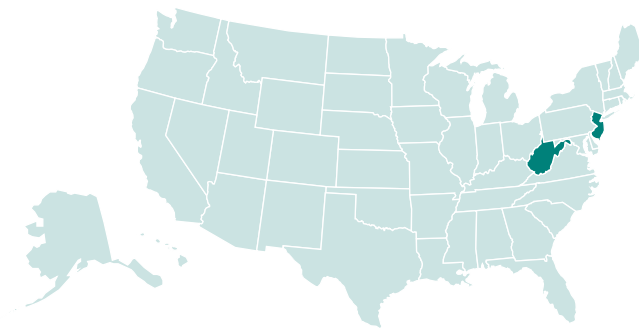
- **2QFY03** SWP 3.1.1 will undergo an in-field operational assessment.
- **3QFY03.** Developmental testing of SWP 3.1.2 has begun and will continue though SWP 3.1.2 is expected to be released to the entire JCALS enterprise as the final software package in 3QFY02.

## Contractors

**Develop/Sustain/Support:** CSC (Morristown, NJ)

**PM Support:** Titan (Shrewsbury, NJ)

**Sustainment:** CSC (Fairmont, WV)







## Mission

Provide over-the-horizon, land-attack cruise missile defense, enhance cruise missile detection, and provide extended engagement ranges to support the air-directed surface-to-air missile (ADSAM) and air-directed air-to-air missile (ADAAM) engagement concepts for current and future air defense weapon systems.

## Description and Specifications

The Joint Land Attack Cruise Missile Defense Elevated Netted Sensors System (JLENS) is an Objective Force, theater-level system that meets the requirements of the Army Transformation. JLENS is a low-cost, airborne sensor providing over-the-horizon land-attack cruise missile defense. JLENS uses advanced sensor and networking technologies to provide precision tracking and 360 degree, wide-area surveillance of land-attack cruise missiles. A joint program, JLENS performs as a multi-role platform to enable extended range command and control linkages, communications relay, blue force tracking, and battlefield awareness. A key element of the Army Transformation single, integrated air picture, JLENS integrates data from multiple sensors and command, control, communications, and intelligence networks, and provides correlated data to ballistic missile command, control, communications, computer, and intelligence (BMC4I).

JLENS provides battlefield commanders the following capabilities:

- Detection and tracking of low-altitude threats (cruise missiles and aircraft) that may go undetected by surface-based sensors due to terrain masking and line-of-sight locations of targets
- Support of ADSAM and ADAAM engagements
- Development and display of the SIAP
- Detection and tracking of enemy surface moving targets.

These technologies provide a low-cost, long-endurance capability to protect US troops and assets in foreign lands, and provide a significant contribution to the defense of the continental US and its population from cruise missile attacks. The JLENS sensor suite consists of a surveillance and precision tracking radar capability. JLENS surveillance provides a long-range air picture enhanced by identification friend or foe. This information, distributed via the Joint Data Network and Joint Composite Tracking Network (presently LINK 16 and Cooperative Engagement Capability), contributes to the SIAP. The JLENS radar is a steerable, lightweight array capable of tracking multiple targets in a sector. The JLENS prioritizes remote and local tracks autonomously or accepts external requests for precision tracking and engagement support.

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

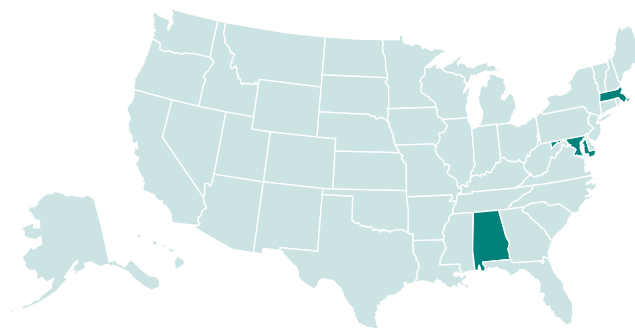
- The Department of Defense and the Joint Chiefs of Staff directed the Army to lead a joint project office (Army, Navy, and Air Force). The US Army Space and Missile Defense Command established the joint project office in Huntsville, AL, with Navy and Air Force deputy program managers.
- The JLENS Program was designated an acquisition category II program by the Army Acquisition Executive and is currently in the concept and technology development phase of the acquisition cycle, concentrating on prototype development and risk reduction activities. JLENS is assigned to the Program Executive Office, Air and Missile Defense.

## Projected Activities

- **FY01-05** Continued system design, integration, and demonstration efforts, leading to Milestone B decision.

## Contractors

Raytheon (Bedford, MA); CAS (Huntsville, AL); TCOM (Columbia, MD)





## Mission

Provide a common, automated, joint communications planning and management system for combatant commanders, commanders of joint task forces, and their supporting service component headquarters.

## Description and Specifications

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

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

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None (The objective JNMS will include a releasable version for combined/allied/coalition use.)

## Program Status

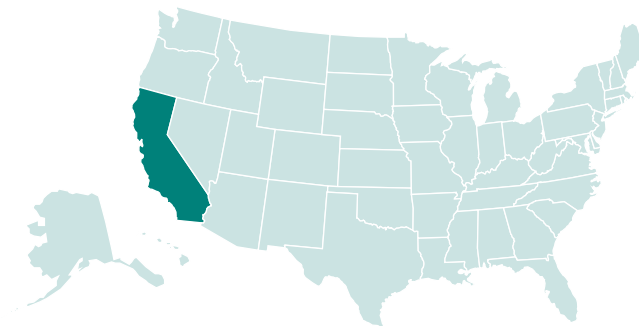
- **1QFY01** Solicitation issued.
- **2QFY01** Contract award.
- **4QFY01** System requirements review.
- **1QFY02** Preliminary design review.
- **1QFY03** Critical design review.

## Projected Activities

- **3QFY03** Functional qualification testing.
- **1QFY04** Operational testing.

## Contractors

SAIC (San Diego, CA)





## 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 lightweight CB protective garments, multi-purpose overboots, gloves, and multi-purpose protective socks. The Army will adopt each component as needed to accommodate various user needs. Each component is based on state-of-the-art material technologies that have undergone extensive user evaluation and field and laboratory testing. This system provides the highest level of protection against current CB threats, while reducing heat strain, weight, and bulk to an absolute minimum. Balancing CB protection and heat-strain management with service-defined mission requirements optimizes user performance.

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

## Foreign Counterpart

Many countries have similar products.

## Foreign Military Sales

Egypt

## Program Status

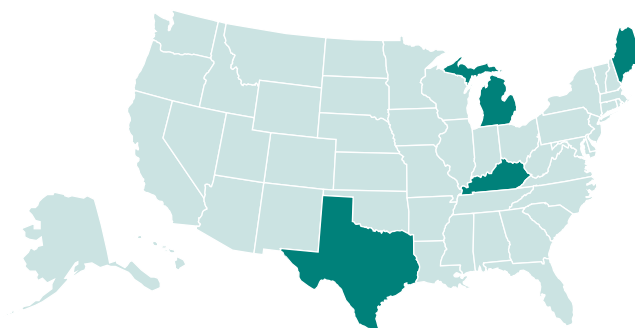
- **3QFY97** Milestone III decision.
- **4QFY97** Commenced production of JSLIST overgarment.
- **FY00** Army began fielding JSLIST overgarment to FP1 units.
- **FY02** Started Block II glove upgrade effort.

## Projected Activities

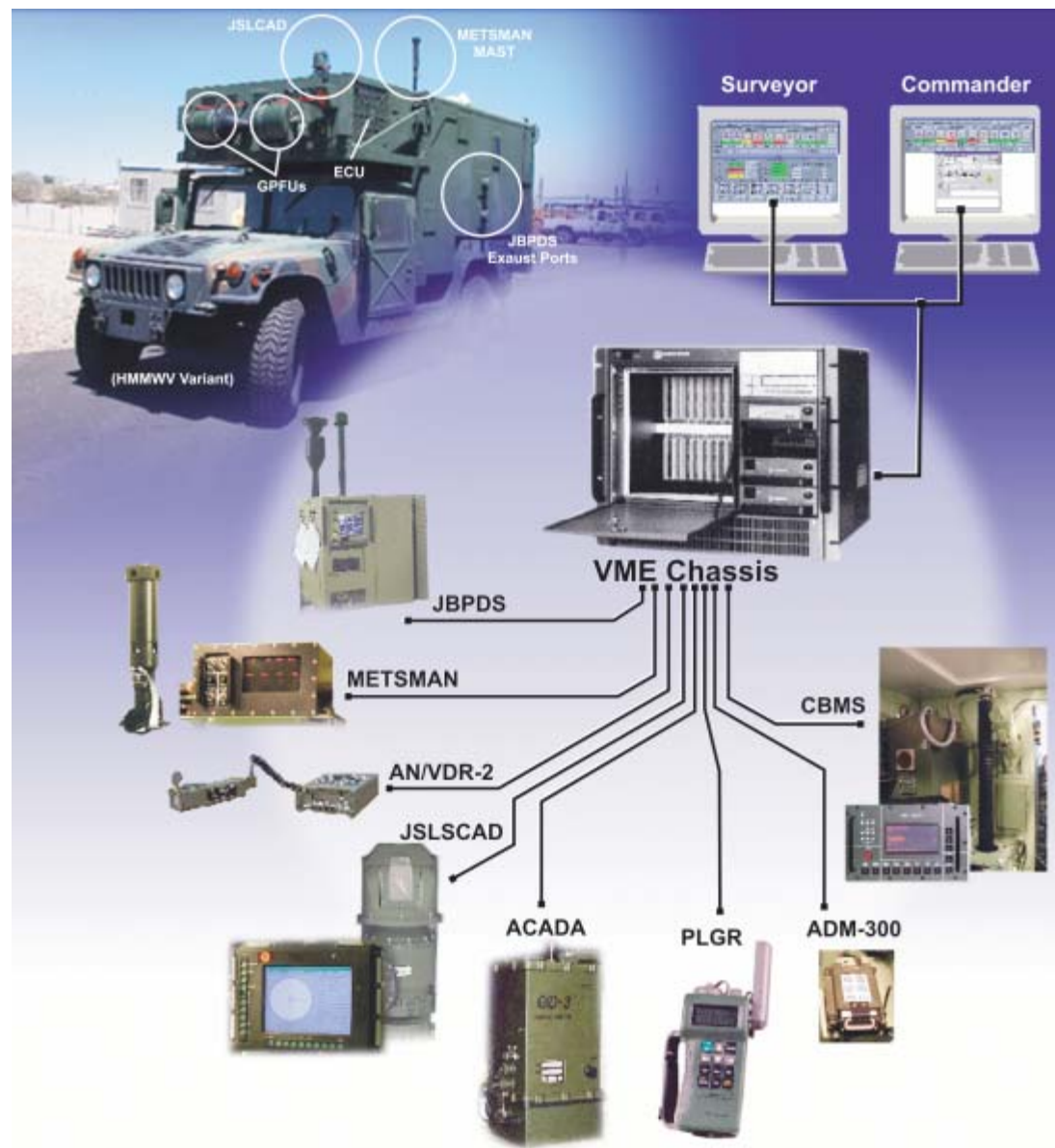
- The JSLIST block upgrade program is an iterative process that will allow for periodic technology insertion of tested, approved materials into the JSLIST production cycle; the pursuit of Special Operations Command requirements; and production of improved gloves and footwear. Multi-purpose protective sock program begins in FY03.

## Contractors

Creative Apparel Associates (Belfast, ME); Group Home Foundation/Belfast Industries, Inc. (Belfast, ME); South Eastern Kentucky Rehabilitation Industries (Corbin, KY); Peckham Vocational Industries, Inc. (Lansing, MI); National Center for the Employment of the Disabled (NCED) (El Paso, TX)



## Joint Service Lightweight Nuclear Biological Chemical Reconnaissance System (JSLNBCRS)



## Mission

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

## Description and Specifications

The Joint Service Lightweight Nuclear Biological Chemical Reconnaissance System (JSLNBCRS) is an NBC detection and identification system. It will consist of a base vehicle equipped with handheld, portable and mounted, current and advanced, NBC detection and identification equipment. The vehicle will be equipped with collective protection, an overpressure system, environmental control system, auxiliary power supply system, navigation system, meteorological data processing system, internal and external communication system and surface samplers. There will be two variants of the JSLNBCRS: the High Mobility Multipurpose Wheeled Vehicle (HMMWV) and the light armored vehicle (LAV).

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

## Foreign Counterpart

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

## Foreign Military Sales

None

## Program Status

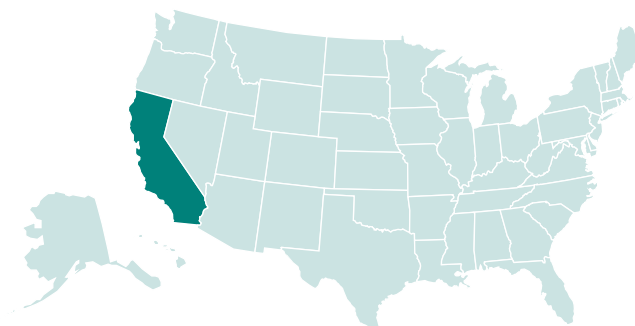
- **4QFY98** Awarded integration contract for prototype development and integration.
- **FY99** Initiated concept exploration and program definition and risk reduction phases.
- **FY00** HMMWV variant design/fabrication/build; developmental test I.
- **FY01-02** HMMWV variant refurbishment; developmental test II/limited user test.
- **FY01-02** LAV variant (Marine Corps Gen II) design/fabrication/build.
- **1QFY03** Complete limited user test/developmental electromagnetic compatibility/electromagnetic interference/high-altitude nuclear electromagnetic pulse (EMI/EMC/HEMP) testing HMMWV.

## Projected Activities

- **2QFY03** Low rate initial production contract award HMMWV.
- **3QFY04** HMMWV/LAV initial operational test and evaluation.
- **4QFY04** Award full production contract (HMMWV/LAV variants).
- **2QFY05** HMMWV variant initial operational capability.

## Contractors

TRW (Dominguez Hills, CA)





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





## Mission

Identify chemically contaminated battlespaces and provide enhanced early warning to joint forces.

## Description and Specifications

The Joint Service Lightweight Standoff Chemical Agent Detector (JSLSCAD) is a lightweight, passive, standoff, chemical agent detector. It will provide on-the-move detection, identification, mapping, and reporting of nerve, blister, and blood agent vapors. The JSLSCAD can communicate its warning automatically through the Joint Warning and Reporting Network (JWARN). It will provide 360 x 60 degree coverage, from a variety of tactical and reconnaissance platforms, at distances of up to five kilometers. Warfighter protection and maneuver unit combat capabilities will be increased with the JSLSCAD. Enhanced early warning for contamination avoidance is the competency of the system. When avoidance is not possible, JSLSCAD will provide extra time for warfighters to don full protective equipment (i.e., mission oriented protective posture [MOPP] gear).

Intended applications include various ground-vehicle, aerial, shipboard, and fixed-emplacement platforms such as the following: M93A1 Fox Block II; Light NBC Reconnaissance System (JSLNBCRS); unmanned aerial vehicle; C130 aircraft; CH53 helicopter; ships; and fixed-site installations. The JSLSCAD detector and the operator display unit weigh approximately 55 lbs. The power adapter used for shipboard and fixed-site applications weighs approximately 10 lbs. The detector is approximately 1 cubic foot and the total of all 3 components is approximately 1.5 cubic feet.

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

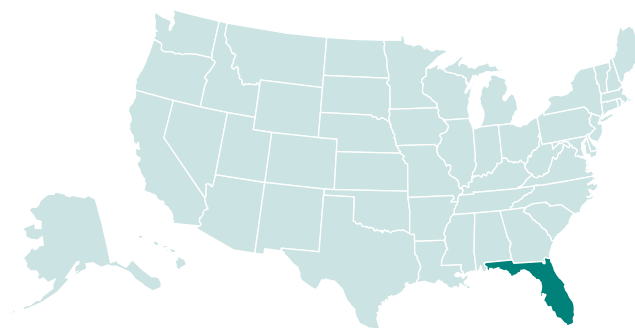
- **1QFY99** Completed preliminary design review.
- **1QFY00** Conducted critical design review.
- **1-2QFY02** Fabricated development and operational test items.
- **2QFY02** Initiated developmental tests.

## Projected Activities

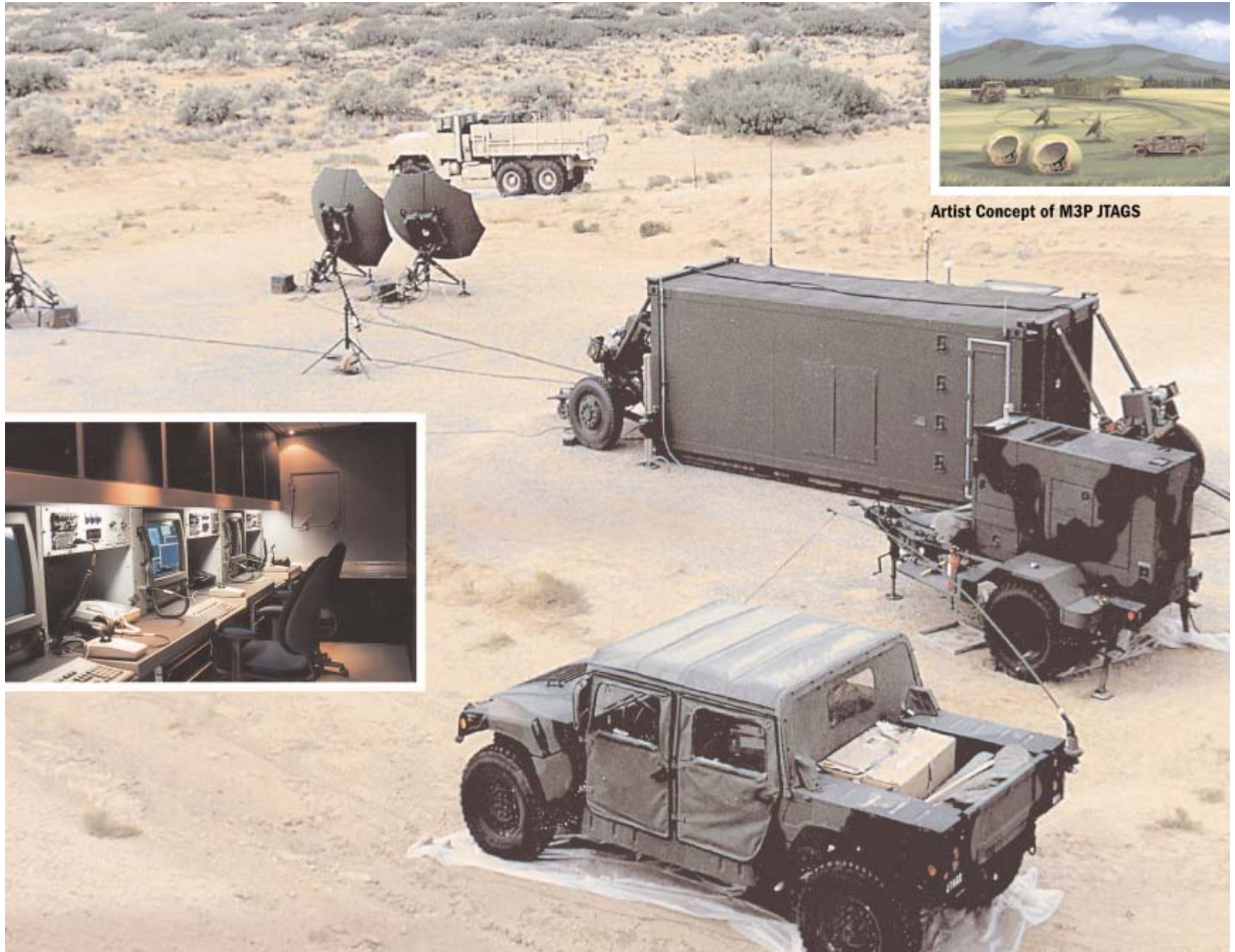
- **2QFY03** Initiate initial operational test and evaluation.
- **2QFY04** Joint service MS III IPR/Type classification.
- **1QFY05** New materiel release.
- **3QFY06** Production deliveries and fieldings.
- **1QFY07** First unit equipped.

## Contractors

Intellitec, Inc (Deland, FL)



## Joint Tactical Ground Stations (JTAGS)



## Mission

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

## Description and Specifications

The Joint Tactical Ground Station (JTAGS) is a transportable information processing system that receives and processes in-theater, direct, downlinked data from defense support program (DSP) and follow-on space-based infrared system (SBIRS) satellites. JTAGS disseminates warning, alerting, and cuing information on theater ballistic missiles and other tactical events throughout the theater, using existing communications networks.

A JTAGS unit consists of a standard 8 x 8 x 20 ft shelter with mobilizer, external collapsible high-gain antennas, standard military generator, and standard five-ton trucks as prime movers. JTAGS can be deployed worldwide. The system is transportable by C-141 aircraft and can be made operational within hours. For enhanced reliability and survivability during contingency situations, the system will deploy in pairs. Whether under peacetime conditions or during crisis situations, the system conducts joint operations.

JTAGS preplanned product improvement (P3I) phase I upgrades, completed in FY00, provide Joint Tactical Information Distribution System (JTIDS) integration and data fusion with other sensors. The phase II P3I (FY98-07) upgrades JTAGS to the SBIRS common multi-mission mobile processor (M3P). A memorandum of agreement between the Army and Air Force Program Executive Offices implemented the joint program development of the SBIRS M3P between the Army JTAGS Product Office and the Air Force SBIRS System Program Office. JTAGSM3P is an acquisition category III joint interest program under the Program Executive Office Air and Missile Defense.

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

- **FY97** Fielded five production units to the European Command, Pacific Command, and Army Space Command Continental United States.
- **1QFY97** Initiated JTAGS P3I phase I.
- **4QFY98** Initiated P3I phase II JTAGS to M3P upgrade to permit operation with SBIRS and DSP satellites and provide coverage for both Army theater and Air Force strategic missions.

- **4QFY99** Conducted M3P preliminary design review.
- **4QFY00** Completed P3I phase I upgrades: sensor fusion and JTIDS integration; conducted M3P critical design review.
- **1QFY01** Conducted M3P integrated baseline review.
- **2QFY01** Completed M3P software design review.

## Projected Activities

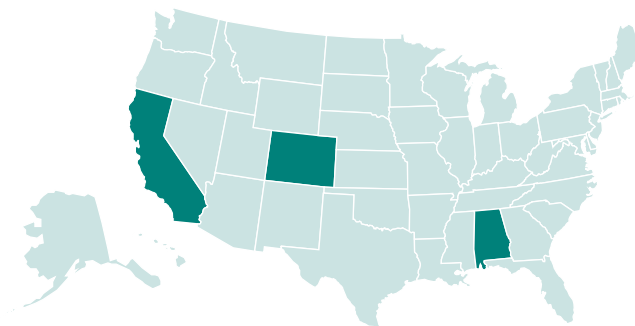
- **1QFY05** Conduct developmental test.
- **2QFY05** Conduct operational test.
- **FY05-07** Field M3Ps (DSP only).

## Contractors

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

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

**Support:** Mevatec (Huntsville, AL)







MIDS LVT (2) Terminal



JTIDS Class 2M Terminal



## Mission

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

## Description and Specifications

The Joint Tactical Information Distribution System (JTIDS)/Multifunctional Information Distribution System (MIDS) (Link-16) is DoD's primary tactical data link. JTIDS Class 2M and MIDS low volume terminal (LVT) (2) are two generations of the Army's solution for Link-16 connectivity. JTIDS and MIDS utilize time division, multiple access, and frequency hopping with forward error detection and correction.

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

**Weight: 88 lbs**

**Size: 13" x 8" x 25"**

**Frequency band: 960-1215 MHz**

MIDS LVT(2) is functionally interchangeable with JTIDS 2M.

## Foreign Counterpart

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

## Foreign Military Sales

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

## Program Status

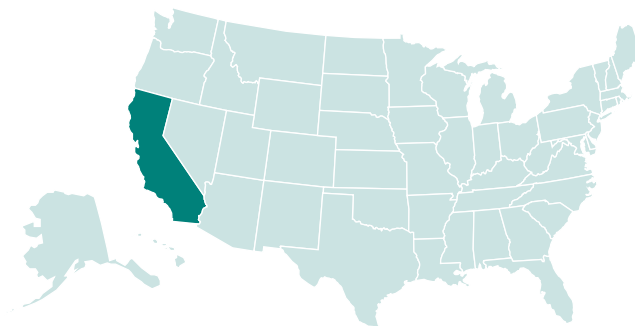
- **2QFY01** Functional verification test (phase I).
- **4QFY01** Low rate initial production (LRIP) 2 decision; contract award.
- **1-2QFY02** First article qualification test.
- **2QFY02** Functional verification test (phase II); LRIP deliveries begin.
- **3QFY02** Initial operational test and evaluation.

## Projected Activities

- **2QFY03** Full rate production decision (MIDS).
- **3QFY03** Contract award (MIDS).

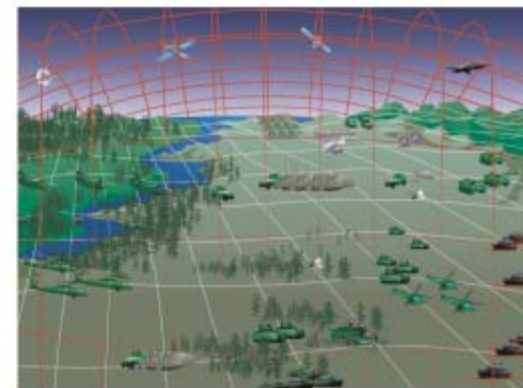
## Contractors

ViaSat Incorporated (Carlsbad, CA)





**JTRS Cluster 1**



## Mission

Provide the warfighter with a software-reprogrammable, multi-band/multi-mode-capable, networkable system that provides simultaneous voice, data, and video communications to increase interoperability, flexibility, and adaptability in support of varied mission requirements.

## Description and Specifications

### Waveform:

The Joint Tactical Radio System (JTRS) waveform program, managed by the JTRS Joint Program Office (JPO), is responsible for the development of software waveform applications and software representations of associated cryptography, evolving the software communications architecture (SCA), certifying compliance of both hardware (with system software) and software waveforms with the SCA, and ensuring overall joint interoperability. JTRS software products are developed for use by all services.

### Cluster 1:

JTRS Cluster 1 is a materiel solution for the JTRS operational requirements document (ORD)-mandated, multi-channel, SCA-compliant hardware system hosting SCA compliant software waveforms. Program goals include: joint and coalition interoperability, independently developed hardware and software, SCA-compliant multi-mode, multi-channel software defined radios, SCA-compliant portable waveforms, long-term-growth-through-technology insertion and long-term competition. JTRS Cluster 1 will be interoperable with specified legacy tactical radios permitting an orderly and cost-effective transition from legacy systems to the multifunctional JTRS. JTRS Cluster 1 is currently slated for fielding to select rotary-wing aviation platforms, Future Combat System (FCS), Stryker Brigade Combat Team (SBCT), Tactical Operations Centers (TOCs), Army Airborne Command and Control System (A2C2S), and Special Operations Forces. Additionally Cluster 1 will be used by the US Air Force Tactical Air Control Party (TACP) and the US Marine Corps Advanced Amphibious Assault Vehicle.

**Weight of radio:** TBD

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

### Waveform Program:

- **August 2001** Designated acquisition category (ACAT) 1D.
- **August 2001** Acquisition strategy approved.
- **June 3, 2002** Milestone B approval.
- **June 24, 2002** Participant in prime systems contract award.

- **September 27, 2002** Single Channel Ground and Airborne Radio System (SINGARS) Enhanced SINGARS Improvement Program (ESIP) Software Waveform contract award.

### Cluster 1 Program:

- **August 2001** Designated ACAT 1D.
- **August 2001** Acquisition strategy approved.
- **June 3, 2002** Milestone B approval.
- **June 24, 2002** Prime systems contract award.

## Projected Activities

### Waveform Program (key Waveform deliveries)

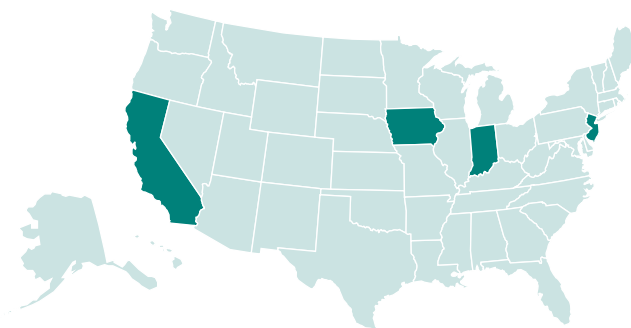
- **4QFY04** SINGARS ESIP; HAVEQUICK II.
- **2QFY05** Enhanced Position Location Reporting System (EPLRS).
- **4QFY05** Wideband networking waveform.

### Cluster 1

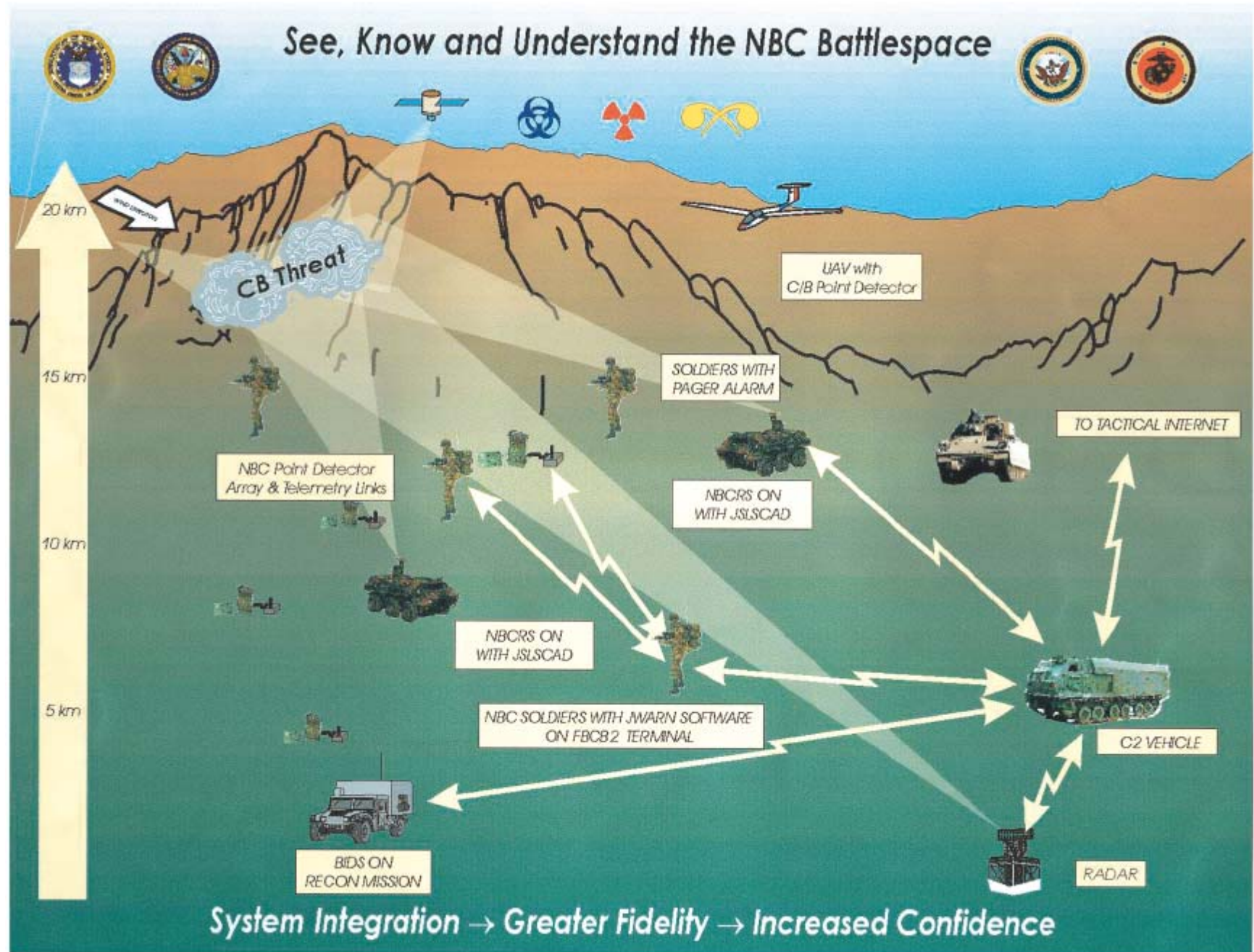
- **3QFY04** Early operational assessment.
- **2QFY06** Milestone C.
- **4QFY06** Multi-service operational test and evaluation.
- **2QFY07** First unit equipped.

## Contractors

Boeing (Seal Beach, CA; Anaheim, CA); Raytheon (Ft Wayne, IN); BAE Systems (Wayne, NJ); Rockwell Collins (Cedar Rapids, IA); TRW (Carson, CA)



## 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 is a US Marine Corps-led program with full participation of the Army, Navy, and Air Force. The JWARN system employs NBC-warning technology to collect, analyze, identify, locate, report, and disseminate information on NBC threats. JWARN software and hardware will be compatible and integrated with joint service command, control, communication, computers and intelligence surveillance reconnaissance (C4ISR) systems. JWARN will be located in command and control centers and employed in making decisions about warning dissemination down to the lowest level on the battlefield. JWARN will provide additional data processing, as well as plan and report production and access to specific NBC information, all of which will improve the efficiency of NBC defense personnel assets.

The system has a three-block acquisition approach:

- **Block I:** Non-developmental item/commercial, off-the-shelf (COTS)/government, off-the-shelf (GOTS) products, standardizing warning and reporting.
- **Block II:** Develop the JWARN mission application software for the mature C4ISR Common Operating Environment (COE) Global Command and Control System (GCCS) stakeholder systems. The JWARN Block II mission application software will provide the NBC community with the following capabilities: NBC hazard prediction, integrated communications, initial tools for battle management, initial data management, and user training support. Network and communication studies will also be performed during this block to address the detectors/sensors integration requirements.
- **Block III:** Provide the total JWARN capability by integrating NBC detector systems, warning and reporting software modules, and battlefield management software modules into the services' C4I2 systems.
- **P3I:** Preplanned product improvements will include artificial intelligence modules for NBC operations, an upgrade to match future C4I2 systems, and standard interfaces for use with future detectors.

## Foreign Counterpart

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

## Foreign Military Sales

None

## Program Status

- **1QFY98** JWARN Milestone III approval for Block I; JWARN Block II approved to enter program definition and risk reduction (PDRR) phase.
- **1QFY03** JWARN Block II completed PDRR.
- **Current** Completed fielding of the COTS NBC analysis software pack and GOTS models; integrate COTS software (with battlefield management functionality) with the maneuver control system and the Windows 32-bit environment.
- **2QFY03** Award JWARN Block II engineering and manufacturing development contract.

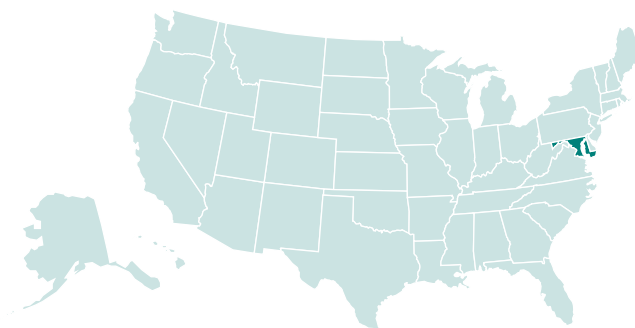
## Projected Activities

- **3QFY03** JWARN Block III Milestone B.
- **2QFY04** JWARN Block II Milestone C.
- **4QFY05** LRIP contract award.

## Contractors

**Block I:** Bruhn Newtech (Ellicott City, MD)

**Block II/III:** TBD



## Land Warrior (LW)



## Mission

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

## Description and Specifications

Land Warrior (LW) is a first generation, modular, integrated fighting system for infantry soldiers and soldiers in support of the close fight that combines an assortment of up-to-date commercial, off-the-shelf (COTS) and government, off-the-shelf (GOTS) technologies with some newly developed components and technologies to create a lethal, survivable, soldier system linked into the digitized battlefield. LW combines computers, lasers, geolocation, and radios with soldiers' mission equipment to achieve the Army Vision of enhancing the individual soldier's close combat lethality, survivability, and tactical awareness. LW will be interoperable with other Army systems as well as other US services and allied military systems. The system's approach optimizes and integrates these capabilities, without adding to the soldier's combat load or logistical footprint.

LW development and funding follows three separate but supporting paths. LW-Initial Capability (LW-IC) represents the baseline LW ensemble configuration. LW-IC fielding to the 75th Ranger Regiment begins in FY04. LW-Stryker Interoperable (LW-SI) uses the baseline LW-IC ensemble to meet specific Stryker Brigade requirements, such as recharge on the move and expanded situational awareness. LW-SI fielding begins in FY05. LW-Advanced Capability (LW-AC) will leverage Objective Warrior advanced technology demonstration technologies for weight reduction and extended mission duration. LW-AC will provide Future Combat System interoperability and provide technology to maintain relevance of the LW fielded fleet. LW-AC will be fielded to the Objective Force.

## Foreign Counterpart

The French FELIN Soldier System is the closest competitor to the LW; however, it is several years behind LW in development. LW continues to monitor foreign integrated soldier development efforts through participation in North Atlantic Treaty Organization (NATO) Working Group 3 meetings and international trade shows.

## Foreign Military Sales

Fifty LW V1.F (LW Export Version) systems will be delivered to Australia under FMS in 3QFY03. LW has also been demonstrated to more than 40 other foreign countries. Many of these countries, including the United Kingdom, Canada, Netherlands and Singapore, have expressed continued interest in LW technology and cooperation.

## Program Status

Panel III NATO has approved the NATO Soldier Modernization Plan (NSMP), which includes a requirement for the LW. The LW systems development and demonstration program does not include any foreign co-development efforts. Foreign military sales, co-assembly, and co-production of some LW components, however, will be considered.

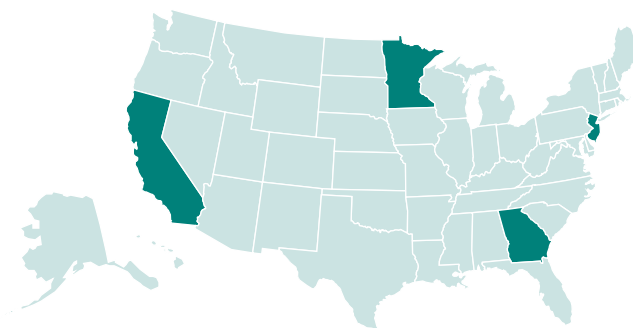
- **2QFY99** New COTS/GOTS technology inserted into the LW program.
- **4QFY00** LW Platoon successfully participated in Joint Contingency Force Advanced Warfighting Experiment at Ft Polk.
- **2QFY01** Contract award to develop LW-IC systems.

## Projected Activities

- **Current-3QFY03** LW-IC Government developmental testing (DT).
- **3QFY03** LW-IC system completes DT.
- **4QFY03** LW-IC Initial Operational Test and Evaluation (IOT& E) begins.
- **1QFY04** LW-IC Milestone C Full Rate Production decision.
- **1QFY04** LW-SI Milestone C Low Rate Initial Production decision.
- **4QFY04** LW-IC First Unit Equipped.

## Contractors

Pacific Consultants (Mountain View, CA); Computer Science Corp (Eatontown, NJ); Pemstar (Rochester, MN, San Jose, CA); Omega Training Group (Columbus, GA); Kaiser Electronics (Carlsbad, CA)





## Lightweight 155mm Howitzer (LW 155)





## Mission

Provide direct, reinforcing, and general support fires for Army Stryker Brigade Combat Teams (SBCTs) and maneuver forces; replace the M198 howitzer as the general support artillery for light forces in the Army.

## Description and Specifications

The M777 Joint Lightweight 155mm Howitzer (LW 155) is a joint Marine Corps/Army program in accordance with an Army/Navy memorandum of agreement, in which the Marine Corps funds the howitzer research, development, test and evaluation (RDT&E) and the Army funds the RDT&E for towed artillery digitization (TAD) and other automation enhancements. It will replace the M198 howitzer as a direct and general support system for Army light forces and SBCTs. The Marine Corps will use the weapon to replace all existing cannon systems. The M777 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 M776 cannon tube is a derivative of the US M284 and M199 cannon tubes, and ballistically similar to the M199 cannon tube to provide the range of the M198 howitzer. The M777's lighter weight, smaller footprint, and lower profile provide improved strategic deployment, tactical mobility, and survivability. The automatic primer feeding mechanism, loader-assist, digital fire control, and other automation enhancements will improve survivability, lethality, and combat reliability, as well as provide light artillery with a semi-autonomous capability that is currently found only in self-propelled howitzers.

**Weight:** 10,000 lbs or less

**Emplace:** three minutes or less

**Displace:** two minutes or less

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

**Rate-of-fire:** four rounds per minute maximum, two rounds per minute sustained

**Ground mobility:** Family of Medium Tactical Vehicles, Medium Tactical Vehicle Replacement, current five-ton trucks

**Air mobility:** two per C-130; six per C-17; 12 per C-5; CH-53D/E; CH-47D; MV-22

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

**Digital fire control:** Self-locating and pointing; on-board firing data computation (TAD Block 2); digital and voice communications; self-contained power supply. These capabilities are being developed under the TAD program.

## Foreign Counterpart

No known foreign counterpart. Several countries (UK, Germany, South Africa, etc.) have TAD-like systems.

## Foreign Military Sales

The LW 155 development was a cooperative effort with both the United Kingdom and Italy. Future cooperative production agreements with both allies are currently being negotiated and would provide 65 - 70 systems to each of those countries.

## Program Status

- **November 8, 2002** LW155 entered low rate initial production (LRIP) for 94 USMC guns (FY03-04).
- The system development and demonstration guns performed well during the May-June 2002 operational assessment by Marine Corps operational test and evaluation activity; passing 37 of 41 requirements. Corrective actions are in place for the four requirements that were not met.
- **October 9, 2001** USMC program was restructured to introduce a low rate production phase and operational assessment to allow the operational test for full rate production to be based upon production howitzers.
- Project manager is synchronizing the TAD program with the basic howitzer. The Army is pursuing TAD through an evolutionary acquisition process.

## Projected Activities

- **3QFY04** Operational test (basic howitzer).
- **3QFY05** USMC initial operational capability (IOC) (basic howitzer without TAD).
- **4QFY05** Operational test (TAD).
- **4QFY06** Army IOC (howitzer with TAD).

## Contractors

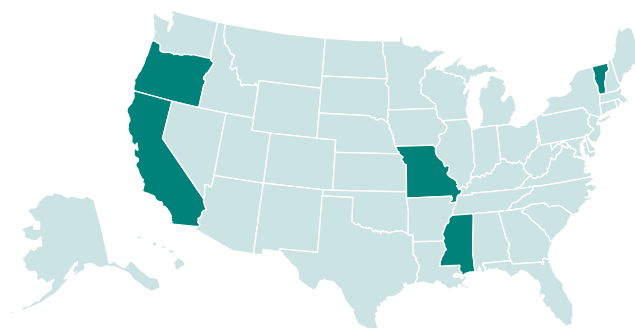
**Howitzer and TAD:** BAE Systems (UK and Hattiesburg, MS)

**Towed Artillery Digitization:** General Dynamics (Burlington, VT)

**Howitzer Body:** Hydro-Mill (Chatsworth, CA)

**Castings:** Precision Castparts Corporation (Portland, OR)

**Optical Fire Control:** Seiler Instrument and Mfg (St. Louis, MO)



## Lightweight Laser Designator Rangefinder (LLDR)



## Mission

Provide Army field artillery fire support teams and US Marine Corps forward observers with the capability to detect, recognize, locate, and designate targets and send digital self/target location data to fire support computers.

## Description and Specifications

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

The TLM contains a charge-coupled device camera, thermal imager, eyesafe laser rangefinder, digital magnetic compass, Global Positioning System, and digital export capability. The TLM performs boresight verification using “see-spot” technology.

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

The LLDR weighs 35.3 lbs including TLM, LDM, interface cable, tripod, battery case, and battery, and can be easily transported by a two-person team.

## Foreign Counterpart

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

## Foreign Military Sales

None

## Program Status

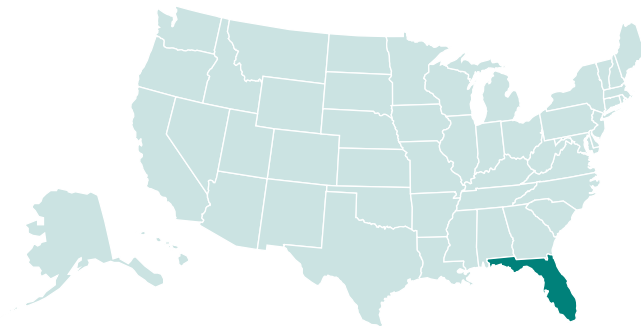
- **4QFY01** Completed testing, Milestone C (LRIP).
- **1QFY02** Awarded low rate production contract.

## Projected Activities

- **3QFY03** Award full rate, multi-year production contract.

## Contractors

Northrop Grumman Electronic Systems (Litton Laser Systems) (Apopka, FL)





## Line-of-Sight Anti-Tank (LOSAT)





## Mission

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

## Description and Specifications

The Line-of-Sight Anti-Tank (LOSAT) weapon system is an integral component of the Army Vision. LOSAT consists of four hypervelocity kinetic-energy missiles (KEM), and a second generation forward looking infrared (FLIR)/TV acquisition sensor, mounted on an air-mobile High Mobility Multipurpose Wheeled Vehicle (HMMWV) chassis. Key LOSAT advantages include the following:

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

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

### LOSAT MISSILE

**Weight:** 175 lbs

**Length:** 112"

**Diameter:** 6.4"

**Range:** Greater than the TOW Missile

**Max velocity:** >1500 meters/sec

### LOSAT FIRE UNIT

**Crew:** 3

**Combat weight:** 11,400 lbs

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

- Began hardware-in-the-loop simulation verification of the fire control system hardware and software.
- Completed system critical design review.
- Finalized fire unit controls and displays layout via early soldier evaluations.
- Began component qualification tests.
- Began assembly of prototype fire unit hardware.

- First Fire Unit "Rollout" ceremony conducted at AUSA National Convention (21 October 2002).

## Projected Activities

Complete component hardware and system software qualification.

- Complete fabrication of fire unit and missile prototype test hardware.
- Begin prototype qualification missile ground and flight tests.
- Begin fire unit mobility/durability, electromagnetic effects, and environmental testing.
- Complete fire unit and missile airworthiness certification.
- Complete training device development and begin soldier training for Dismounted Battlespace Battlelab demonstrations.
  - FY04 Milestone C (low rate initial production)
  - Initial Operational Test and Evaluation FY05
  - First unit equipped first battalion FY06

## Contractors

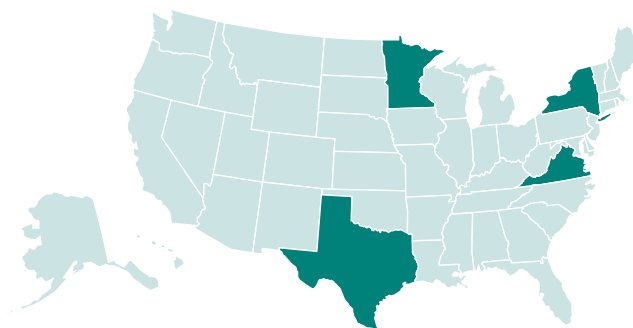
**Missiles and Fire Control:** Lockheed Martin (Grand Prairie, TX)

**Electro-optical system:** Raytheon (Plano, TX)

**Inertial measurement unit:** Honeywell (Minneapolis, MN)

**C02 Pulsed laser and field tactical trainer:** BAE Systems (Austin, TX; Long Island, NY)

**Altitude Control Motors:** ARC (Gainesville, VA)



## Load Handling System Modular Fuel Farm (LMFF)



## Mission

Provide ability to rapidly establish a fuel issue, distribution, and storage capability at any location for division and below regardless of the availability of construction equipment.

## Description and Specifications

Expansion of the battlefield, increased unit movements, and the requirement to rapidly relocate have made necessary a fuel storage, issue, and distribution system that can replace the existing fuel system supply point in selected division-and-below units. The development and fielding of brigade combat teams that provide the Army with the ability to respond anywhere in the world with a brigade size force in 96 hours dictates the need for this new fuel distribution and storage capability.

The Load Handling System Modular Fuel Farm (LMFF) is a Palletized Load System (PLS) and Heavy Expanded Mobility Tactical Truck Loading Handling System (HEMTT-LHS)-compatible petroleum storage and distribution system. It consists of two different modules, a pump filtration module and a tank rack module. A PLS or HEMTT-LHS can transport two tank racks, one on the truck and one on the trailer, for a total of up to 5,000 gallons of bulk petroleum. Flexibility of the LMFF allows capacity and layout to be tailored to the situation.

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

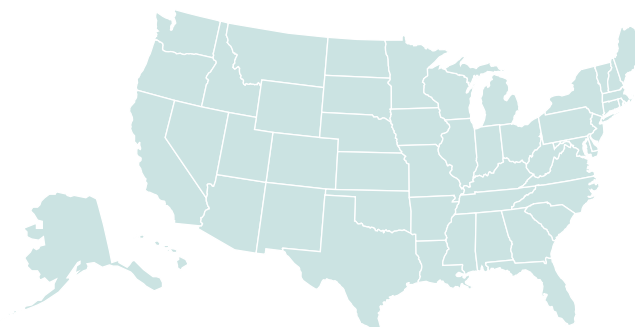
- Approved Operational Requirements Document.
- Concept experimentation program completed. (The LMFF, consisting of six tankracks and one pump filtration module, was used by the California Army National Guard during exercise Golden Spike (annual training). The LMFF was used to perform retail refueling of tactical vehicles taking part in the exercise.

## Projected Activities

- **FY03** Milestone C decision forecasted.

## Prime Contractors

TBD

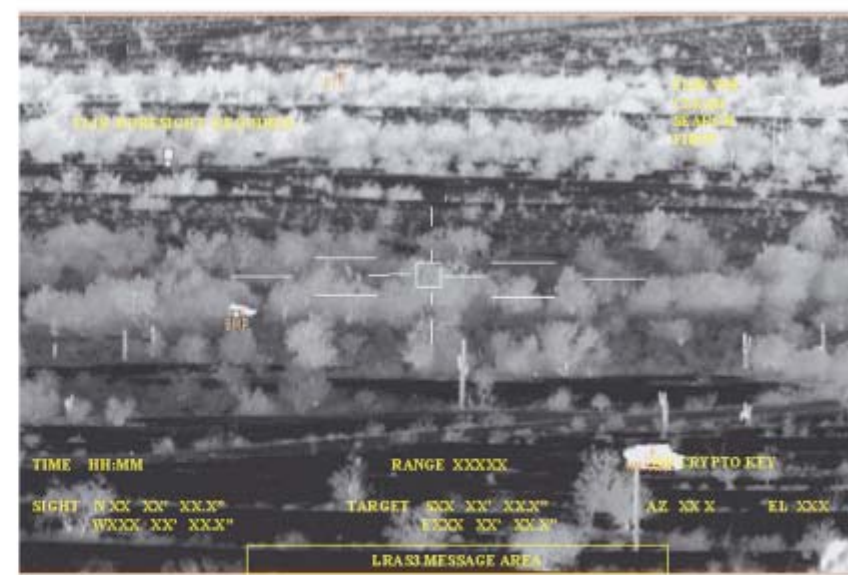




## Long Range Advanced Scout Surveillance System (LRAS3)



**Day TV View Through LRAS3**



**Thermal View Through LRAS3**



## Mission

Provide Army armor and infantry scout platoons with a long-range sensor system whose capability is significantly enhanced as compared to the currently fielded AN/TAS-6, night observation device, long-range (NODLR).

## Description and Specifications

The Long Range Advanced Scout Surveillance System (LRAS3) consists of a second generation forward looking infrared (FLIR) with long-range optics, an eyesafe laser rangefinder, a day video camera, and a Global Positioning System (GPS) with attitude determination.

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

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

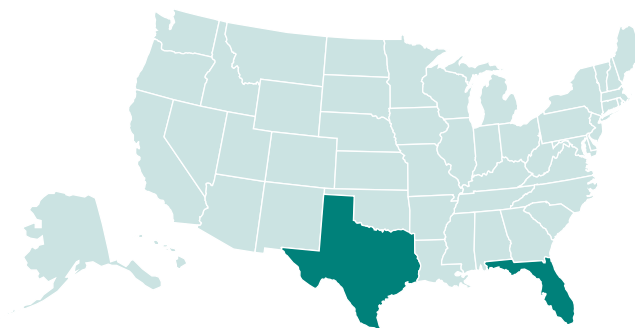
- **2QFY01** Began initial production testing.
- **1QFY02** First unit equipped.
- **2QFY02** Field second brigade set to III Corps.
- **3QFY02** Completed initial production testing.
- **4QFY02** Completed FBCB2 interface development.
- **1QFY03** Fielded third brigade set to III Corps.

## Projected Activities

- **2QFY03** Field fourth brigade set to I Corps.
- **4QFY03** Field fifth brigade set to I Corps.

## Contractors

Raytheon (McKinney, TX); DRS Technologies (Palm Bay, FL)



## Longbow Hellfire



## Mission

Provide the warfighter an air-to-ground precision missile system to engage and defeat individual advanced-armor hard point targets while increasing aircraft survivability.

## Description and Specifications

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

The primary advantages of the Longbow missile include:

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

The combination of Longbow Hellfire's fire-and-forget capability and Hellfire II's semi-active laser 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"

**Weight:** 108 lbs

**Length:** 69.2"

**Range:** 0.50 - 8 km

## Foreign Counterpart

United Kingdom: Brimstone

South Africa: Mokopa, ZT6

## Foreign Military Sales

Singapore, Israel

Direct Commercial Sale: United Kingdom

## Program Status

- **November, 2001** Awarded fourth increment of multi-year program.
- **4QFY02** Delivered a total of more than 5,500 Longbow Hellfire missiles into inventory.

## Projected Activities

- Continue fielding.
- Complete full rate production.

## Contractors

Longbow LLC (Orlando, FL)

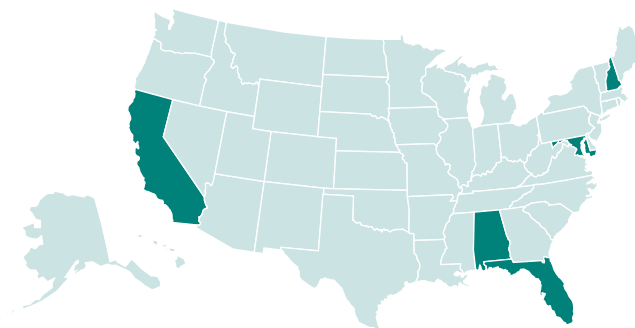
**Guidance Section:** Northrop Grumman (Huntsville, AL)

**Sensor Group:** Lockheed Martin (Orlando, FL)

**Electronics and Chips:** Northrop Grumman (Baltimore, MD)

**Transceiver:** BAE Systems (Nashua, NH)

**Transmitter:** M/A Com (San Jose, CA)







## Mission

Provide automated, on-line, near-real-time capability for planning, coordinating, monitoring, and controlling tactical operations on the battlefield.

## Description and Specifications

The Maneuver Control System (MCS) automates the creation and distribution of the common tactical picture of the battlefield and creates and disseminates operations plans and orders for combined arms maneuver commanders. MCS provides timely, accurate status information, as well as providing the common tactical picture software supporting a battlefield situation display for all the Army Tactical Command and Control System battlefield functional areas.

MCS Block IV software has as its foundation the Defense Information Infrastructure Common Operating Environment software and will be compliant with the joint technical architecture. MCS software development is synchronized with the Army Battle Command System, and software integration efforts at the Central Technical Support Facility (CTSF) in Ft Hood, TX. MCS will be fielded on common hardware.

MCS also manages a worldwide MCS "light" beta site program. The intent of this program is to rapidly deploy developmental software into the operational force to receive direct soldier feedback that influences system design and matures the product at a faster rate.

## Foreign Counterpart

The MCS is designed to interoperate with the respective command and control systems of Canada, France, Germany, Italy, and the United Kingdom as well as the other nations involved in the Multilateral Interoperability Program (MIP), an international initiative to define interoperability between C2 systems at echelons corps through battalion. The MIP implementation is based upon NATO standardization agreements and Australia, Britain, Canada, and America Quadripartite Standardization Agreements and, therefore, can be extended to other coalition partners.

## Foreign Military Sales

None

## Program Status

- Demonstrated MCS capabilities in system stress tests and developmental field tests.
- Finalizing MCS 6.3 software for delivery to CTSF to conduct system stress testing in preparation for the Stryker Brigade Combat Team (SBCT) and MCS IOT&Es.

## Projected Activities

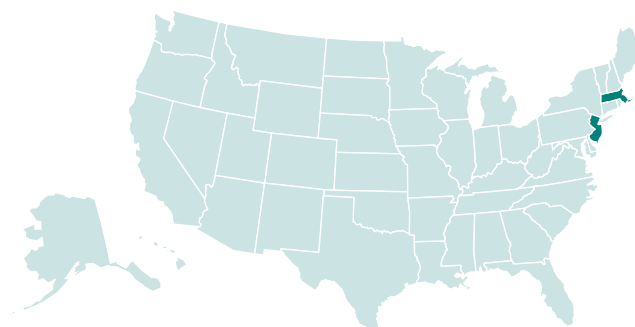
- Preparation to support the SBCT IOT&E.
- Support a system (MCS) IOT&E as directed by Army staff.
- Support Army units currently utilizing MCS in support of Army test objectives.
- Continued deployment within Army units.

## Contractors

**MCS Block IV Software:** Lockheed Martin (Tinton Falls, NJ)

**Versatile Computer Unit (VCU):** General Dynamics (Taunton, MA)

**Notebook Computer Unit (NCU):** General Dynamics (Taunton, MA)



## Material Handling Equipment (MHE)



## Mission

Provide container- and materiel-handling capability critical to the worldwide deployment and support of the Army in cargo transfer companies, transportation companies, quartermaster units, and ammunition platoons.

## Description and Specifications

The systems that fall into the Materiel Handling Equipment (MHE) category include:

- **All-Terrain Lifter, Army System (ATLAS)** - used for handling palletized loads, Air Force 463 L pallets, and for stuffing containers
- **Rough Terrain Container Handler (RTCH)** - moves and stacks 20 ft and 40 ft containers
- **Rough Terrain Container Crane (RTCC)** - augments a unit's materiel handling capability in addition to handling 20 ft and 40 ft containers
- **6,000 lb Variable Reach Rough Terrain Forklift (6K VRRFTL)** - used to handle palletized loads, to stuff containers, and to handle missile pods
- **4,000 lb Rough Terrain Forklift (4K RTFL)** - an air-droppable vehicle used forward on the battlefield.

## Foreign Counterpart

Sweden: Kalmar RT Center (RTCH)

## Foreign Military Sales

Australia: RTCH

Egypt: ATLAS

## Program Status

There are numerous on going MHE programs at different stages of the life cycle, including R&D, production, deployment, fielding, sustainment, and service life extension programs.

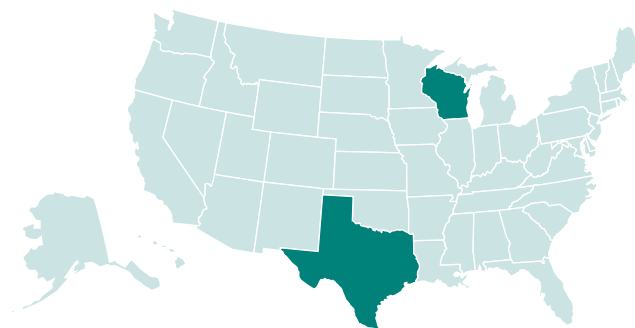
## Projected Activities

On-going contract awards, testing, production, and fielding efforts.

## Contractors

Kalmar RT Center (Cibolla, TX)

Trak International (Port Washington, WI)



## Medium Extended Air Defense System (MEADS)



*Cleaver  
198*



## Mission

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

## Description and Specifications

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

- Defense against multiple and simultaneous attacks by short range ballistic missiles, low radar cross-section cruise missiles, and other air-breathing threats
- Immediate C-130 and C-17 deployment for early entry operations
- Mobility to displace rapidly and protect maneuver force assets during offensive operations
- Netted and distributed architecture and modular components to increase survivability and flexibility of employment in a number of operational configurations
- A significant increase in firepower with greatly reduced requirements for personnel and logistics.

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

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

MEADS is a cooperative development program with Germany and Italy. The cost share arrangement for the risk reduction effort (RRE) contract is: US-55 percent; Germany-28 percent; and Italy-17 percent. The period of performance is 32.5 months.

## Program Status

- Completed the transition effort of the project definition and validation phase.
- **1999** The program was restructured to add a RRE phase to incorporate the PAC-3 Missile as the initial MEADS interceptor.

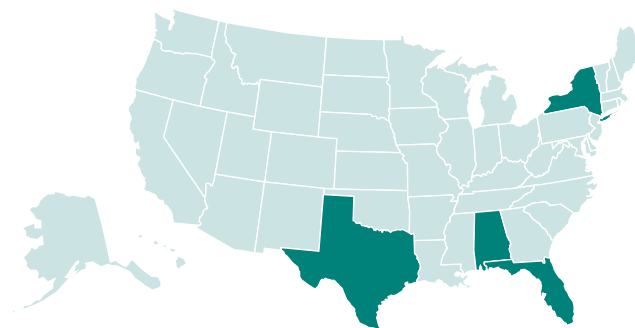
## Projected Activities

- **FY04-12** MEADS is currently scheduled to enter its design and development phase.
- MEADS International, NAMEADSMA, and the partner nations continue baselining the program to reflect the integration of the PAC-3 missile.
- NAMEADSMA and the partner nations continue developing an international cost and schedule consensus to support the national decision processes of each partner nation, and discussing overall acquisition strategy for the entire program.

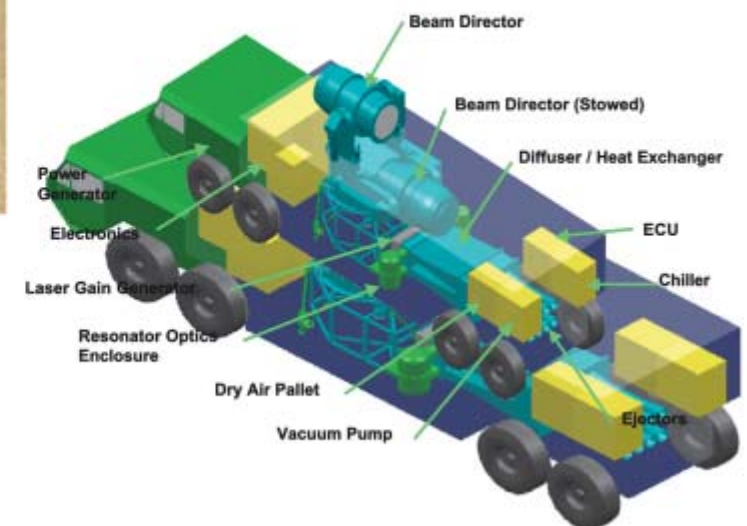
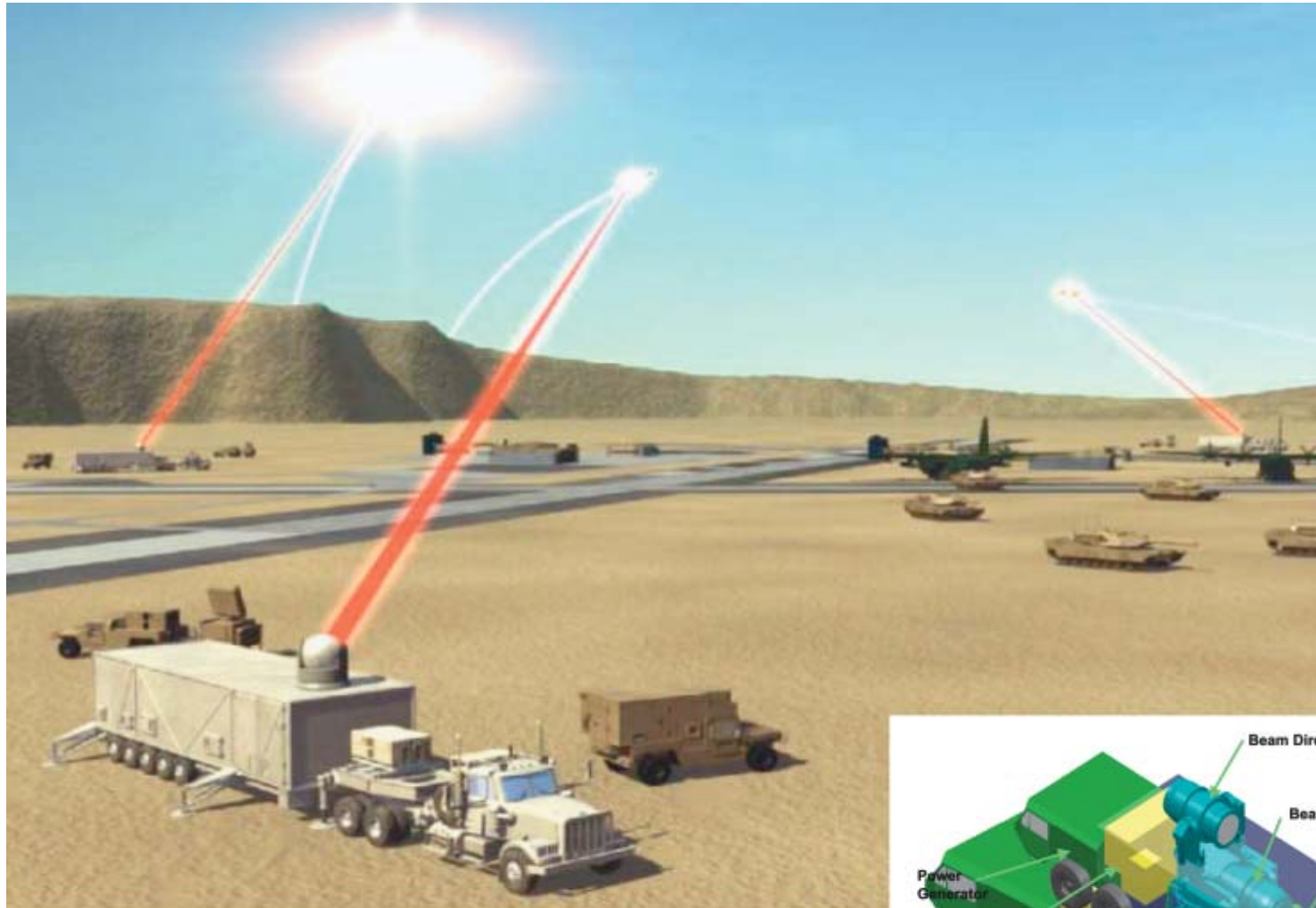
## Contractors

MEADS International, Inc. of Orlando, FL, a joint venture corporation composed of Lockheed Martin (US) and EuroMEADS, a consortium of European Aeronautics Defense and Space (EADS) Company (Germany), MBDA (Italy).

MEADS International, Inc. (Syracuse, NY; Orlando, FL; Huntsville, AL; Dallas, TX); CAS, Inc. (Huntsville, AL)



## Mobile Tactical High Energy Laser (MTHEL)



## Mission

Provide improved survivability of defended assets against attack from rocket, artillery, and mortar (RAM) projectiles, unmanned aerial vehicles, cruise missiles, precision guided missiles, and other evolving threats using a laser weapon system that is highly lethal and cost-effective.

## Description and Specifications

The Mobile, Tactical, High Energy Laser (MTHEL) weapon system consists of the following elements, mounted on common Army platforms:

**Sensor element:** Consists of a radar antenna array assembly subsystem, electronics, and control assembly subsystem required to provide target acquisition and tracking. MTHEL will use existing radars capable of meeting requirements. The sensor element may include an adjunct optical sensor subsystem if needed to meet target acquisition performance requirements.

**Battle management, command, control, communications, computer, and intelligence (BMC4I) element:** Controls and monitors the system; provides battle management, including target acquisition through the fire control radar, engagement control, kill assessment, and communications; and provides operator interfaces. The BMC4I will interface with and support existing command and control systems.

**Effector element:** Consists of a controller subsystem, optics and beam control subsystem, laser gain generator subsystem, fluid supply (including re-supply) subsystem, and the vehicle(s) required to move the element. The laser gain generator subsystem generates the high power beam. The optics and beam control subsystem uses information from the BMC4I subsystem to provide the capability to steer the beam such that the system tracks the threat objects and directs the lethal laser beam to the target. The MTHEL will use high energy deuterium fluoride chemical laser technologies to provide the capability for cost-effective kill mechanisms.

The program is in the concept and technology development phase of its acquisition life cycle. A collaborative program with the Israeli Ministry of Defense, MTHEL addresses a set of urgent needs for both nations.

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

Collaborative development program with Israel

## Program Status

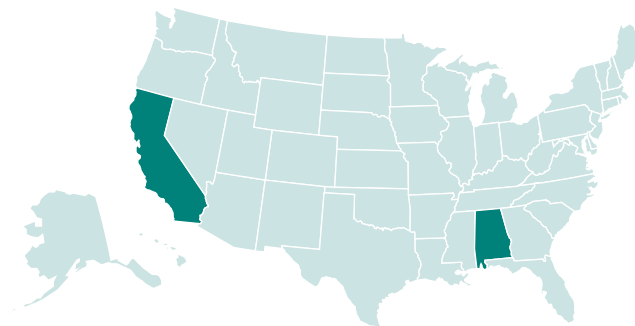
- **FY00** THEL Advanced Concept Technology Demonstration (ACTD) successful single and multiple rocket shoot downs.
- **FY01-02** System engineering trade studies to define system architecture and configuration, and identify critical technologies for risk reduction activities.
- **4QFY02** MTHEL test bed successful shoot-down of 152mm artillery projectile.

## Projected Activities

- **FY03** Development of system technical requirements, extended lethality testing, and risk reduction culminating in a Milestone B decision in early FY04.
- **3QFY03** Alternative systems review - concept selection.
- **4QFY03** System requirement review - final performance requirements.
- **2QFY04** Contract award for system development and demonstration phase.
- **3QFY07** Prototype testing.

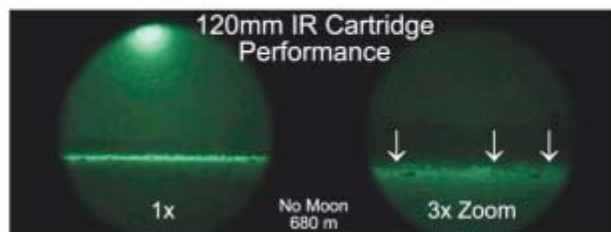
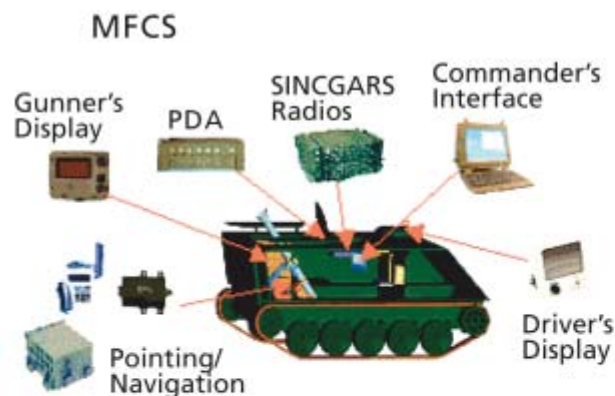
## Contractors

TRW (Redondo Beach, CA); Mevatec (Huntsville, AL); SAIC (Huntsville, AL); CSC (Huntsville, AL)





# Mortar System (120mm)



Operation Enduring Freedom

Next Generation  
Extended Range  
120mm Ammo Family



M1064A3 Mortar Carrier



IBCT Mortar Carrier



FCS  
NLOS Mortar Carrier





## Mission

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

## Description and Specifications

The 120mm mortar system is a conventional, smoothbore, muzzle-loaded mortar system that provides increased range, lethality, and safety compared to the World War II-vintage 4.2-inch (107mm) heavy mortar system it replaced in mechanized infantry, motorized, armored, and cavalry units. It is employed in towed (M120) and tracked carrier versions (M121) and in the Stryker Brigade Combat Team (SBCT) wheeled mortar carrier. It fires a family of enhanced, US-produced ammunition. The mortar fire control system (MFCS) will provide Paladin-like (M109A6) fire control capability that greatly improves mortar lethality, responsiveness, and crew survivability. MFCS links mortar fires with the digital battlefield. It integrates a fire control computer with an inertial navigation and pointing system, allowing crews to fire in less than one minute, down from the current 8-12 minute (day/night) standard. The M303 sub-caliber tube insert enables 120mm mortar crews to perform cost-effective live-fire training with stockpiled older M300 series 81mm ammunition. New infrared illumination ammunition, the first of its kind in the world, provides enhanced night fighting capability. Advanced munitions include the XM395 precision guided mortar munition (PGMM).

**Range:** 7240 m

**Rate of fire:** 16 rounds/min for the first minute; four rounds/min sustained

**Weight:** 319 lbs

**Crew:** Four M121 carrier-mounted on the M1064; five M120 towed

**Ammunition:** High explosive, smoke, illumination (visible light and infrared), full-range practice.

## Foreign Counterpart

Many countries have similar systems.

## Foreign Military Sales

None

## Program Status

Initial fielding of the 120mm mortar system is complete; M120 version was issued to the Initial Brigade Combat Team, 10th Mountain Division, 82nd Airborne Division, and was successfully used in Operation Enduring Freedom. MFCS concluding Engineering and Manufacturing Development (EMD). The XM395 PGMM and XM984 ER-DPICM advanced technology demonstrations are complete. PGMM has transitioned to PM mortar management as a component advanced development program. Development of family of next generation 120mm ammo for the FCS requires funding.

## Projected Activities

### PGMM:

- **FY03** Will enter system development and demonstration phase.

### XM930 Visible Light Illuminating Round:

- **2QFY03** Materiel release.

### M983 Infrared Illuminating Round:

- **3QFY03** Materiel release.

### MFCS (Heavy):

- **FY02** MFCS completed version 1 software development, technical testing, computer reliability study, and initial operational test and evaluation.
- **FY03** Activities include TC STD (Mar 03) and first unit equipped (FUE) (April 03).

### MFCS (Light):

- **FY03** Begin system development and demonstration (SD&D) of Block 1.

### MBC (Heavy):

- **2QFY03** Achieve materiel release and FUE.

## Contractors

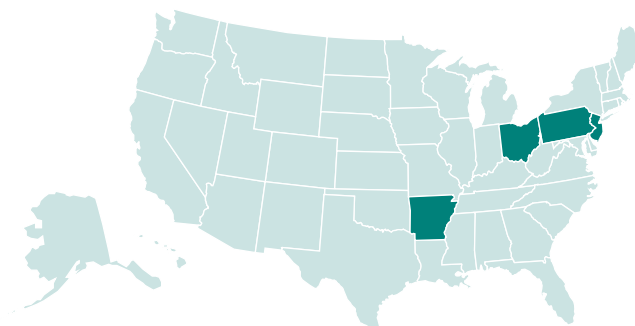
**Multi-Option Fuze:** L-3 Communications (Cincinnati, OH)

**Government:** ARDEC (Picatinny, NJ)

**Shell Body:** Chamberlain Mfg. (Scranton, PA)

**LAP of Smoke and Illumination:** Pine Bluff Arsenal (Pine Bluff, AR)

**Propellant Charge:** GDOTS (Camden, AR)



See appendix for list of subcontractors



## Mission

Provides responsive and precise non-line-of-sight (NLOS) lethality, increased survivability to the Objective Force unit of action (UA), and reduced requirements for operational personnel and logistical support against a dynamic enemy as well as autonomous clearance of fires for target acquisition, command, and control.

## Description and Specifications

The Future Combat Systems (FCS) Networked Fires Systems Technology (NFST) consists of the networked fires C4ISR architecture and the NLOS Launch System (LS). Networked fires is the triad of sensors, effects-generating capabilities, and battle command that enables dynamic application of lethal and non-lethal destructive and suppressive effects to achieve the commander's tactical and operational objectives. Networked fires enables the destruction of enemy forces at standoff to ensure freedom of action and reduce the need to rely on tactical assault to achieve decisive outcomes through the use of all effectors servicing the UA, to include: NLOS LS, NLOS-C, NLOS-M, High Mobility Artillery Rocket System (HIMARS), and joint assets such as Joint Strike Fighter (JSF), and DDX.

The NLOS LS consists of a precision attack missile (PAM) with a multi-capable warhead effective against armor and soft targets; a loitering attack missile (LAM) that searches, surveys, targets, verifies, and assesses battle damage, and can serve as an airborne radio transmission platform for other systems, as well as attack high payoff targets; a Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) software application that provides responsive and precise NLOS lethality against a dynamic enemy as well as autonomous clearance of fires for target acquisition, command, and control; and a container launch unit (CLU) with a 15 missile capability and computerized launch system.

Key FCS NFST advantages include the following:

- Real time battlefield surveillance
- Enabling technology for FCS
- NLOS LS fire control performed remotely
- NLOS LS allows remote emplacement
- Enables extending-range target/engagement
- NLOS LS jam-resistant GPS.

### NLOS LS

**Weight:** CLU with 15 missiles, approximately 2,900 lbs

**Dimensions:** 43" width x 43" length x 69" height

**Range:** PAM approximately 40km; LAM approximately 70km + 30 minutes loitering time

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

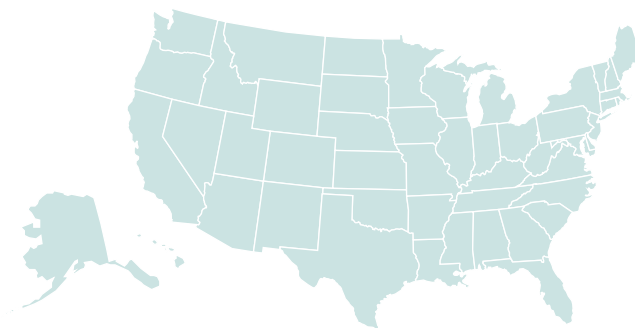
- DARPA NETFIRES demonstration program.
- Preparing pre-system development and demonstration (SDD) contractual documentation and technological surveys. Evaluating contractor technical solutions.

## Projected Activities

- **FY03** Complete technology demonstration phase; complete Milestone (MS) B.
- **FY04-06** Begin Block I 36-month SDD.
- **4QFY06** Complete MS C.
- **FY07** Begin Production Phase.
- **4QFY08** First unit equipped (FUE) Block 1.
- **4QFY10** Initial operational capability (IOC), Block 1.
- **2QFY11** FUE Block II.

## Contractors

TBD









## Mission

Detect, identify, and mark areas of nuclear and chemical contamination; sample for nuclear, biological, and chemical (NBC) contamination; and report accurate information to supported commanders in real time.

## Description and Specifications

The Nuclear, Biological and Chemical Reconnaissance System (NBCRS)-Fox Block I Modification (M93A1) contains an enhanced NBC sensor suite consisting of the M21 remote sensing chemical agent alarm, MM1 mobile mass spectrometer, chemical agent monitor/improved chemical agent monitor, AN/VDR-2 Beta Radiac, and M22 Automatic Chemical Agent Detector/Alarm. The NBC sensor suite has been digitally linked with the communications and navigation subsystems by a dual-purpose central processor system known as the Multipurpose Integrated Chemical Agent Detector (MICAD). The MICAD processor fully automates NBC warning and reporting functions and provides the crew commander with full situational awareness of the Fox's NBC sensors, navigation, and communications systems. The M93A1 Fox is also equipped with an advanced navigation system Global Positioning System and autonomous navigation system that enables the system to accurately locate and report agent contamination. The mobility platform is a six-wheeled, all-wheel-drive armored vehicle capable of cross-country operation at speeds up to 65 mph.

The Fox system is fully amphibious with swimming speeds up to six miles per hour. As a reconnaissance vehicle, it can locate, identify, and mark chemical/biological agents on the battlefield. The Fox usually accompanies the scouts or motorized reconnaissance forces when performing its NBC mission. It has an over-pressure filtration system that permits the crew to operate the system in a shirt-sleeve environment that is fully protected from the effects of NBC agents and contamination.

The M93A1 system is operated by a three-person crew. The M93A1 is one of the few systems fielded with a fully interactive class 4/5 electronic technical manual (IETM). The IETM is a single multi-media CD that contains the 12-manual library and is structured to incorporate advanced diagnostics that support the system.

## Foreign Counterpart

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

## Foreign Military Sales

None

## Program Status

### Block I:

- **1QFY02** Fielding of 64 systems complete.
- **FY02** Continued production of NBCRS Block 1 modification (M93A1); Approximately 97 legacy Fox systems planned in this conversion.

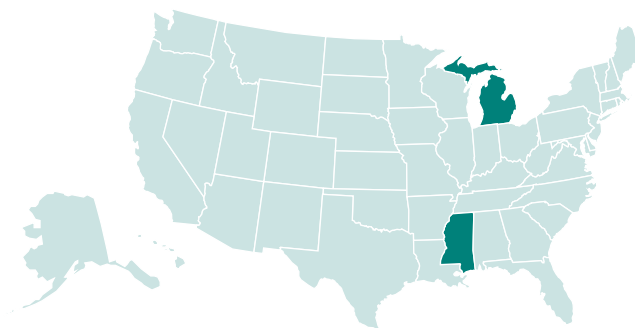
## Projected Activities

### M93A1:

- **3QFY03** Complete fielding of the last modification.

## Contractors

**M93A1:** General Dynamics (Detroit, MI; Anniston, AL); Henschel Wehrtechnik (Kassel, Germany)





XM29

## Mission

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

## Description and Specifications

The XM29 Integrated Air Burst Weapon will replace selected M16 rifles and M4 carbines. The modular, dual-barrel XM29 will combine the lethality of 20mm HEAB munitions and 5.56mm NATO ammunition with a full-solution fire control to effect decisively violent and suppressive target results and to greatly improve small arms performance. This fire control will incorporate a laser range finder, ballistic processor, direct view optics, electronic compass (bearing, tilt, cant), thermal sighting, and an internal display.

The XM29's HEAB ammunition is capable of defeating not only exposed targets, but those in defilade (targets that have taken cover behind structures, terrain features, and/or vehicles), a capability lacking in current direct fire rifles and carbines. The XM29 will provide an overmatch in system effectiveness while increasing its ability in:

- Providing effective day/night operation
- Providing an 8x increase in lethality for a basis of issue of 4 XM29's per Infantry Squad
- Mitigating the aim error associated with standard Kinetic Energy (KE) ammunition

The XM29 will be compatible with the digital battlefield and will provide the lethality upgrade for the Land Warrior.

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

- **2QFY00** A Milestone I decision was made and the program transitioned to the Office of Product Manager, Small Arms.
- **4QFY00** A program definition and risk reduction (PDRR) effort was initiated under OPMSA management and a PDRR contract was awarded.
- **2QFY02** Army AAE concurred with block (evolutionary) approach to fielding the XM29 and proceeding with the program.

## Projected Activities

- **FY03-05** Continue program definition and risk reduction phase, building prototype hardware to produce and test a near-final design of the XM29 to meet user requirements for the PDRR exit criteria.
- **3QFY05** MS II decision prior to transition to Milestone C.
- **3QFY06** A Milestone C decision.
- **FY06-07** Low rate initial production.
- **3QFY07** Full rate production in process review.
- **FY08** First unit equipped.

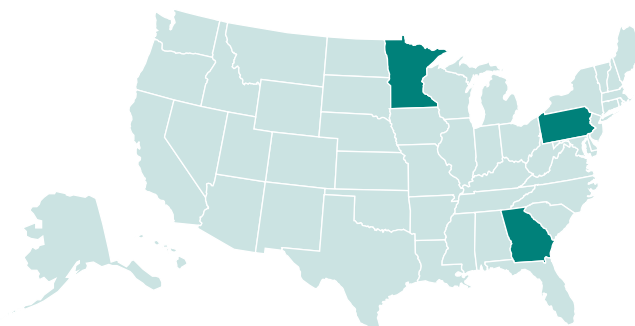
## Contractors

**System Integration and 20mm ammunition:** Alliant Techsystems (Hopkins, MN)

**Target Acquisition/Fire Control:** Brashear LP (Pittsburgh, PA)

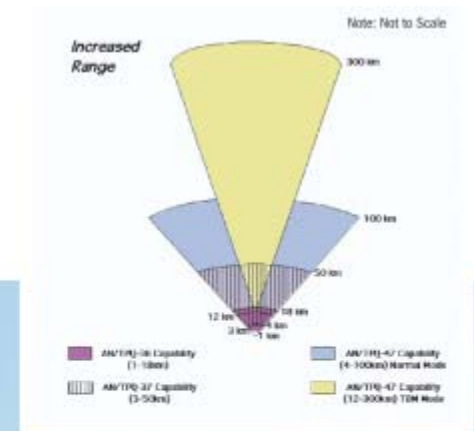
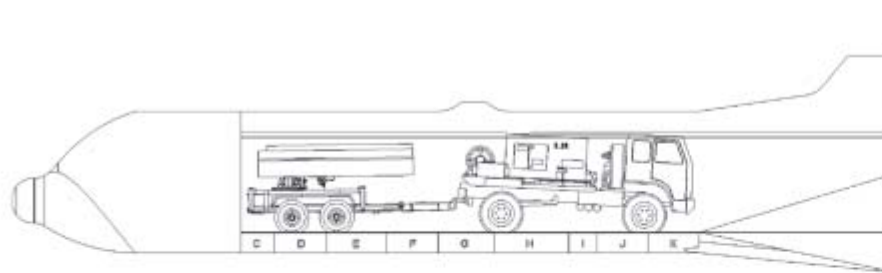
**Weapon:** H&K (Oberndorf, Germany)

**Training Systems:** Omega Training Group, (Columbus, GA)





## Phoenix Battlefield Sensor System (PBS2)





## Mission

Provide next-generation weapons-locating radar to detect and locate enemy artillery, rockets, and missiles quickly and accurately enough to permit immediate engagement.

## Description and Specifications

The Phoenix Battlefield Sensor Ssystem (PBS2) system will replace the AN/TPQ-37 artillery locating radar. The PBS2 system will increase the current AN/TPQ-37 artillery range performance, while improving accuracy and target throughput. The PBS2 will also provide a new capability for missile and rocket detection at ranges out to more than 300 kilometers.

The system will use the standard Army light medium tactical vehicles in a highly mobile, transportable, and survivable configuration that reduces crew size from 12 to 9. The system will be capable of roll-on/roll-off from a single C-130 aircraft for rapid deployment. The program will further leverage the AN/TPQ-36 (V)8 electronics upgrade program by using the same operations central shelter currently being fielded.

## Foreign Counterpart

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

## Foreign Military Sales

None

## Program Status

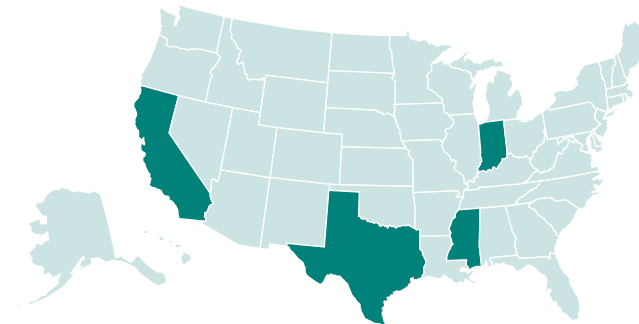
- **1QFY99** Milestone II approval.
- **4QFY99** Start of contract effort with Raytheon Systems; established partnering agreement with Raytheon.
- **4QFY00** Conducted preliminary design review.
- **3QFY01** Conducted critical design review.

## Projected Activities

- **4QFY03** Begin developmental test.
- **1QFY05** Conduct limited user test.
- **1QFY06** Low rate initial production contract.


## Contractors


Raytheon (El Segundo, CA; Forest, MS; Ft Wayne, IN; Dallas, TX), TRW (Carson, CA)




## XM395 Precision Guided Mortar Munition

### Organic LOS/BLOS Precision for Spectrum of Forces

**Current**  


**Interim**  


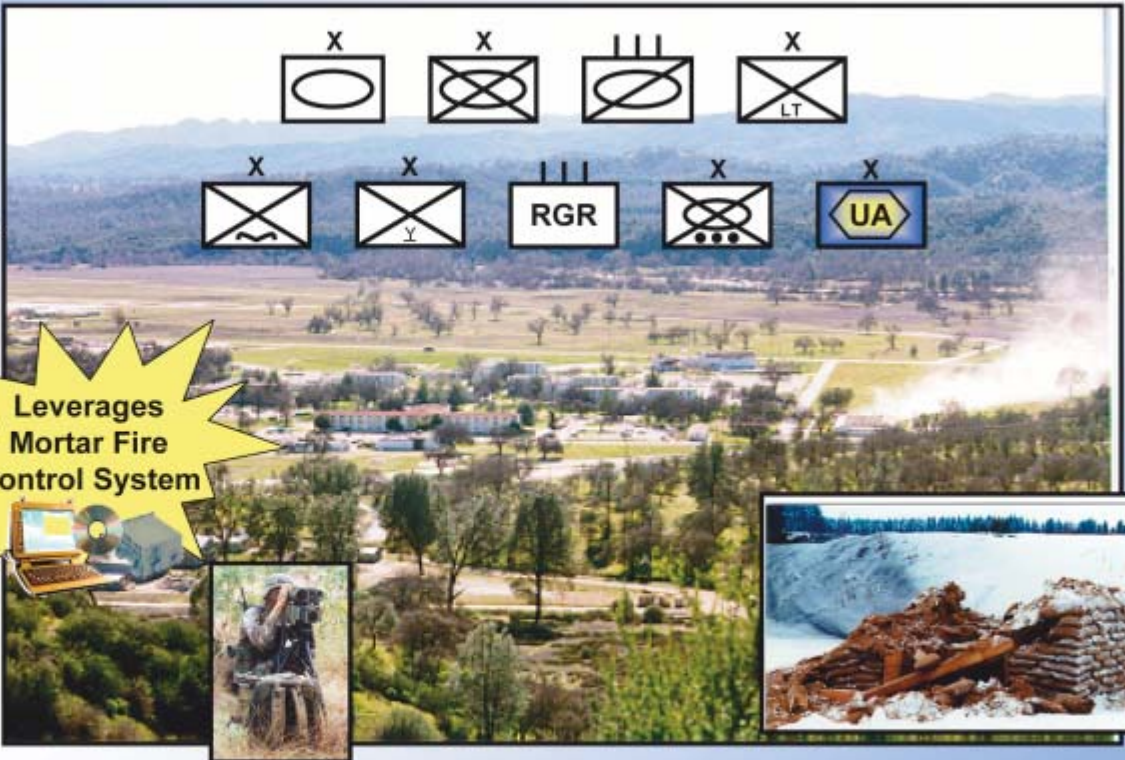
**Objective**  


**Leverages Mortar Fire Control System**

**Leverages Existing Fire Support Systems (G/VLLD, LLDR, AFATDS) Reduces Collateral Damage**

**Masonry Structures Earth and Timber Bunkers Light Armor Vehicles**

**Precision Munitions Increase Warfighter Effectiveness**



## Mission

Provide a precision strike munition for the Interim and Objective Forces that will defeat personnel within high value point targets, such as earth and timber bunkers, masonry structures, light armored vehicles, and command and control centers.

## Description and Specifications

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

**Precision:** Two rounds or fewer to affect the target (semi-active laser designation for precision strike).

**Range:** Provides lethality at extended ranges with block upgrades (10km to 15km).

**Lethality:** Provides enhanced lethality against personnel protected by earth and timber bunkers, lightly armored vehicles, and masonry structures.

**Shelf Life:** 10 years.

**Weapon System:** Compatible with all current, interim and objective 120mm US mortar systems.

## Foreign Counterpart

Sweden produced and fielded an anti-tank 120mm mortar munition (Strix), with a fire-and-forget infrared sensor. It is not compatible with the US 120mm mortar system, PGMM's operational concept, or target set.

## Foreign Military Sales

None

## Program Status

PGMM is currently in component advanced development. At the completion of CAD, PGMM will complete its component demonstration technical requirements (warhead, fuze) and program documentation for a Milestone B Decision (4QFY03) to proceed to the system development and demonstration phase. A competitive source selection is planned for the next phase through low rate initial production (LRIP).

## Projected Activities

- **4QFY03** Milestone B.
- **4QFY03 - 4QFY06** System development and demonstration phase.
- **1QFY06** Production qualification tests and evaluation.
- **3QFY06 - 4QFY06** Operational tests.
- **1QFY07** Milestone C (Block I).
- **1QFY07 - 1QFY08** LRIP.
- **2QFY08** Materiel release for Future Combat Systems
- **2QFY08** First unit equipped.
- **3QFY08** Initial operational capability.

## Contractors

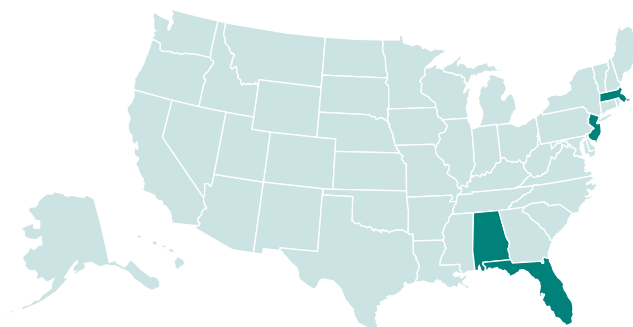
**Program Management:** ARDEC (Picatinny, NJ)

**Prime System:** Lockheed Martin (Orlando, FL)

**Airframe and Control System:** Diehl (Nuremburg, Germany)

**Support:** Camber (Huntsville, AL)

**Guidance Gyros:** Draper Laboratory (Cambridge, MA)









## Mission

Provide continuous, all weather, near-real-time direct support intelligence, force protection, tactical communications intelligence electronic support, electronic attack, and enhanced situational awareness to the tactical maneuver commanders.

## Description and Specifications

Prophet detects, collects, and exploits full spectrum radio frequency emissions. A secondary mission will be electronic attack against selected enemy emitters to interrupt, spoof, disrupt, and/or disable target command and control nodes.

Prophet is mounted on a High Mobility Multipurpose Wheeled Vehicle (HMMWV), with a quick-erect seven-meter antenna mast. The Prophet also has a dismounted man-pack version, which supports airborne and early entry operations. Both configurations provide intelligence support to a division, Stryker/Heavy/Light brigade, regiment, or task force. This intelligence support provides indications, warning, location, tracking, and identification of hostile forces/equipment, and will analyze data to determine probable enemy plans and intentions. Prophet will cross-cue other battlefield sensors (e.g. tactical unmanned aerial vehicles, PBS2 radars, etc.) as well as provide additional data that may confirm indications and detections from the other battlefield manned and unmanned sensors.

Prophet will replace the current tactical SIGINT legacy systems, which include the AN/TSQ-138 Trailblazer, the AN/TRQ-32 Teammate, the AN/TLQ-17A Trafficjam, and the AN/PRD-12 lightweight man-transportable radio direction finding set. The Prophet employs open systems architecture, modular design, and nonproprietary industry standards, which support evolutionary growth and expansion via circuit card assemblies and software versus wholesale hardware replacement. The Prophet system will be procured under a three-block acquisition approach, which will ensure reduced footprint, reduced logistics, standardization, enhanced sustainability, smaller and lighter force structure, and improved mobility. As an Objective Force capability, Prophet will ensure overall information superiority for the forward area tactical commanders when deployed and integrated into the maneuver units' networked sensor arrays to provide gap and seam coverage in the forward tactical areas.

## Foreign Counterpart

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

## Foreign Military Sales

None

## Program Status

- **3QFY02** Received initial six production vehicles and conducted Washington, DC, rollout ceremony for Prophet Block I.
- **4QFY02** Follow-on test and evaluation of production Prophet Block I completed.

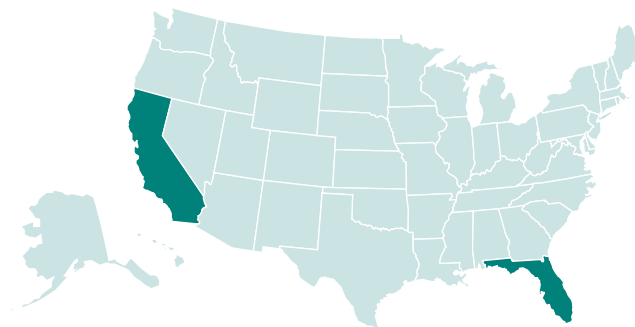
- **1QFY03** Fielded six Prophet Block I and two Prophet control systems to 313th MI Battalion, 101st Air Assault Division, Ft Campbell, KY; fielded six Prophet Block I and two Prophet control systems to 501st MI Battalion, 1st Armored Division, United States Army, Europe (USAREUR); fielded six Prophet Block I and two Prophet control systems to 103rd MI Battalion, 3rd Infantry Division, Ft Stewart, GA; Block II/III MS B decision to enter system development and demonstration (SDD); completed accelerated development and testing of the Prophet control; completed follow-on foreign comparative testing (FCT II).

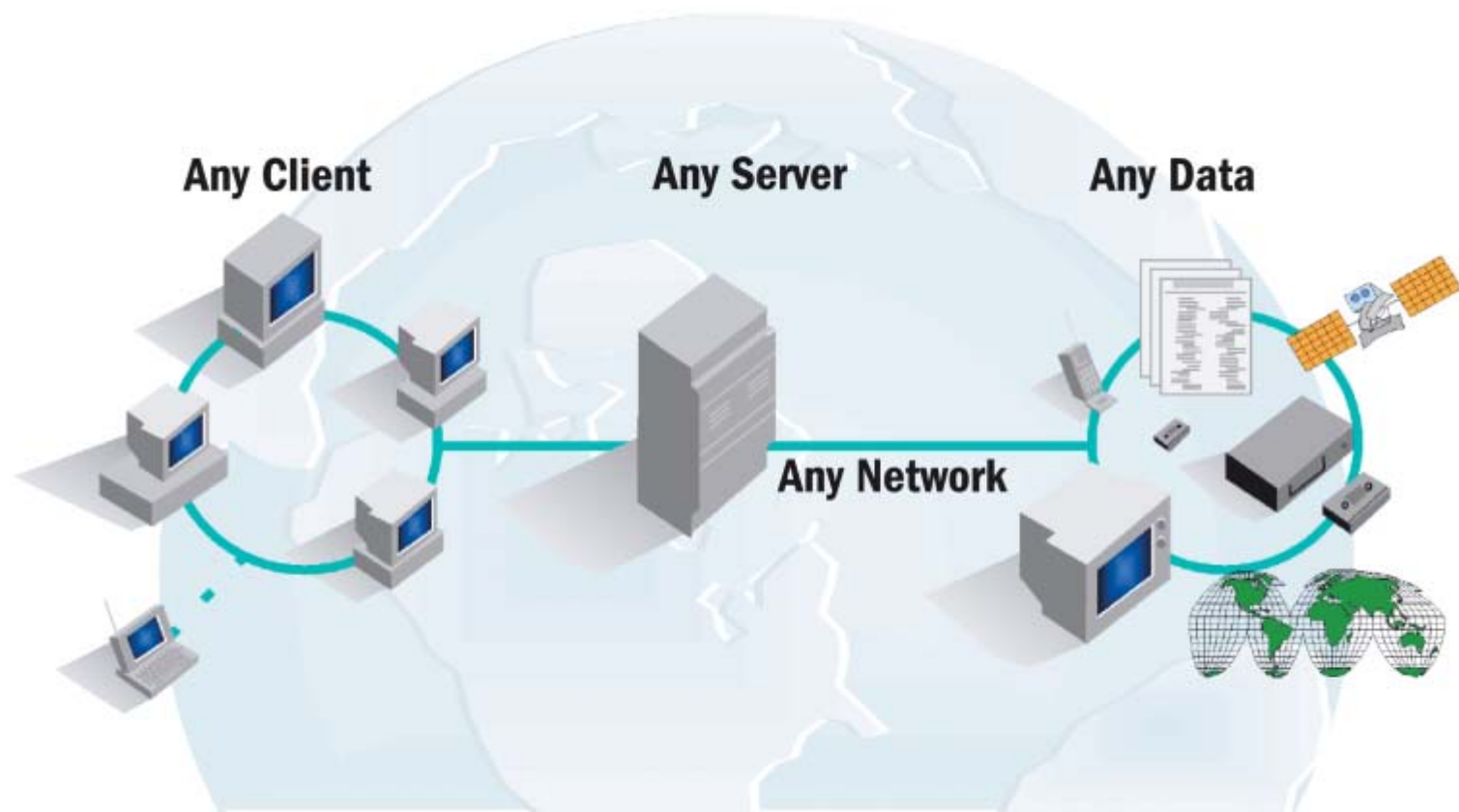
## Projected Activities

- **2QFY03** Award contract for Block II/III SDD; complete accelerated development and testing of Prophet digital reporting; field three Prophet Block I and one Prophet Control systems to 1st and 2nd Stryker Brigade Combat Teams (SBCTs), Ft Lewis, WA; field six Prophet Block I and three Prophet Control systems to 312th MI Battalion, 1st Cavalry Division, Ft Hood, Texas; and to 104th MI Battalion, 4th Infantry Division, Ft Hood, TX; field three Prophet production and one Prophet Control system to 3rd SBCT, Ft Polk, LA; field four Prophet production and one Prophet Control systems to 3rd ACR, Ft Carson, CO; add digital reporting capability to fielded Prophet Block I systems.
- **1QFY04** Field two Prophet Block I and one Prophet control systems to US Army Intelligence Center, Ft Huachuca, AZ.

## Contractors

**Prophet Block I Prod:** Titan Systems (Santa Clara, CA; Melbourne, FL)





## Mission

Develop, field, and sustain an automated information system that supports the full spectrum of Army Reserve Component (RC) operations for the 21st Century.

## Description and Specifications

The Reserve Component Automation System (RCAS) supports the Legacy-to-Objective transition path of the Army's Transformation Plan by providing the Army the capability to administer, manage, and mobilize Army National Guard and US Army Reserve forces more effectively. It achieves economies of scale and seamless interoperability through data management; common interfaces and applications; shared, tailorable databases; and a standard, open systems architecture. RCAS supports daily operations, training, and administrative tasks at all Guard and Reserve echelons and provides timely and more accurate information to plan and support mobilization. RCAS links approximately 10,500 Guard and Reserve units at approximately 4,000 sites located in all 50 states, the District of Columbia, Puerto Rico, the Virgin Islands, Europe, and the Pacific Rim.

The RCAS consists of commercial, off-the-shelf hardware and office automation software; government, off-the-shelf software; and newly developed software applications integrated into an open system environment that is consistent with the Joint Technical Architecture and Defense Information Infrastructure (DII) Common Operating Environment (COE). Its personal computer-based architecture is scalable with local and wide area network from single user sites to large sites and is compliant with C2-level security.

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

- **FY02** Began information technology (IT) infrastructure refresh and advancement.
- **1QFY03** Milestone III fielding decision for Increment 7 scheduled for 2QFY03 based on Integrating Integrated Product Team availability.
- Army and RC continue to balance operations and maintenance sustainment requirements against fiscal year funding and are addressing FY03-04 shortfalls during year of execution, and a FY05 shortfall in the FY05-09 Program Objective Memorandum/Budget Estimate Submission cycle.

## Projected Activities

- Field Increment 7 (Milestone IIIf) delivering safety and occupational health, civilian personnel, and mobilization planning-integrated data viewer functionality.
- Complete testing and fielding of Increment 8 (Milestone IIIg) to deliver remaining functionality in the areas of mobilization and human resources.
- Continue IT infrastructure refresh and advancement.
- Transition project to full sustainment phase under centralized management.

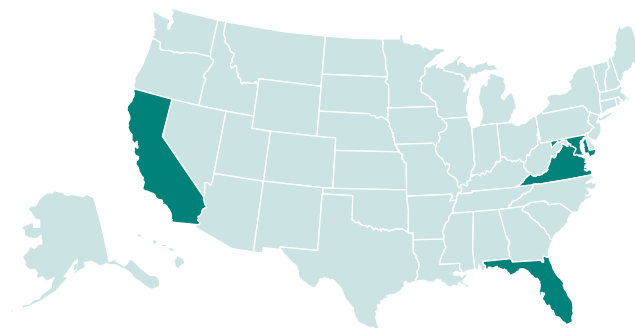
## Contractors

**System Development and Integration:** Science Applications International Corporation (Vienna, VA)

**Engineering:** GRC International (McLean, VA); Digicon (Rockville, MD)

**Telecommunications:** Cisco Systems Corporation (San Jose, CA)

**Hardware:** Tech Data Corporation (Clearwater, FL)





## Second Generation Forward Looking Infrared (2nd GEN FLIR)





## Mission

Provide the Army with an advanced sensor system for a superior reconnaissance, surveillance, and target acquisition capability and a common view of the battlefield during varied atmospheric and obscurant conditions.

## Description and Specifications

Horizontal technology integration (HTI) second generation forward looking infrared (FLIR [SGF]) provides the M1A2 SEP Abrams Main Battle Tank, M2A3/M3A3 Bradley Fighting Vehicle, and Long Range Advanced Scout Surveillance System (LRAS3) and the Line-of-Sight Antitank (LOSAT) system with a leap-ahead target acquisition capability. It operates effectively in daylight, at night, and through varied atmospheric and obscurant conditions.

HTI SGF is the Army's premier horizontal technology integration program. HTI SGF entails the insertion of a common second generation thermal sensor, known as the B-Kit, into the Army's highest priority ground-based platforms. By integrating a common thermal sensor known as a B-Kit into any candidate platform, the user community is able to see the same battlefield and achieve a broad overmatch to potential adversary capabilities. The linkage between the B-Kit and the perspective sights are system-specific platform links called A-Kits.

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 US forces well into the future. Commonality of FLIR sensors in multiple platforms facilitates development and fielding of future upgrades, such as image fusion, aided target recognizers, and target trackers.

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

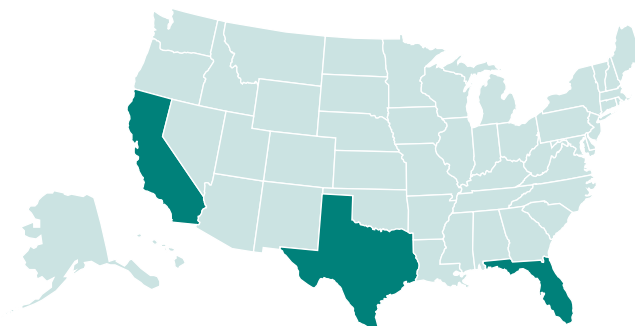
## Program Status

- **1QFY00** Successfully completed HTI SGF Milestone III.
- **3QFY00** First unit equipped (FUE) (within M1A2 SEP).
- **1QFY01** FUE (within M2A3 BFV).
- **3QFY01** FUE (within LRAS3).
- **2QFY02** B-kit multi-year competitive contract awards.
- **4QFY02** Fielded 1000th SGF system.
- **1QFY03** Competitive awards of constituent core B-Kit components (SADA II and OWL).
- **1QFY03** VECP for Block 1 B-Kit improvements.

## Projected Activities

### Contractors

Raytheon (McKinney, TX; Santa Barbara, CA); DRS Technologies (Palm Bay, FL; Dallas, TX); GDLS (Deland, FL)





## Mission

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

## Description and Specifications

The Secure Mobile Anti-Jam Reliable Tactical-Terminal (SMART-T), mounted on a standard High Mobility Multipurpose Wheeled Vehicle (HMMWV), provides range extension for the Army's Mobile Subscriber Equipment system at echelons corps and below (ECB). It processes data and voice communications at both low data rate and medium data rate (MDR) (75 bps-1.544 Mbps). It will be the only wide-band satellite capability at ECB. Development is underway to upgrade existing MDR terminals to advanced extremely high frequency (AEHF) (8192 Kbps).

## Foreign Counterpart

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

## Foreign Military Sales

None

## Program Status

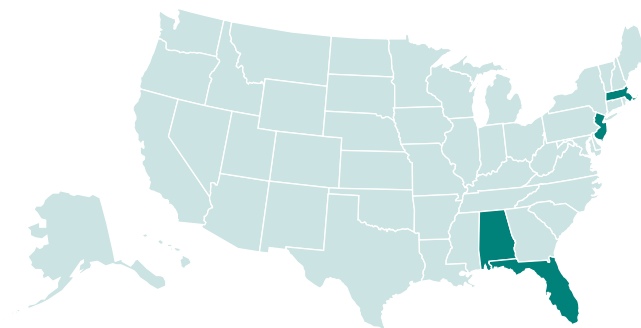
- **3QFY02** Awarded the follow-on production contract to procure additional terminals.
- **FY99 - FY03** 104 terminals fielded to multi-service units, Marines, Air Force, Army, and others.

## Projected Activities

- Continue procuring and fielding MDR SMART-T terminals.
- Continue AEHF development.

## Contractors

Raytheon (Marlborough, MA; Largo, FL); SCI (Huntsville, AL); Lincoln Labs (Lexington, MA); EPS (Eatontown, NJ)



## 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 its Internet controller, provides the communications link for the digitized force. SINCGARS configurations include manpack, vehicular (both low and high power), and airborne models. Communications security is integrated into currently produced versions of the ground and airborne radios. System improvement program (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 lbs

**Height:** 3.4"

**Length:** 10"

**Width:** 5.4"

## Foreign Counterpart

United Kingdom: Racal; France: Thomson CSF; Belgium: Marconi; Sweden: Ericsson.

## Foreign Military Sales

Bahrain, Finland, Georgia, Greece, Hungary, Italy, Kuwait, Morocco, New Zealand, Saudi Arabia, SHAPE Tech Center (NATO), Spain, Special Defense Acquisition Fund (for FMS), Taiwan, Ukraine, and Uzbekistan.

## Program Status

- **3QFY01** Program year 15 production option awarded.
- The Army acquisition objective is currently 242,480 ground and 9,248 airborne radios. A total of 229,778 ground and 9,204 airborne radios have been procured to date. Approximately 215,500 radios have been fielded.
- **2QFY02** Awarded production contract delivery orders for ground radios, airborne radios, and radio test sets.
- **1QFY03** Testing of the Integrated GPS into the ASIP radio.

## Projected Activities

- **FY04-09** President's Budget contains funding to complete fielding the ASIP model SINCGARS radios currently on contract and procure a portion of the assets required for Stryker Brigade Combat Teams (SBCTs).

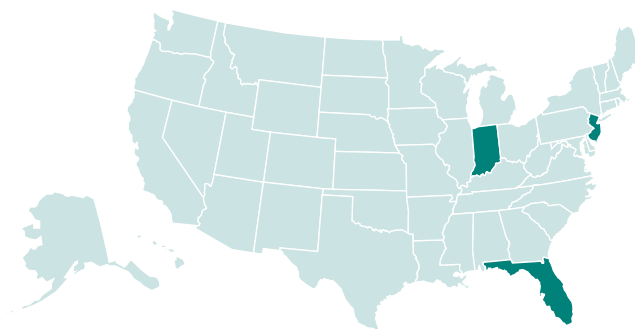
## Contractors

**Radio:** International Telephone and Telegraph (ITT) (Ft Wayne, IN); General Dynamics (Tallahassee, FL)

**TPF/NET:** EPS (Shrewsbury, NJ)

**Fielding:** BAE Systems (W. Long Branch, NJ)

**Engineering:** Titan (Shrewsbury, NJ)



## Smoke Generator (M56 Coyote)



## Mission

Deny information to the enemy, protect our forces, and dominate the maneuver battle by generating large-area obscuration in the visual, infrared, and millimeter regions of the electromagnetic spectrum, defeating critical observation, intelligence, target acquisition, and tracking systems.

## Description and Specifications

The Motorized Smoke Generator (M56) is a large-area smoke generator system mounted on the M1113 High Mobility Multipurpose Wheeled Vehicle (HMMWV). The M56 can obscure high-priority stationary targets such as airfields, bridges, and ammunition depots, as well as mobile targets such as convoys and troop movements. The system is modular and uses a gas turbine engine as a power source to disseminate the obscurants. The visual screening module is capable of vaporizing fog oil for up to 90 minutes. Dissemination of graphite is provided for 30 minutes to blind infrared sensors. A program to add obscuration capability in the millimeter wave region has been initiated and will begin fielding in FY06.

**Turbine engine-powered visual screening (fog oil):** 0-1.33 gal/min

**Infrared screening (graphite):** 1-10 lbs/min

**Millimeter wave screening:** to be added in FY05

## Foreign Counterpart

Countries that use former Soviet doctrine emphasize extensive use of obscurants during tactical exercises. Many nations, especially those in the Middle East, are beginning developmental programs in this area.

## Foreign Military Sales

Taiwan

## Program Status

- **1QFY01** Initiated second major production effort for the M56 Smoke Generator system.
- **FY01** Initiated millimeter-wave (MMW) obscurant pre-planned product improvement development effort, to be followed by production and integration.
- **FY02** Began fielding of driver's vision enhancer.
- **FY02** Continued MMW research, development, test, and evaluation.

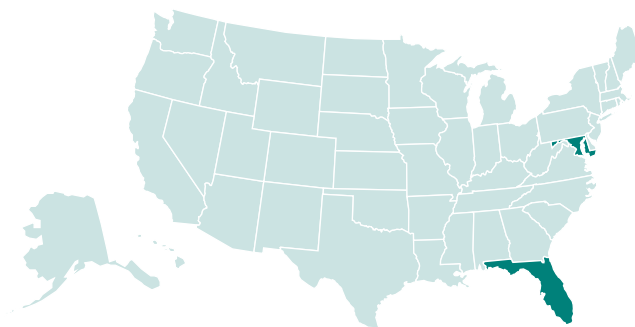
## Projected Activities

- **FY03** Continue second production.

## Contractors

**Production:** General Dynamics Robotics Systems (Westminster, MD)

**MMW RDTE:** Titan System Corporation (Melbourne, FL)









## Mission

Provide man-portable and platform-launched low-altitude air defense for unit of action, other maneuver forces, and self-defense of helicopters.

## Description and Specifications

The Stinger family of missiles continues to be the world's most advanced, accurate, short range, fire-and-forget anti-aircraft missile in America's air defense arsenal. As the Army transforms to Objective Force, Stinger and Stinger-based platforms will remain in the Army inventory until at least 2018 to provide this critical bridge for Transformation. Stinger is the "backbone" for short range air defense (SHORAD), and is the only US Army aviation air-to-air missile. Stinger is operational in the US armed services and those of 18 friendly nations. It is deployed on a wide variety of platforms including the Avenger, Linebacker, and Bradley vehicles, and the Kiowa Warrior and special operations aircraft, Navy special operating ships, and the USMC's Avenger and Light Armored Vehicle-AD. Stinger is integrated on the Longbow Apache helicopter. More than 44,000 Stinger Reprogrammable Microprocessor (Stinger-RMP) missiles have been delivered and more than \$4 billion has been invested in Stinger weapon systems and platforms. The Stinger program has evolved from the Redeye to Stinger Basic, followed by Stinger Post, to the Stinger-RMP.

Stinger Block I is the current version of Stinger and incorporates the latest hardware and software into the Stinger-RMP missile, which increases overall performance against low-observable targets, cruise missiles, and unmanned aerial vehicles. The Block I missile incorporates a roll frequency sensor/seeker that eliminates the need for super-elevation on aviation platforms. The Stinger Block I is compatible with all current and planned launch platforms. Stinger is a fire-and-forget missile, capable of all-aspect engagement, including head-on, using a dual-color infrared/ultraviolet (IR/UV) seeker and proportional navigation system to fly an intercept course to the target. The missile is externally reprogrammable, allowing upgrades without costly hardware changes as threats evolve. In addition, Stinger Block I is being integrated on the Predator unmanned aerial vehicle to provide an air-to-air, self-defense capability in the ever-changing, ever-increasing threat environment facing our joint forces.

**Guidance:** Passive IR/UV homing

**Speed:** Supersonic

**Navigation:** Proportional with lead bias

**Weight:** 34.5 lbs

**Diameter:** 2.75"

**Length:** 60"

## Foreign Counterpart

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

## Foreign Military Sales

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

## Program Status

The Army continues to procure Block I new build missiles.

## Projected Activities

- Continue to buy new Stinger Block I missiles to support the Stinger-based SHORAD force.
- Conduct shelf life analysis to determine if missile shelf life can be extended to facilitate the start of a Stinger missile refurbishment program in order to reduce new missile buys and maintain inventory level sufficient to support go-to-war quantities.

## Contractors

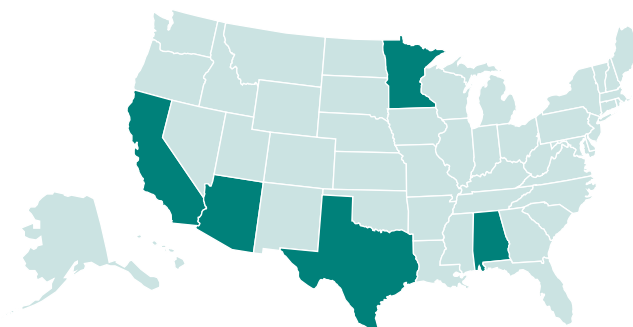
**Prime:** Raytheon (Tucson, AZ)

**Sensors:** Honeywell (Minneapolis, MN)

**Substrate:** Natel Engineering (Chatsworth, CA)

**Component Analysis:** Tyco (Austin, TX)

**SETA:** Dynetics (Huntsville, AL)





## Mission

Provide the primary combat and combat support platform of the Stryker Brigade Combat Teams (SBCT) to enable a strategically deployable (C-17/C-5) and operationally deployable (C-130) brigade capable of rapid movement anywhere on the globe in a combat-ready configuration.

## Description and Specifications

Stryker supports the Army Vision and Transformation and fulfills an immediate requirement with equipment that is highly deployable, lethal, survivable, mobile, and reliable.

The Stryker family of vehicles consists of two variants: the infantry carrier vehicle (ICV) and the mobile gun system (MGS). The ICV is a troop transport vehicle capable of carrying nine infantry soldiers, their equipment, and a crew of two consisting of a driver and vehicle commander. The MGS is designed to support infantry. It incorporates a 105mm turreted gun and autoloader system designed to defeat bunkers and breach double-reinforced concrete walls. There are eight other configurations based on the ICV that provide combat and combat support capabilities. These are the reconnaissance vehicle (RV), mortar carrier (MC), commander's vehicle (CV), fire support vehicle (FSV), engineer squad vehicle (ESV), medical evacuation vehicle (MEV), anti-tank guided missile vehicle (ATGM), and nuclear, biological and chemical reconnaissance vehicle (NBCRV).

The Stryker is an eight-wheeled vehicle powered by a 350hp diesel engine. It incorporates a central tire inflation system, run-flat tires, and a vehicle height management system. The Stryker family (less the MEV) is armed with a remote weapons station that supports an M2 .50 caliber machine gun or MK19 automatic grenade launcher, the M6 countermeasure device (smoke grenade launcher), and an integrated thermal weapons sight. The Stryker is capable of supporting a communications suite that integrates the Single Channel Ground and Airborne Radio system (SINCGARS) radio family; Enhanced Position Location Reporting System (EPLRS); Force XXI Battle Command Brigade-and-Below (FBCB2); Global Positioning System (GPS); and high frequency and near-term digital radio systems. The Stryker provides 360 degree protection against 14.5mm armor piercing threats.

The Stryker is deployable by C-130 aircraft and combat-capable upon arrival. The Stryker is capable of self-deployment by highway and self-recovery. It has a low noise level that reduces crew fatigue and enhances survivability. It moves about the battlefield quickly and is optimized for close, complex, or urban terrain. The Stryker program leverages non-developmental items with common subsystems and components to quickly acquire and field these systems. Where appropriate, Strykers will integrate existing government furnished material subsystems.

The Stryker family of vehicles stresses performance and commonality that reduces the logistics footprint and minimizes sustainment costs.

Each SBCT requires 330 Stryker variants. The current program acquires 2,121 Strykers to field 6 SBCTs, 1 of which will be configured as a cavalry regiment.

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

- **2QFY03** First unit equipped.

## Projected Activities

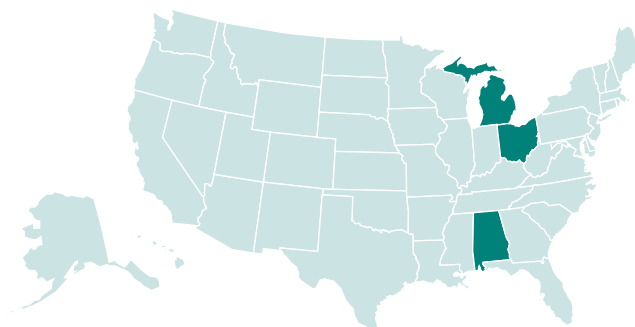
- **1QFY04** Milestone III.

The MGS and NBCRV are in development and will be delivered beginning in 2004. Development, testing, and fielding are proceeding concurrently in order to minimize fielding timelines. The 1st SBCT at Ft Lewis, Washington will achieve initial operational capability by 3QFY03.

## Contractors

General Dynamics Land Systems (Sterling Heights, MI; Lima, OH; Anniston, AL)

General Motors Defense (London, ONT, Canada)



## Super High Frequency (SHF) Terminal





## Mission

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

## Description and Specifications

The current generation of Super High Frequency (SHF) Terminals include large, fixed facilities (AN/FSC-78, AN/GSC-39 and 52) defined by the size of their antennas, receive/transmit capabilities, and their mission. These facilities are generally co-located with Defense Information System Network (DISN) points of entry. They provide the satellite transmission path for the DISN, and serve as reach-back entry points for tactical terminals. Ground mobile force, or tactical terminals, are the AN/TSC-85 and 93, currently being modified to C models in order to expand their capability and extend their life while the replacement is being developed. The 85s and 93s are multi-channel terminals capable of receiving, transmitting, and processing low, medium, and high-capability multiplexed voice, data, and teletype signals. The 85 is a nodal system, capable of communicating with up to four other GMF terminals (85s or 93s). The 85 provides a capacity of 48 channels of 16 or 32 kbps voice and/or digital data. The 93 provides a capacity of 24 multiplexed channels.

The Tactical SHF Terminal that will replace the 85s and 93s will provide multi-band capability (military X and Ka bands, and commercial C and Ku bands) in the SHF range. It will operate over commercial and military SHF satellites to include the DSCS, the Wideband Gapfiller System (WGS) and possibly the Advanced Wideband Satellite (AWS) or Transformational Communications System (TCS). The SHF Terminal will provide throughput capabilities up to 20 mbps. The Tactical SHF Terminal will satisfy tactical and highly mobile command and control, intelligence, fire support, air defense, and logistics communications requirements in support of Army, USMC, Special Operations Command, and Joint Communication Support Element. The terminals will be integrated on an Expanded Capability Vehicle (ECV) and be the warfighter's primary means of reachback communications.

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

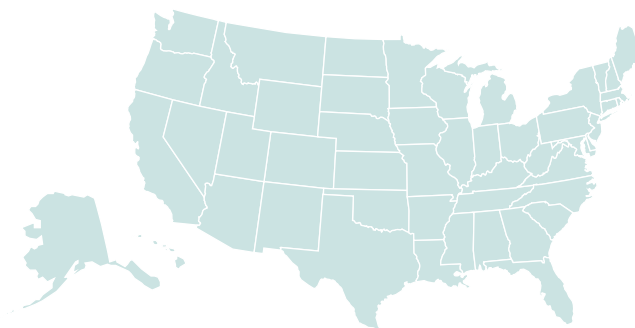
- **4QFY02** DA validated operational needs statement.
- **4QFY02** Government-hosted Industry Day.
- **1QFY03** RFP issued.
- **1QFY03** Proposals received.

## Projected Activities

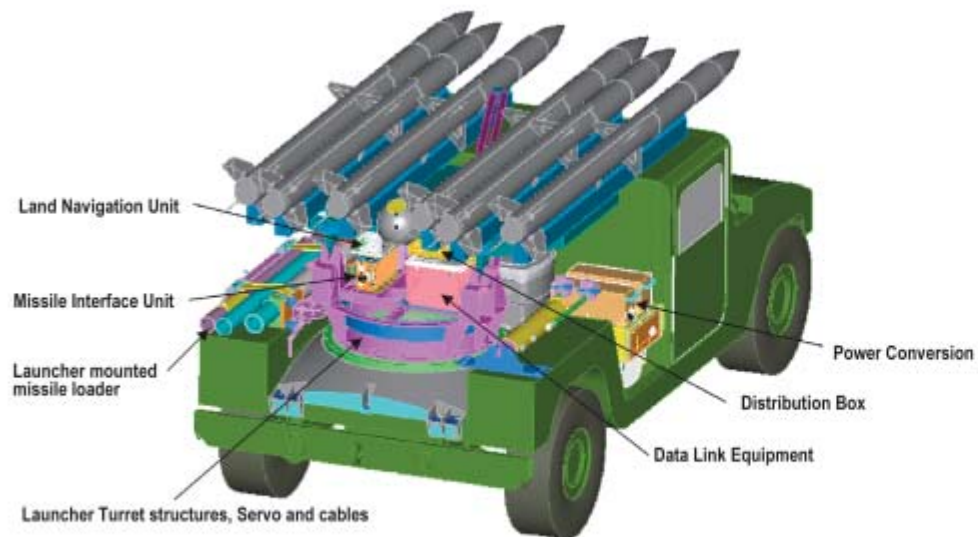
- **2QFY03** Complete evaluation of proposals.
- **2QFY03** Congressional notification and contract award.

## Contractors

TBD



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



## Mission

Provides networked, inner-tier Air and Missile Defense (AMD), pooled at the unit of employment (UE) and task-organized to the unit of action (UA) to protect the maneuver force and theater rear assets from aerial threats.

## Description and Specifications

The Surface Launched Advanced Medium Range Air-to-Air Missile (SLAMRAAM) is a net-centric weapon system consisting of a launcher on an Army common platform (HMMWV), a tri-service AMRAAM missile, an organic sensor (Sentinel Enhanced Target Range and Classification [ETRAC] Radar), other joint external sensors (PATRIOT, AWACS, etc.), and the centralized fire control using a robust Battle Management Command, Control, Communications, Computers and Intelligence (BMC4I) system in order to provide air and missile defense for UA/UE maneuver forces. SLAMRAAM is a highly mobile and transportable system consisting of a basic load of four to six AIM-120 AMRAAMs, a slewable launcher with integrated electronics, supporting 360 degree engagement capability, with on-board integrated BMC4I and Force XXI Battle Command Battalion/Brigade and Below (FBCB2) capability for ground and air operational and situational awareness. SLAMRAAM provides a critical beyond line-of-sight and non-line-of-sight overmatch capability against rapidly evolving air threats to UAs/UEs to defeat aerial reconnaissance, surveillance, and target acquisition unmanned aerial vehicles; unmanned combat aerial vehicles; and rotary wing, cruise missile, and fixed wing aircraft. The SLAMRAAM is a robust, lightweight, day or night, adverse weather system, and is extremely effective against low radar cross section targets in high clutter environments.

The platform stores, transports, loads, aims, launches, provides in-flight updates, and reloads multiple AMRAAMs. Primary means of engaging targets is via centralized fire control orders from a BMC4I command post (platoon, battery, or battalion) using Forward Area Air Defense Command, Control and Intelligence (FAADC2I) digital networks. However, in periods of degraded operations, targets can be engaged at the launcher (decentralized) using a remote fire control console. SLAMRAAM communications consists of digital data and voice radio frequency connectivity with its parent platoon/battery command post, the air battle management operations center (ABMOC), the Sentinel/sensor command and control node and FBCB2, as well as connectivity with Global Positioning System (GPS) to obtain positioning data.

**Armament:** A basic load of four to six AIM-120 AMRAAMs

**Sensors:** Sentinel radar provides the organic air track picture to the SLAMRAAM. Additionally, SLAMRAAM has the capability to execute engagements from joint sensor information (e.g., PATRIOT, Joint Land Attack Cruise Missile Defense Elevated Netted Sensor [JLENS], AWACS) provided by the ABMOC.

**Chassis:** Modified HMMWV

**Fire Control:** Fire control commands are received from superior command post and automatically distributed to the individually selected SLAMRAAM(s) via FAAD C4I network. Each SLAMRAAM has an integrated fire control computer that will support multiple launches.

## Foreign Counterpart

Norway: NASAM

## Foreign Military Sales

None

## Program Status

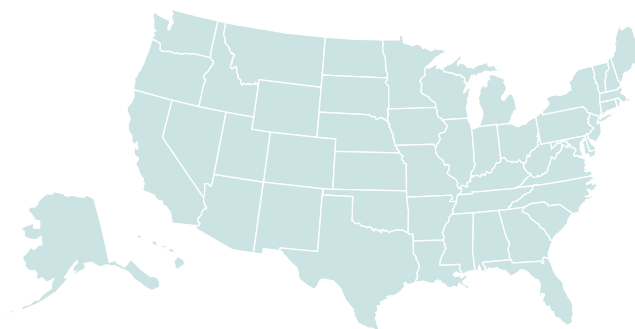
- **June 5, 2002** SLAMRAAM ORD approved by Army Requirements Oversight Council (AROC).
- Fully funded in the **FY04-09** POM.

## Projected Activities

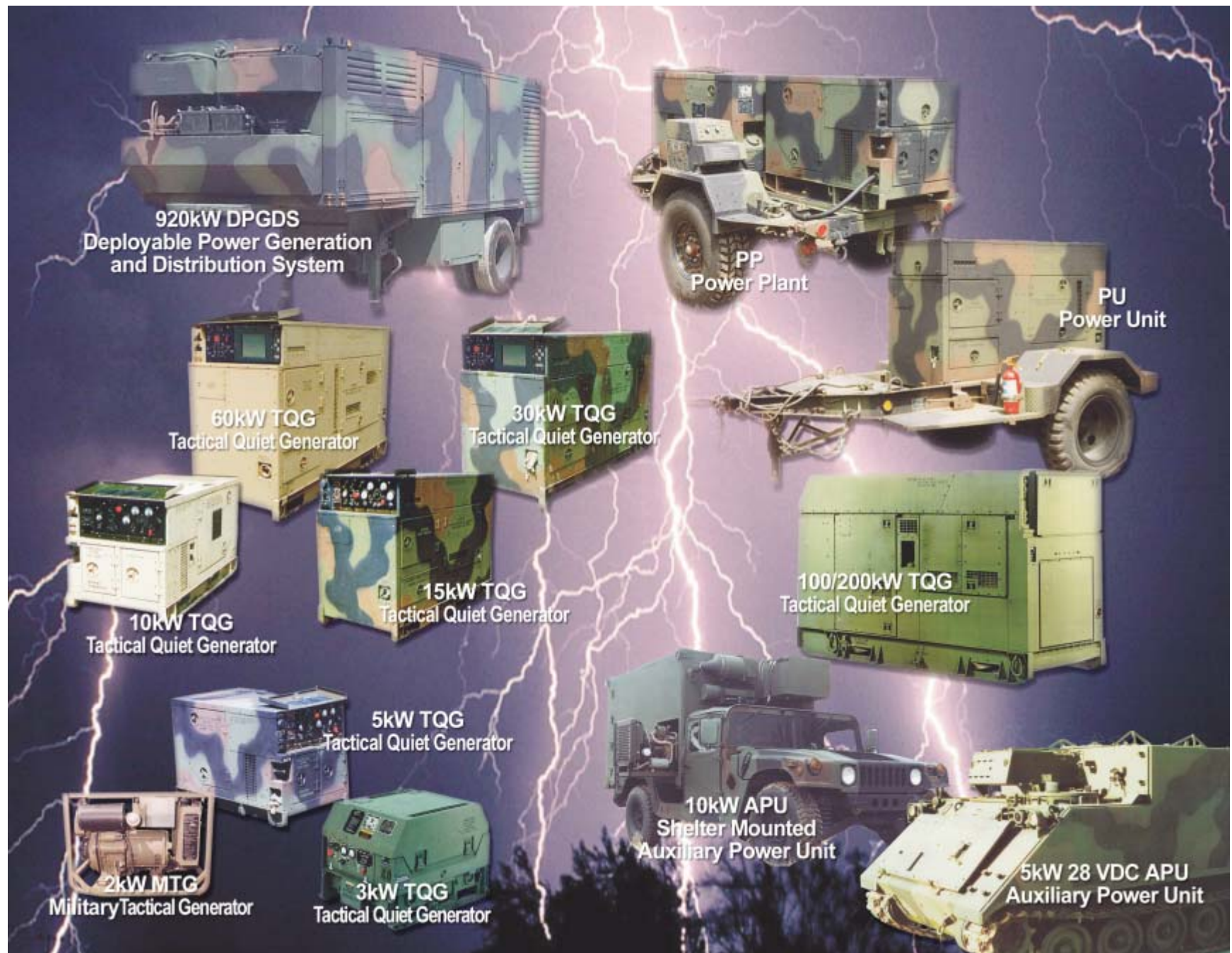
- **4QFY03** Milestone B scheduled.
- **1QFY04** Contract award expected.

## Contractors

TBD









## Mission

Provide a modernized standard family of mobile electric power sources for all services in accordance with Department of Defense Directive (DoDD) 4120.11, through a coordinated Inter-Service effort to develop, acquire, and support mobile electric power sources from small, 0.5kW man-portable generators to large, 920kW prime power generating systems.

## Description and Specifications

The Tactical Electric Power program, consisting of small, medium, and large power sources; power units and power plants (PU/PP); and auxiliary power units (APU), provides the DoD with “single fuel” (diesel/JP-8) electrical generator systems that:

- Are more reliable (500 - 600 hours mean time before failure [MTBF]).
- Reduce weight/cube for enhanced mobility/transportability.
- Reduce infrared (IR) signature and noise (to 70 dBA @ 7 m).
- Are survivable in chemical, biological, and nuclear environments.
- Provide quality electric power for command posts, C4ISR systems, weapon systems, logistics and maintenance functions, medical and base support activities, and other battlefield support equipment.
- Comply with Environmental Protection Agency guidelines.

## Foreign Counterpart

No known foreign counterpart meets Army requirements. However, the 2kW MTG was originally manufactured in Canada and bought by the Canadian Ministry of Defense. It is now adapted by DoD.

## Foreign Military Sales

Tactical quiet generators (TQGs) have been purchased 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

- The 2kW MTG, 3kW, 5kW, 10kW, 15kW, 30kW, and 60kW TQGs are currently in production and fielding is on-going.
- Assembly of PU/PP (trailer mounted generator sets) and procurement of 5kW 28 Volt DC and 10kW shelter mounted APUs continues.
- The 920kW Deployable Power Generation and Distribution System (DPGDS) has entered production and fielding.

## Projected Activities

- **FY03** The 100kW TQG and 200kW TQG, currently in development, will begin operational testing, with initial fielding beginning in FY05.
- **FY03** Advanced Medium Mobile Power Sources (AMMPS) program, the next generation Tactical Electric Power Sources, will mark Milestone B (entry into system development and demonstration) and is scheduled for production beginning in FY08.

## Contractors

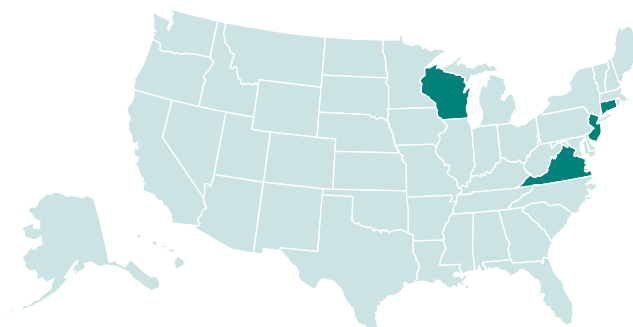
**3kW, 5kW, 10kW, 15kW, 100kW and 200kW TQG:** Fermont (Bridgeport, CT)

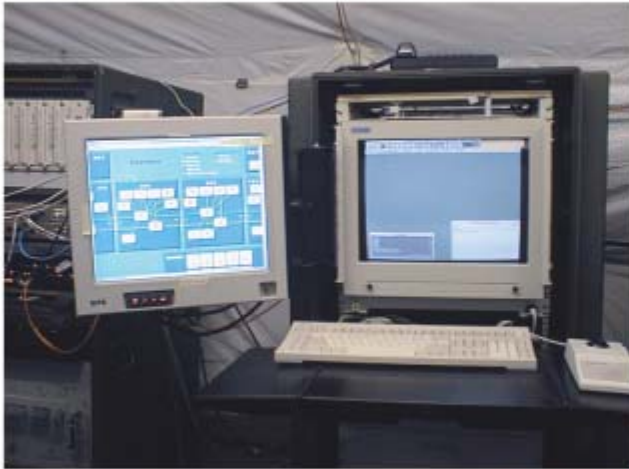
**DPGDS:** Radian (Alexandria, VA)

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

**Trailers for Power Units and Power Plants (PU/PP):** Miller USA (Berlin, WI)

**Support/Engineer Contractor:** Modern Technologies Corporation (MTC) (Springfield, VA)





## Mission

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

## Description and Specifications

The Tactical Exploitation System (TES) is the Army's Legacy-to-Objective system for tactical exploitation of national and theater intelligence, surveillance, and reconnaissance assets. TES replaces the Advanced Electronic Processing and Dissemination System (AEPDS), Enhanced Tactical Radar Correlator (ETRAC), and the Modernized Imagery Exploitation System (MIES). The system combines the existing capabilities of these systems into a single, integrated, and scalable family of systems with a common software baseline. TES interfaces with numerous satellite and air-platform tactical sensors and processes/exploits intelligence data, imagery, and support information. TES is deployed in three primary configurations; TES Main, TES Forward, and the Distributive TES (DTES). These system variants can support split-based operations or can interoperate with other services (Navy and Air Force TES system variants).

TES Forward and DTES are highly mobile element configurations based on the High Mobility Multipurpose Wheeled Vehicle (HMMWV). TES Main is typically housed in Wolfcoach vans pulled by Freightliner (FL-60) tractors. Each TES configuration has similar operational, communications, and support capabilities with a common soldier interface using the TES multi-functional workstation (MFWS).

TES is designed to provide the commander maximum flexibility to satisfy intelligence needs in a wide range of operational scenarios. TES provides multiple configurations, ranging from one C-130 deployable HMMWV early-entry capability to collocated TES Main and Forward elements with up to 18 operator MFWS (expandable to 40 MFWS). TES operators can perform imagery intelligence (IMINT), signal intelligence (SIGINT), cross-intelligence, or dissemination functions from any system workstation. TES provides quick set-up/tear-down and C-130 drive-on/drive-off capability to support rapid, tiered, or large scale deployments.

Army TES systems and other services' TES systems variants are key bridging elements for the Interim Distributed Common Ground Station-Army (I-DCGS-A) and are an existing proof-of-concept for the emerging Objective Distributed Common Ground Station-Army (DCGS-A) architecture.

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

- **1QFY03** Fielded DTES #2 (basic configuration) to V-Corps.

- **1QFY03 - 05** Create and submit unfunded requests for production of TES Light configuration to field to support Special Operations Command (SOC) and forward area support terminal system replacement.
- **1-2QFY03** Re-baseline TES fielding plans; award TES objective acquisition development contract for revised system fieldings.

## Projected Activities

- **2QFY03** Field TES Forward #4 to III-Corps.
- **3QFY03** Field Initial TES trainer to Intelligence Center and School.
- **4QFY03** Field DTES #5 (basic configuration) to 1st Infantry Division (ID).
- **1QFY04** Field DTES #3 and DTES#4 to 1st CAV and 4th ID.
- **2QFY04** Field DTES #9 to 2nd ID; field TES Main #4 (without triband satellite subsystem) to III-Corps.
- **3QFY04** Field DTES #6 to 3rd ID.
- **4QFY04** Field DTES #7 to 10th MTN.
- **1QFY05** Field DTES #8 to 101st AA; field DTES #10 to 25th ID.

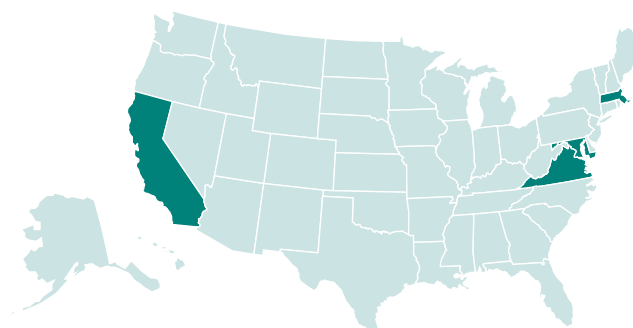
## Contractors

**Integration:** Northrop Grumman (Baltimore, MD); Wolf Coach (Auburn, MA)

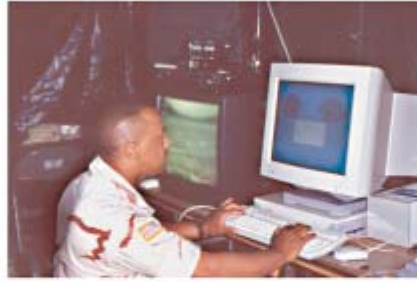
**Gale Software Application:** TRW (Chester, VA)

**Imagery:** Paragon Systems (Oakland, CA)

**Generators:** Wenzlau Engineering (South Pasadena, CA)



## Tactical Operations Center (TOC)





## Mission

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

## Description and Specifications

The TOCs program integrates Army Battle Command Systems (ABCS), communications equipment, and local area networks into standard Army platforms (vehicles and shelters), and tents. TOCs are digitized, tactically mobile, and fully integrated. Military, off-the-shelf; non-developmental items; commercial, off-the-shelf; and emerging technologies are incorporated into Department of the Army (DA)-approved system architectures. The TOCs are Defense Information Infrastructure/Common Operating Environment (DII/COE) and Joint Technical Architecture (JTA) compliant. The TOCs program also provides the commander and his staff with a digitized command information center, where information is exchanged, displayed, and fused, and where courses of action become orders.

TOCs are interoperable across all Army mission areas and joint/allied command and control nodes, and provide a common operational picture to the warfighter. TOCs are also modular and provide the capability to “jump,” and conduct split-based operations, or simultaneous operations in more than one place as a headquarters is on the move. Operations are revolutionized through a combination of state-of-the-art data processing, communications, and information transport methods, using the Tactical Internet (TI) and the latest networking capabilities. Information dominance is achieved through the orderly evolution of capabilities demonstrated during advanced warfighting experiments. These include collaborative planning, improved large screen displays, new data radios and the TI.

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

- **2QFY97** Established TOC program.
- **1QFY00** First TOC delivered to the 4th Infantry Division (First Digitized Division).
- **1QFY01** Completed fielding of digitized TOCs to the 4th Infantry Division (ID).
- **1QFY01** Competitively awarded a TOC integration contract for 1st Stryker Brigade Combat Team (SBCT) and 2nd SBCT.

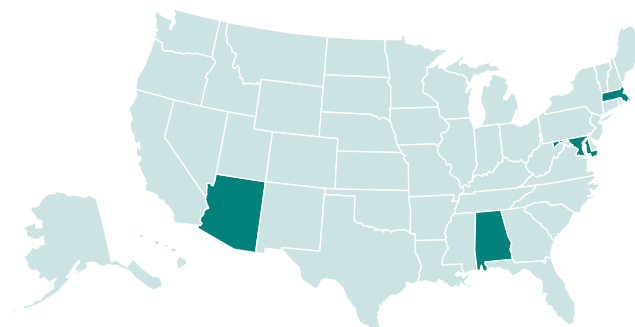
- **3QFY01** Completed fielding of a mobility module G6 to the 3rd US Army.
- **3QFY01** Completed fielding of digitized TOCs to 1st SBCT.
- **FY02** Began fielding to 1st Cavalry Division (2nd Digitized Division).

## Projected Activities

- **FY03** Complete fielding to 2nd SBCT.
- **FY03** Complete fielding to 1st Cavalry Division.
- **FY04-06** Complete fielding to III Corps, 3rd Brigade, 4ID, 3rd Armored Cavalry Regiment, and 4th-6th SBCTs.

## Contractors

General Dynamics (Huntsville, AL; Scottsdale, AZ; Taunton, MA); TRW (Huntsville, AL); CSTI (Westminster, MD)



## Tactical Unmanned Aerial Vehicle (TUAV)



## Mission

Provides Brigade Combat Team, Stryker Brigade, and Armored Cavalry commanders near real-time reconnaissance, surveillance, and target acquisition, and battle damage assessment.

## Description and Specifications

The RQ-7A Tactical Unmanned Aerial Vehicle (TUAV) system configuration, fielded in platoon sets, consists of four air vehicles with electro-optic/infrared imaging payloads, two ground control station (GCS) shelters mounted on High Mobility Multipurpose Wheeled Vehicles (HMMWVs) and their associated ground data terminals, one air vehicle transport HMMWV towing a trailer-mounted hydraulic launcher, one HMMWV with trailer for personnel and equipment transport, one portable GCS, and one portable ground data terminal. There is one maintenance section multifunctional (MSM) (two HMMWV, one with mounted shelter and trailer, one with personnel and equipment) manned by soldiers for every system (platoon), transporting spares and providing maintenance support. In addition, a mobile maintenance facility manned by contractor personnel is located at the Divisional Military Intelligence Battalion to provide sustainment maintenance and supply support to the MSM including "off system support" and "maintenance by repair."

The RQ-7A TUAV has a wingspan of 13 feet and can carry a payload of approximately 60 lbs. It has a gross takeoff weight of just over 300 lbs. Endurance is more than four hours on-station at a distance of 50 km. The system is compatible with the All Source Analysis System (ASAS), Advanced Field Artillery Tactical Data System (AFATDS), Joint Surveillance Target Attack Radar System (JSTARS) Common Ground Station, Joint Technical Architecture - Army, and the Defense Information Infrastructure Common Operating Environment. The system GCS is also the only joint certified GCS in DoD. The RQ-7A TUAV system can be transported by three C-130 transports.

The system also has an "early entry" configuration of 15 soldiers, one GCS, the air vehicle transport HMMWV and the launcher trailer, which can be transported in one C-130. All components can be slung under a CH-47 or CH-53 helicopter for transport. The personnel needed to support the platoon operational tempo consists of 12 air vehicle operators (96U), one platoon sergeant (96U), one platoon leader (35D), and one UAV warrant officer (350U). The maintenance section is comprised of four EW system repairs (33W) and three engine mechanics (52D).

## Foreign Counterpart

Several US allies are operating systems of a similar class: United Kingdom (Phoenix), Israel (Searcher and Searcher II), France (Fox AT), and Sweden (Ugglan). Denmark, Belgium, and the United Kingdom are developing requirements or acquiring systems in the TUAV class.

## Foreign Military Sales

None

## Program Status

- **6 May 2002** Initial operational test and evaluation successfully conducted and concluded at Ft Hood, TX.
- **30 September 2002** Initial operational capability was achieved. RQ-7A TUAV systems are currently fielded and operational at the 1st and 2d Stryker Brigades at Ft Lewis, WA, the 4th Infantry Division at Ft Hood, TX, and the UAV Training Base at Ft Huachuca, AZ.
- **25 September 2002** the Army Acquisition Executive authorized the RQ-7A TUAV program to enter into full rate production and award a contract in FY03, with options for FY04 through FY07, to procure the remaining 28 RQ-7A TUAV systems.
- **27 December 2002** the Full Rate Production contract to procure nine systems in FY03, with options for FY04 to FY07, was awarded to AAI Corporation, the prime contractor for the TUAV.
- **FY00-03** Three low rate initial production contracts awarded for a total of 13 systems.

## Projected Activities

- Continued system fielding.
- Continued soldier training.

## Contractors

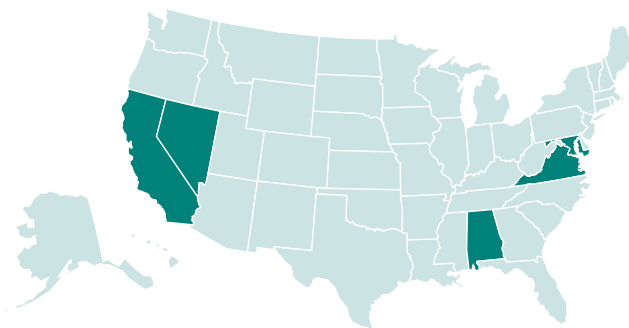
**Air Vehicle/Ground Data Terminal:** AAI Corporation (Hunt Valley, MD)

**GCS/PGGS:** CMI (Huntsville, AL)

**Autoland System:** Sierra Nevada Corp (Sparks, NV)

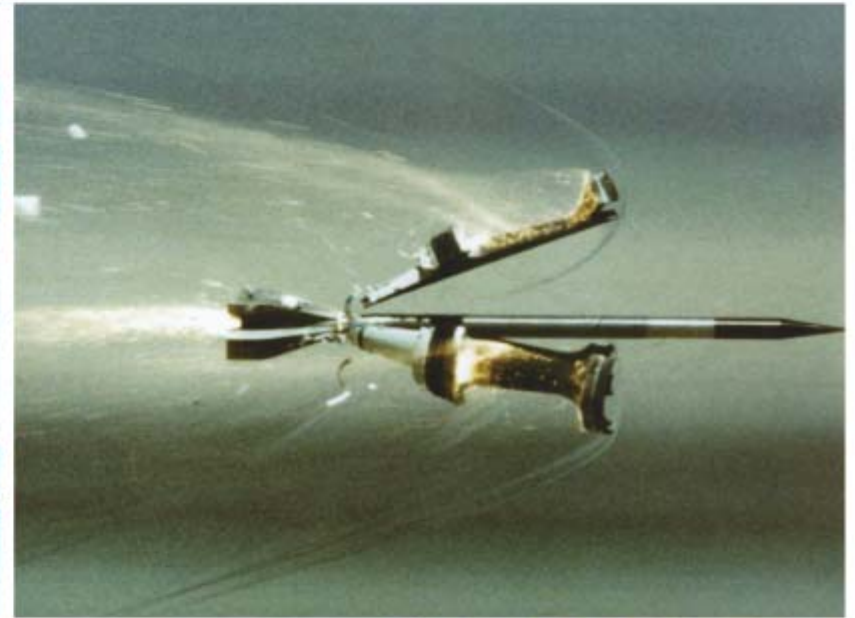
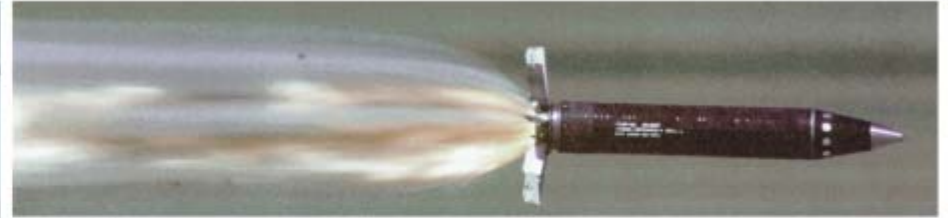
**GDT Pedestal:** Tecom (Chatsworth, CA)

**Training and Tech Manuals:** DPA (Arlington, VA)





## Tank Main Armament System (TMAS)





## Mission

Provide the Army with world-class, direct-fire, tank ammunition for use in ground combat weapons platforms (120mm M1A1/M1A2 Abrams Main Battle Tanks, and the 105mm Mobile Gun System [MGS]).

## Description and Specifications

The 120mm family of tank ammunition is the most advanced and lethal of its kind in the world, and consists of two primary types of ammunition: kinetic energy (KE) ammunition and multipurpose ammunition.

Kinetic energy ammunition lethality is optimized by firing a maximum-weight projectile at the greatest velocity possible. The 120mm-series of KE ammunition (M829A1/A2/E3) uses depleted uranium penetrators of increased mass and length, lighter sabots, and more energetic propellants.

Multipurpose ammunition uses a high explosive (HE), shaped-charge warhead to provide blast, armor penetration, and fragmentation effects. The M830A1 multi-purpose, anti-tank (MPAT) cartridge's sub-caliber, discarding-sabot projectile gives it a higher velocity, decreased drag, and increased accuracy over the M830 cartridge. Its fuze includes a selectable proximity sensor to provide an anti-helicopter capability. The XM908 high explosive, obstacle-reduction cartridge reduces large concrete obstacles, buildings, bunkers, and light armor. It is identical to the M830A1 except that the fuze and proximity sensor are replaced with a steel nose. Fielding for the XM908 has been limited to US forces in Korea.

The XM1028 canister cartridge will provide the Abrams with the capability to effectively provide rapid, lethal fire against massed assaulting infantry armed with handheld anti-tank and automatic weapons at close range. The cartridge will have no fuze and is intended to be similar in concept to a shotgun shell.

For the Future Combat System (FCS) platform, smart, precision munitions will enable precision strikes against high-value targets at extended ranges. The medium range munition (MRM), whether 120mm or 105mm, will enable the FCS to expand its engagement zone beyond eight kilometers with an autonomous and/or designated munition.

The centerpiece of 105mm MGS ammunition are new HE and canister cartridges. HE ammunition (M393A3) will destroy hardened enemy bunkers, machine gun, and sniper positions, and create openings in walls through which infantry can pass. Canister (XM1040) ammunition will provide rapid, lethal fire against massed assaulting infantry armed with handheld anti-tank and automatic weapons at close range. The Army has serviceable stocks of 105mm KE, M900 cartridges that will provide the MGS with the capability to destroy a variety of light-skinned and armored vehicles (through the T-62 tank) in a self-defense role; a high explosive, anti-tank (HEAT), M456 cartridge provide a capability against a multitude of thin-skinned targets, infantry fighting vehicles, and light tanks.

## Foreign Counterpart

NATO tanks employ KE, MPAT, and HEAT ammunition, but only France and the United Kingdom use depleted uranium KE penetrators. NATO countries use tank ammunition with composite sabots or proximity switches.

## Foreign Military Sales

**M829:** Kuwait, Saudi Arabia; **M830:** Kuwait, Egypt; **KE-W/A1** and **KE-W/A2:** Egypt.

## Program Status

- **M829A2, M830A1 and M908:** Fielded. M829E3: Transitions to full-rate production in FY03. XM1002 MPAT Trainer and the XM1028 and XM1040 canister cartridges are in development.

## Projected Activities

### XM908:

- **FY03** Complete type classification (Standard).

### M829E3:

- **FY03** Transition to full-rate production.

### MRM:

- **4QFY03** TRL6; conduct guide-to-hit demonstration in FY03 followed by SDD.

### XM1028:

- **FY03** Continue development; transition to production in FY04.

### XM1040:

- **FY03** Begin development.

### XM1002:

- **FY03** Complete SDD.

### M939A3:

- **FY03** Low-rate production following testing of competitor's bid samples.

## Contractors

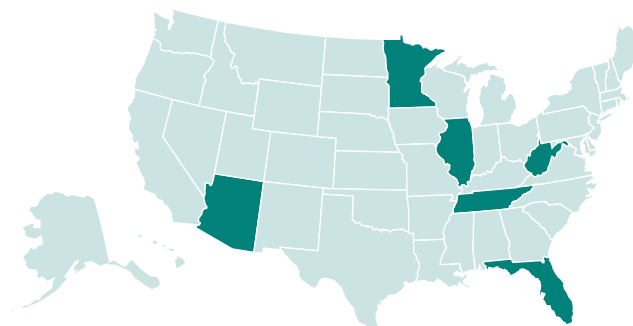
**XM1002:** Alliant Techsystems (New Brighton, MN)

**XM908 and XM1028:** General Dynamics-Ordnance and Tactical Systems (St. Petersburg, FL; East Alton, IL)

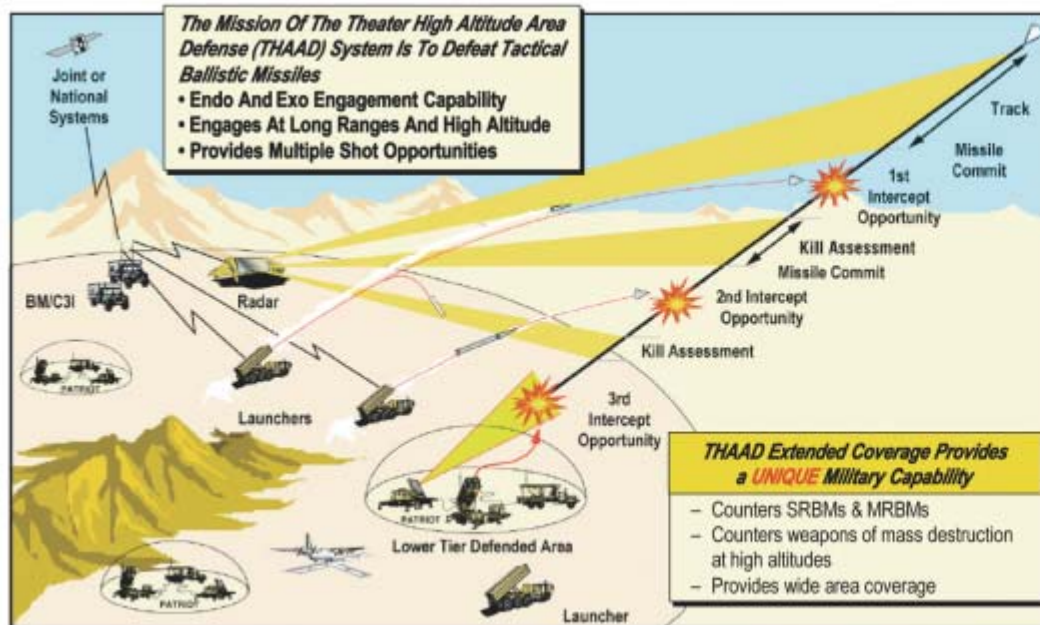
**M829A3:** Alliant Techsystems (Hopkins, MN); Plymouth (Rocket City, WV); AOT (Johnson City, TN)

**MRM-KE:** Alliant Techsystems (Clearwater, FL)

**MRM-CE:** Raytheon (Tucson, AZ)



# Theater High Altitude Area Defense (THAAD) System



## Mission

Provide regional defense of ballistic missile (BM) 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 the ground-based terminal element of the Ballistic Missile Defense System (BMDS) designed to intercept short-, medium-, and intermediate-range missile threats that will employ increasingly sophisticated warhead technologies. Designed to intercept the most prolific ballistic missile threats in the mid-course and terminal phase of their flights, the THAAD system will augment existing and other planned missile defense 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, command and control/battle management (C2/BM) 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 is based on a modified Heavy Expandable Mobility Tactical Truck (HEMTT) M-1120 Load Handling System (LHS), and has a capacity of eight THAAD missile rounds on a Missile Round Pallet (MRP). Additionally, this launcher can quickly be reconfigured to operate with the PATRIOT system. The High Mobility Multipurpose Wheeled Vehicle (HMMWV)-based C2/BM centers will coordinate with the theater air defense command and control system and will control both the engagement and force operations for THAAD.

The C2/BM will provide automated acquisition and identification of BM 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 range, tracks it, and provides in-flight updates to the THAAD interceptor prior to intercept. The radar also performs hit assessment to support the decision to commit additional interceptors or to cue lower tier systems. 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 on C141/C5/C17 military aircraft, and, in theater, highly mobile on Army standard movers on highways and unimproved roads, to enable rapid deployment to any theater on short notice.

## Foreign Counterpart

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

## Foreign Military Sales

None

## Program Status

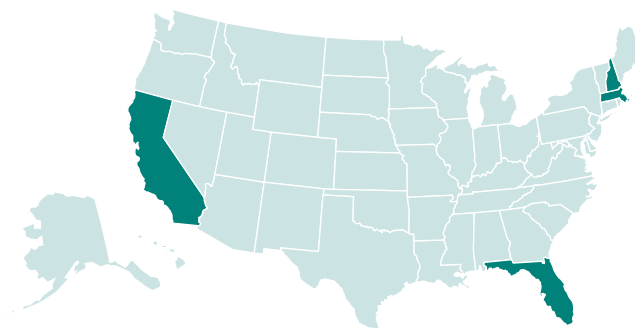
- Eleven flight tests were flown during program definition and risk reduction with the last two tests being successful intercepts.
- **June 23, 2000** Received program Milestone II approval.
- **September 27, 2001** The US Government & Industry Team developing the THAAD system achieved a major milestone by successfully completing the critical design review (CDR) for the radar segment.
- **June 21, 2002** THAAD Government & Industry Team successfully completed the system preliminary design review (PDR).

## Projected Activities

- The program will continue to develop and conduct extensive ground tests and risk mitigation efforts to maintain a low risk program.
- **1QFY04** System CDR.
- **3QFY04** First developmental test flight.

## Contractors

Lockheed Martin Space Systems (Sunnyvale, CA); Raytheon (Bedford, MA); Boeing (Canoga Park, CA); BAE (Nashua, NH); Honeywell (Clearwater, FL)





## Theater Support Vessel (TSV)





## Mission

Provide high speed intra-theater transport of troops and cargo.

## Description and Specifications

The Theater Support Vessel (TSV) represents the next-generation Army watercraft to support the Army's doctrinal intra-theater lift mission. Utilizing commercial, off-the-shelf technology, it will self-deploy to the theater of operations at speeds greater than 40 knots through sea state 5+ (winds of 21 knots or greater), while capable of transporting more than 350 soldiers plus gear and up to 1,250 short tons of cargo. Capable of operational maneuver from standoff distances and into five times as many ports, the TSV will provide rapid, intra-theater lift for ready-to-fight combat forces together with their equipment. As a result, the TSV will minimize the need for large-scale reception, staging, onward movement, and integration of soldiers, vehicles and equipment within the battle space. It offers the joint force commander a multi-modal and multi-purpose platform to support joint operations that complements C-17 and C-130 airlift capabilities. The vessel will have the following additional features:

- En route mission planning
- Joint interoperable C4ISR
- Movement tracking system
- Electronic navigation
- Integrated materiel handling.

## Foreign Counterpart

Royal Australian Navy - HMAS Jervis Bay

## Foreign Military Sales

None

## Program Status

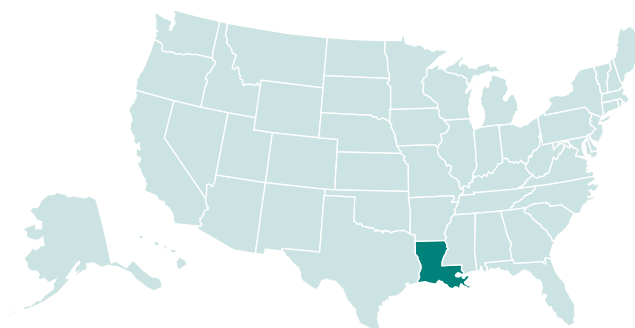
- **4QFY01** Contract award for Army/Navy joint lease of High Speed Vessel (HSV-X1), Joint Venture.
- **4QFY02** Contract award for Army lease of Theater Support Vessel (TSV-1X), US Army Spearhead.
- The total Army requirement is currently 24 vessels.

## Projected Activities

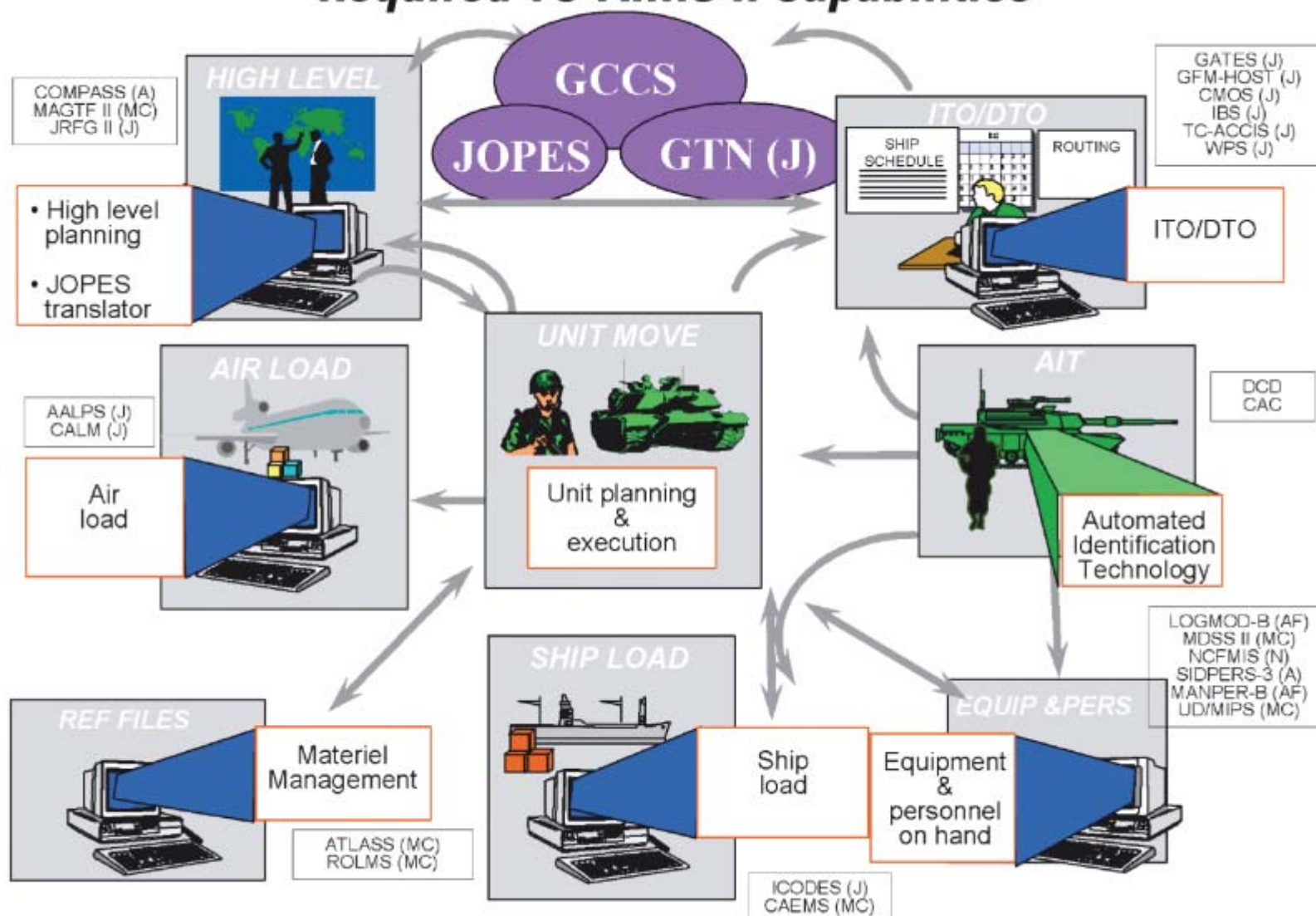
- **4QFY02** Complete testing of TSV-1X.

## Contractors

Bolinger/Incat USA (Lockport, LA)



## Required TC-AIMS II Capabilities



## Mission

Facilitate movement management of personnel, equipment, and supplies from home station to the conflict and back; provides source ITV data.

## Description and Specifications

Transportation Coordinators' Automated Information for Movements System II (TC-AIMS II) is a joint service migration system. Characteristics include:

- Source feeder systems to joint force requirements generation (JFRG) II, joint planning and execution system (JOPES), global transportation network (GTN), and services' command and control systems
- Joint transportation system supporting chairman's 72-hour time-phased force and deployment data (TPFDD) initiative
- Common user interface facilitates user training and operations
- COTS hardware architecture
- Incremental, block upgrade developmental strategy
- Distributive computing application.

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

- **November 4, 2002** OSD (C3I) Milestone (MS) III fielding decision rendered for Block 1.

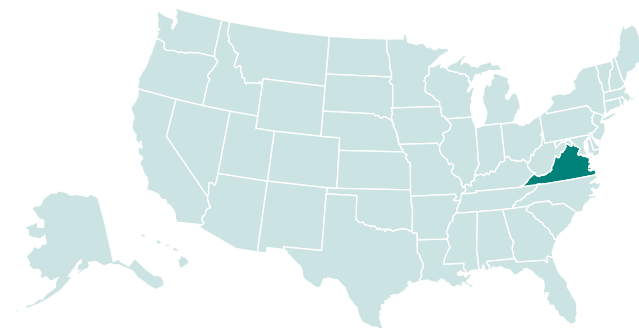
## Projected Activities

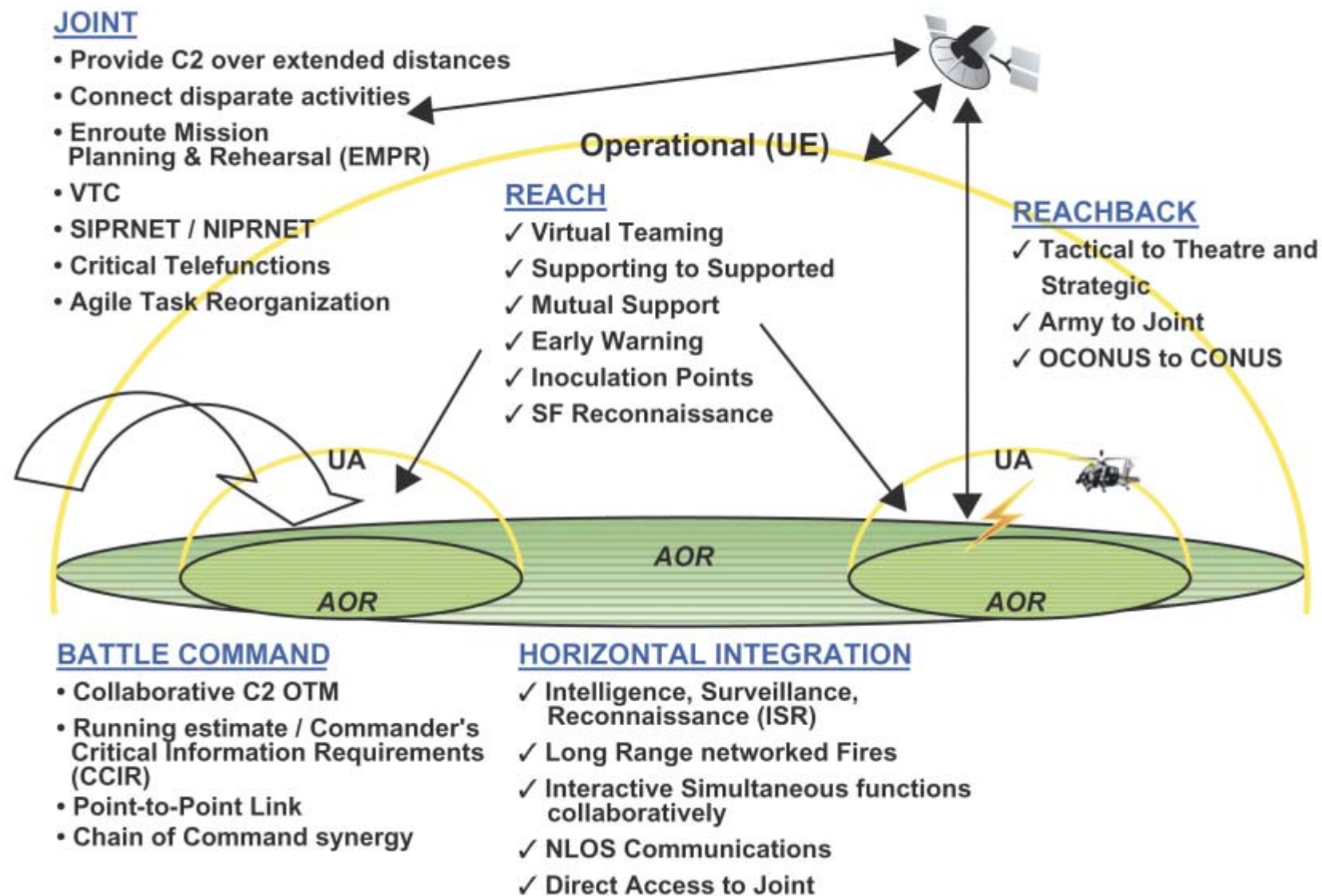
- Field Block 1, unit move capability, to Army and Navy (excluding USMC).
- **4QFY03** Complete development and testing of Block 2 in preparation for MS III fielding decision. Block 2 will provide a Web-based capability to all users.

## Contractors

**System Development/Maintenance:** DynCorp (Chantilly, VA)

**Training:** SRA (Fairfax, VA)







## Mission

Provide integrating, high speed, and high capacity backbone communications network for the Objective Force, optimized for offensive and joint operations so that the theater combatant commander will have the capability to perform multiple missions simultaneously with campaign quality.

## Description and Specifications

Warfighter Information Network (WIN)-Tactical is the Army's tactical deployed communications network for the Objective Force (OF) and, when required, the Joint Force Commander, and used throughout the OF's unit of employment (UE) infosphere. WIN-Tactical will support command centers and mobile elements of the UE infosphere and will leverage the Joint Tactical Radio System (JTRS) or provide physical connectivity with the unit of action units. WIN-Tactical will be modular in design, scalable to users' requirements, and capable of adapting (task reorganization) to the evolution of the war fight. WIN-Tactical will make the most effective use of bandwidth and adventitious use of spectrum. WIN-Tactical will be a Joint Tactical Architecture-Army (JTA-A)-compliant, commercial-standards-based network capability that is easy to upgrade, operate, maintain, manage, and train. WIN-Tactical's overall design and acquisition strategy will enable the insertion of new technologies as they become available. The objective is to routinely place state-of-the-art technologies and their enabling capabilities into the hands of the warfighter. WIN-Tactical comprises network infrastructure (e.g., integrated and/or embedded switching, routing, and transmission systems), network operations (e.g., naming, addressing, and user profiles) and user interfaces that provide voice, video, and data services throughout the battlespace. WIN-Tactical will provide the baseline communications transport and networking requirements in support of the Future Combat Systems (FCS) mission.

## Foreign Counterpart

No known foreign counterpart

## Foreign Military Sales

None

## Program Status

- **4QFY02** Pre-Milestone B contract award - two prime contractors.
- **1QFY03** Army Requirements Oversight Council (AROC) validates WIN-T operational requirements document.
- **3QFY03** Joint Requirements Oversight Council (JROC) validates WIN-T operational requirements document.

## Projected Activities

- **4QFY03** Milestone B approval.
- **4QFY03** System development and demonstration contract option award.
- **4QFY04** Preliminary design review.
- **2QFY05** Early user test.
- **4QFY05** Milestone C approval.
- **1QFY06** Production contract award.
- **2QFY08** Initial operational test and evaluation.
- **3QFY08** First unit equipped.
- **1QFY09** Full rate production.

## Contractors

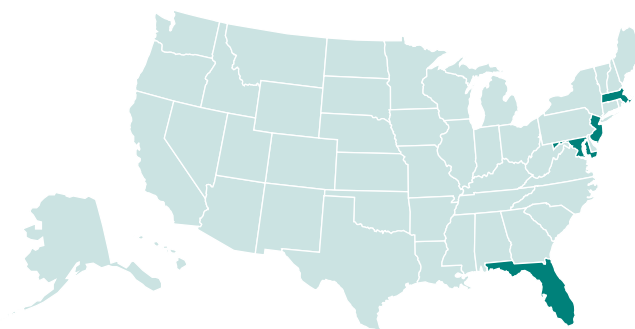
Lockheed Martin (Gaithersburg, MD)

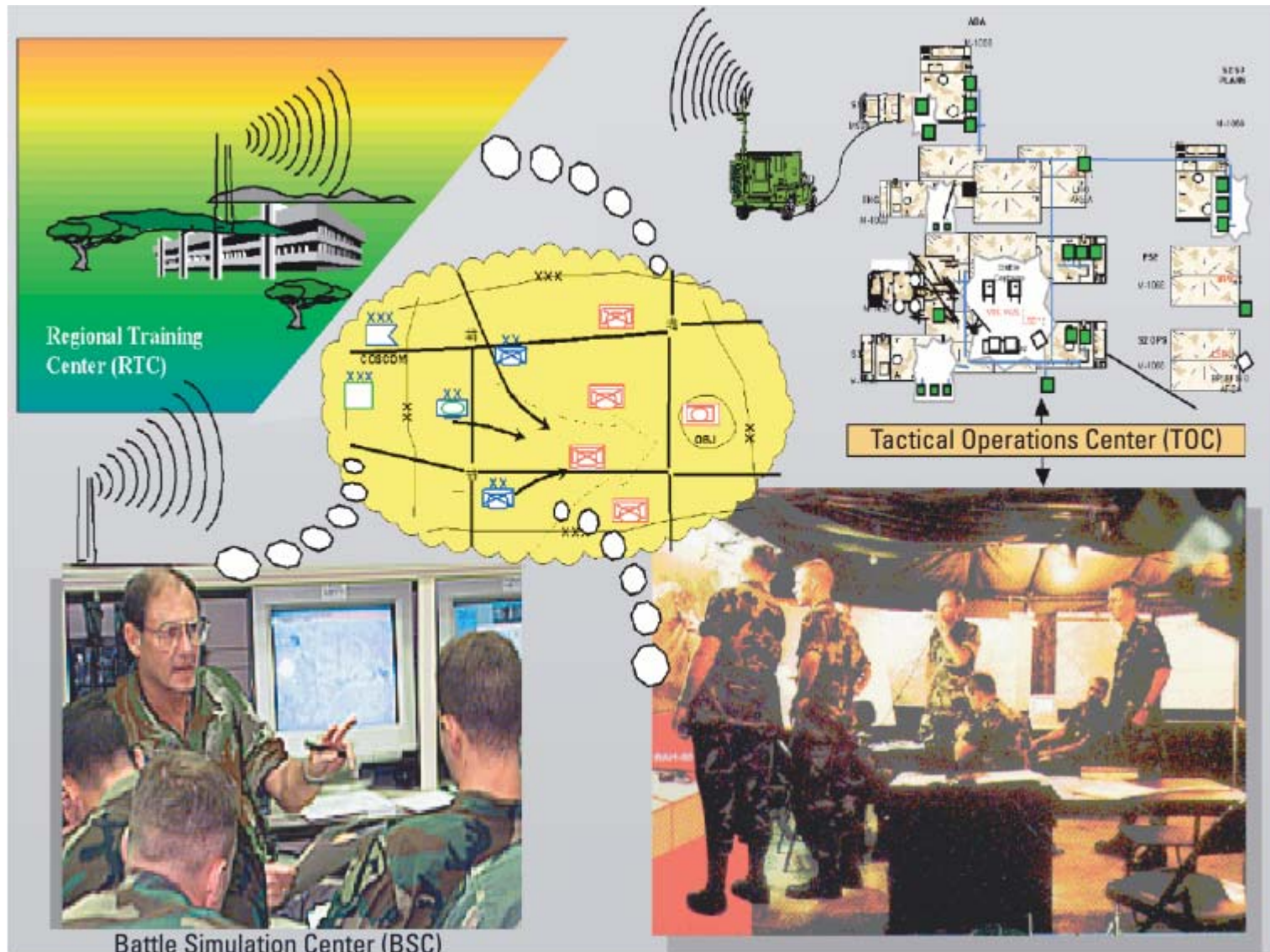
General Dynamics (Taunton, MA)

Harris (Melbourne, FL)

BAE Systems (Wayne, NJ)

BBN Technology (Cambridge, MA)





### Battle Simulation Center (BSC)

## Mission

Train unit commanders and their battle staffs from battalion (through seamless interoperability with OneSAF) through theater level; provide training at educational institutions and support joint training as the land component of the Joint Simulation System (JSIMS).

## Description and Specifications

Warfighters Simulation 2000 (WARSIM) is the next generation computer-based command and control constructive training simulation system for readiness of the 21st century land warfighter. WARSIM is the land component of the JSIMS being developed to train joint task force and service Title 10 requirements for division through echelon above corps. Each service is providing an accredited representation of their service systems/operations to support joint and service training—an enhancement to today's service training capability. WARSIM replaces the corps battle simulation, and tactical intelligence simulation at initial operational capability.

Compared to today's legacy simulations, JSIMS/WARSIM will provide a single simulation system to train the full spectrum of missions—from stability and support operations to mid/high intensity battlefield. WARSIM allows commanders and staffs to train as they will fight—through direct stimulation of their organic C4I equipment in an operational environment. WARSIM fosters leader development by providing sufficient simulation fidelity to permit doctrine, tactics, techniques, and procedures to be utilized in training agile leaders.

WARSIM employs data-driven flexible behaviors allowing dramatically improved representation levels (i.e., rules of engagement, cooperation levels by groups of non-combatants, etc.) and supports the use of multiple databases including National Imagery Mapping Agency products.

## Foreign Counterpart

Several foreign governments are developing command and control simulations. United Kingdom is in the concept formulation of their requirement. Germany has developed GUPPIS. Korea has developed CHANG 21.

## Foreign Military Sales

None

## Program Status

- **FY03** Support JSIMS integration, test, and validation.

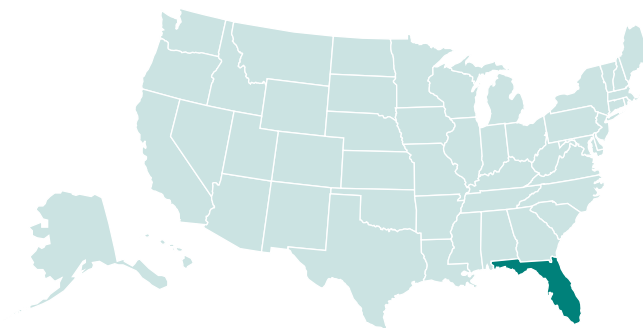
## Projected Activities

- **FY04** Continue development of Army Title 10 capability.

## Contractors

Lockheed Martin Information Systems (Orlando, FL)

Veridian (Orlando, FL)



# Recapitalization





The key enabler of Army Transformation is recapitalization, an effort complementary and essential to Transformation of the Army into the Objective Force. Recapitalization permits the Army to “skip a generation” of system procurement, assists in stabilizing operations and support costs, improves readiness and safety, revitalizes the existing force for a fraction of the fleet replacement cost, and ensures we maintain combat overmatch.

Seventy-five percent of the Legacy Force has exceeded its expected half-life and is increasingly expensive to maintain. Many subsystems and components are becoming obsolete. Without recapitalization, increasing operational and support costs will divert increasing funds from modernization efforts associated with Transformation.

Recapitalization rebuilds, or restores systems to like-new condition in appearance, performance, and life expectancy. Additionally, it provides the opportunity to insert new and superior technology to improve safety, reliability, and maintainability. Recapitalization is also selected upgrade, or the addition of new systems with new or improved warfighting capabilities to selectively rebuilt systems, such as Longbow to Apache, or second generation forward-looking infrared target-acquisition capability to Abrams, Bradley, and other systems.

As Transformation of the Army proceeds, Recapitalization establishes a “win-win” opportunity for the Army and the Nation. But more importantly, it will provide our Soldiers with safer, more reliable, more capable equipment.

## Abrams Upgrade

M1A1



M1A2



M1A2 System Enhancement Program (SEP)

## Mission

Provide mobile protected firepower for battlefield superiority.

## Description and Specifications

The Abrams tank modernization strategy supports the Army Vision and Transformation by providing the Abrams tank the lethality, survivability, and fightability necessary to defeat advanced threats well into the future. The Abrams tank closes with and destroys enemy forces on the integrated battlefield using mobility, firepower, and shock effect. The 120mm main gun on the M1A1 and M1A2, combined with the powerful 1500 hp turbine engine and special armor, make the Abrams tank particularly suitable for attacking or defending against large concentrations of heavy armor forces on a highly lethal battlefield.

Features of the M1A1 modernization program include increased armor protection; suspension improvements; and a nuclear, biological, and chemical (NBC) protection system that increases survivability in a contaminated environment. A modification consisting of an integrated applique computer and a far-target-designation capability can be incorporated on the tank.

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

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

## Foreign Counterpart

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

## Foreign Military Sales

Egypt: 755 M1A1 Kits; Kuwait: 218 M1A2s; Saudi Arabia: 315 M1A2s.

## Program Status

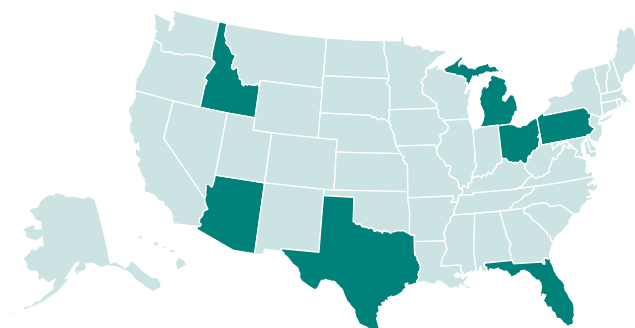
- Continue M1A2 SEP Upgrade (M1 to M1A2SEP) production through **FY04** and complete retrofit of the M1A2 to M1A2SEP for a total of 588 M1A2SEP tanks. The 4th Infantry Division and the 1st Cavalry Division will be equipped with M1A2SEP tanks.
- **FY99-07** AIM program recapitalizes the hi-optempo M1A1 tank fleet. Approximately 135 M1A1 AIM vehicles will be modified to the M1A1D configuration with the addition of a second generation forward looking infrared and eventual fielding to the 3rd Armored Cavalry Division.

## Projected Activities

- **FY03** M1A2 SEP production continues. The Army's M1A2 SEP fleet requirement is 588 vehicles.
- **FY03** Continuation of fielding of M1A2 SEPs to 1st Cavalry Division, Ft Hood, TX.

## Contractors

General Dynamics (Sterling Heights, MI; Warren, MI; Muskegon, MI; Scranton, PA; Lima, OH; Tallahassee, FL); Honeywell (Phoenix, AZ); Bechtel (Idaho Falls, ID); Raytheon (McKinney, TX)





# Apache





## 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

The AH-64 Apache is the Army's heavy division/corps and Objective Force heavy attack helicopter. Current fleet includes the A model and D (Longbow) model. The Longbow remanufacturing effort inducts the A model and incorporates a millimeter wave fire control radar (FCR), radio frequency interferometer (RFI), fire-and-forget radar-guided Hellfire missile, and numerous cockpit management and digitization enhancements. Both models are programmed for recapitalization to address Task Force Hawk lessons learned, such as upgrading to second generation forward looking infrared (FLIR) technology with the Modernized Target Acquisition Designation Sight/Pilot Night Vision Sensor (MTADS/PNVS), non-line-of-sight communications, video transmission/reception, etc., and to reduce maintenance cost drivers. Apache is a highly mobile and lethal aerial weapons platform able to destroy armor, personnel, and materiel targets day or night and under obscured battlefield and/or adverse, weather conditions. Apache is fielded to active, National Guard and Army reserve attack battalions and cavalry units in accordance with the 2002 Army Modernization Plan.

Apache Longbow adds significant warfighting capability to the combined arms team on the digitized battlefield through increased survivability, lethality, versatility, and long-term reliability improvements.

Two hundred and three A models will be retained and fielded to NG units.

**Combat mission speed:** 167 mph

**Combat range:** 300 miles

**Combat endurance:** 2.5 hours

**Maximum gross weight:** 20.260 lbs

**Armament:** Hellfire missiles, 2.75" rockets and 30mm chain gun

**Crew:** 2 (pilot and co-pilot gunner)

### Foreign Counterpart

The Tiger Eurocopter is produced by a Franco-German consortium under the European Aerospace and Defense Systems (EADS).

## Foreign Military Sales

Egypt, Greece, Israel, Kuwait, Netherlands, Saudi Arabia, Singapore, United Arab Emirates.

Direct commercial sales: Japan and the United Kingdom.

## Program Status

- **FY02** Fielded two attack battalions bringing the total to seven.
- **2QFY02** Completed first multi-year contract with delivery of 232nd airframe. Second multi-year contract delivered first of 269 aircraft.

## Projected Activities

- **FY03** Field two additional attack battalions; complete delivery of 227 FCR/RFIs.
- **FY03-07** Continue converting the Army's requirement of 501 A models to Apache Longbow (program consists of two multi-year contracts: first delivered 232 Longbows, the second delivers an additional 269).
- **FY05** Fielding of the MTADS/PNVS to the Apache fleet (704 Apaches) begins.

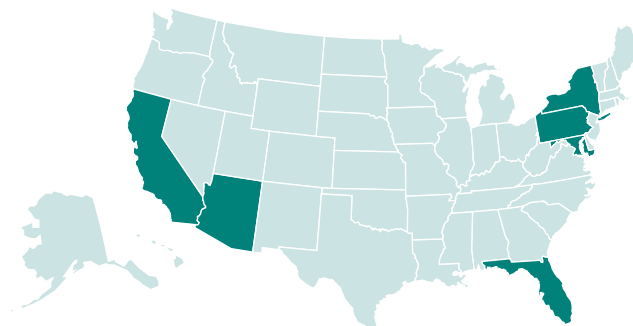
## Contractors

**Airframe/fuselage:** Boeing (Mesa, AZ; Philadelphia, PA)

**Fire Control Radar:** Northrop Grumman (Linthicum, MD); Lockheed Martin (Owego, NY; Orlando, FL)

**MTADS/PNVS:** Lockheed Martin (Orlando, FL); Boeing (Mesa, AZ)

### Rotor Blades: Composite Structures (Monrovia, CA)



## Black Hawk



## Mission

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

## Description and Specifications

The Black Hawk (UH-60) is a utility tactical transport helicopter that replaces the UH-1 "Huey." The versatile Black Hawk has enhanced the overall mobility of the Army, due to dramatic improvements in troop capacity and cargo lift capability, and will serve as the Army's utility helicopter in the Objective Force. On the asymmetric battlefield, it provides the commander the agility to get to the fight quicker and to mass effects throughout the battlespace across the full spectrum of conflict. An entire 11-person, fully equipped infantry squad can be lifted in a single Black Hawk, transported faster than in predecessor systems and in most weather conditions. The Black Hawk can reposition a 105mm howitzer, its crew of six, and up to 30 rounds of ammunition in a single lift. The aircraft's critical components and systems are armored or redundant, and its airframe is designed to progressively crush on impact to protect the crew and passengers.

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

## Foreign Counterpart

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

## Foreign Military Sales

Bahrain, Colombia, Egypt, Israel, Saudi Arabia.

Commercial Sales: Argentina, Australia, Bahrain, Brazil, Brunei, China, Greece, Hong Kong, Japan, Jordan, Malaysia, Mexico, Morocco, Philippines, Spain, Taiwan, Thailand, Turkey.

Co-production: Republic of Korea.

## Program Status

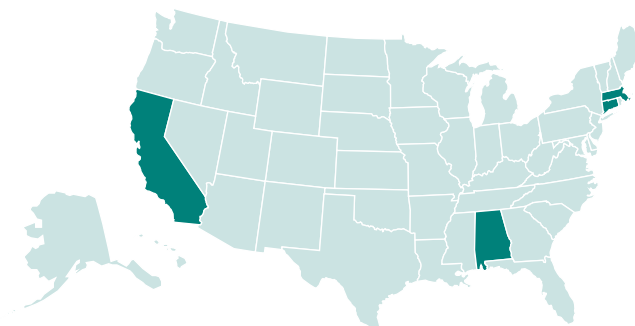
- Initiated risk reduction activities under research, development, test, and evaluation program to integrate and qualify the UH-60M. Signed cost plus award fee contract with Sikorsky Aircraft for the UH-60M program. Initiated UH-60M program to recapitalize and upgrade fielded UH-60A and UH-60L Black Hawk to the UH-60M configurations. The UH-60M will include a digitized cockpit to provide situational awareness, standardized configuration, upgraded engine (701) and power train, and a zero-time, zero-mile service life extension.
- FY97-01** Executed last year of multi-year V contract, UH-60L deliveries ran through June 2002.
- FY02-06** Awarded new five-year multi-year contract to produce UH-60L model aircraft. Initiated program to upgrade all flight simulators to latest UH-60L configuration. Conducted UH-60M airframe critical design review.
- Inducted first UH-60A model aircraft for A model recap/rebuild program, which will restore A model systems to like-new condition in appearance, performance, and life expectancy.

## Projected Activities

- FY03** Conduct first flight and developmental test on UH-60M test articles.
- FY04** Begin UH-60M low rate initial production Lot #1 for 10 aircraft. UH-60M milestone decision.

## Contractors

United Technologies (Stratford, CT); General Electric (Lynn, MA); GNK Westland (Tallahassee, AL); Parker Hannifin (Irvine, CA)





## Bradley Upgrade





## Mission

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

## Description and Specifications

The Bradley M2A3 Infantry/M3A3 Cavalry Fighting Vehicle (IFV/CFV) is configured as follows:

**Length:** 21.5 ft

**Width:** 11.83 ft with armor tiles; 10.75 ft without armor tiles

**Height:** 11.8 ft

**Weight:** 67,000 lbs combat loaded

**Power train:** 600 hp Cummins VTA-903T diesel engine with GM-Allison HMPT-500-3EC hydro-mechanical automatic transmission

**Cruising range:** 250 mi

**Road speed:** 38 mph

**Crew:** M2A3: 10 (3 crew; 7 dismounts); M3A3: 5 (3 crew; 2 dismounts)

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

**Vehicle features:** Two second generation forward looking infrared (FLIR) sensors in the Improved Bradley Acquisition System (IBAS) and Commander's Independent Sight (CIV) provide "hunter-killer target handoff" capability with ballistic fire control system; embedded diagnostics; integrated combat command and control (IC3) digital communications suite hosting Force XXI Battle Command Brigade-and-Below (FBCB2) package with digital maps, messages and friend/foe situational awareness; position navigation system with GPS and inertial navigation system; and enhanced squad situational awareness with squad leader display integrated into vehicle digital images and IC3.

**Current models/variants:** Bradley M2/M3 A0, A2, A2 ODS (Operation Desert Storm), A3 IFV/CFVs, Bradley Fire Support Team (BFIST) Vehicle, Bradley Linebacker, and MANPADS Under Armor (MUA).

## Foreign Counterpart

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

## Foreign Military Sales

Bradley M2A2s: Saudi Arabia.

## Program Status

- **FY99** the Bradley Program Office completed upgrading all Bradley A1s to the A2 configuration.

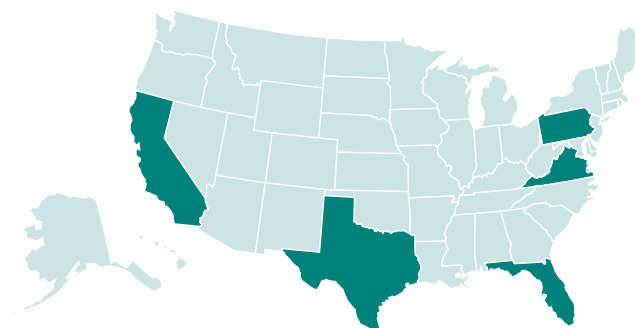
- **FY01** Bradley A3 was approved for full-rate production; first year of a three-year multi-year contract was awarded.
- **Current** Bradley A2 to A2 ODS modification for the Active Army continues, as well as the conversion of Bradley A0 to A2 ODS for the Army National Guard (ARNG) and the A2 to A3 remanufacture effort; Bradley A3 in full-rate production.
- **1QFY03** Bradley A3 fielded to the 1st Cavalry Division.
- Fieldings to the 1st Cavalry Division and the 4th Infantry Division. The 3rd Armored Cavalry Regiment will be issued M3A2ODS with second generation FLIR and FBCB2.

## Projected Activities

- **FY03** Continue modification of Bradley A2s to A2 ODS and fielding; continue ARNG A0 conversion to A2 ODS.
- **FY03** Award of the last year of the A3 multi-year contract (March 2003).
- **FY03** Continue A3 fielding to 1st Cavalry Division.
- Quantity of A3s reduced from 1,037 to 595 during the **FY04-09** POM.

## Contractors

United Defense, L.P. (San Jose, CA; Fayette, PA; York, PA; Arlington, VA); Raytheon (McKinney, TX); DRS Technologies (Palm Bay, FL); EFW (Ft Worth, TX)





## Mission

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

## Description and Specifications

As the Army's only Objective Force heavy-lift cargo helicopter capable of intra-theater cargo movement of payloads up to 16,000 lbs in a high hot environment, the CH-47 Chinook/Improved Cargo Helicopter (CH-47F) is an essential component of the Army Vision. The CH-47F program will remanufacture 301 of the current fleet of 429 CH-47Ds, install a new digital cockpit, and make modifications to the airframe to reduce vibration. Additionally, the program will remanufacture the Army's MH-47D/E fleet to the MH-47G configuration.

The CH-47F upgraded cockpit will provide future growth potential and will include a digital data bus that permits installation of enhanced communications and navigation equipment for improved situational awareness, mission performance, and survivability. Airframe structural modifications will reduce harmful vibrations, reducing operation and support (O&S) costs and improving crew endurance. Other airframe modifications reduce by ~60 percent the time required for aircraft tear down and build-up after deployment on a C-5 or C-17. These modifications significantly enhance the Chinook's strategic deployment capability.

Installation of the more powerful and reliable T55-GA-714A engines improve fuel efficiency and enhance lift performance by approximately 3,900 lbs. An improved, crash-worthy extended range fuel system (ERFS II) will enable Chinook self-deployment and extend operational radius. A program is also underway to reduce O&S costs through the joint development with the United Kingdom of a low-maintenance rotor hub.

**Max gross weight:** 50,000 lbs

**Max cruise speed:** 170 knots/184 miles per hour

**Troop capacity:** 36 (33 troops plus 3 crewmembers)

**Litter capacity:** 24

**Sling-load capacity:** 26,000 lb center hook; 17,000 lb forward/aft hook; 25,000 lb tandem

**Minimum crew:** 3 (pilot, co-pilot, and flight engineer)

## Foreign Counterpart

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

## Foreign Military Sales

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

## Program Status

- **3QFY98** Awarded the engineering and manufacturing development (EMD) contract. Completed in FY03. Two CH-47F prototype aircraft delivered to the Army.

- **1QFY03** Awarded low rate initial production (LRIP) for 7 aircraft.

### T55-GA-714A Engine:

- **1QFY98** Commenced low-rate initial production.
- **1QFY00** First unit equipped.
- **2QFY00** Currently fielding for the CH-47D/MH-47D/MH-47E.

### Extended Range Fuel System (ERFS):

- **2QFY00** ERFS received a full materiel release.
- **3QFY01** First flight (EMD).

## Projected Activities

- **4QFY04** First LRIP CH-47F delivery.
- **3QFY07** First unit equipped.

### T55-GA-714A Engine:

- **2QFY08** Scheduled completion.

## Contractors

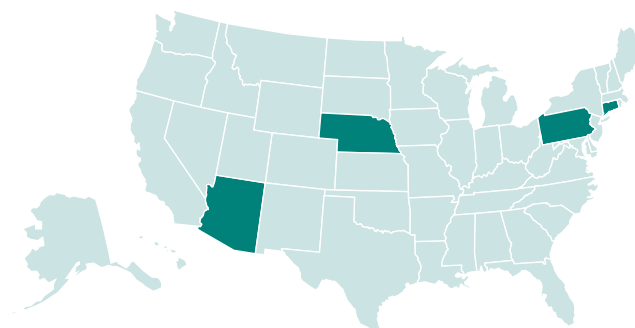
**Aircraft:** Boeing (Philadelphia, PA)

**Cockpit Upgrade:** Rockwell Collins (Cedar Rapids, IA)

**Engine Upgrade:** Honeywell (Phoenix, AZ)

**ERFS II:** Robertson Aviation (Tempe, AZ)

**Engine Controls:** PECS (Hartford, CT)









## Mission

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

## Description and Specifications

The Heavy Expanded Mobility Tactical Truck (HEMTT) is a 10-ton, 8-wheel drive truck developed for cross-country military missions up to 11 tons. The HEMTT transports ammunition, petroleum, oils, and lubricants, and is used as a prime mover for certain missile systems such as the PATRIOT. The M984A1 wrecker is a recovery vehicle for other vehicle systems. The M978 Tanker is a 2,500 gallon fuel transporter. The M977/M985 HEMTT cargo is the ammunition transport prime mover for the MLRS. The M1120 Load Handling System (LHS) transports palletized material and 8 x 8 x 20 ft ISO-containers. The LHS is the newest variant equipped with an integral load-handling system providing self-load/unload capability. The LHS provides the soldier with an efficient and economic system with capabilities similar to that of the Palletized Load System (PLS) and is a major enabler in the Army's drive to achieve a distribution-based logistics system.

The HEMTT extended service program (ESP) recapitalizes (RECAP) old/high mileage trucks. The trucks are disassembled down to the frame and rebuilt with improvements. The completed ESP truck is configured the same as a new production unit, complete with new vehicle warranty.

**Truck payload:** 11.0 tons

**Trailer payload:** 11.0 tons

**Flatrack dimensions:** 8 x 20 ft

**Engine type:** Diesel

**Transmission:** Automatic

**Number of driven wheels:** 8

**Range:** 300 mi

**Air transportability:** C-130, C-17, C-5

## Foreign Counterpart

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

## Foreign Military Sales

Most significant recent sales have been to Korea.

## Program Status

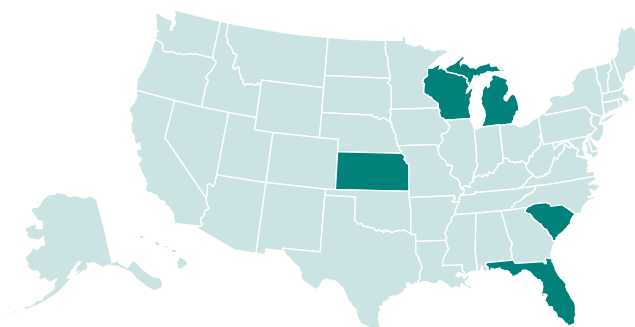
- **October 31, 2002** Material release/type classification for HEMTT new production (A2) interim and ESP/RECAP (A2R1) completed. The A2 and A2R1 models incorporate an electronically controlled engine, new electronically controlled transmission, improved corrosion protection, four-point seat restraints, and IETMs.

## Projected Activities

- **FY03** HEMTT fieldings will target 15th FSB 1st Cav Ft Hood, CBT NDNG, 215th FSB 1st Cav Ft Hood, 172nd SBCT Alaska, PATRIOT, 2-43 ADA Kuwait.
- Prototype development of the LHS-based THAAD missile launcher.

## Contractors

Oshkosh Truck (Oshkosh, WI; Bradenton, FL); Detroit Diesel (Emporia, KS; Redford, MI); Michelin (Greenville, SC)



## 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 common components and kits to enable its reconfiguration as a troop carrier, armament carrier, S250 shelter carrier, ambulance, TOW missile carrier, and a Scout vehicle. The heavy variant, with a payload of 4,400 lbs, is the prime mover for the light howitzer, towed Vulcan system, and heavier shelter carriers. A tri-service program, HMMWV also provides vehicles to satisfy Marine Corps and Air Force requirements. Since its inception, the HMMWV has undergone numerous design and configuration updates, including technological, environmental, operational, and safety improvements. These include higher payload capability, radial tires, 1994 Environmental Protection Agency emissions update, commercial bucket seats, three-point seat belts, four-speed transmissions, and, in some cases, turbocharged engines and air conditioning.

An up-armored HMMWV was developed to provide increased ballistic (up to 7.62mm NATO AP) and blast protection (12-lb mine, front; 4-lb mine, rear), primarily for the Military Police (MP), Special Operations, and contingency force use. The A2 configuration and the expanded capacity vehicle (ECV) were introduced in 1995. 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 payload of the ECV is 5,100 lbs, including crew. The ECV chassis is used for the M1114 up-armored HMMWV and serves as a platform for mission payloads and for systems that exceed 4,400 lbs.

The HMMWV Modernization is a block ECP that will modernize the vehicle. It utilizes the existing A2/ECV series production platform and will become the baseline vehicle configuration with production planned for 4QFY05. The modernized HMMWV will integrate an electronically controlled turbo diesel engine that will meet the 2004 emissions requirements, anti-lock brake and traction control system, as well as other safety enhancements that will be common across the platform. The goal of this program is to increase commonality across variants, reduce the overall operations and support costs, and increase the service life to 21 years.

A hybrid electric HMMWV (HE HMMWV) is under development to provide additional capabilities and reduce the logistics footprint. The HE HMMWV will provide off vehicle power of at least 30 kW, silent mobility, and extended silent watch. The HE HMMWV uses the M1113 ECV chassis but replaces the drive train with a hybrid electric drive train, the current configuration of which is a 2.2 liter, 75kW generator, battery pack, and electric traction motors at each axle. Production is scheduled to begin in 2005.

## Foreign Counterpart

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

## Foreign Military Sales

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

## Program Status

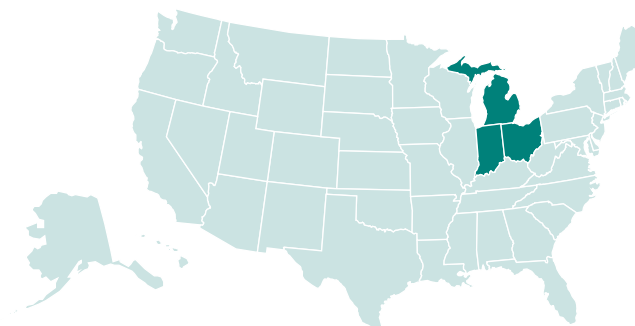
- **October 19, 2001** Focused program jointly approved to recapitalize 4,372 vehicles in select Counter Attack Corps units. Rebuild of engine and drive train and focused component inspection, repair, and replace efforts will result in a like-new vehicle with a 10-year extended service life.
- Continued fielding of A2 HMMWVs and M1114 HMMWVs to Army, USMC, Air Force, and Foreign Military Sales customers.
- Continued development of HMMWV Modernization and HE HMMWV programs.

## Projected Activities

- **1QFY04** Award contract for HMMWV recapitalization.
- **1QFY04** Up-armored HMMWV modernization contract award.
- **4QFY05** Production cut-in for modernization HMMWV.
- **3QFY05** Production contract award for HE HMMWV.

## Contractors

AM General (South Bend, IN); O'Gara-Hess & Eisenhardt (Fairfield, OH); GEP (Franklin, OH); Defiance (Defiance, OH); GM (Warren, MI)





## Multiple Launch Rocket System (MLRS) Upgrade (Launchers)





## Mission

Provide counterbattery fire and suppression of enemy air defenses, light materiel, and personnel targets.

## Description and Specifications

The Multiple Launch Rocket System (MLRS) is an artillery weapon system that supplements cannon artillery fires by delivering large volumes of firepower in a short time against critical, time-sensitive targets. The MLRS is capable of supporting and delivering all freeflight basic and extended range (ER-MLRS) rockets and Army Tactical Missile System (ATACMS) Block I missiles. The basic warhead carries improved conventional submunitions. Munition upgrade programs are underway to extend the range and accuracy of the rockets and to upgrade the launcher to fire precision guided rockets and missiles to include Guided MLRS (GMLRS) and ATACMS/Brilliant Anti-Armor Submunition (BAT) Block II weapons.

The M270A1 upgrade starts with rebuilding the carrier and launcher loader module. The rebuilt M270 is then upgraded by adding the Improved Fire Control System (IFCS) and the Improved Launcher Mechanical System (ILMS) modifications. The IFCS will mitigate electronic obsolescence and will provide growth for future weapon systems. The ILMS will provide rapid response to time-sensitive targets by reducing the aiming time by 70 percent and reducing the reload time by 40 percent. The M270A1 upgrade launcher supports the Army Transformation by providing overmatch capabilities to the Counterattack Corps through 2020.

**Length:** 6832mm - Width: 2972mm - Weight: 24,756 kg

**Range:** 483 km - Average speed: 40 kph - Max speed: 56 kph

## Foreign Counterpart

Iraq: ABABEL 50, 100 (262mm, 400mm); Brazil: AVIBRAS/TECTRAN ASTROS II (127mm, 180mm, 300mm); Yugoslavia: ORKAN M87 (262mm); Israel: LAR-60 (160mm), MAR-350 (300mm) (350mm); Egypt: SAKR-80 (325mm); Russia (Union of Fed States): BM-22 (220mm), 9A52 (300mm); North Korea: M-1985 (240mm), M-1978 (170mm), M-1991 (240mm); China: WM-80 (273mm), WS-1 (320mm); Chile: RAYO (160mm).

## Foreign Military Sales

Bahrain, Denmark, France, Germany, Greece, Israel, Italy, Japan, Korea, The Netherlands, Norway, Turkey, and the United Kingdom (M270 launcher and M26 basic rocket); Norway and Korea (M270A1 upgrade launcher and ER-MLRS rocket).

## Program Status

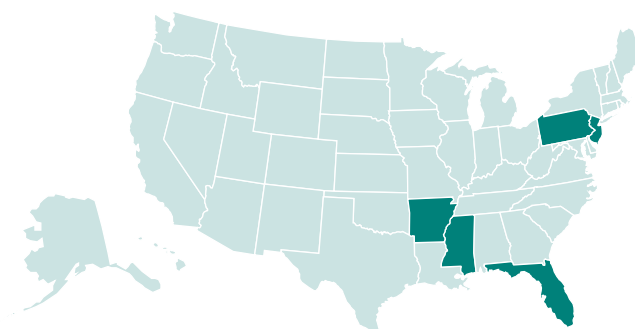
- **FY89** MLRS began co-production by the United States, Germany, France, Italy, and the United Kingdom. A total of 857 launchers have been procured for the United States.
- **3QFY98** Initial procurement of the planned system improvement, M270A1 upgrade.
- **3QFY00** Delivered the first M270A1 low-rate production launcher.
- **1QFY02** Completed the M270A1 initial operational test.
- **2QFY02** Completed first unit equipped with 4th Infantry Division.

## Projected Activities

- **1QFY03** M270A1 Award full-rate production contract.
- **1QFY03** Fielding to III Corps Artillery.
- **3QFY03** Complete fielding to I Corps Artillery.

## Contractors

United Defense (York, PA); Harris (Melbourne, FL); Allied Signal (Teterboro, NJ); Vickers (Jackson, MS); Lockheed Martin (Camden, AR)



# Maintenance



The Army will maintain the systems already in place through repair and/or replacement of end items, parts, assemblies, and subassemblies that wear out or break. This category includes equipment whose useful life is being extended through continued maintenance, though not receiving further upgrades or recapitalization.

# Avenger





## Mission

Provide mobile, short-range air defense protection for the unit of action and maneuver forces against unmanned aerial vehicles, rotary-wing aircraft, high performance fixed wing fighter bombers, and cruise missiles. Avenger is organic to divisions, cavalry regiments, corps, and theater air defense brigades.

## Description and Specifications

The Avenger system is a lightweight and highly mobile and transportable surface-to-air missile/gun weapon system mounted on a High Mobility Multipurpose Wheeled Vehicle (HMMWV). It has a two-man crew and can operate in day or night and in clear or adverse weather conditions. The system incorporates a fully rotatable turret, operator's position with displays, fire control electronics, and standard vehicle-mounted launchers that support and launch multiple Stinger missiles. Avenger can be operated remotely up to 50 meters from the fire unit and can shoot on the move. A notable upgrade is the slew-to-cue (STC) capability, embedded into a new Avenger fire control computer, which 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. Avenger STC provides a significantly enhanced engagement capability while correcting several key system obsolescence issues.

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

**Sensors:** Forward looking infrared sensor/laser range finder/optical sight

**Chassis:** Modified heavy HMMWV

**Fire Control:** Digital fire control computer/gyro-stabilized electronic turret

## Foreign Counterpart

Russia: SA-9.

## Foreign Military Sales

Taiwan, Egypt.

## Program Status

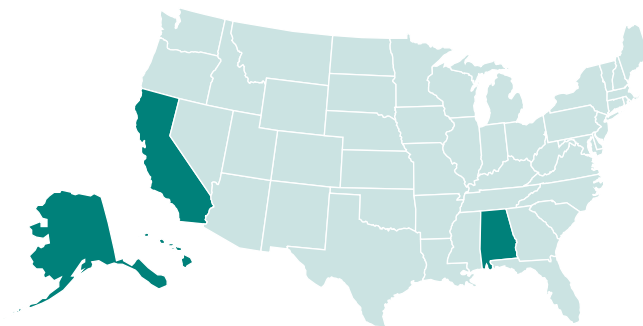
- STC fielding complete.
- Production/modernization program terminated.

## Projected Activities

- Homeland defense.
- Sustainment of Legacy Force through FY18.

## Contractors

Boeing (Huntsville, AL); MLS (Inglewood, CA); AATNA (Anchorage, AK); ASI (Huntsville, AL)



## Fixed Wing



## Mission

Perform operational support missions for the Army, joint services, national agencies, and multinational users in support of intelligence and electronic warfare (IEW), transporting key personnel and providing logistical support.

## Description and Specifications

The Fixed Wing fleet consists of 8 aircraft platforms and nearly 300 aircraft that allow the Army to perform day-to-day operations in a more timely, cost efficient manner without reliance on commercial transportation alternatives. The fleet provides timely movement of key personnel to critical locations throughout the theater of operations, and transports time-sensitive/mission critical supply items and repair parts needed to continue the warfight. Special electronic mission aircraft (SEMA) provide commanders with critical intelligence and targeting information, enhancing their lethality and survivability on the battlefield.

The fleet includes the RC-7B Aerial Reconnaissance Low (ARL); C-12 Utility; RC-12 Guardrail/Common Sensor (GRCS); C-20/C-37 executive jets; C-23 cargo; C-26 utility; and UC-35 utility aircraft. The RC-7B and RC-12 are classified as special electronic mission aircraft (SEMA) and provide real-time intelligence collection in both peace and wartime environments. The C-12, C-23, C-26 and UC-35 are classified as operational support aircraft and provide direct fixed wing support to warfighting CINCs worldwide. The C-20 and C-37 stationed at Andrews Air Force Base are classified as senior support aircraft for designated support of the Chief of Staff and Service Secretary.

	RC-7	C-12/RC-12	C-20/37	C-23	C-26	UC-35
<b>Platform</b>	DeHavilland Dash 7	Beech King Air 200	Gulfstream	Sherpa	Metro Liner	Cessna Citation
<b>Propulsion</b>	PT6A-50	PT6A-41/42/67	Rolls Royce	PT6A-65AR	Garrett TPE331-12	JT15D or PW535A
<b>Ceiling</b>	25,000 ft	31,000/35,000 ft	45,000 ft	20,000 ft	25,000 ft	45,000 ft
<b>Speed</b>	110 (loiter) kts 220 (Cruise) kts	260 kts	459 kts	180 kts	260 kts	415 kts
<b>Max Weight</b>	47,000 lbs	12,500/16,500 lbs	74,600/95,000 lbs	25,600 lbs	16,500 lbs	16,500 lbs
<b>Range</b>	1500nm	1454/1000nm	4220/5500nm	900nm	1500nm	1500nm
<b>Passengers</b>	N/A	6-8	12-14	30	20	8

## Foreign Counterpart

All Army fixed wing aircraft are commercial, off-the-shelf (COTS) products or developed from COTS products.

## Foreign Military Sales

Egypt: Beechcraft-200 (C-12) maintenance services; Greece: two Beechcraft-200s (C-12), plus modifications; Israel: eight Beechcraft-200s (C-12), plus modifications, with a four additional aircraft option.

## Program Status

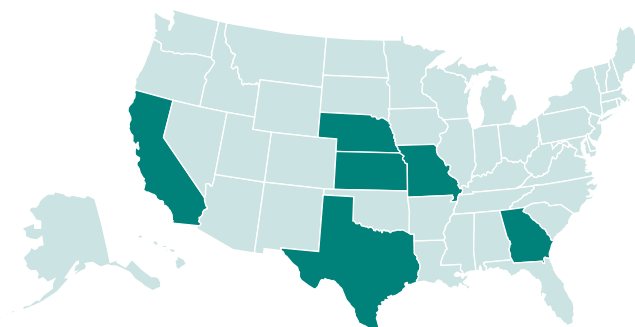
- C-37, UC-35 and RC-7 are only aircraft in production. All C-37s and UC-35s purchased to date with congressional plus-up funding.
- C-12, RC-12 and UC-35 aircraft utilizing a life cycle contractor support (LCCS) maintenance contract (DynCorp).
- C-23 aircraft utilizing a LCCS maintenance contract (Duncan).
- C-37, C-20, and C-26 aircraft utilizing Air Force LCCS maintenance contracts.

## Projected Activities

Headquarters Department of the Army-directed hub-and-spoke effort that will locate aircraft at centralized locations to increase efficiency to the Army.

## Contractors

Cessna Aircraft (Wichita, KS); Raytheon-Beechcraft (Wichita, KS); Shorts Brothers (Belfast, Ireland); Fairchild (San Antonio, TX); DeHavilland Aviation (Canada); Gulfstream (Savannah, GA); DynCorp (Ft Worth, TX); Duncan (Lincoln, NE); AVTEL (Mojave, CA); Saberliner (St. Louis, MO)









## Mission

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

## Description and Specifications

The Kiowa Warrior is the Army's rapidly deployable, lightly armed reconnaissance helicopter. The Kiowa Warrior includes advanced visionics, navigation, communication, weapons, and cockpit integration systems. The mast-mounted sight (MMS) houses a thermal imaging system, low-light television, and a laser rangefinder/designator. These systems allow target acquisition and engagement at stand-off ranges and in adverse weather conditions. The Kiowa Warrior's highly accurate navigation system provides precise target location that can be sent digitally to other aircraft or artillery via its advanced digital communications system. Battlefield imagery can be transmitted to provide near-real-time situational awareness to command and control elements.

The Kiowa Warrior is rapidly deployable by air and can be fully operational within minutes of arrival. The armament systems combine to provide anti-armor, anti-personnel, and anti-aircraft capabilities at stand off ranges. Although Kiowa Warrior fielding is complete, the Army is currently installing a series of safety and performance modifications to keep the aircraft safe and mission effective until it is retired.

**Max gross weight:** 5,200 lbs

**Max speed:** 118 kt clean; 108 kt armed

**Crew:** 2

**Armament:** Air-to-air Stinger (ATAS) (two-round launcher); .50 caliber machine gun (500 rounds); Hydra 70 (2.75 in) rockets (7-shot pod); Hellfire missiles (two-round launcher)

## Foreign Counterpart

France: Gazelle, Alouette; Germany: BO-105; Russia: Hind, Hip, Hoplite; Italy: Agusta A129.

## Foreign Military Sales

Taiwan: Delivery of 39 Kiowa Warriors (not safety enhanced program [SEP] configuration) completed.

## Program Status

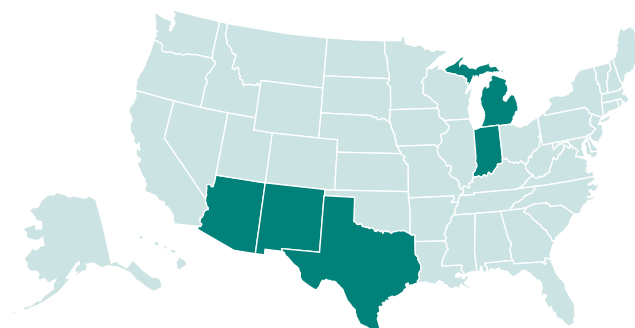
- **2QFY97** Initiated SEP (installation of safety and performance enhancements).
- **2QFY99** Completed OH-58D retrofit program.
- **1QFY00** Completed initial Kiowa Warrior fielding.
- **2QFY01** Awarded contract for SEP Lot IV (22 aircraft).
- **1QFY02** Awarded SEP Lot V contract (24 aircraft).

## Projected Activities

- **2QFY03** Award SEP Lot VI contract (24 aircraft).
- **2QFY04 - FY07** Award SEP Lots VII through X contracts (79 aircraft).
- Weight Reduction Program (NRE - **FY04**; APA - **FY07**).
- **FY09** Begin retirement of Kiowa Warriors as the Army fields RAH-66 Comanche.
- **1QFY09** Return last SEP-modified aircraft to the field.

## Contractors

Bell Helicopter, Textron (Ft Worth, TX); Rolls Royce/Allison Engines (Indianapolis, IN); Honeywell (Albuquerque, NM); Simula (Phoenix, AZ); Smiths (Grand Rapids, MI)



## Paladin



## Mission

Provide the primary artillery support for armored and mechanized infantry divisions.

## Description and Specifications

The M109A6 (Paladin) howitzer is the most technologically-advanced self-propelled cannon system in the Army. The "A6" designation identifies several improvements to the standard model.

The fire control system is fully automated, providing accurate position location, azimuth reference, and on-board ballistic solutions of fire missions. The howitzer has a servo-driven, computer-controlled gun drive with manual backup. Paladin uses state-of-the-art components to achieve dramatic improvements in the following:

**Survivability:** "Shoot and scoot" tactics; improved ballistic and nuclear, biological, and chemical protection.

**Responsive fires:** Capable of firing within 45 seconds from a complete stop with on-board communications, remote travel lock, and automated cannon slew capability.

**Accurate fires:** On-board POSNAV and technical fire control.

**Extended range:** 30 km with high explosive rocket-assisted projectile (HE RAP) and M203 propellant.

**Increased reliability:** Improved engine, track, and diagnostics.

**Upgrades include:** Global positioning system-aided self-location; M93 muzzle velocity system; and commercial, off-the-shelf-based computer processor.

Other Paladin specifications include the following:

**Max unassisted range:** 22000 m

**Max assisted range:** 30000 m

**Min range:** 4000 m

**Max rate of fire (ROF):** Four rounds/minute for three minutes

**Sustained ROF:** One round/minute (dependent on thermal warning device)

**Max speed:** 38 mph (61.1 Kph) (highway)

**Crew size:** Four (accompanying M992 FAASV-5)

**Weight empty (approx.):** 56,400 lbs (25,605.6 Kg)

**Weight combat loaded (approx.):** 63,615 lbs (28,881.21 Kg)

## Foreign Counterpart

Germany: PzH-2000; Britain: AS-90; France: Truck-mounted Caesar, F-77; China: PLZ-45

## Foreign Military Sales

None

## Program Status

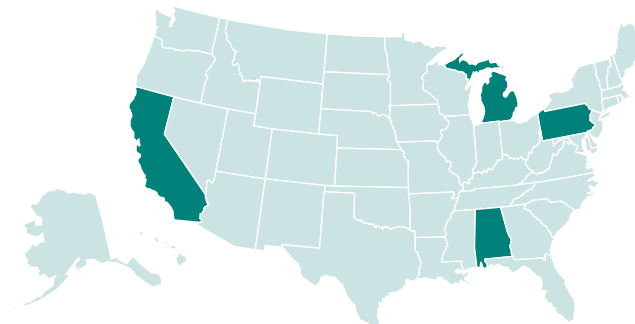
- **3QFY02** Initial limited National Guard production of seven Paladins fielded to 1-107 Pennsylvania National Guard (PANG).
- Additional production run of 18 Paladins initiated.
- Completed fielding of first four battalions of Enhanced Display System (EDS) including FBCB2.
- Initiated Paladin Digitized Fire Control System (PDFCS) development/production with TRW.

## Projected Activities

- Develop V.7 software improvements.
- **FY04** Project fielding of 18 Paladins to 1-109 PANG.
- **FY04** Project PDFCS fielding to begin.

## Contractors

United Defense, L.P. (York, PA); TRW (Carson City, CA); Anniston Army Depot (Anniston, AL); Detroit Diesel (Detroit, MI); Camber (Huntsville, AL)



## PATRIOT (PAC-3)





## Mission

Provide defense of critical assets and maneuver forces belonging to the corps and to echelons above corps against aircraft, cruise missiles, and tactical ballistic missiles (TBMs).

## Description and Specifications

The combat element of the PATRIOT missile system is the fire unit, which consists of a phased array radar set (RS), an engagement control station (ECS), an electric power plant, an antenna mast group (AMG), a communications relay group (CRG), and eight launching stations (LS).

The RS provides all tactical functions of airspace surveillance, target detection, identification, classification and tracking, and missile guidance and engagement support. The ECS provides the human interface for command control of operations. Each LS contains four ready-to-fire PAC-2, guidance enhanced missiles (GEM, GEM+), missiles sealed in canisters that serve dual purposes as shipping containers and launch tubes. PATRIOT's fast-reaction capability, high firepower, ability to track numerous targets simultaneously, and ability to operate in a severe electronic countermeasure environment are significant improvements over previous air defense systems.

The PATRIOT Advanced Capability-3 (PAC-3) upgrade program incorporates significant upgrades to the RS and ECS, and adds the new PAC-3 missile, which utilizes hit-to-kill technology for greater lethality against TBMs armed with weapons of mass destruction. Additionally, up to 16 PAC-3 missiles can be loaded per launcher, increasing firepower and missile defense capabilities. The primary mission of the PAC-3 missile is to kill maneuvering and non-maneuvering TBMs. The system will also be able to counter advanced cruise missiles and aircraft threats. The PAC-3 upgrade program comprises system improvements to increase performance against evolving threats, meet user requirements, and significantly enhance joint interoperability.

## Foreign Counterpart

Russia: a combination of the SA-10 and SA-12.

## Foreign Military Sales

Germany, Greece, Israel, Japan, Kuwait, Saudi Arabia, Taiwan, and the Netherlands are currently participating in PATRIOT acquisition programs.

## Program Status

- Fielding basic PATRIOT complete. US missile production deliveries include PATRIOT PAC-2, GEM, GEM+, and the PAC-3 missile.

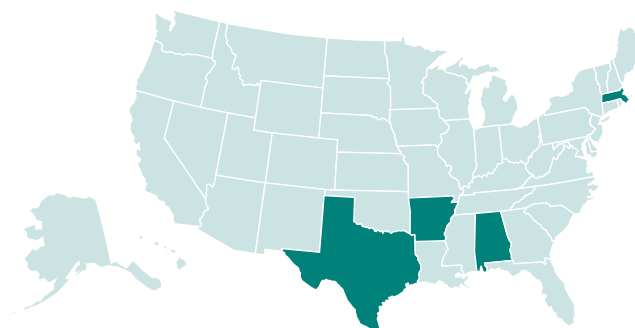
- The major radar upgrade portion of the PAC-3 program is in full-rate production. The PAC-3 missile successfully conducted 11 test flights of TBM, cruise missile, and aircraft targets.
- 4QFY01** First unit equipped.
- 4QFY02** Initial operational test and evaluation completed.
- FY03** First full battalion to be recapitalized along with receiving the PAC-3 Configuration-3 ground system upgrades.
- October 31, 2002** A PAC-3 Defense Acquisition Board approved the PAC-3 Block 2002 production decision for procurement of PAC-3 missiles in FY03 and FY04, the PAC-3 acceleration plan, and the transfer of PAC-3 and MEADS to the Army.

## Projected Activities

- Continue PAC-3 evolutionary development program.
- Award the FY04 Block 2002 PAC-3 missile production contract.
- Provide cost reduction initiative hardware for missile integration.
- Define flight tests/target requirements for PAC-3 follow-on testing.

## Contractors

Lockheed Martin (Grand Prairie, TX; Camden, AR; Lufkin, TX); Raytheon (Andover, MA; Bedford, MA); Boeing (Huntsville, AL)





MK19-3



M249



M16



M4



M240B

## Mission

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. The M16A2 enhances accuracy over its predecessor 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. It achieves more than 85 percent commonality with the M16A2 rifle and replaces 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 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.

**M240B medium machine gun:** The M240B is a ground-mounted, gas-operated, crew-served machine gun. This 7.62mm machine gun delivers more energy to the target than the smaller caliber M249 SAW. It is issued to infantry, armor, combat engineer, special force/rangers, and selected field artillery units.

**MK19-3 40mm grenade machine gun:** A self-powered, air-cooled, belt-fed, blowback-operated weapon, the MK19-3 is designed to deliver decisive firepower against enemy personnel and lightly armored vehicles. It is the primary suppressive weapon for combat support and combat service support units.

	M4	M16A2/A4	M249	M240B	MK19-3
<b>Caliber:</b>	5.56mm	5.56mm	5.56mm	7.62mm	40mm
<b>Weight:</b>	*7.7 lbs	*8.8 lbs	16.5 lbs	27.6 lbs	72.5 lbs
<b>Max Effective Range:</b>	600 m at** 500 m pt**	800 m/600 m at 550 m pt	1000 m at 600 m pt	1800 m at 800 m pt	2200 m at

\*Loaded weight with sling and one magazine only. \*\*(**at**: area target, **pt**: point target)

## Foreign Counterpart

Numerous.

## Foreign Military Sales

Numerous foreign countries purchase US small arms.

## Program Status

- **MWS** In production.
- **M16A2** Procurement complete.
- **M16A4** FY03 final year of procurement.
- **M4** In production.
- **M240B** In production.
- **Mk19** FY03 final year of procurement.
- **M249** Executing FY03 Congressional Plus-up.

## Projected Activities

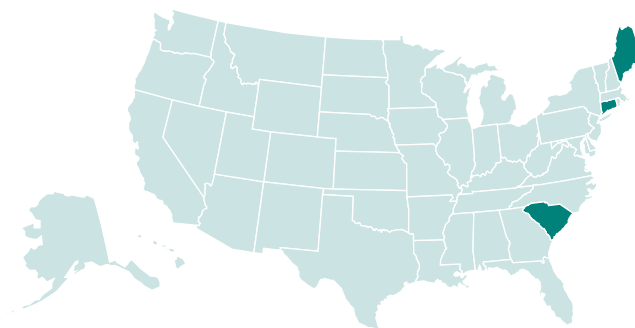
- Continue planned procurement.

## Contractors

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

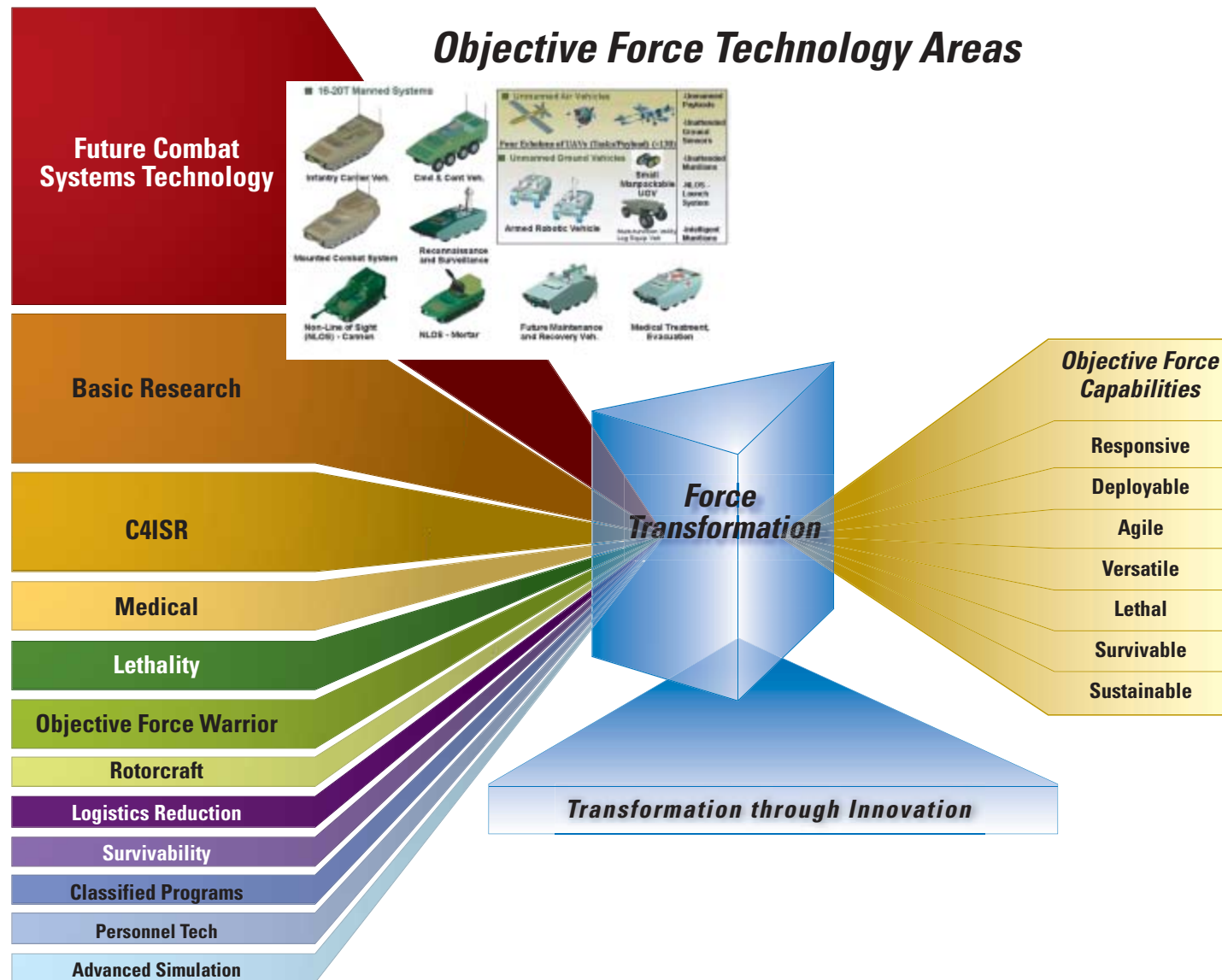
**M16A4, M249 Squad Automatic Weapon, and M240B Medium Machine Gun:** FN Manufacturing (Columbia, SC)

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





# Science and Technology





**The Army Science and Technology (S&T) community is pursuing technologies to enable the Objective Force.**

The most important S&T programs are designated by the Headquarters of the Department of the Army (HQDA) as Science & Technology Objectives (STOs). The STOs are co-sponsored by the warfighter's representative, Training and Doctrine Command (TRADOC), and seek to develop S&T products within the cost, schedule, and performance metrics assigned when they are approved. Representative STOs and some other key efforts are included here to relate S&T program opportunities to systems development and demonstration and acquisition programs. The larger and more complex STOs—that have significant warfighter payoff—may also be designated as Army Advanced Technology Demonstrations (ATDs) or OSD-approved Advanced Concept Technology Demonstrations (ACTDs). The ATDs and ACTDs are major systems and component-level demonstrations designed to “prove” the technical feasibility and military utility of advanced technology. The ACTDs also provide a limited leave-behind capability for continued user evaluation and use while it is determined whether a formal acquisition program should be pursued.

The Army's S&T investments have been articulated in terms of the Objective Force (OF) technology areas. The illustration at left depicts these technology areas in color bands that are relatively proportional to the Army investment in each area. The S&T section of this handbook is organized according to these OF technology areas, beginning with the Future Combat Systems (FCS) and ending with Advanced Simulation. Representative STOs will be described within each area of technology. The 175 Army STOs for FY03 are described fully in the Army Science & Technology Master Plan (ASTMP), which may be obtained from the Defense Technical Information Center (DTIC) at <http://www.dtic.mil/dtic/prices>.

The Army Materiel Command (AMC) executes nearly 70 percent of the Army's S&T program. Three other Major Commands execute the remainder of the Army S&T program: U.S. Army Medical Research and Materiel Command (MRMC), Corps of Engineers (COE), and Space and Missile Defense Command (SMDC).

## Future Combat Systems (FCS)

Future Combat Systems (FCS), the Army's top priority S&T program, will be a multi-functional, multi-mission, reconfigurable family of systems designed to maximize joint interoperability; strategic and tactical transportability; and integration of mission capabilities, including direct and indirect fire, reconnaissance, troop transport, counter mobility, nonlethal effects, and secure, reliable communications. FCS will provide these advanced warfighting capabilities while significantly reducing logistics demands.

The FCS is a family-of-systems: an ensemble of fighting capabilities that meets the weight and volume constraints for C-130 transportability. The Program Manager FCS is using the Boeing/SAIC lead systems integrator to identify and integrate Army, Defense Advanced Research Projects Agency (DARPA), and industry technology programs to develop a future system that will satisfy the capabilities described in the Operational Requirements Document. The FCS STO will develop Army technologies to provide revolutionary lethality through advanced direct, indirect, and air defense subsystems; increased agility using integrated advanced propulsion technologies such as electric drive/suspension, hybrid electric power, or fuel cells/reformers. FCS will have revolutionary survivability for 20-ton class vehicles using a combination of innovative lightweight armors, active protection systems, signature management, and new structural designs. FCS will seek to significantly reduce logistic/sustainment demands compared to current systems by effectively integrating technologies to reduce platform size, weight, fuel consumption, and manning requirements. FCS will incorporate manned and unmanned platforms (air and ground) by effectively integrating these technologies enabled capabilities into the family-of-systems design. FCS will also have embedded training and battle rehearsal capabilities to provide the commander with several new means to train the soldier. An emerging concept of FCS multi-functional capabilities is shown in the figure below.

In September 2001, the Army directed the acceleration of the FCS program to deliver first unit equipped (FUE) in 2008. This new date, combined with the technical work that must be accomplished, presents a tremendous challenge for both the S&T and the Army Acquisition communities. To meet this challenge, the Army and DARPA are continuing their FCS partnership to define and develop technology options that will be available the FCS Increment 1 in 2008 and for future upgrades. The FCS STO defines the Army/DARPA program. The technologies being pursued are those that could be combined into the kind of multi-function/multi-role, networked system of systems that will satisfy the Operational Requirements Document needs. In addition to developing a set of technology options by investing in specific technology development programs, the Army/DARPA collaborative FCS program is working concurrently with industry to define, develop, and validate potential FCS concepts. In March 2002, a lead systems integrator (LSI) was competitively selected to conclude the concept and technology development (CTD) phase by providing the systems architecture and material concept to meet required FCS capabilities and

support feasibility demonstrations for the Milestone B decision in the third quarter of fiscal year 2003.



## Future Combat Systems (FCS)

### Army/DARPA Partnership

FCS is the networked system of systems that will serve as the core building block within all maneuver Unit of Action echelons to develop overmatching combat power, sustainability, agility, and versatility necessary for full spectrum military operations.

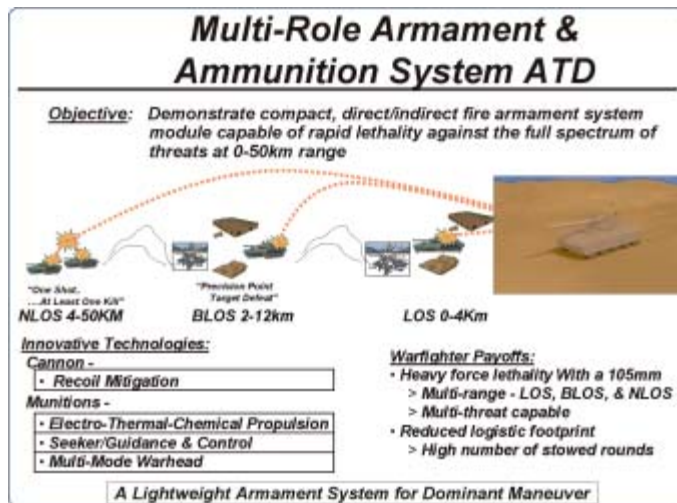
Approximately one-third of the Army's S&T investment is focused on technologies for the FCS. The S&T program has been shaped to pursue future technology options for FCS with the capability to incorporate, over time, these advances through spiral developments. The initial version of FCS (Block I) will be designed to provide certain threshold capabilities. Subsequent versions will have increased functionality to achieve Objective Force full spectrum capabilities. Operational versatility will be realized using an open-architecture system concept, with a design approach that can be readily upgraded and tailored to enable the system-of-systems to perform different missions as needed. Following are some of the other Army STOs that will enable FCS capabilities.

### Multi-Role Armament and Ammunition System (MRAAS) ATD

Developing and fielding an FCS Multi-Role Armament System with its complementing multi-function ammunition suite will provide a diverse lethality system, capable of defeating the full spectrum of threats. It will enable rapid engagement of direct and indirect targets from the same platform. The system will maximize mission flexi-

bility using a common, cartridge-based munition family that also simplifies the overall armament system and munition logistics. The munition's enhanced hit-and-kill probability will result in an increase of first-round effects on target, thereby increasing the number of stowed kills. In addition, dynamic re-targeting will exhibit information from the digitized network. Multi-purpose warhead development will provide a defeat capability against the full spectrum of threats, both moving and stationary, and a robust direct-fire defeat mechanism will provide superior lethality against of future threat armor.

Electro-thermal chemical (ETC) technology, composite materials, and propellant optimizations will achieve low-impulse/lightweight launcher that will provide increased energy on target and a versatile propulsion system for various munition packages. Recoil mitigation techniques will enable greater muzzle energy and increased ranges without detrimental effects to the vehicle or crew. Integral swing breech/autoloader interface will allow for rapid rates of fire and resupply. Novel kinetic energy (KE) penetrator technologies will provide defeat capability of heavy armors at 0–4 km. Dynamic retargeting through in-flight updates, using digitized information from the command, control, communications, computers, intelligence, surveillance, and reconnaissance network, will reduce target location errors and high-precision kill from an affordable, high-G gun-launched munition. Advanced composite structures and smart materials will provide extended range capabilities while reducing cartridge volume and weight. Smaller warheads that retain or increase lethality against all targets will result from advances in munition design, liner materials, and alternate explosives and fuzing. This project supports FCS (networked lethality) and Objective Force for future improvements beyond Block I.



## Compact Kinetic Energy Missile (CKEM) Technology ATD

The CKEM will provide FCS and other Objective Force systems with a revolutionary hypervelocity kinetic energy weapon. The CKEM weapon system is being designed to provide overwhelming lethality against present and future threats at almost half the mass and size of the current KE missile to significantly improve versatility in the Objective Force. CKEM will defeat explosive reactive armor (ERA) 1–3 and threat active protection systems by using a lighter, smaller, faster, KE missile that will significantly increase the number of KE stowed kills. The CKEM's system-level performance goals include the following:

- Missile length: less than 5 ft
- Missile weight: threshold—less than 100 lbs; objective—65 lbs
- Range: overwhelming lethality at 0.4–5 km, with greater percentage kill than any current KE weapon at close-in engagements of fewer than 200 meters to ranges out to 8 km
- Penetrator energy exceeds 10 MJ at all ranges of interest.

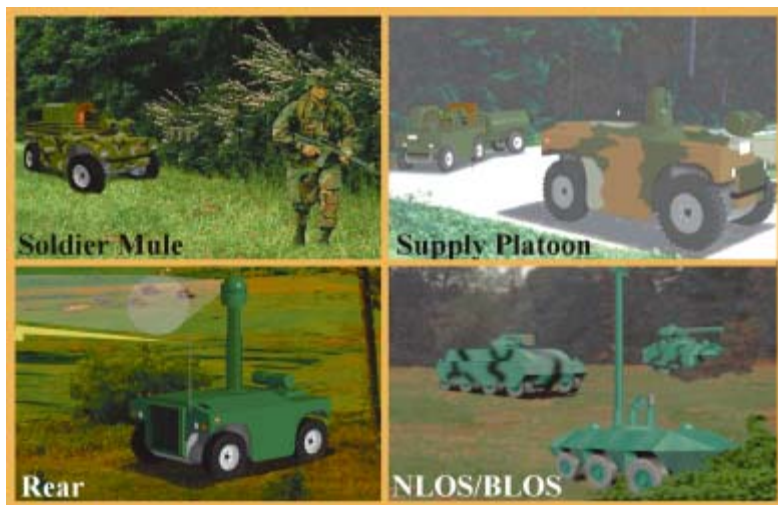
The following technologies are critical to successfully accomplishing the system performance goals and objectives: high energy density, insensitive propulsion, enhanced lethality and hypervelocity guidance technology, advanced propulsion technology, miniaturization of guidance and control technologies, and qualification of lethality damage mechanisms.



### Robotic Follower ATD

The Robotic Follower ATD will develop, integrate and demonstrate the technology required to achieve unmanned follower capabilities for FCS and other land combat systems. This technology will enable a wide variety of FCS/Objective Force applications such as soldier mule, unmanned supply “platoon,” non-line-of-sight/beyond-line-of-sight (NLOS/BLOS) fire, and rear security. A key tenet for the robustness and speed of the follower systems is the “assistance” of the manned leader to provide a high-level proofing of the follower’s path, avoiding areas that would impede or confuse the unmanned followers, which operate with minimal user intervention.

This cooperative ATD between Tank Automotive Research, Development and Engineering Center (TARDEC) and the US Army Research Laboratory (ARL) is focused on a series of demonstrations that will successively increase the follower performance and improve the maturity of the software algorithms, soldier-machine interface, and sensor technology for transition to the FCS program. In FY01, baseline follower technology was demonstrated on the Demo III Experimental Unmanned Vehicle (XUV). To meet the accelerated milestone decision date for inclusion into FCS Block I, a vehicle-following capability on a Stryker infantry carrier platform and a dismounted soldier following capability on an XUV will be demonstrated in 2003. The Demo III XUV chassis will be the test and integration asset while technology enhancements are delivered from ARL’s semi-autonomous robotics for FCS STO. Coordination with the FCS LSI will promote early adoption of follower technology into Block I. Performance enhancements, particularly in the areas of speed and separation distance, will be demonstrated by FY06, as potential technology upgrades for FCS Block II.



### Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR)

Research and technology in the areas of C4ISR is designed to enable comprehensive situational awareness for network-centric operations. This technology area includes advanced sensors and sensor processing, intelligence and electronic warfare systems and techniques, militarized and special-purpose electronics, counter-mine technologies, and C4 system technologies. Following are some of the Army STOs that will enable C4ISR capabilities.

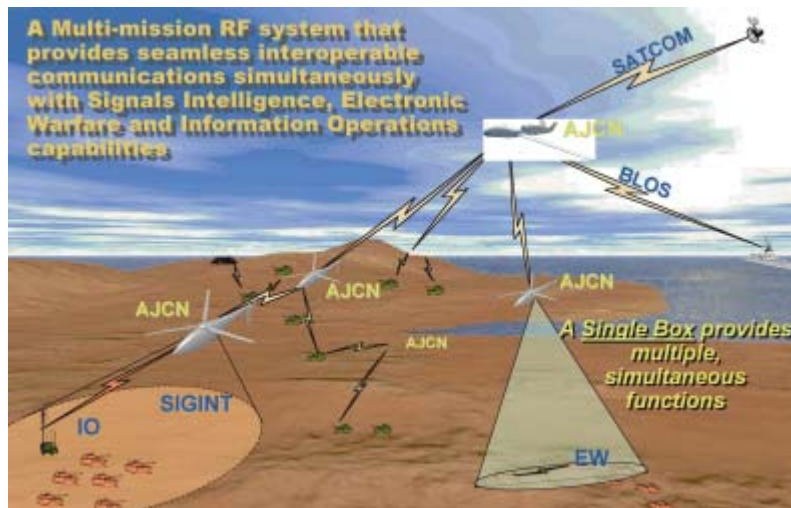
#### Adaptive Joint C4ISR Node (AJCN) Advanced Concept and Technology Demonstration (ACTD)

The AJCN ACTD demonstrates communications relay and signals intelligence/electronic warfare (SIGINT/EW) capability in a multi-functional, modular, scaleable, and re-configurable airborne payload. The ACTD will provide two Army payloads (less than 200 lbs) integrated into Hunter-class unmanned aerial vehicles and two payloads that will be integrated into Air Force RC-135/KC-135 aircraft.

The mission payload’s primary function is to relay multiple types of communications waveforms. The payload also provides the capability to perform SIGINT, information warfare, and electronic attack missions simultaneously. The AJCN payloads are Joint Tactical Radio System (JTRS) compliant and will host JTRS software waveforms. An equally important product of the ACTD is the development of the Concept of Operations and Tactics, Techniques, and Procedures for a multi-function payload and aerial communications relays.

The AJCN ACTD is a joint Army, Air Force, DARPA, and Joint Forces Command (JFCOM) technology program. The Army is the lead service with Communications Electronics Command (CECOM) Research Development & Engineering Center as the technology manager. The JFCOM is the Operational Manager. The ACTD program begins in FY03 and ends with a Military Utility Assessment in FY05. Funding for the four mission payload’s “residuals” support is provided through FY07 by the ACTD program.





### Networked Sensors for the Objective Force ATD

The objective of the Networked Sensors for the Objective Force ATD is to develop and optimize sensor suites for small unmanned platforms, such as unmanned ground vehicles, small unmanned aerial vehicles, and unattended ground sensors. These sensor suites will incorporate robust (secure, jam-resistant, stealthy, self-organizing, self-healing) communications products.

A sensor hub links the networked sensors information to higher echelon communications and provides reach-back, command and control, sensor planning, and data management tools. The networked sensors will be developed to operate in complex terrain (including military operations in urban terrain) and demonstrate a system-of-systems capability.

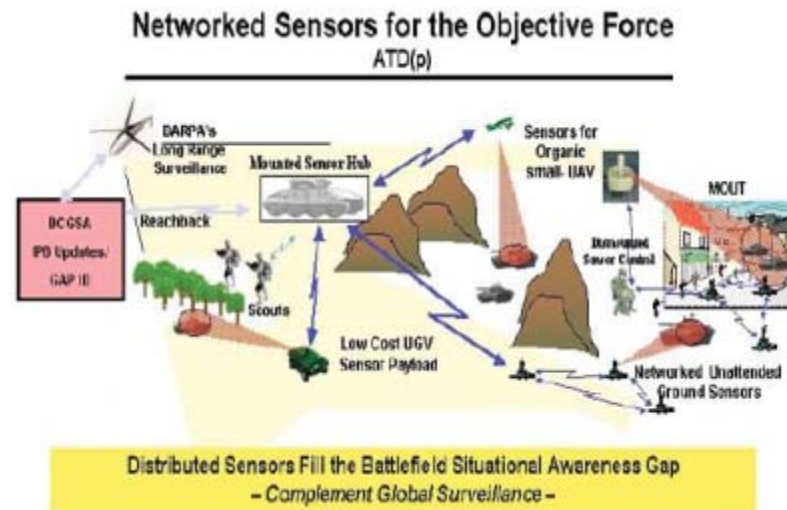
This capability will provide commanders with organic unmanned networked sensors assets to provide beyond-line-of-sight (BLOS) situational awareness (SA) picture and targeting information for direct and indirect fire weapons and threat avoidance. The networked sensors will:

- Provide remote monitoring out to ~10km without placing soldiers in harm's way
- Increase a unit's area of coverage
- Provide near-real-time BLOS SA data for early warning to speed decision making and reaction time.

Low-cost sensor technology, such as uncooled infrared imaging, flash laser with short-wave infrared focal planes, and acoustic, seismic, and magnetic sensors,

will be integrated on small unmanned platforms to demonstrate the day and night capability of these platforms to provide faster target identification and reaction time with reduced false alarms. The use of intelligence reach-back and tools to aid in sensor deployment along with smart data management will also be developed.

Mounted and dismounted virtual simulations and live experiments with Training and Doctrine Command Battlelabs in warfighter operational environments will be used to address hardware and operational integration issues; investigate new operational concepts, tactics, techniques, and procedures; and validate component and system technology readiness levels.



### Battlespace Terrain Reasoning and Awareness (BTRA)

The BTRA STO seeks to develop a comprehensive suite of physical combat environment decision-support tools that generate the geospatial information necessary to support the decision and execution process across command, control, communications, computers, intelligence, surveillance, and reconnaissance systems of the Objective Force.

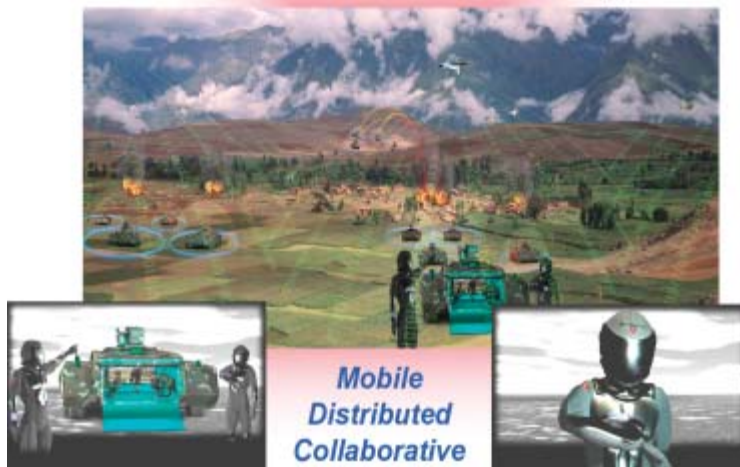
This STO will develop technology to improve the current static decision aids by providing dynamic tactical execution aids. These analytical tools will model the inter-relationships of terrain, weather, force/threat behavior, and the influence of dynamic state environment changes. BTRA will ensure that the products of this analysis are "smart, interactive products" and have a content and structure

capable of being imported and further evaluated by application-specific decision support tools of other command, control, communications, computers, intelligence, surveillance, and reconnaissance systems.

### Geospatial Information Integration and Generation Tools

This STO will deliver tools to integrate, manage, and exploit multi-source imagery, features, and elevation data in order to present only the best set of relevant terrain information. The generation and integration of high-resolution, accurate, timely, multi-source data into lightweight terrain networks are required to make the common relevant operational picture (CROP). The capabilities developed will enable small unit tactical operations to have accurate, timely, up-to-date digital terrain information. Geospatial data mining tools will be developed to gather spatial data from traditional and non-traditional sources and automatically identify relationships and patterns that are not readily apparent to the warfighter. Additionally, software tools will be developed to generate terrain features and attributes from multi-source data in an autonomous or semi-autonomous mode to fill the gap between tactical geospatial information requirements and the strategic/operational information provided by the National Imagery and Mapping Agency (NIMA).

### Execution-Centric Decision Support



### Agile Commander ATD

The Agile Commander ATD develops software tools that enable faster course of action (COA) development and analysis for all echelons with improved quality and reproducibility. This effort focuses on improving the combat capabilities of the

Objective Force by providing a framework for both interactive and collaborative planning and execution while on the move. In addition, the Agile Commander ATD provides a capability to rapidly war-game and critique multiple courses of action.

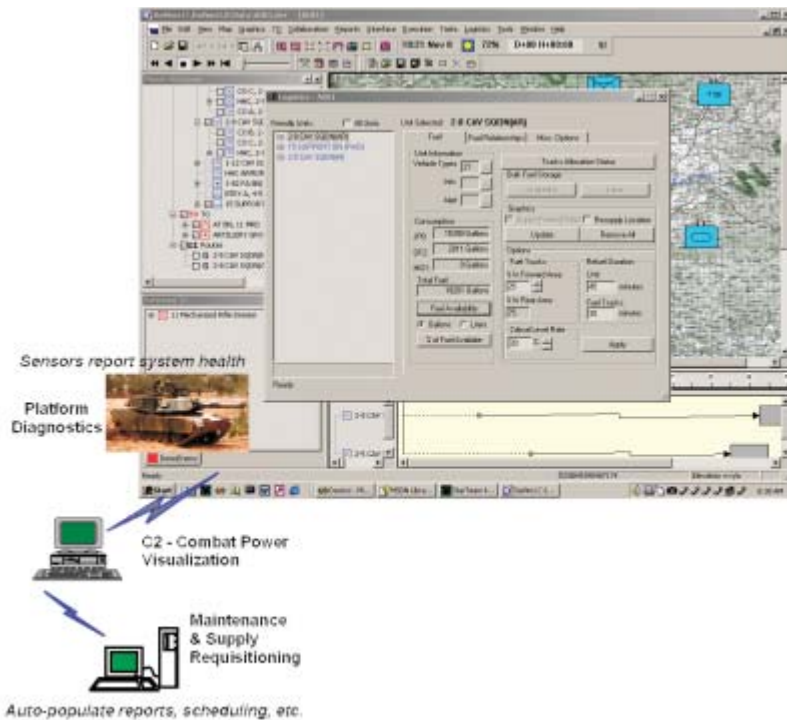
The major products developed under the Agile Commander ATD include:

- The DaVinci (or “distributed analysis and visualization infrastructure for C4I”) tool set. DaVinci is an advanced suite of decision aid software tools that will enable execution-centric, mobile command and control (C2) ground-based operations. In partnership with DARPA PM for FCS C2, the DaVinci was provided as the base tool for the development of the commander’s support environment (CSE).
- The Combined Arms Planning and Execution-Monitoring System (CAPES), which was developed and transitioned to PM Army Tactical Command and Control System (ATCCS)/Global Command and Control System (GCCS) in FY02.
- Follow-on software development will provide a fully integrated prototype C2 system linked to netted sensors/fires effects that will transition into Army Battle Command System (ABCS) 7.0 and the Command, Control and Communications On-the-Move Technology Demonstration. The prototype C2 system will showcase a full spectrum, combined arms capability, rooted in the use of collaborative decision aids supportive of operations on-the-move (OTM).

### Logistics Command and Control (LOG C2) ATD

The LOG C2 ATD will significantly speed the tactical decision-making process for Army logisticians by developing, demonstrating, and transitioning software products that enhance combat service support (CSS) decision-making capabilities and enable sustainment of a highly agile and versatile force. The LOG C2 ATD will attain real-time planning and situation data by interfacing with Legacy and Interim CSS systems to provide a common operating picture tailored to unit task, purpose, and situation.

In addition, the LOG C2 ATD will provide collaborative, distributed combined arms planning and decision support tools for commanders and sustainers. The LOG C2 ATD will provide logistics situation understanding to commanders that enhances the planning of future operations and the execution of current operations. These enhancements will reduce planning times and enable CSS information to be an enabler for Objective Force Maneuver Units operating with a reduced logistics tail.



### C4ISR On-the-Move Demonstration

The program provides early and continuing demonstrations of enhanced survivability and lethality of FCS platforms through the effective employment of integrated C4ISR OTM systems supported by ISR assets and networked fires. This effort will leverage and integrate a variety of S&T, PM, and DARPA technology programs into a cohesive, integrated C4ISR system of systems.

In FY03, the initial demonstrations support the FCS Milestone B decision by providing an understanding of the technology maturity and payoffs from C4ISR on-the-move technologies to enable FCS Unit of Action capabilities. These demonstrations will integrate real, surrogate, and simulated sensors, along with surrogate FCS communications, and state-of-the-art command and control equipment to provide a baseline assessment of C4ISR technologies for the FCS and lead systems integrator. This program will demonstrate that sensors, effective and timely knowledge dissemination, and beyond-line-of-sight weapons can effectively be integrated into a seamless, system-of-systems.

In FY04/05, the test bed demonstration will be at Ft Knox in coordination with the FCS lead systems integrator and Unit of Action battle lab to evaluate evolving FCS architectures. During these demonstrations, 20 percent of the sensors/sys-

tems will be simulated. Throughout the program, functionality and complexity of the command and control systems will be expanded to understand the limits of technology as capability is added. These demonstrations also provide operational testing information for tactics, techniques, and procedures (TTPs) at the unit cell level.



### Multi-Functional On-The-Move (OTM) Secure Adaptive Integrated Communications (MOSAIC) ATD

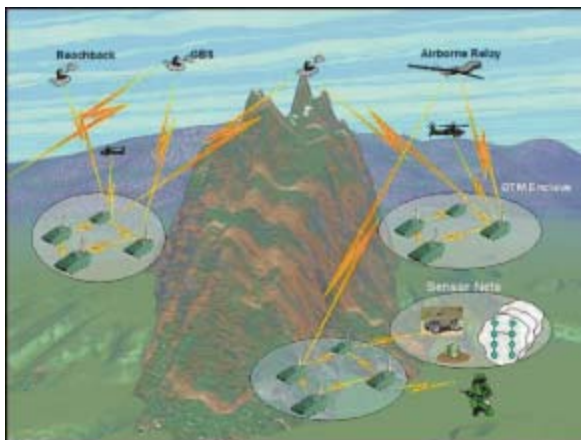
The MOSAIC ATD will enable OTM maneuver net communications for the mobile, dispersed battle force in the Objective Force/FCS concepts. MOSAIC develops and demonstrates technologies to provide OTM capabilities required by Joint Tactical Radio System (JTRS) Cluster 1 and Warfighter Information Network - Tactical (WIN-T) programs for C3OTM and networking solutions. In turn, MOSAIC provides integrated network solutions for FCS Block I.

This ATD will focus on integrating a highly adaptive communications infrastructure to support the seamless flow of multi-media services across terrestrial and space-based platforms. MOSAIC will leverage leading-edge technologies developed by government and commercial research programs. Its wireless communications architecture will support multimedia applications; quality of service for mobile/multi-hop networks; adaptive and ad-hoc mobility protocols; bandwidth management; and horizontal/vertical handoff in a mobile wireless environment. The MOSAIC ATD will demonstrate:

- Connectivity between 15–20 nodes in a field environment
- Mobile communications that enable commanders to effectively lead during dynamically changing and offensive operations anywhere on the battlefield, whether stationary or OTM, and to maintain situational understanding at all times



- Dynamic, extended range, redundant communications through a network that is:
  - Open, featuring a multi-layered architecture with multiple paths that provides a level of redundancy for assured communications that can be quickly diagnosed and is self-healing
  - Improved, reliable, redundant NLOS communications to optimize connectivity through automatic link establishment to support operations in varied environments
  - Self-organizing and extendable—adds entities to the network in a seamless manner.



### Overwatch ACTD

The Overwatch ACTD objective is to mature algorithms and integrate a staring sensor into a packaged system for mounting on a High Mobility Multipurpose Wheeled Vehicle (HMMWV) and an Unmanned Ground Vehicle (UGV) and demonstrate the system's capability to detect, locate, and identify (by type) weapons being fired in real-time. The ACTD will demonstrate the capability to detect, classify, and locate small arms, mortars, and rocket-propelled grenades in complex terrain at stand-off ranges to enable rapid, precision engagement of enemy shooters. The sensor package will consist of a fast framing MWIR sensor, a LWIR imaging sensor, a laser ranger/designator, and an on-board processor. The HMMWV-mounted Battlefield Ordnance Awareness Sensor System will be modular in design to aid in migrating to other platforms.

By the end of FY03, the program will specify and acquire initial system hardware, and develop and integrate the real-time system software. In FY04, the signature databases and classification algorithms will be developed and integrated into a

prototype sensor system on the HMMWV and the initial full scale test 1 will be performed. In FY06, the sensor system will be integrated into the UGV and a major system demonstration will be performed. The final product is a validated system mounted on a HMMWV and a UGV that supports dismounted forces by providing real-time detection, classification, location, and designation of small caliber weapons fire.



### Joint Intelligence, Surveillance, and Reconnaissance (JISR) ACTD

The JISR ACTD is designed to provide timely top-down/bottom-up ISR and operational information for enhanced battlespace visualization for CENTCOM's early entry force commander. This includes the need to share that picture with Joint Task Force (JTF) and coalition partners. The program's goal is to implement an Internet, Web-technology-based system-of-systems that integrates existing C4ISR sensors and processors to establish a joint tactical sensor grid. This sensor grid will seamlessly integrate with the existing theater command and control, intelligence (C2I) architecture to provide timely and relevant sensor data and other intelligence information to early entry forces and their supporting headquarters.

The JISR sensor grid has four major components:

- "Information Agent" technology to enable smart data and product retrieval across disparate legacy sensors and databases
- Joint Technical Architecture (JTA) standard sensor link protocol (SLP) to plug additional tactical sensors into the grid
- Distributed Geospatial Meta Database Management System to organize, archive, and serve sensor data and other intelligence information to user friendly Web-based visualization tools



- Thin Client Web Browser technology allowing users remote access from any existing joint or combined C2I workstation.

### Counter Terrorism - Cave/Urban Assault ACTD

The Counter Terrorism - Cave/Urban Assault ACTD will demonstrate, with a Special Operations Forces (SOF) sponsor, an optimized suite of prototype light-weight, soldier-borne sensors that provide a decisive overmatch for dismounted assault in restricted/covered environments – cave, tunnels, and urban. Current sensors are too large, too heavy (not soldier-portable), lack the range needed for identification and the sensitivity for operations in “true dark” (interior spaces) and restricted terrain.

The prototype sensor capabilities introduced in the ACTD use micro-uncooled infrared (UCIR), short wave infrared (SWIR) imaging, urban unattended ground sensors (UGS), and through-the-wall sensing (TTWS) technologies. The ACTD program also provides TTPs to achieve decisive capabilities in difficult/restricted terrain, day or night. The ACTD is structured in two vignettes, Cave/Tunnel Surveillance and Assault (Operational Demo I) and Urban Assault (Operational Demo II).

In FY03 the ACTD program acquires a sensor suite of approach sensors and cave assault sensors and conducts component performance evaluations to develop initial TTPs. In FY06 the military utility assessment (MUA) will be completed and field residuals will be provided to USASOC to equip two SOF “A” Teams and transition development to designated SOCOM PEO/PM for acquisition. The ACTD program will fund these residuals through FY08.

#### Cave Assault Sensors



#### Universal Soldier Sensor

### Joint Tactical Radio System (JTRS) Squad-Level Communications

This STO will provide multi-band, multi-mode squad-level tactical radio communications as a JTRS Cluster 2 gap-filler for Future Combat System Block I first unit

equipped (FUE) limited user test (LUT) in FY07. The STO will ensure TSM-Soldier size, weight and power consumption (SWAP) and unit cost objectives are met, and critical soldier radio wideband networking waveform (WNW) technologies are optimized for transition to the Land Warrior and JTRS Cluster 2 acquisition programs through technical collaboration with Objective Force Warrior ATD. Wideband networking waveform and radio technologies emerging from the DARPA Small Unit Operations Situation Awareness System (SUO SAS) Phase 3 program will be matured to support network-centric operations for the dismounted soldier while mitigating risk for JTRS Cluster 2. This STO will provide squad-level voice and data communications with connectivity to upper echelon C2/maneuver and unattended networks.

In FY00-02, DARPA developed and demonstrated SUO SAS prototype tactical radio communications in laboratory and field environments supported by networking modeling and simulation analysis. In FY03 the Army initiated a STO program that will conduct SUO SAS prototype tactical radio communications performance trade-off and affordability analyses to provide a SWAP-reduced design and develop communications reference architecture to support hardware and software portability to JTRS. The SUO SAS prototypes will be included in the C4ISR OTM demonstration in FY03 to evaluate heterogeneous quality of service in mobile ad-hoc networks. In FY03-05 the STO program will develop SWAP-reduced scaleable (multi-band, multi-channel) RF front-end and programmable radio modem and link-layer intranet processor WNW hardware and software components with JTRS-compliant application programming interfaces and begin laboratory integration and technical demonstrations of a squad-level tactical radio. In FY05-07, the STO program will integrate WNW with JTRS platform to demonstrate portability, complete ruggedized Objective Force Warrior soldier tactical radio mechanical packaging design, and integrate with Objective Force Warrior system for wearable application. Functional prototypes will be provided for the Objective Force Warrior ATD operational user demonstrations and support FCS Block I FUE LUT.



### Advanced Night Vision Goggles (ANVG) ATD

The focus of this program is to develop and demonstrate an integrated 100-degree field of view (FOV) helmet-mounted, night vision goggle system. ANVG technology will significantly increase individual soldier capabilities under adverse weather and military operations in urban terrain (MOUT) conditions. The ANVG will provide an ultra-wide 40 x 100 degree FOV with greater than 50 percent improvement over current goggle performance, and an integrated heads-up display for in-platform applications. Low-halo tube technology will provide more effective navigation and improved safety in MOUT operations. The ANVG will be a modular horizontal technology integration (HTI) design that can also meet requirements for Mounted Warrior and Land Warrior, allowing head mounting for night driving, navigation, or handheld weapon use. Additionally, for the dismounted application, an uncooled forward-looking infrared (FLIR) camera will be added to the helmet-mounted assembly that will provide thermal image insert to the image intensifier to enhance target detection performance and complement the IR performance.

Recent developments include the following:

- Concluded formal flight testing by the Aviation Technical Test Center (ATTC) Ft Rucker on initial prototypes
- Received delivery of a proof-of-concept demonstrator with integrated FLIR for I2/IR fusion.

Projected activities in FY03:

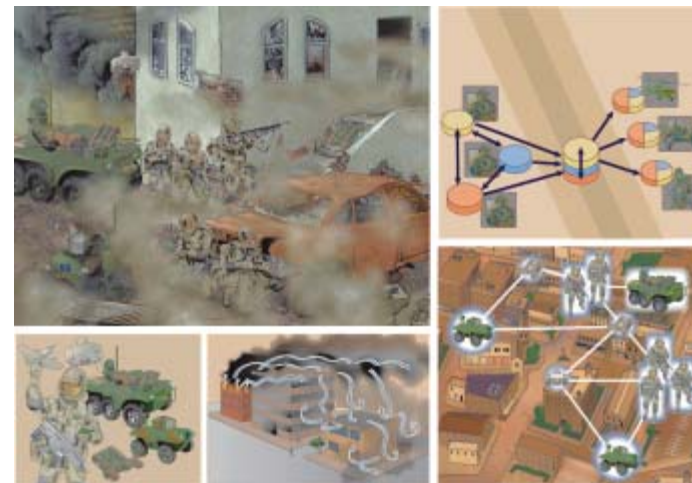
- Design and fabricate improved ANVGs having larger exit pupil, replaceable tube configuration, and larger integral HUD display for symbology
- Continue system evaluations.

### C2 in Complex and Urban Terrain

The purpose of this STO is to develop a suite of command and control tools for Objective Force dismounted and mounted commanders, leaders, and soldiers to employ during close combat in complex and urban terrain. Objectives will include experiments with an ensemble of tactical decision aids, unattended ground sensor clusters, air vehicles, ground robots, and human platforms, including their organic sensor assets. These tools will be used to identify and fuse critical decision information day and night in any combat situation to enhance survivability and increase combat effectiveness by providing Objective Force dismounted and mounted commanders/leaders/soldiers with enhanced collaboration, reach-back, autonomous asset management, and seamless situational understanding.

A modeling and experimentation effort will identify critical information filters for the commander. ARL will develop human performance models to quantify the effects of uncertainty on dynamic decision-making. The work will be a collaborative effort with the Mounted Maneuver Battle Lab - Ft Knox, the Dismounted Battlespace Battle Lab -

Ft Benning, the Battle Command Battle Labs – Ft Leavenworth and Huachuca, and the Depth & Simultaneous Attack Battle Lab – Ft Sill. A suite of C2 system tools (decision aids to manage cognitive load and uncertainty) for complex/urban terrain will be demonstrated at the Mounted Maneuver Battle Lab - Ft Knox, Dismounted Battlespace Battle Lab - Ft Benning, the Battle Command Battle Labs – Ft Leavenworth and Huachuca, and the Depth & Simultaneous Attack Battle Lab – Ft Sill.



## Medical

Biomedical research and technology provide new opportunities to protect and treat warfighters in order to ensure worldwide deployability, increase warfighter availability, and reduce casualties and loss of life. Research efforts are managed by the US Army Medical Research and Materiel Command (USAMRMC), and include Army and Department of Defense (DoD)-funded programs for which the Army is Executive or DoD Lead Agent. Health hazards addressed include endemic (i.e., diseases naturally common to a specific geographic area) infectious diseases, chemical and biological warfare agents, environmental injuries, operational stress, and trauma resulting from enemy weapons. The major goals of the Army biomedical science and technology program are to provide technologies in the following three investment areas:

- Combat casualty care (treat casualties under field conditions)
- Infectious diseases (prevent illness and injury)
- Military operational medicine (sustain optimum military effectiveness).

The following are some of the Army STOs and other efforts that will enable new force health protection and combat health support technologies.

## Combat Casualty Care

### Field Medical Monitoring and Therapeutic Devices for Casualty Care STO

The Army is developing smaller and lighter diagnostic life support and surgical systems that are compatible with far-forward field operations, in which factors such as high noise, vibration, dirt, moisture, and electromagnetic interference can render many medical devices unusable. These systems will fill a current gap in far-forward treatment capability and enable effective casualty care to be provided in the logistically constrained, highly mobile battlefield of the Objective Force. Systems being developed include a two-person portable stretcher system for medical evacuation that integrates improved technologies in power, patient monitoring, and delivery of medication and oxygen. Other efforts will exploit micro-impulse radar patient monitoring for medic use, and will use ceramic oxygen-generator technology to provide medical grade oxygen and eliminate logistically burdensome compressed gas cylinders. Other efforts focus on enhancing the current military field anesthesia delivery system to provide reproducible drug delivery and greater patient safety, and to achieve US Food and Drug Administration (FDA) approval of the system. The latter will enable peacetime training and use of the device. Together, these systems will enhance the capability of medics and far-forward surgeons to initiate and sustain essential critical care at the front lines and during evacuation.



### Hemorrhage Control STO

Army medical researchers are working on a variety of products that can save lives by quickly stopping blood loss from severe battlefield wounds. Excessive bleeding is the most common cause of death for wounded soldiers. Even in hospitals, the major causes of early death among those who die of wounds are central nervous system injury and uncontrolled bleeding. The Army is pursuing drugs,

devices, and techniques that slow or control bleeding and are usable far forward on the battlefield, since these have the greatest potential to save lives.

Army researchers have worked in coordination with Israeli investigators to explore the use of recombinant-activated human clotting factor VII (rFVIIa) in stopping internal bleeding. The protein rFVIIa binds to injured tissue and stimulates blood clot formation in the vicinity of the injury. The protein has been used successfully to treat bleeding episodes in hemophiliacs. Army medical researchers are also developing expandable foams derived from fibrinogen, a protein involved in human blood clotting that is converted into fibrin, the major constituent of clots. These foams could be injected as a liquid into an inaccessible deep cavity wound of a casualty (e.g., chest, abdomen), where they would be activated, and expand to contact injured internal organs and control bleeding.

### Soft Tissue Trauma Care STO

The Army is evaluating methods to effectively treat soft-tissue (flesh) injuries on the battlefield. New spray-on, flexible wound dressings that provide pain relief, anti-infective protection, and auto-cleaning of wounds, while also providing protection from further battlefield contamination. These dressings will preclude further and secondary tissue injury or damage and may allow wounded soldiers to either continue operating, or will at least minimize their care requirements pending evacuation. Other devices include a new, servo-controlled tourniquet for potential incorporation into advanced combat uniforms, and a lightweight system for wound cleaning and removal of dead tissue from the wound.

### Battlefield Treatment of Fractures STO

The Army is evaluating methods to effectively treat bone fractures that occur on the battlefield. New lightweight splint materials that can be effectively applied by the combat medic may, for upper extremity fractures, permit limited or full battlefield functionality of injured warfighters. For lower extremity fractures, these materials may permit sufficient mobility to reduce the number of unit personnel required to move the casualty pending battlefield evacuation. Other devices include new pins for surgical stabilization of fractures that incorporate anti-infectives to prevent subsequent bone infection, and new bone replacement material for surgical repair of bone injuries that incorporates anti-infectives to prevent subsequent infection complications.

### Blood Products STO

The Army seeks to develop freeze-dried plasma for use in treating bleeding in combat casualties. Current supplies of plasma are liquid and frozen and logistically demanding for use on the battlefield. Successful development and licensing of freeze-dried plasma will make plasma available as a lightweight powder that



can be reconstituted when needed. No special storage will be required and shelf-life will be much longer.

### **Military Operational Medicine Research Program**

A primary objective of the Military Operational Medicine Research Program is the transition of physiological data, models, and algorithms to materiel developers and commanders to enhance medical readiness and sustainability during deployments.

### **Optimization of Visual Performance with Optical and Electro-Optical Systems and Materials STO**

This research will provide the Army with essential bioengineering data and evaluations of the impact of displays on visual performance. Results can be used to guide the optimal design of advanced imaging and display technologies to solve battlefield problems such as degraded fighting environments and directed-energy, chemical, and biological weapons.

### **Environmental Medicine and Bioenergetics Research: Warfighter Physiological Status Monitoring STO**

This research effort is designed to enhance soldier survivability and performance/mission planning through real-time physiological and cognitive assessment sensors. A series of algorithms will be developed as an integral part of a research tool kit needed to gather data on warfighter status. Field studies will be conducted on hydration state, thermal strain, and vigilance in warfighters to identify relevant data to commanders. This research will produce a predictive model and specifications for a minimal suite of soldier-acceptable physiological sensors that provide individual and unit health and performance indices for medics and commanders. Results will transition into Land Warrior and Objective Force Warrior initiatives.

### **Innovative Strategies to Assess Health Risks from Environmental Exposures to Toxic Chemicals STO**

This research effort addresses potential health hazards to soldiers exposed to toxic industrial/agricultural chemicals (TICs) and militarily-relevant chemicals (MRCs). It will develop low-cost, sensitive screening tools to assess health risks from environmental exposures to TICs, MRCs, and chemical mixtures. Methods will be developed to evaluate the safety of water and food to protect deployed forces from incidental or purposeful contamination of these vital commodities.

### **Rapid Analysis of Food and Water for Chemical and Microbial Contaminants STO**

This medical research effort is designed to develop methods for rapid detection of chemical and microbial contaminants in food and drinking water to validate safety for human consumption. Enabling genomic, computer miniaturization, biotechnology, and micro-electrical mechanical system technologies will be exploited. Technologies will transition to the United States Army Medical Materiel Development Activity for development of a field test kit capable of rapidly detecting pesticide and bacterial contamination.

### **Head-Supported Mass (HSM) - Warfighter Health and Performance STO**

This Army medical research effort will provide operational guidelines, design criteria and health-risk criteria for mass head-supported devices, supporting design of FCS components and other systems that rely on such devices. Head-supported devices with misplaced centers of mass or large weight can degrade warfighter performance and increase the risk for chronic and acute injuries. The biomedical-based guidelines and criteria from this research will enhance the effectiveness of head-supported devices while reducing the risk of injuries associated with their use. This research contributes to the development of an integrated total body injury and performance model.

### **Body Armor Blunt Trauma Assessment STO**

This research effort will establish injury thresholds to measure the forces behind impacted body armor as estimated by pathologic analysis. Scalable impactors will be developed that simulate soft and hard body armor force signatures in order to define injury thresholds. This research will use finite element models of the pig and human thorax to establish a tool for body armor developers to use in developing lighter, more comfortable body armor that will prevent blunt trauma injury for the future warfighter.

### **Medical Countermeasures for Laser Eye Injury STO**

This Army medical research effort will enhance soldier survivability through reduced physiological and psychological effects of laser-induced eye injuries. Exposure limits for military lasers or exposure conditions will be updated. Guidance for field triage, a therapy kit and updated eye protection guidelines will be established, including many potential pharmacological solutions. Finally, this research will provide enhanced classifications for laser-induced injuries to the retina, and corresponding treatment/medical management strategies/informatics.



## Gulf War Illness

The USAMRMC is currently managing approximately 120 projects worth more than \$100 million, in addition to in-house efforts, on Gulf War illness research. The emphasis of research solicitations and peer-reviewed projects funded since 1994 includes the following:

- Epidemiological (i.e., measures the occurrence and distribution of disease and its impact) studies of symptoms and health outcomes in Gulf War veterans
- Long-term or delayed clinical effects of low-level exposures to chemical warfare agents
- Health effects associated with possible exposures to combinations of chemical warfare agents, psychological stress, environmental stressors, inoculations, insecticides and pyridostigmine bromide (i.e., anti-nerve agent)
- Neurobiology of stress, including prevention and treatment of chronic, non-specific symptoms
- Safety of medical material in operational environments
- Leishmania (i.e., parasitic infectious disease) diagnostics tests and treatments
- Heavy metal toxicity, including depleted uranium and tungsten alloys such as those currently used or contemplated for use in armor penetrating munitions.

## Infectious Disease Research

The Military Infectious Diseases Research Program is an Army-funded and direct program that involves Army and Navy scientists deployed in a worldwide Army-Navy network of laboratories and field sites in the United States and overseas. The program focuses on developing drugs, vaccines, and vector-control products to prevent the operational impact of endemic infectious diseases in the battle area, the most common cause of military casualties during combat deployments. Recent emphasis is on developing diagnostic devices to assist the field medic in evaluation, management, and other decision-making relative to infected warfighters.

## An Intravenous Drug to Treat Severe and Complicated Malaria Caused by Multi-Drug-Resistant Malaria

This STO addresses a need for a new intravenous drug to treat severe and complicated malaria caused by multi-drug-resistant malaria parasites. The resulting product will be a replacement for the currently fielded drug for this indication, for which future availability is doubtful due to manufacturer considerations, and the efficacy of which is decreasing as resistance develops against the current drug. Efficacy and safety sufficient to obtain FDA approval for human studies and war-

rant transition of the candidate drug to advanced development will be demonstrated.

## Anti-Malarial Drug Discovery

The feasibility of using genomic approaches such as DNA microarray technology to identify a new malarial parasite target will be explored. Targets will be used to develop assays for drug discovery. The goal is to identify two new unknown targets and two drugs for each target to carry on to development for either treatment and/or prophylaxis of malaria.

## Next-Generation Anthrax Vaccine

The bioterrorism incidents involving anthrax that followed the events of September 11, 2001 have greatly increased emphasis on accelerating the development of a next-generation anthrax vaccine. The objective is to finalize technology-based research efforts, leading to transition of a vaccine candidate based on recombinant protective antigen (rPA), a protein from the anthrax bacteria, out of the technology base to advanced development. Preliminary experiments in rabbit and non-human primate models have already demonstrated protection from anthrax infection using rPA vaccine candidates produced in either *B. anthracis* or *E. coli* expression systems.

Challenges include expanding animal efficacy data comparing Anthrax Vaccine Absorbed (AVA, the currently licensed vaccine) with rPA, and demonstrating surrogate efficacy against *B. anthracis* aerosol challenge with antibody to rPA alone. The immediate goal is to obtain entry of the program into component advanced development in the first or second quarter FY03, thus activating advanced development funding and activities required to initiate phase 1 clinical trials. Phase 1 trials of the two rPA vaccine candidates are planned to start in the first or second quarter FY03. Based on the current schedule, down selection between the two candidates with subsequent transition to full acquisition status (Milestone B) is expected in the second quarter of FY05.

## Congressionally Directed Medical Research Programs

The USAMRMC Office of Congressionally Directed Medical Research Programs (CDMRP) manages targeted biomedical research programs mandated by Congress. The mission of the CDMRP is to provide hope by promoting innovative research, recognizing untapped opportunities, creating partnerships, and guarding the public trust in these target areas. Although not all of these programs have direct war-zone relevance, the potential benefits of the research realized by the civilian population will extend to warfighters and their dependents. Since its inception in FY92, the CDMRP has managed approximately \$2.3 billion to support peer-reviewed research, spanning 26 programs. The five core programs managed by the CDMRP focus on breast, prostate, and ovarian cancer,

neurofibromatosis, and military health. More than 4,180 contracts and grants have been awarded and are managed by the CDMRP. The USAMRMC will continue to manage peer-reviewed research programs in its five core programs and other areas as specified by Congress.

### Rotorcraft

Rotorcraft research and technology is designed to enhance the performance and effectiveness of future rotorcraft, including rotors and structures, propulsion and drive systems, avionics and weapons, and human-systems integration (e.g., crew station) technologies. The Army has reoriented the Aviation S&T strategy to focus on unmanned aerial vehicles (UAV) to support FCS (dominant situational awareness and UAV). The strategy seeks creative and innovative approaches to integrate technological advances in aeronautics, as well as mission equipment, for UAVs. This approach focuses on advances that are achievable by designing the UAV systems from the ground up, without the limitations that a manned platform imposes and that takes advantage of the warfighting synergy gained when manned and unmanned systems combine to accomplish a common objective. The strategy also takes advantage of not having a “man in the cockpit” and the unique ability of the UAV to accomplish the “dull, dirty, and dangerous” missions. The intent of the Army strategy is to conduct research to mature technologies that result in UAV products that represent leap-ahead capability for the warfighter and are technically ready to transition to production. Following are some of the Army Science and Technology Objectives (STOs) that will enable rotorcraft capabilities.

### Hunter Standoff Killer Team (HSKT) ACTD



HSKT ACTD (FY01-FY06) will demonstrate advanced precision targeting, manned and unmanned vehicle teaming, and battlefield cognitive decision aiding. These advanced warfighting capabilities will be integrated from mature technologies. The elements will be linked with other service assets as part of a joint maneuver task force to show the utility of teamed airborne reconnaissance, surveillance, targeting, and attack operations in a joint environment. The HSKT ACTD will also demonstrate the tactics, techniques and procedures (TTPs) and concept of operations (CONOPS) while conducting a joint military utility assessment (JMUA). The combatant commander sponsor for this ACTD is Pacific Command (PACOM)/US Forces Korea (USFK).

The HSKT will improve the ability to mass fires and effects while increasing force effectiveness in lethality, survivability, and operational tempo. HSKT will also improve intelligence and battle command situational awareness. This ACTD enables Objective Force lethality capabilities by integrating and demonstrating the following technologies and tools:

- Cognitive Decision Aiding (CDA)
- Teaming UAVs with AH-64D Longbow Apaches and the Army Airborne Command and Control UH-60 Black Hawk. Manned/unmanned teaming will allow the AH-64D Longbow Apache to use UAVs as wingmen, extend shooter eyes-on-target, increase situation awareness within current cockpit workload, and produce a more lethal, more survivable, more responsive manned platform
- Precision targeting sensor on UAVs
- Upgraded accuracy of Joint Standoff Weapons (JSOW) engagements from Navy F/A-18
- Exploitation of overhead theater surveillance assets.

### A-160 Hummingbird

The A-160 Hummingbird, a DARPA/ARMY STO, is a rotary-wing UAV. The STO performance goals include 2500 nm range; 40 hours endurance; 30,000 ft ceiling; and out-of-ground-effect (OGE) hover performance of 15,000 ft. The vehicle is designed as either an extended range, multi-purpose or medium altitude, long endurance UAV to support the Objective Force units in primarily a C4ISR role. Other roles include tactical deployment of unattended ground sensors (UGSs), UGVs, and micro air vehicles (MAVs).

The A-160 relies on numerous advancements in technologies to achieve the unprecedented characteristics. First is a patented optimum speed rotor (OSR) control that allows the rotor to operate over a wide range of operating speeds. OSR allows the A-160 to operate at an optimum lift over drag (L/D) point for the specific flight conditions using high L/D airfoils. In order to allow the rotor to operate over this wide range, the rotor needs to be very stiff and light. The rotor blades are com-

posed of graphite fiber composites that satisfy both requirements. Second, the hingeless rigid main rotor system allows the vehicle to be very responsive, and combined with high speed electrical actuators, allows for precision control, higher harmonic control, and improved performance in gusty conditions. Third, the A-160 has a high fuel fraction and an efficient power plant.

Designed payload weight will be a minimum of 300 lbs and can be significantly increased by sacrificing range and endurance. Current maximum payload is 1,000 lbs. Projected aircraft-integrated payloads include electro-optic/infrared (EO/IR) surveillance systems, laser range finder/designators, synthetic aperture radar, ground moving target indicator radar, foliage penetration radar, electronic intelligence (ELINT) systems, communications network relays, net-centric communication nodes, satellite communication links, electronic countermeasures payloads. Many payloads will give a maneuver commander added situational awareness with the intent of increasing his situational understanding. There are also numerous payloads for remote delivery to include unmanned sensors and tactical resupply.

The A-160 Hummingbird is being developed by Frontier Systems, Inc., located in Irvine, CA.

### Unmanned Combat Armed Rotocraft



A highlight of the Army UAV S&T strategy is the on-going collaborative effort between the Army and DARPA on the A-160 Hummingbird and the unmanned combat armed rotorcraft (UCAR).

The UCAR program is a four-phase, eight-year program to design, mature, and demonstrate a vertical takeoff and landing, armed and lethal, unmanned rotorcraft for the Objective Force. UCAR will be designed for survivability, with optimal mobility and agility, and capable of going deep into the battlespace and performing attack and armed reconnaissance missions. UCAR will have the ability to function autonomously or as part of a manned/unmanned team with other Objective Force Systems, (e.g., Comanche and FCS). UCAR will enable the soldier of the Objective Force to See First, Understand First, and Act First while remaining out of harm's way.

The UCAR program was initiated in FY02 with an Army-DARPA Memorandum of Agreement. The program is currently in phase I (concept development and system trades) with four contractor teams: Sikorsky/Raytheon; Northrop Grumman;

Lockheed Martin/Bell; and Boeing. In mid-year FY03, phase I will be complete, and with Army-DARPA approval, the program will proceed into phase II (preliminary design) with two contractor teams.

### Micro Air Vehicle (MAV) ACTD

The MAV ACTD (FY02-FY06) will demonstrate an affordable, lift-augmented, ducted fan UAV that is "backpackable" or man-portable. The ACTD is jointly funded by the Army and DARPA and is an evolutionary product of both the Organic Air Vehicle (OAV) and the MAV DARPA programs. The threshold goals of the ACTD are: nine-inch diameter; less than five lbs gross weight airframe; high resolution electro-optical infrared (EOIR) wide field of views; sensors; and autonomous flight capability. The ACTD objective goals are: six-inch diameter, one lb gross weight airframe; high resolution EOIR wide field of views; sensors; and autonomous flight capability. The mission parameters for the MAV ACTD will be defined through spiral development and field trials. The mission will include vertical take-off and landing, high-speed forward flight, and ability to navigate using Global Positioning System (GPS) and other on-board sensors for improved situational awareness. The MAV is primarily a small-unit asset with an operating envelope up to 200 feet above ground level and a 10-kilometer radius from the controlling unit. The MAV platform's "perch and stare" mode provides a unique surveillance capability; utilizing this mode, the MAV lands (perches) and watches (stares) using the EOIR sensors to provide extended, real-time situational awareness.

The MAV ACTD addresses a critical warfighter need to provide close-in, real-time surveillance information at the small-unit level in complex and urban terrain and under adverse weather conditions. The MAV will enable the front line soldier to see around the corner, under the vegetation canopy, and inside the building while staying out of harm's way. The MAV ACTD is being sponsored by the US Pacific Command and will be evaluated by the 25th Infantry Division (Light).



### Objective Force Warrior (OFW)

OFW technologies enable a paradigm shift in future infantry soldier capabilities: including enhanced ballistic protection, clothing and equipment, dismounted warrior C4, compact power and power management, nutritional enhancements, soldier weapons, and warrior technology integration, all at reduced weight.

The following STOs enable Objective Force Warrior capabilities.



### OFW Advanced Technology Demonstration (ATD)

The OFW ATD will demonstrate revolutionary lethality, survivability, and agility for the dismounted soldier and small teams through an integrated system-of-systems approach. The goal is to provide the dismounted soldier the same combat-overmatch, skip-a-generation capability that the Future Combat Systems (FCS) brings to the maneuver portion of the Objective Force.

OFW will employ open-system architectures and high-risk/high-payoff technologies to yield a lightweight, multi-threat protective combat suit integrated with multi-function sensors, weapons, and medical capabilities. The soldier system-of-systems will allow the soldier to operate for extended periods under arduous conditions, with minimal loss in physical capabilities from fatigue, stress, and hardship. A network-centric communications/sensor/power suite will provide connectivity with other dismounted personnel, unmanned air/ground platforms, and FCS to form adaptive, distributed sensor networks for better situational understanding of local environ-

ments and threats. OFW connectivity will enable the soldier and small teams to network and mass fires, and generally access the power of the Objective Force.

Key performance goals include: 50 lbs maximum fighting load per warfighter; 24 hour individual, and 72 hour autonomous team operations; full networked communications; and compatibility with Warfighter Information Network-Tactical/Joint Tactical Radio System. A competitive concept exploration phase will be followed by design and demonstration phases to provide integrated system-of-systems soldier demonstrators for FY06 field experiments and demos. Concurrent maturation of technologies will be performed to ensure system-of-system affordability, with reduced sustainment costs.

### Portable and Mobile Power

This STO develops, demonstrates, and transitions component power technologies leading to higher-energy, lighter-weight, quiet, and more fuel and cost efficient power sources, generators, silent mobile power sources, chargers, and power management systems. This effort will provide technology advancements leading to:

- Fuel-efficient, quiet, tactical, mobile, power generation and silent watch for mobile platforms
- Smart rapid field chargers for recharging higher energy density batteries
- Portable hybrid power sources
- Power management for soldier systems.

Specific power solutions and goals will include component level development of high energy density hybrid power sources to provide at least 50 percent power reduction through the operating system level of Land Warrior. Specific mobile power solutions will include development of logistic fuel cell components for a 1–2 kW mobile power source for scout vehicle silent watch.

This effort will also mature and test advanced catalytic ignition technology, control electronics, and lightweight composites to provide for 10 kW power generators with reduced fuel consumption and 50 percent less volume and size.

### Individual Ballistic Protection

This program develops advances in materials technology to improve the protection and performance of armor systems for the individual warfighter against conventional and emerging ballistic threats. The STO will demonstrate protective materials technology with 35 percent lower system weight compared to the 1996 individual countermine protective systems. By FY03, the program will demonstrate an improved material system prototype for second-generation multiple ballistic threat protection with a 25 percent decrease in weight. This effort will develop enhanced/modified fundamental mechanics models to predict stress and failure in modern armor materials against these threats. The STO will demonstrate a protec-



tive (opaque) armor system with 30 percent reduced area density (compared to FY00) against fragment threat and tungsten-carbide core projectiles without incurring significant cost, bulk, or flexibility penalties.

## Lethality

FCS and the Objective Force will require a complementary mix of weapon systems to accomplish the flexible, layered lethality necessary for the full range of missions. The focus of the weapon systems development programs is to provide overwhelming lethality for line-of-sight (LOS), non-line-of-sight (NLOS), and beyond-line-of-sight (BLOS) with enhanced precision. Not only will these systems contribute to survivability of the FCS forces, but they will also reduce the sustainment requirements associated with delivering vast quantities of ammunition, missiles, or mortars to the battlefield. The following programs are key technologies in this area and the associated area of target detection/identification/designation.

### Low Cost Precision Kill/Advanced Precision Kill (LCPK) ATD

The goal of the LCPK ATD is to provide a mid-range, air-to-ground weapon capable of defeating non-tank targets such as selected personnel carriers, air defense emplacements, small watercraft, military operations on urbanized terrain targets, and lightly armored vehicles. The weapon will provide increased stowed kills and will be capable of point target accuracy while producing minimal collateral damage. The Army has identified and documented a requirement for Advanced Precision Kill Weapon Systems (APKWS) to fill the weapon gap between the current unguided 2.75-inch rocket system and the Hellfire anti-armor missile.

The LCPK ATD program addresses key features of the APKWS operational requirement by developing, demonstrating, and integrating a low-cost (less than \$10k), accurate ( $\sim 1$  m CEP), 2.75-inch guided rocket onto the AH-64D Apache. The LCPK will provide a standoff range of greater than 6 km with a surgical strike capability against specified point targets. The LCPK will use a small, strap-down laser seeker, off-the-shelf inertial devices, and low-cost control mechanization. A high single-shot probability of kill will be achieved, reducing cost-per-kill by 5 times, minimizing collateral damage, and increasing the number of stowed kills by 4 to 20 times.



### Responsive Accurate Mission Module (RAMM)

RAMM is a 120mm semi-automated, responsive, and high-angle mortar armament module that provides hybrid benefits of traditional mortars, artillery, and direct fire systems. The program will demonstrate a turreted mortar system able to receive digital threat information and engage targets out to 12 kilometers.

### Objective Crew Served Weapon (OCSW) ATD

The OCSW ATD will demonstrate the technological maturity and operational utility of a highly lethal, lightweight, two-man portable, crew-served weapon. This system will provide a full solution, day/night target acquisition and fire control system. The OCSW will significantly reduce the dismounted soldier's load by providing a greater than 60 percent reduction in weapon system weight, and a 75 percent reduction in ammunition on a weight-per-kill basis, compared to current crew-served weapon systems. With its high explosive, precision, airbursting munitions, the OCSW system will provide revolutionary overmatch lethality. The OCSW will defeat body-armor-protected threat personnel in defilade, out to a maximum effective range of two kilometers.

The OCSW will defeat light and lightly armored vehicles beyond one kilometer with its armor-piercing warhead, provide a heavy machine gun capability in a medium machine gun package/role, and will also be a fully interoperable, lethality component block upgrade to Land Warrior. In accordance with the strategy of the Army and Joint Service Small Arms Master Plans, the OCSW will provide the 21st century warfighter with dramatic improvements in lethality, survivability,

reduced soldier load, and sustainability. In addition to the impressive capabilities it affords to dismounted warriors, OCSW may be the secondary armament system for FCS vehicles.

### Solid State Laser (SSL) STO

In FY01, the Army resumed investments in high energy laser (HEL) technologies to support advanced weapon technology development efforts for the Objective Force. The Army S&T budget for HEL technology is supporting the development and demonstration of a high-average power (15–25 kilowatt) SSL laboratory breadboard by FY04. In FY04, the Army will evaluate the SSL concept against competing SSL efforts being supported by the High Energy Laser Joint Technology Office (HEL-JTO) High-Power Solid-State Laser Program. The most promising technology will then be upgraded into a 100 kilowatt SSL laboratory device, scheduled for completion in FY07.

This STO addresses related technical issues such as high average power output from compact and more efficient lasers; precision optical pointing and tracking; laser fluence degradation due to atmospheric effects; lethality; and effectiveness against low-cost laser countermeasures. To date, the Army has demonstrated the nation's highest average power, solid-state flash-lamp pumped laser (10 kW) as part of the SSL STO. The characteristics of SSL technology—such as efficient, all-electric operation, lightweight and compact packaging, and good beam propagation—show promise for deployment on a small, mobile weapon platform as an element in the FCS. The SSL STO is leveraging technological development and lessons learned from other on-going laser programs, such as the Department of Energy National Ignition Facility, the combined US/Israeli Tactical High Energy Laser Advanced Concept Technology Demonstration, the US Air Force Airborne Laser Program, and efforts supported by the DoD HEL JTO.

### High-G, Micro Electro-Mechanical Systems (MEMS), Inertial Measurement Unit (IMU) STO

The Army is using MEMS technology to develop affordable, precision guidance systems for missiles and munitions. The low-cost, high-G, MEMS IMU program is developing small, reliable, MEMS-based IMUs and inertial navigation systems (INS) in order to address the Army's concern over the high cost of traditional IMU systems, such as spinning mass, ring laser, and fiber-optic gyroscope-based systems. Army/Navy guided munitions and missiles require improvements in Fire Support (FS) capabilities for both close range and over-the-horizon missions. All extended range munitions require an inertial navigation system to achieve the required delivery accuracy.

A critical component of this system is the IMU. Today, the IMU is costly and cannot survive the high-G setback acceleration experienced by projectiles; it cannot provide tactical accuracies; and it cannot be produced in quantity. Accordingly, the Army is focusing on development of a common MEMS configured IMU product that meets

the requirements of 90 percent of all DoD guided tactical weapons. Although the specific application requirement varies among munitions, which need high-G capability, and missiles, which need high accuracy, the same processing and manufacturing technologies are necessary for high-yield, low-cost MEMS devices for both weapon systems.

These MEMS-based guidance systems will enable the development of faster, smaller, lighter, lower cost, and more precise munitions and missiles. MEMS technology also provides inherent cost savings and size reduction, making it ideal for application to navigation and control systems for small missiles and munitions and other applications. In addition to the size and weight savings, because the new MEMS IMUs are being designed to meet the requirements for more than 90 percent of the DoD tactical weapons, economies of scale in production will also result in major cost savings for DoD.



### Logistics Reduction

Logistics reduction technologies enhance deployability and reduce logistics demand. Examples include precision roll-on/roll-off air delivery, technologies for airfields and pavements to support force projection, and 21st century truck and robotics to support resupply and demand for food, fuel, and water. For convenience, environmental programs managed by the US Army Corps of Engineers are also included in this section. Following are some of the Army programs and STOs that will enable logistics reduction and environmental technologies.

### JRAC Joint Rapid Airfield Construction (JRAC) STO

This STO will produce engineering tools that will vastly improve the military's capability to rapidly construct contingency airfields in the theater of operations. The primary objectives of this program are to:

- Integrate advanced terrain analysis technologies and performance prediction modeling to optimize contingency airfield site selection

- Exploit advanced construction technologies to enhance airfield construction productivity
- Utilize emerging commercial soil stabilization technologies to rapidly provide contingency airfield surfaces capable of sustaining mission operations.

Rapid deployment of the Objective Force will require in-theater airfields to sustain intense aircraft traffic associated with the stability and support operations and small-scale conflict scenarios. In many force projection operations, in-theater airfields are either nonexistent or severely deteriorated. Currently, light/medium military engineer units do not have the capability to rapidly upgrade existing airfields or to construct contingency airfields to support Objective Force mission requirements.

The objectives of this STO will bring together technologies that will assist the Interim and Objective Forces in achieving optimal force projection throughput. This effort will create a rapid and effective site selection process, enhance construction productivity by 30 percent using computer assisted methods, and develop innovative stabilization techniques that will reduce required additive amounts by 50 percent and improve material cure times by as much as 96 percent.

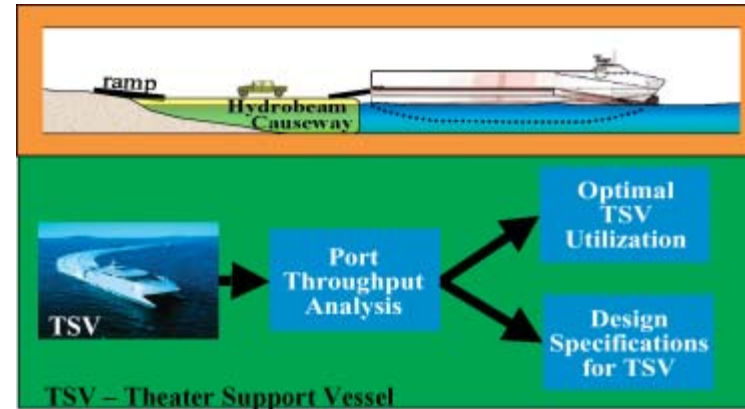


### Rapid Port Enhancement for the Theater Support Vessel (TSV) STO

This STO will develop rapidly installed causeways for offloading TSVs at small ports, utilizing high strength fabric technologies. The program also will develop objective tools for evaluating existing port throughput capacity, port upgrade potential, and potential power projection throughput.

The product of this STO will be a TSV-transportable causeway system that will build upon technologies produced by the Enhanced Coastal Mobility and Sea-State Mitigation ATD. This work will lead to a dramatic increase in the ability of the TSVs to accomplish required discharge rates, even in locations where the port infrastructure is extremely limited. Analytical tools will also be developed for identifying potential bottlenecks and predicting TSV throughput at small ports.

In FY04, an analytical modeling capability to predict causeway motions/responses will be developed and technologies for continued development and demonstration of the causeway system will be evaluated and down-selected. By FY06, modeling and simulation tools for bottleneck identification and prediction of TSV throughput capabilities at small ports will be completed and validated and a rapidly installed lightweight causeway system will be transitioned to system development and demonstration.

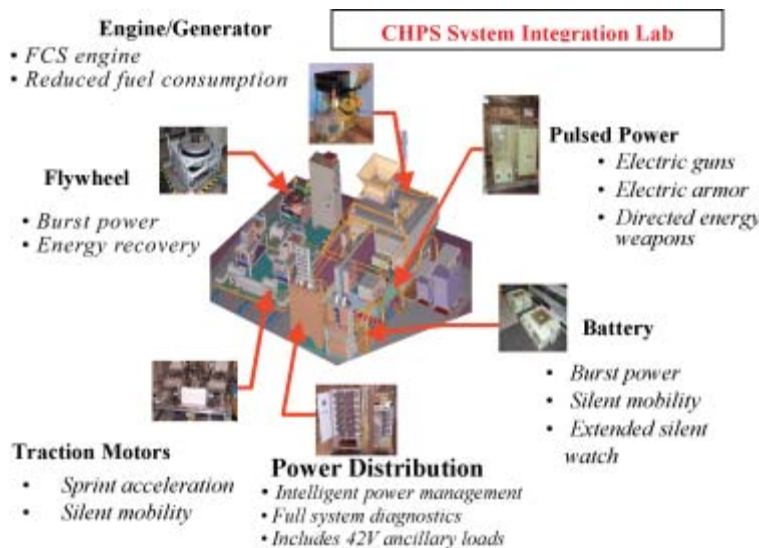


### Combat Hybrid Power Systems (CHPS)

The CHPS program will develop the necessary enabling technologies for a hybrid electric FCS providing silent operation and mobility, enhanced dash speed, battlefield robustness and reduced signatures (acoustic, thermal, visual, electromagnetic imaging [EMI]). Total system weight and volume will be reduced through lightweight, compact components. System architecture allowing intelligent energy management and power generation for electro-thermal-chemical (ETC) gun, directed energy weapons (DEW), and electromagnetic (EM) armor will also be developed. Both a hardware-in-the-loop system integration laboratory (SIL) and a virtual prototype environment are utilized to demonstrate and evaluate these technologies in a 15–20 ton notional combat vehicle. In-hub motors, electro-mechanical suspension, and wheel station development are part of the program.



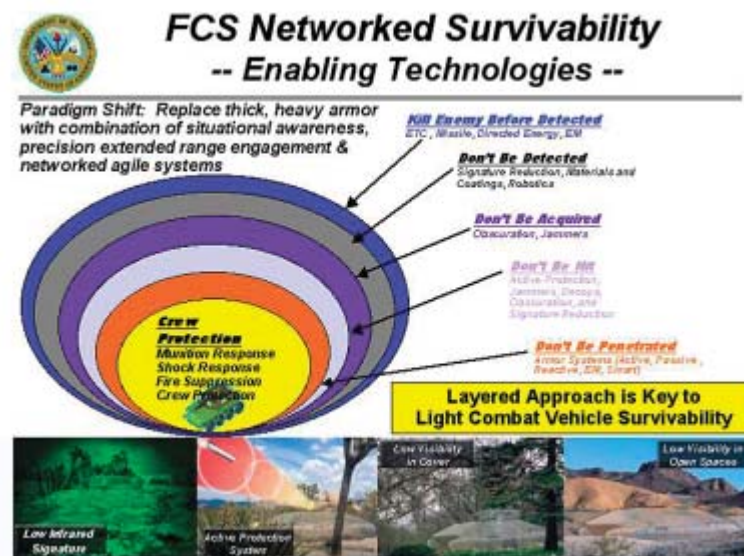
By FY03, the program will demonstrate 200 kilojoules pulsed power, complete 0.12 m<sup>3</sup> wheel motor demonstration. By FY04, the program will complete in-hub motor and wheel station integration. The system will achieve full performance within FCS volume constraints by FY05. Increased funding in FY03-05 enables volume, weight, and performance goals to be pursued simultaneously.



## Survivability

In FCS, the traditional notion that survivability equates to heavily armored vehicles is no longer valid. Survivability of the force and of individual platforms will be achieved with many layers of protection. The basic notion behind this concept is to "See First, Understand First, Act First and Finish Decisively."

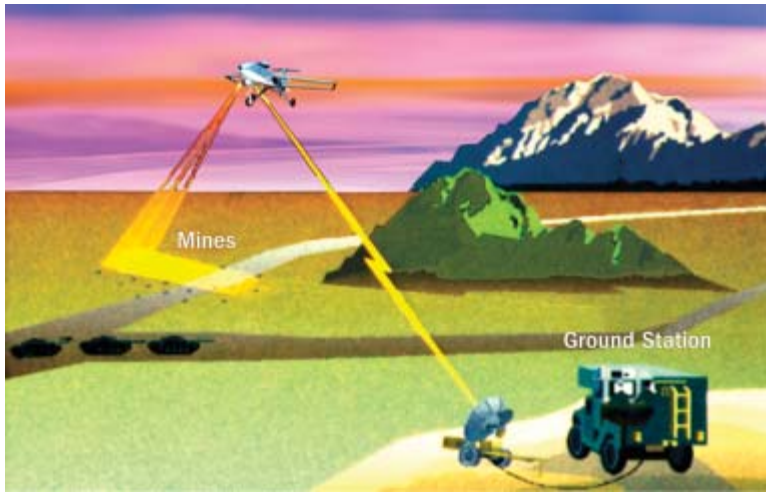
For FCS to be significantly more deployable and sustainable than current heavy forces, much lighter ground platforms will be needed. While survivability in FCS will be enhanced significantly through superior situational awareness and remote fires, the challenge for S&T is to provide sufficient platform protection for soldiers to perform their missions with confidence while keeping the systems light and agile. Following are some of the Army STOs that will enable survivability technologies.



## Lightweight Airborne Multispectral Minefield Detection (LAMD)

The LAMD system STO explores an innovative concept and technology to support a lightweight airborne stand-off minefield and nuisance mine detection system capable of detecting surface laid patterned minefields. This STO will investigate a variety of new components and focal plane array (FPA) technologies such as 3–5 micron size staring FPAs, multi-spectral/hyperspectral FPAs, passive polarization, active sources, sensor fusion and electronic stabilization to support a lightweight, limited capability for future tactical unmanned aerial vehicles (UAVs). LAMD has been structured to provide an interim capability, known as LAMD-I, which will provide a limited minefield detection capability that can be integrated onto the tactical UAV (TUAV) through the WESCAM Advanced Electro-Optical Infrared (EOIR) sensor as early as FY03.





### Ballistic Protection for FCS

Advanced frontal armors are needed to protect against large-caliber kinetic energy (KE) penetrators conditioned by active protection systems (APS), medium-caliber KE penetrators, and handheld infantry weapons that cannot be countered by APS. Structural armor is needed to protect against heavy machine guns and overhead artillery. The objectives for entry into the system development and demonstration phase of FCS are a weight of 80 lbs per square foot for frontal armor, and 20 lbs per square foot for structural armor.

This program addresses these challenges by combining several passive and energetic armor technologies, including the use of advanced ceramics, composite materials, lightweight high-strength metals and, possibly, energetic materials and electromagnetic defeat mechanisms.

### FCS Mine Detection and Neutralization

The FCS mine detection and neutralization effort will enhance warfighter operational tempo (rates of advance) during route clearance and mine avoidance missions, increase vehicle survivability, and enhance soldier survivability. The objective of this effort is to investigate, develop, and evaluate forward-looking sensor technologies, signal processing techniques, and mine neutralization techniques applicable to detecting and neutralizing on/off-route surface and buried anti-tank mines. Forward-looking mine detection goals involve detecting and locating mines at distances of 10–30 meters in front of the host vehicle, at speeds of 15–20 kph. Mine neutralization goals include the following:

- Probability of kill: 90–95 percent

- Standoff: 10–50 meters
- Rate of advance: 10–20 kph with low-order detonation.

FCS mine detection and neutralization will be designed as a modular system for bolt-on integration onto FCS vehicle platforms, avoiding the need for specialized overpass vehicles and following confirmation sensors. This program also will pay particular attention to total life cycle costs, sustainability, and maintainability. Sensor and neutralization technology will transition to advanced development and insertion into demonstration and acquisition programs. The program supports FCS, the Mounted Battle Lab, the Maneuver Support Battle Lab, and the Engineer School and Center.



### Integrated Army Active Protection System (IAAPS)

Active protection (AP), in conjunction with other survivability systems, will allow future combat vehicles to replace heavy armor with advanced lightweight armor. This program integrates and demonstrates active protection equipment and software designed to provide hemispherical protection of ground combat vehicles by diverting or destroying threat munitions at significant stand-off distances. Detailed trade studies of active protection technologies, conducted under this program, led to the selection of a suite of survivability equipment for ground combat vehicle application. The suite includes passive threat sensors, electronic warfare (EW) countermeasures, the Army Active Protection System (AAPS), a commanders' decision aid for command and control of the system, vehicle interface provisions, and soldier machine interface provisions.

In FY01, the program completed component and subsystem testing, and installed the suite on a ground combat vehicle. In FY02, the program completed static field-testing of the survivability system against a number of live-fired threats. In FY03 and FY04, AAPS will be transitioned from a static to a dynamic capability that will include: upgrading algorithms for vehicle motion compensation, development of a search radar, gimbal stabilization, and ruggedization of equipment. An AP threat defeat demonstration will be conducted from a moving

platform in FY04. The IAAPS technologies providing threshold capability will transition to the FCS PM in FY04. In FY05, IAAPS will integrate an improved EW suite, including sensors and countermeasures, into the AP platform and demonstrate the suite while the platform is moving.



### Close-In Active Protection for FCS

Protection against widely-proliferated rocket-propelled grenades and other man-portable anti-armor weapons is very difficult because they can be fired without warning from very short ranges and penetrate all but the heaviest armor. Close-in active protection technology offers the unique ability to protect lightweight combat vehicles from these weapons without the need for heavy armor.

The system uses staring sensors to detect incoming rounds and multiple countermeasure launchers to provide protection in all directions. The system is configured to respond instantly to threat weapons fired from very short ranges. The countermeasures are designed to attack the threat warhead from the side and defeat the warhead by destroying it before it can detonate.

In early 2003, the program will develop a prototype close-in active protection system mounted on a moving, light-armored vehicle and demonstrate the defeat of various man-portable anti-armor weapons.



### Full Spectrum Active Protection System (FSAP)

The purpose of an active protection system is to intercept an incoming threat munition and degrade or destroy it before impact, or to cause it to miss its intended target. The objective of the FSAP program is to demonstrate a single universal countermeasure for protection against smart top-attack, hit-to-kill (e.g., anti-tank guided missiles), large-caliber gun, tube-launched kinetic energy, and high explosive anti-tank (HEAT) threats. This is a joint program between the Tank Automotive Research, Development and Engineering Center, the Armaments Research, Development, and Engineering Center, the Army Research Laboratory, and the Aviation and Missile Research Development and Engineering Center. FSAP uses a balanced approach including development of armor systems to capture the residual debris of a successful active protection engagement. FSAP is a key enabling technology to provide protection for the lighter weight FCS that cannot afford the weight burden of armor alone to meet its ballistic protection requirements.

### Personnel

Personnel technologies include advanced training tools and methods to enhance warfighter and commander abilities and performance; advanced human engineering concepts to ensure human system physical compatibility; and cognitive engineering concepts to avoid information overload and optimize task allocation to enhance warfighting effectiveness. Following are some of the Army STOs that will enable personnel technologies.

### Methods and Measures of Commander-Centric Training STO

This STO will develop and assess training methods for Objective Force commanders and operators and formulate principles of effective training and measurement in the

Army's future environment. This STO will provide changes in unit behavior associated with digitization, identify key skills for digital system operators, identify key commander and operator skills, and develop measures of performance with defined levels of proficiency.

It will also describe requirements for automated measurement tools in realistic, simulated environments; employ controlled research environments for assessing training methods; and formulate and assess training principles for key command, control, communications, computers, intelligence, surveillance, and reconnaissance skills to provide to materiel, training, doctrine and training device developers.

### Selection, Classification, and Performance Metrics for the Objective Force STO

This STO will develop and test methods for identifying knowledge, skills, and attributes needed for effective future performance and for validating predictor measures needed for selecting and classifying soldiers in 2008 and beyond.

This STO will identify common demands for future Army initial entry jobs and identify selected future demands for two job groups and knowledge, skills, and attributes needed to effectively perform future jobs in these groups. The knowledge, skills, and attributes will include those linked to Army-wide demands as well as those unique to these groupings. The STO will develop predictors and measures of future performance, then link predictors and performance measures to provide recommendations for future enlisted selection and classification.

### Embedded Training and Mission Rehearsal

The goal of embedded training research is to develop simulation technology that will be embedded within Objective Force systems to provide training and mission rehearsal capabilities that are available anytime, anywhere. Research is being conducted to support embedded training for both mounted and dismounted warfighters. Embedded training will provide individuals, crews, and leaders with realistic training, skill development, and mission rehearsal capabilities that will be an integral part of their Future Combat Systems and Objective Force Warrior systems. When fielded, it will permit soldiers to train with their "go to war equipment" anytime, anywhere.

Embedded-training will integrate constructive and virtual simulations with actual warfighter machine interfaces creating an "on-board" environment that will allow individuals and crews to use sensors, displays, and controls to interact with virtual terrain and computer generated forces. The research will also explore the feasibility of using tactical C4ISR network and communications systems for net-based embedded training.



### Advanced Simulation

Advanced Simulation tools provide increasingly realistic environments and systems to support acquisition, requirements, and training. This includes technologies for networked simulations, embedded training, constructive simulations, virtual environments, and range systems for live use.

Following is one of the Army STOs that will enable Advanced Simulation leading to immersive virtual training.

### Joint Virtual Battlespace STO

Joint Virtual Battlespace is a systems framework, designed to provide the Army with Simulation Modeling Acquisition for Requirements and Training (SMART) capabilities in support of acquisition decisions and full life cycle analysis and training for FCS and Objective Force, and assist Army Transformation. Utilizing the JVB, Army will be able to evaluate how FCS contributes to the total capability of the Objective Force, and how the Objective Force plays in a joint force. The concept of JVB is:

- A configurable representation of information flows to stimulate network-centric warfare
- A flexible and tailorable modeling environment to measure the effectiveness of organization and operations, tactics, techniques, and procedures as functions of command, control, and communications



- A focus on high-fidelity platform representations to provide the crucial link between engineering-level, physics-based models, high-resolution platform-based models, and aggregate-level, unit-behavior-based models.

The JVB architecture allows integrated models to share data and services through a common consistent environment. The JVB's architecture is designed to enable a tailorable environment with high fidelity digital terrain and dynamic environmental effects.



### Institute for Creative Technologies (ICT)

The ICT at the University of Southern California is an innovative partnership with the private sector to exploit advances in the entertainment and game industries to achieve unprecedented realism in Army training. It is a Department of the Army-sponsored, university-affiliated center for research, application, and education in modeling and simulation technologies. Advances in modeling and simulation will revolutionize how the Army develops doctrine and requirements, designs equipment, trains soldiers, and rehearses missions. ICT represents an unprecedented collaboration between the Army and the entertainment industry. In its first two years, ICT has established itself as a dominant player in the field of human immersion in virtual reality environments. ICT's researchers have contributed significantly to basic research in such fields as natural language processing, real-time motion capture for animating virtual humans, and synthetic sound projection. The ICT has captured the resulting technologies to create immersive simulations such as the mission rehearsal exercise that was recognized by the Defense Modeling and Simulation Office as the best training simulation of 2001, and was awarded the best application of autonomous agent technology during the 2001 Autonomous Agents Conference.









## Appendices

Army Combat Organizations

Glossary of Terms

Systems by Contractors

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 up to 220 men

Artillery unit of this size is called a battery

Armored Cavalry or Air Cavalry unit is called a troop

Basic tactical element of the maneuver battalion or cavalry squadron

Normally five companies make up a battalion

### Battalion

Commanded by a lieutenant colonel

Tactically and administratively self-sufficient

Armored Cavalry and Air Cavalry equivalents called squadrons

Two or more combat battalions make up a brigade

### Brigade

Commanded by a colonel

May be employed on independent or semi-independent operations

Combat, combat support or service support elements may be attached to perform specific missions

Normally three combat brigades are in a division

### Division

Commanded by a major general

Fully structured division has own brigade-size artillery, aviation, engineer, combat support and service elements

Two or more divisions make up a corps commanded by a lieutenant general



**Acquisition Categories (ACAT):** ACAT I programs are Milestone Decision Authority Programs (MDAPs) or programs designated ACAT I by the Milestone Decision Authority (MDA). ACAT I programs have two sub-categories:

1. ACAT ID, for which the MDA is USD (A&T). The “D” refers to the Defense Acquisition Board (DAB), which advises the USD (A&T) at major decision points.
2. ACAT IC, for which the MDA is the DOD Component Head or, if delegated, the DOD Component Acquisition Executive (CAE). The “C” refers to Component. The USD (A&T) designates programs as ACAT ID or ACAT IC.

**ACAT IA** programs are MAISs or programs designated by the Assistant Secretary of Defense for Command, Control, Communications, and Intelligence (ASD [C3I]) to be ACAT IA. A MAIS is an AIS acquisition program that is:

1. Designated by the ASD (C3I) as a MAIS, or
2. Estimated to require program costs in any single year in excess of 30 million in FY96 constant dollars, total program costs in excess of 120 million in FY96 constant dollars, or total life-cycle costs in excess of 360 million in FY96 constant dollars.

ACAT IA programs have two sub-categories:

1. **ACAT IAM**, for which the MDA is the Chief Information Officer (CIO) of the Department of Defense (DOD), the ASD (C3I). The “M” (in ACAT IAM) refers to Major Automated Information System Review Council (MAISRC). (Change 4, 5000.2-R)
2. **ACAT IAC**, for which the DOD CIO has delegated milestone decision authority to the CAE or Component CIO. The “C” (in ACAT IAC) refers to Component.

**ACAT II** programs are defined as those acquisition programs that do not meet the criteria for an ACAT I program, but do meet the criteria for a major system, or are programs designated ACAT II by the MDA.

**ACAT III** programs are defined as those acquisition programs that do not meet the criteria for an ACAT I, an ACAT IA, or an ACAT II. The MDA is designated by the CAE and shall be at the lowest appropriate level. This category includes less-than-major AISs.

**Acquisition Phase:** All the tasks and activities needed to bring a program to the next major milestone occur during an acquisition phase. Phases provide a logical means of progressively translating broadly-stated mission needs into well-defined system-specific requirements and ultimately into operationally effective, suitable, and survivable systems. The acquisition phases for the systems described in this handbook are defined below:

**Concept and Technology Development:** Concept and Technology Development refers to the development of a materiel solution to an identified, validated need. During this phase, the Mission Needs Statement (MNS) is approved, technology issues are considered, and possible alternatives are identified. In this phase, the initiation concept is approved, a lead Component is designated, and exit criteria are established. The leader of the concept development team will work with the integrated test team to develop an evaluation strategy that describes how the capabilities will be evaluated once the system is developed.

Major components of this phase are Concept Exploration, Decision Review, and Component Advanced Development. Concept Exploration evaluates the feasibility of alternative concepts and assesses the merits of these concepts. This phase ends with a Decision Review, at which the preferred concept for which technologies are available is selected. The Decision Review may also determine whether additional component development is necessary before key technologies can enter System Development and Demonstration. Component Advance Development occurs when the project leader has a concept for the needed capability, but does not yet know the system architecture. The project exits Component Advanced Development when a system architecture has been developed and the component technology has been demonstrated in the relevant environment or the Milestone Decision Authority (MDA) decides to end this effort. This effort is intended to reduce risk on components that have only been demonstrated in a laboratory environment and to determine the appropriate set of subsystems to be integrated into a full system.

**System Development and Demonstration:** System development and demonstration is the process of developing concepts into producible and deployable products that provide capability to the user. The purpose of this phase is to develop a system, reduce program risk, ensure operational supportability, design for producibility, ensure affordability, and demonstrate system integration, interoperability, and utility. The major components of this phase are System Integration, System Demonstration, and Interim Progress Review. Development is aided by the use of simulation-based acquisition and guided by a system acquisition strategy and test and evaluation master plan (TEMP). System modeling, simulation, and test and evaluation activities are integrated into an efficient continuum planned and executed by a test and evaluation integrated product team (T&E IPT).

The independent planning, execution, and evaluation of dedicated Initial Operation Test and Evaluation (IOT&E), as required by law, and Follow-on Operational Test and Evaluation (FOT&E), if required, are the responsibility of the appropriate operational test activity (OTA). The program enters System Integration when the Project Manager has an architecture for the system, but has not yet integrated the subsystems into a complete system. This effort is intended to integrate the subsystems and reduce system-level risk. The purpose of the

Interim Progress Review is to confirm that the program is progressing as planned or to adjust the plan to better accommodate progress made to date, changed circumstances, or both. The program enters System Demonstration when the Project Manager has demonstrated the system in prototype articles.

**Production and Deployment:** The purpose of the Production and Deployment phase is to achieve an operational capability that satisfies mission needs. In this phase, software has to prove its maturity level prior to deploying to the operational environment. Once maturity has been proven the system or block is baselined and a methodical and synchronized deployment plan is implemented to all applicable locations. A system must be demonstrated before DOD will commit to production and deployment. For DOT&E Oversight programs, a system can not be produced at full-rate until a Beyond Low-Rate Initial Production Report has been completed and sent to Congress, the Secretary of Defense, and the USD(AT&L).

The components of this phase include Low-Rate Initial Production (LRIP), the Full-Rate Production Decision Review, and Full-Rate Production and Deployment. LRIP is intended to result in completion of manufacturing development to ensure adequate manufacturing capability and to produce the minimum quantity necessary for initial operational test and evaluation. The Full-Rate Production Decision Review considers the cost estimate, manpower, results of test and evaluation, compliance and interoperability certification. Following the completion of a Full-Rate Production Decision Review, the program enters Full-Rate Production and Deployment.

**Operations and Support:** The objective of the Operations and Support phase is the execution of a support program that meets operational support performance requirements and sustainment of systems in the most cost-effective manner throughout their life-cycle. The sustainment program includes all elements necessary to maintain the readiness and operational capability of deployed systems. The scope of support varies among programs but generally includes supply, maintenance, transportation, sustaining engineering, data management, configuration management, manpower, personnel, training, habitability, survivability, safety, IT supportability, and environmental management functions. This activity also includes the execution of operational support plans.

Programs with software components must be capable of responding to emerging requirements that will require software modification or periodic enhancements after a system is deployed. A follow-on operational test and evaluation program that evaluates operational effectiveness, survivability, suitability, and interoperability, and that identifies deficiencies is conducted, as appropriate.

At the end of its useful life, a system must be demilitarized and disposed of. Disposal must be carried out according to all legal and regulatory requirements relating to safety, security and the environment.

**Acquisition Program:** A directed, funded effort designed to provide a new, improved or continuing weapons system or AIS capability in response to a validated operational need. Acquisition programs are divided into different categories that are established to facilitate decentralized decision-making, and execution and compliance with statutory requirements.

**Advanced Concept Technology Demonstrations (ACTDs):** ACTDs are a means of demonstrating the use of emerging or mature technology to address critical military needs. ACTDs themselves are not acquisition programs, although they are designed to provide a residual, usable capability upon completion. If the user determines that additional units are needed beyond the residual capability and that these units can be funded, the additional buys shall constitute an acquisition program with an acquisition category generally commensurate with the dollar value and risk of the additional buy.

**Automated Information System (AIS):** A combination of computer hardware and software, data, or telecommunications, that performs functions such as collecting, processing, transmitting, and displaying information. Excluded are computer resources, both hardware and software, that are physically part of, dedicated to, or essential in real time to the mission performance of weapon systems.

**Commercial and Non-Developmental Items:** Market research and analysis shall be conducted to determine the availability and suitability of existing commercial and non-developmental items prior to the commencement of a development effort, during the development effort, and prior to the preparation of any product description. For ACAT I and IA programs, while few commercial items meet requirements at a system level, numerous commercial components, processes, and practices have application to DOD systems.

**Demilitarization and Disposal:** At the end of its useful life, a system must be demilitarized and disposed. During demilitarization and disposal, the PM shall ensure materiel determined to require demilitarization is controlled and shall ensure disposal is carried out in a way that minimizes DOD's liability due to environmental, safety, security, and health issues.

**Developmental Test and Evaluation (DT&E):** DT&E shall identify potential operational and technological capabilities and limitations of the alternative concepts and design options being pursued; support the identification and description of design technical risks; and provide data and analysis in support of the decision to certify the system ready for operational test and evaluation.

**Division Capstone Exercise (DCX):** DCX I and DCX II demonstrated the progress made in modernizing and digitizing Army heavy forces. The 4th Infantry Division (Mechanized) faced the world-class opposing force (OPFOR) of the National Training Center at Fort Irwin, in DCX I to emphasize digitization and continuous operations. This exercise demonstrated the degree to which the command and control of these



forces has been enhanced through the advanced information technology. DCX II, at Fort Hood, TX, demonstrated the future potential of the Army's modernization and recapitalization efforts—made possible by embedding advanced technologies, especially information technology, within the 4th Infantry Division. The technologies enable the division to operate in an expanded battlespace in which they see first, understand first, act first and win decisively. These systems are programmed for fielding to the Army's Counteroffensive Corps, III Corps, and the Interim Brigade Combat Teams.

**Interim Force:** The Interim Force units will be highly mobile at the strategic, operational and tactical levels. They will be C-130-like transportable and equipped with a family of Interim Armored Vehicles, lightweight artillery and other available technology designed to ensure maximum lethality and survivability while increasing tactical, operational, and strategic maneuver. The Interim Force will be organized as a rapidly deployable, full-spectrum force, providing the warfighting CINCs with increased options for Small Scale Contingencies (SSCs) while not compromising readiness for Major Theater Wars (MTWs). Its design also supports rapid integration of multinational and interagency capabilities for peace keeping/peace enforcement and warfighting missions.

**Joint Program Management:** Any acquisition system, subsystem, component or technology program that involves a strategy that includes funding by more than one DOD component during any phase of a system's life cycle shall be defined as a joint program. Joint programs shall be consolidated and collocated at the location of the lead Component's program office, to the maximum extent practicable.

**Legacy Force:** Until and even after the Objective Force has begun fielding, the Legacy Force will maintain the Army's non-negotiable contract with the American people—to fight and win the nation's wars. Through selective recapitalization and modernization of equipment, the Legacy Force will have the technological superiority to win decisively in any conflict. Digitization and other initiatives instituted previously during the Force XXI process will ensure the Army retains the capability to dominate in MTW. The Legacy Force, complemented by the Interim Force as it is fielded, will be the Army's force until the Objective Force is fully fielded.

**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 pro-

duction until realistic survivability or lethality testing is completed and the report required by statute is submitted to the prescribed congressional committees.

**Low-Rate Initial Production (LRIP):** The objective of this activity is to produce the minimum quantity necessary to: provide production configured or representative articles for operational tests, -establish an initial production base for the system; and permit an orderly increase in the production rate for the system, sufficient to lead to full-rate production upon successful completion of operational -testing.

**Major Automated Information System (MAIS) Acquisition Program:** An AIS acquisition program that is (1) designated by ASD (C3I) as a MAIS, or (2) estimated to require program costs in any single year in excess of 30 million in FY96 constant dollars, total program costs in excess of 120 million in FY96 constant dollars, or total life-cycle costs in excess of 360 million in FY96 constant dollars. MAISs do not include highly sensitive classified programs.

**Major Defense Acquisition Program (MDAP):** An acquisition program that is not a highly sensitive classified program (as determined by the Secretary of Defense) and that is: (1) designated by the Under Secretary of Defense (Acquisition and Technology) (USD [A&T]) as an MDAP, or (2) estimated by the USD (A&T) to require an eventual total expenditure for research, development, test and evaluation of more than 355 million in FY96 constant dollars or, for procurement, of more than 2.135 billion in FY96 constant dollars.

**Major Milestone:** A major milestone is the decision point that separates the phases of an acquisition program. MDAP milestones include, for example, the decisions to authorize entry into the engineering and manufacturing development phase or full rate production. MAIS milestones may include, for example, the decision to begin program definition and risk reduction.

**Major System:** A combination of elements that shall function together to produce the capabilities required to fulfill a mission need, including hardware, equipment, software, or any combination thereof, but excluding construction or other improvements to real property. A system shall be considered a major system if it is estimated by the DOD Component Head to require an eventual total expenditure for RDT&E of more than 135 million in FY96 constant dollars, or for procurement of more than 640 million in FY96 constant dollars, or if designated as major by the DOD Component Head.

**Milestone Decision Authority (MDA):** The individual designated in accordance with criteria established by the USD (A&T), or by the ASD (C3I) for AIS acquisition programs, to approve entry of an acquisition program into the next phase.

**Modifications:** Any modification that is of sufficient cost and complexity that it could itself qualify as an ACAT I or ACAT IA program shall be considered for man-

agement purposes as a separate acquisition effort. Modifications that do not cross the ACAT I or IA threshold shall be considered part of the program being modified, unless the program is no longer in production. In that case, the modification shall be considered a separate acquisition effort. (Added from 5000.2-R)

**Objective Force:** The Objective Force will be equipped with significantly advanced systems centered around the Future Combat Systems (FCS). It will be a system of systems, networked internally and externally through a responsive, reliable, mobile, non-line-of-sight, and commander-and-execution-centric command and control capability. It will leverage joint/interagency reachback and Army direct downlink capabilities for intelligence, personnel and force planning, administration, technical engineering, information operations and logistical support.

**Operational Support:** The objectives of this activity are the execution of a support program that meets the threshold values of all support performance requirements and sustainment of them in the most life-cycle cost-effective manner. A follow-on operational testing program that assesses performance and quality, compatibility, and interoperability, and identifies deficiencies shall be conducted, as appropriate. This activity shall also include the execution of operational support plans, to include the transition from contractor to organic support, if appropriate. (Added from 5000.2-R)

**Operational Test and Evaluation (OT&E):** OT&E shall be structured to determine the operational effectiveness and suitability of a system under realistic conditions (e.g., combat) and to determine if the operational performance requirements have been satisfied. The following procedures are mandatory: threat or threat representative forces, targets, and threat countermeasures, validated in coordination with DIA, shall be used; typical users shall operate and maintain the system or item under conditions simulating combat stress and peacetime conditions; the independent operational test activities shall use production or production representative articles for the dedicated phase of OT&E that supports the full-rate production decision, or for ACAT IA or other acquisition programs, the deployment decision; and the use of modeling and simulation shall be considered during test planning. There are more mandatory procedures (9 total) in 5000.2-R. Either include all mandatory procedures or rewrite the definition.

**For additional information on acquisition terms, or terms not defined, please refer to:**

*AR 70-1, Army Acquisition Policy, or*

*DA PAM 70-3, Army Acquisition Procedures.*

**AAI Corporation**

Tactical Unmanned Aerial Vehicle

**AATNA**

Avenger

**ACS**

Distributed Learning System (DLS)

**AFRA**

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

**AM General**

High Mobility Multipurpose Wheeled Vehicle (HMMWV)

**APC**

Air/Missile Defense Planning and Control System (AMDPCS)

**ARC**

Line of Sight Anti-Tank (LOSAT)

**ARDEC**

Mortar (120mm)  
Precision Guided Mortar Munition (PGMM)

**ASI**

Avenger

**Advanced System Technology**

Close Combat Tactical Trainer

**Action Manufacturing**

2.75 Inch Rocket System/Advanced Precision Kill Weapon System

**Alliant Techsystems**

2.75 Inch Rocket System/Advanced Precision Kill Weapon System

Ammunition

War Reserve Mod

Tank Main Armament System (TMAS)

OICW

Small Arms (M16A4, M240B, M249, M4, MK19, XM107)

**Allied Signal**

Multiple Launch Rocket System (MLRS) Upgrade (Launchers)

**Allison**

Family of Medium Tactical Vehicles (FMTV)

**Anniston Army Depot**

Paladin

**Army Research Lab**

Integrated Meteorological System (IMETS)

**Atlantic Research**

Army Tactical Missile System (ATACMS) Block IA (APAM & QRU)

**Austin Information Systems**

All Source Analysis System (ASAS)

**AVTEL**

FIXED WING

**BAE Systems**

Advanced Threat Infrared Countermeasures (ATIRCM) Common Missile Warning System (CMWS) Countermine  
Joint Chemical Agent Detector (JCAD)  
Joint Tactical Radio System (JTRS)  
Lightweight 155mm Howitzer (LW155)  
Line of Sight Anti-Tank (LOSAT)  
War Reserve Mod

Longbow Hellfire

Army Data Distribution System (ADDS)/EPLRS

Single Channel Ground and Airborne Radio System (SINCGARS)

Theater High Altitude Area Defense (THAAD)

Warfighter Information Network (WIN)-Tactical

**BBN Technology**

Warfighter Information Network (WIN)-Tactical

**BFG**

Army Tactical Missile System (ATACMS) Block IA (APAM & QRU)

**Battelle**

Joint Biological Point Detection System (JBPDS)

**Bechtel**

Abrams Upgrade

**Bell Helicopter Textron**

Kiowa Warrior

**Boeing**

Apache  
Avenger  
Chinook  
Comanche (Boeing Sikorsky Team)  
Common Missile  
Defense Satellite Communications System (DSCS)  
Future Combat Systems (FCS)  
Joint Tactical Radio System (JTRS)  
PATRIOT (PAC-3)  
Theater High Altitude Area Defense (THAAD)

**Bofors Defence (UDLP)**

Excalibur (XM982) (with Raytheon)

**Bolinger/Incat USA**

Theater Support Vessel (TSV)

**Booz Allen Hamilton**

Common Ground Station (CGS)  
Army Key Management System

**Brashear, LP**

Objective Individual Combat Weapon (OICW)

**Bruhn Newtech**

Joint Warning and Reporting Network (JWARN) (Block 1)

**CACI**

Airborne Reconnaissance Low (ARL)  
Common Ground Station (CGS)  
Guardrail/Common Sensor

**Camber**

Precision Guided Mortar Munition (PGMM)  
Paladin

**CAS, Inc**

Army Airborne Command and Control System (A2C2S)  
Joint Land Attack Cruise Missile Defense Elevated Netted Sensors System (JLENS)  
Medium Extended Air Defense System (MEADS)

**Caterpillar**

Family of Medium Tactical Vehicles (FMTV)  
Construction Equipment

**Cedarapids, Inc.**

Construction Equipment

**Cessna Aircraft**

Fixed Wing

**CMI**

Tactical Unmanned Aerial Vehicle  
(TUAV)

**Communications Systems Support**

Army Key Management System

**Computer Science Corp**

Land Warrior  
Joint Computer-Aided Acquisition &  
Logistics System (JCALS)  
Guided Multiple Launch Rocket System  
(GMLRS)  
Mobile, Tactical, High Energy Laser  
(MTHL)  
Advanced Field Artillery Tactical Data  
System (AFATDS)

**CSTI**

Tactical Operations Centers (TOC)

**CTC**

Common Hardware System

**Cubic Defense Systems**

Common Ground Station (CGS)

**Chamberlain Manufacturing**

Mortar (120mm)

**Cisco Systems Corporation**

Reserve Component Automation System  
(RCAS)

**Colt's Manufacturing**

Small Arms

**Composite Structures**

Apache

**Creative Apparel Associates**

Joint Service Lightweight Integrated Suit  
Technology (JSLIST)

**Cubic Defense Systems**

Common Ground Station (CGS)

**CyTerra**

Countermine

**DPA**

Tactical Unmanned Aerial Vehicle  
(TUAV)

**DRS Technologies**

2nd Gen FLIR  
Bradley Upgrade  
Improved Target Acquisition System  
Long Range Advanced Scout  
Surveillance System (LRAS3)

**Day and Zimmerman**

Ammunition

**Defiance**

High Mobility Multipurpose Wheeled  
Vehicle (HMMWV)

**DeHavilland Aviation**

Fixed Wing

**Detroit Diesel**

Paladin  
Heavy Expanded Mobility Tactical Truck  
(HEMTT) Extended Service Program  
/HEMTT - ESP

**Dewey Electronics**

Tactical Electric Power

**Diehl**

Precision Guided Mortar Munition  
(PGMM)

**Digicon**

Reserve Component Automation System  
(RCAS)

**Draper Laboratory**

Precision Guided Mortar Munition  
(PGMM)

**Duncan**

Fixed Wing

**DynCorp**

Transportation Coordinators' Automated  
Information for Movements System II  
(TC-AIMS II)

**Dynetics**

Stinger

**DynPort LLC**

Anthrax Vaccine Absorbed  
Joint Vaccine Acquisition Program  
(Botulism, Venezuelan equine  
encephalitis, Tularemia)  
Smallpox Vaccine

**Evans & Sutherland**

Close Combat Tactical Trainer

**ECC**

Engagement Skills Trainer 2000

**EFW**

Bradley Upgrade

**EG&G**

Countermine

**EPS**

Secure Mobile Anti-Jam Reliable  
Tactical Terminal (SMART-T)  
Advanced Field Artillery Tactical Data  
System (AFATDS)  
Single Channel Ground and Airborne  
Radio System (SINCGARS)

**ERDAS**

Digital Topographic Support System  
(DTSS)

**Ensign Bickford**

Countermine

**ESRI**

Digital Topographic Support System  
(DTSS)

**FATS, Inc.**

Engagement Skills Trainer 2000

**FCBS**

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

**FN Manufacturing**

Small Arms

**Fairchild**

Fixed Wing

**Fermont**

Tactical Electric Power

**GD Versatron**

Excalibur (XM982)

**GD Weapons**

Small Arms



#### **General Dynamics Land Systems**

2nd Gen FLIR  
Abrams Upgrade  
Stryker

#### **General Dynamics Ordnance and Tactical Systems**

Excalibur (XM982)  
Mortar (120mm)  
Tank Main Armament System (TMAS)

#### **General Dynamics Robotics Systems**

Smoke Generator (M56 Fox)

#### **GenCorp**

Joint Tactical Ground Station (JTAGS)

#### **General Electric**

Black Hawk  
Army Tactical Missile System  
(ATACMS) Block I & IA

#### **GEO-Centers**

Advanced Tactical Parachute System  
(ATPS)

#### **GEP**

High Mobility Multipurpose Wheeled  
Vehicle (HMMWV)

#### **GNK Westland**

Black Hawk

#### **GRC International**

Reserve Component Automation  
System (RCAS)

#### **General Dynamics**

2.75 Inch/APKWS  
Advanced Field Artillery Tactical Data  
System (AFATDS)  
Air Traffic Control

All Source Analysis System (ASAS)  
Combat Service Support Control  
System (CSSCS)  
Common Ground Station (CGS)  
Common Hardware System  
Forward Area Air Defense Command  
and Control (FAAD C2)  
Future Combat Systems (FCS)  
Global Command and Control  
System-Army (GCCS-A)  
Integrated System Control (ISYSCON)  
V(1)/V(2)  
Lightweight 155mm Howitzer (LW155)  
Maneuver Control System (MCS)  
(ATCCS)  
Nuclear, Biological and Chemical  
Reconnaissance System (NBCRS)-Fox  
Single Channel Ground and Airborne  
Radio System (SINCGARS)  
Tactical Operations Centers (TOC)  
Warfighter Information Network (WIN)-  
Tactical

#### **General Motors**

High Mobility Multipurpose Wheeled  
Vehicle (HMMWV)

#### **General Motors Defense**

Stryker

#### **Getronics**

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

#### **Goodyear**

**Graseby Electronics, LTD**  
Automatic Chemical Agent  
Detector/Alarm (ACADA)

#### **Group Home Foundation/Belfast Industries, Inc.**

Joint Service Lightweight Integrated  
Suit Technology (JSLIST)  
**Grove NA**  
Construction Equipment

#### **Gulfstream**

Fixed Wing

#### **H&K**

Objective Individual Combat Weapon  
(OICW)

#### **Harris Corporation**

Defense Satellite Communications  
System (DSCS)  
MIDS (LINK-16)  
MLRS Upgrade (Launchers)  
Warfighter Information Network (WIN)-  
Tactical

#### **Henschel Wehrtechnik**

Nuclear, Biological and Chemical  
Reconnaissance System (NBCRS)-Fox

#### **Honeywell**

Abrams Upgrade  
Chinook  
Comanche (with Rolls Royce)  
Kiowa Warrior  
Line of Sight Anti-Tank (LOSAT)  
Stinger  
Theater High Altitude Area Defense  
(THAAD)  
**Hydro-Mill**  
Lightweight 155mm Howitzer (LW155)

#### **IBM**

Distributed Learning System (DLS)

#### **ILEX**

Guardrail/Common Sensor

#### **Information Systems Engineering Command**

Defense Satellite Communications  
System (DSCS)

#### **Information Systems Support, Inc.**

Army Key Management System

#### **ITT**

Defense Satellite Communications  
System (DSCS)  
Single Channel Ground and Airborne  
Radio System (SINCGARS)

#### **Innolog**

Army Data Distribution System  
(ADDS)/EPLRS

#### **Intellitec**

Joint Biological Point Detection  
System (JBPDS)  
Joint Service Lightweight Standoff  
Chemical Agent Detector (JSLSCAD)

#### **John Deere**

Construction Equipment

#### **KAISER ELECTRONICS**

Land Warrior

#### **Kalmar RTC**

Materiel Handling Equipment

#### **Kuchera Defense**

Integrated Family of Test Equipment  
(IFTE)

**L-3 Communications**

Aviation Combined Arms Tactical Trainer (AVCATT)  
Force XXI Battle Command Brigade-and-Below (FBCB2)  
Mortar (120mm)  
Guardrail/Common Sensor

**L-3/IEC**

Excalibur (XM982)

**L-3 KDI**

Excalibur (XM982)

**Laguna Industries**

Integrated System Control (ISYSCON)  
V(1)/V(2)

**Light Helicopter Turbine Engine Company (LHTEC)**

Comanche

**Lincoln Labs**

Secure Mobile Anti-Jam Reliable Tactical Terminal (SMART-T)  
Joint Biological Point Detection System (JBPDS)

**Lockheed Martin**

PATRIOT (PAC-3)  
Aerial Common Sensor  
All Source Analysis System (ASAS)  
Apache  
Army Tactical Missile System (ATACMS)  
ATACMS Block IA(APAM & QRU)  
Close Combat Tactical Trainer (CCTT)  
Comanche  
Combat Service Support Control System (CSSCS)  
Common Missile  
Global Command and Control System-Army (GCCS-A)

Guided Multiple Launch Rocket System (GMLRS)  
High Mobility Artillery Rocket System (HIMARS)  
Javelin (joint venture with Raytheon)  
Joint Tactical Ground Station (JTACS)  
Line of Sight Anti-Tank (LOSAT)  
Longbow Hellfire  
Maneuver Control System (MCS) (ATCCS)  
Multiple Launch Rocket System (MLRS)  
Precision Guided Mortar Munition (PGMM)  
Theater High Altitude Area Defense (THAAD)  
War Reserve Mod  
Warfighter Information Network (WIN)-Tactical  
Warfighters Simulation 2000 (WARSIM)

**Logicon**

MIDS (LINK-16)

**Longbow LLC**

Longbow Hellfire

**M/A-COM**

Longbow Hellfire

**MANTECH**

All Source Analysis System (ASAS)

**MEADS, Intl.**

Medium Extended Air Defense System (MEADS)

**MITRE**

MIDS (LINK-16)

**MLS**

Avenger

**MTC**

Tactical Electric Power

**Mevatec**

Joint Tactical Ground Station (JTACS)  
Mobile, Tactical, High Energy Laser (MTHL)

**Michelin**

Heavy Expanded Mobility Tactical Truck (HEMTT) Extended Service Program/HEMTT - ESP

**Miller – USA**

Tactical Electric Power

**Miltope**

Integrated Family of Test Equipment (IFTE)

**NTS**

Guided Multiple Launch Rocket System (GMLRS)

**Natel Engineering**

Stinger

**National Center for the Employment of the Disabled**

Joint Service Lightweight Integrated Suit Technology (JSLIST)

**Navigator Development**

Future Combat Systems (FCS)

**New Mexico State University at Las Cruces**

Integrated Meteorological System (IMETS)

**Northrop Grumman**

ABN Recon-Low  
Advanced Threat Infrared Countermeasures (ATIRCM) Common Missile Warning System (CMWS)  
Aerial Common Sensor  
Airborne Reconnaissance Low (ARL)  
Air Traffic Control  
Apache  
ATIRCM/CMWS  
Defense Satellite Communications System (DSCS)  
Digital Topographic Support System (DTSS)  
Future Combat Systems (FCS)  
Integrated Family of Test Equipment (IFTE)  
Integrated Meteorological System (IMETS)  
Joint Tactical Ground Station (JTACS)  
Lightweight Laser Designator  
Rangefinder (LLDR)  
Longbow Hellfire  
Tactical Exploitation System (TES)

**O’Gara-Hess**

High Mobility Artillery Rocket System (HIMARS)  
High Mobility Multipurpose Wheeled Vehicle (HMMWV)

**Omega Training Group**

Land Warrior  
OICW

**Oshkosh Truck**

Heavy Expanded Mobility Tactical Truck (HEMTT) Extended Service Program/HEMTT - ESP

**PECS**

Chinook

**Pemstar**  
Land Warrior

**PTC**  
Future Combat Systems (FCS)

**Pacific Consultants**  
Land Warrior

**Para-Flite**  
Advanced Tactical Parachute System (ATPS)

**Paragon Systems**  
Tactical Exploitation System (TES)

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

**Parker Hannifin**  
Apache  
Black Hawk

**Peckham Vocational Industries, Inc.**  
Joint Service Lightweight Integrated Suit Technology (JSLIST)

**Pine Bluff Arsenal**  
Mortar (120mm)

**Precision Castparts Corporation**  
Lightweight 155mm Howitzer (LW155)

**Quantum Magnetics**  
Countermine

**RDA**  
Air/Missile Defense Planning and Control System

**Radian**  
Tactical Electric Power

**Raytheon**  
2nd Gen FLIR  
Abrams Upgrade  
Advanced Field Artillery Tactical Data System (AFATDS)  
Advanced Threat Infrared Countermeasures (ATIRCM)/Common Missile Warning System (CMWS)  
Aerial Common Sensor  
Air Traffic Control  
Army Airborne Command and Control System (A2C2S)  
Army Data Distribution System (ADDS)/EPLRS  
Bradley Upgrade  
Common Missile Excalibur (XM982)  
Fixed Wing (with Beechcraft)  
Force XXI Battle Command Brigade-and-Below (FBCB2)  
Guardrail/Common Sensor  
Javelin (joint venture with Lockheed Martin)  
Joint Land Attack Cruise Missile Defense Elevated Netted Sensors System (JLENS)  
Joint Tactical Radio System (JTRS) (Waveform)  
Line of Sight Anti-Tank (LOSAT)  
Long Range Advanced Scout Surveillance System (LRAS3)  
PATRIOT (PAC-3)  
PBS2  
Secure Mobile Anti-Jam Reliable Tactical Terminal (SMART-T)  
Stinger  
Tank Main Armament System (TMAS)  
Theater High Altitude Area Defense (THAAD)

War Reserve Mod

**Robertson Aviation**  
Chinook

**Rockwell Collins**  
Global Positioning System (GPS)  
Joint Tactical Radio System (JTRS)  
Chinook

**Rockwell/Meritor**  
Family of Medium Tactical Vehicles (FMTV)

**Rolls-Royce**  
Kiowa Warrior (with Allison Engines)  
Comanche (with Honeywell)

**SAIC**  
Army Key Management System  
Global Command and Control System-Army (GCCS-A)  
Joint Network Management System (JNMS)  
Mobile, Tactical, High Energy Laser (MTHL)  
Future Combat Systems (FCS)  
Reserve Component Automation System (RCAS)

**SCI**  
Secure Mobile Anti-Jam Reliable Tactical Terminal (SMART-T)

**SETA**  
Army Tactical Missile System (ATACMS) Block IA (APAM & QRU)

**SRA**  
Transportation Coordinators' Automated Information for Movements System II (TC-AIMS II)

**Saberliner**  
Fixed Wing

**Science and Tech Research, Inc.**  
Automatic Chemical Agent Detector/Alarm (ACADA)

**Scott Manufacturing**  
Family of Medium Tactical Vehicles (FMTV)

**Sechan Electronics**  
Digital Topographic Support System (DTSS)

**Seiler Instrument and Mfg.**  
Lightweight 155mm Howitzer (LW155)

**Shorts Brothers**  
Fixed Wing

**Sierra Nevada Corp**  
Tactical Unmanned Aerial Vehicle (TUAV)

**Sikorsky (United Technologies)**  
Black Hawk  
Comanche

**Simula**  
Kiowa Warrior

**Smiths**  
Kiowa Warrior

**South Eastern Kentucky Rehabilitation Industries**  
Joint Service Lightweight Integrated Suit Technology (JSLIST)

**Sprint**  
Distributed Learning System (DLS)

**Stewart & Stevenson**

Family of Medium Tactical Vehicles (FMTV)  
High Mobility Artillery Rocket System (HIMARS)

**Sypris Electronics LLC**

Army Key Management System

**Sytex**

MIDS (LINK-16)  
All Source Analysis System (ASAS)

**TACOM**

Stryker

**TCOM**

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

**TRG**

Advanced Tactical Parachute System (ATPS)

**TRW**

Aerial Common Sensor  
Air/Missile Defense Planning and  
Control System  
Comanche  
Combat Service Support Control  
System (CSSCS)

Force XXI Battle Command Brigade-and-Below (FBCB2)  
Forward Area Air Defense Command and Control (FAAD C2)  
Global Combat Support System-Army (GCSS-A)  
Guardrail/Common Sensor  
Integrated System Control (ISYSCON)  
V(4)/Tactical Internet Management System (TIMS)  
Joint Service Lightweight Nuclear  
Biological Chemical Reconnaissance  
System (JSLNBCRS)  
Joint Tactical Radio System (JTRS)  
Mobile, Tactical, High Energy Laser (MTHEL)  
Paladin  
PBS2  
Tactical Exploitation System (TES)  
Tactical Operations Centers (TOC)

**Tech Data Corporation**

Reserve Component Automation System (RCAS)

**Technical Solutions Group**

Countermine

**Tec-Masters**

Integrated Family of Test Equipment (IFTE)

**Tecom**

Tactical Unmanned Aerial Vehicle (TUAV)

**Teradyne**

Longbow Hellfire

**Textron**

Kiowa Warrior

**Titan Systems**

Advanced Field Artillery Tactical Data  
System (AFATDS)  
Joint Computer-Aided Acquisition &  
Logistics System (JCALS)  
Prophet  
Single Channel Ground and Airborne  
Radio System (SINGARS)  
Smoke Generator (M56 Fox)

**Trak International**

Materiel Handling Equipment

**Trimble Navigation E&C**

Construction Equipment

**Tyco**

Stinger

**United Defense, LP**

Bradley Upgrade  
Future Combat Systems (FCS)  
Multiple Launch Rocket System (MLRS)  
Paladin

**ViaSat Incorporated**

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

**Veridian**

Warfighters Simulation 2000 (WARSIM)

**Vickers**

High Mobility Artillery Rocket System (HIMARS)  
Multiple Launch Rocket System (MLRS)

**Wenzlau Engineering**

Tactical Exploitation System (TES)

**Wolf Coach**

Tactical Exploitation System (TES)



## ALABAMA

2.75" Rocket System/Advanced Precision Kill Weapon System  
 General Dynamics: Anniston, AL;  
 General Dynamics: Huntsville, AL  
 Air Warrior (AW)  
 U.S. Army: Huntsville, AL  
 Air/Missile Defense Planning and Control System (AMDPCS)  
 TRW: Huntsville, AL  
 Army Airborne Command and Control System (A2C2S)  
 Raytheon: Huntsville, AL  
 CAS Huntsville, AL  
 Army Tactical Missile System (ATACMS)—Block I & IA  
 SETA: Huntsville, AL  
 Avenger  
 Boeing: Huntsville, AL  
 ASI: Huntsville, AL  
 Black Hawk  
 GNK Westland: Tallassee, AL  
 Common Missile  
 Boeing: Huntsville, AL  
 Future Combat Systems (FCS)  
 Navigator Development: Enterprise, AL  
 Guided Multiple Launch Rocket System (GMLRS)  
 NTS: Huntsville, AL  
 CSC: Huntsville, AL  
 Integrated Family of Test Equipment (IFTE)  
 Miltope Corporation: Hope Hull, AL  
 Tec-Masters: Huntsville, AL  
 Northrop Grumman: Huntsville, AL  
 Joint Land Attack Cruise Missile Defense Elevated Netted Sensors System (JLENS)  
 CAS: Huntsville, AL  
 Joint Tactical Ground Station (JTAGS)  
 Mevatec: Huntsville, AL  
 Longbow Hellfire  
 Northrop Grumman: Huntsville, AL

Medium Extended Air Defense System (MEADS)  
 Lockheed Martin: Huntsville, AL  
 CAS, Inc.: Huntsville, AL  
 Mobile, Tactical, High Energy Laser (MTHL)  
 Mevatec: Huntsville, AL  
 SAIC: Huntsville, AL  
 CSC: Huntsville, AL  
 Nuclear, Biological and Chemical Reconnaissance System (NBCRS)—Fox  
 General Dynamics: Anniston, AL  
 Paladin  
 Camber: Huntsville, AL  
 Anniston Army Depot: Anniston, AL  
 PATRIOT PAC-3  
 Boeing: Huntsville, AL  
 Precision Guided Mortar Munition (PGMM)  
 Camber: Huntsville, AL  
 Secure Mobile Anti-Jam Reliable Tactical Terminal (SMART-T)  
 SCI: Huntsville, AL  
 Shadow Tactical Unmanned Aerial Vehicle (TUAV)  
 CMI: Huntsville, AL  
 Stinger  
 Dynetics: Huntsville, AL  
 Stryker  
 General Dynamics Land Systems: Anniston, AL  
 Tactical Operations Centers (TOCs)  
 General Dynamics Defense Systems: Huntsville, AL  
 TRW: Huntsville, AL

## ALASKA

Avenger  
 AATNA: Anchorage, AK

## ARIZONA

Abrams Upgrade

Honeywell: Phoenix, AZ  
 Apache Longbow  
 Boeing: Mesa, AZ  
 CH-47 Chinook/Improved Cargo Helicopter (CH-47F)  
 Honeywell: Phoenix, AZ  
 Robertson Aviation: Tempe, AZ  
 Common Ground Station (CGS)  
 General Dynamics: Scottsdale, AZ  
 Common Missile  
 Raytheon: Tucson, AZ  
 Defense Satellite Communications System (DSCS)  
 US Army Information Systems  
 Engineering Command: Ft Huachuca, AZ  
 Excalibur 155mm Precision-Guided Extended Range Artillery Projectile Family  
 Raytheon: Tucson, AZ  
 Javelin  
 Raytheon: Tucson, AZ  
 Kiowa Warrior  
 Simula: Tempe, AZ  
 Stinger  
 Raytheon: Tucson, AZ  
 Tactical Operations Center (TOC)  
 General Dynamics: Scottsdale, AZ;  
 Tank Main Gun Ammunition  
 Raytheon: Tucson, AZ

## ARKANSAS

2.75" Rocket System/Advanced Precision Kill Weapon System  
 General Dynamics: Camden, AR  
 Army Ammunition  
 General Dynamics: Camden, AR  
 Army Tactical Missile System (ATACMS) Blocks I and IA  
 Atlantic Research Corporation: Camden, AR  
 High Mobility Artillery Rocket System (HIMARS)

Lockheed Martin: Camden, AR  
 Mortar (120mm)  
 GDOTS: Camden, AR  
 Pine Bluff Arsenal: Pine Bluff, AR  
 Multiple Launch Rocket System (MLRS)  
 Lockheed Martin: Camden, AR  
 PATRIOT (PAC-3)  
 Lockheed Martin: Camden, AR

## CALIFORNIA

Advanced Threat Infrared Countermeasures (ATIRCM)  
 Raytheon: Goleta, CA  
 Aerial Common Sensor (ACS)  
 TRW: McClellan, CA  
 Apache  
 Composite Structures: Monrovia, CA  
 Army Key Management System (AKMS)  
 Science Applications International Corporation: San Diego, CA  
 Black Hawk  
 Parker Hannifin: Irvine, CA  
 Avenger  
 MLS: Inglewood, CA  
 Bradley Upgrade  
 United Defense, L.P.: San Jose, CA  
 Comanche  
 TRW: Redondo Beach, CA  
 Lockheed Martin: Sunnyvale, CA  
 Combat Service Support Control System (CSSCS)  
 TRW: Carson, CA  
 Common Ground Station (CGS)  
 Cubic Defense Systems: San Diego, CA  
 Countermine  
 Quantum Magnetix: San Diego, CA  
 Defense Satellite Communications System (DSCS)  
 Boeing: Canoga Park, CA

Digital Topographic Support System (DTSS)  
 ESRI Inc.: Redlands, CA  
 Enhanced Position Location Reporting System (EPLRS)  
 Raytheon: Fullerton, CA  
 Excalibur 155mm Precision-Guided Extended Range Artillery Projectile Family  
 General Dynamics Versatron: Healdsburg, CA  
 L3 Communications Interstate Electronics Corporation: Anaheim, CA  
 Phoenix Battlefield Sensor System (PBS2)  
 Raytheon: El Segundo, CA  
 TRW: Carson, CA  
 Fixed Wing Aircraft (UC-35 Medium Range Aircraft)  
 AVTEL: Mojave, CA  
 Force XXI Battle Command Brigade-and-Below (FBCB2)  
 L-3 Communications: San Diego, CA  
 Raytheon: El Segundo, CA  
 TRW: Carson, CA  
 AFRA: Carson, CA  
 Forward Area Air Defense Command and Control (FAAD C2)  
 TRW: Los Angeles, CA  
 Future Combat Systems (FCS)  
 United Defense: Santa Clara, CA  
 Boeing: Anaheim, CA  
 Global Combat Support System-Army (GCSS-A)  
 TRW: Dominguez Hills, CA  
 Guardrail/Common Sensor (GR/CS)  
 TRW: McClellan, CA  
 ISYSCON (V)4/Tactical Internet Management System (TIMS)  
 TRW: Los Angeles, CA  
 Joint Network Management System (JNMS)

SAIC: San Diego, CA  
 Joint Service Lightweight Nuclear, Biological and Chemical Reconnaissance System (JSLNBCRS)  
 TRW: Dominguez Hills, CA  
 Joint Tactical Ground Station (JTACS)  
 Northrop Grumman: Azusa, CA  
 Lockheed Martin: Sunnyvale, CA  
 GenCorp: Azusa, CA  
 Joint Tactical Information Distribution System (JTIDS)/Multifunctional Information Distribution System (MIDS)  
 ViaSat: Carlsbad, CA  
 Joint Tactical Radio System (JTRS)  
 Boeing: Seal Beach, Anaheim, CA);  
 TRW: Carson, CA  
 Land Warrior (LW)  
 Pacific Consultants: San Jose, CA  
 Pemstar: San Jose, CA  
 Kaiser Electronics: Carlsbad, CA  
 Lightweight 155mm Howitzer (LW155)  
 Hydro-Mill: Chatsworth, CA  
 Longbow Hellfire  
 M/A Com: San Jose, CA  
 Mobile, Tactical, High Energy Laser (MTHL)  
 TRW: Redondo Beach, CA  
 Paladin  
 TRW: Carson City, CA  
 Prophet  
 Titan Systems: San Diego, CA  
 Reserve Component Automation System (RCAS)  
 Cisco Systems Corporation: San Jose, CA  
 Second Generation Forward Looking Infrared (FLIR)  
 Raytheon: Santa Barbara, CA  
 RQ-7A (Shadow) Tactical Unmanned Aerial Vehicle (TUAV)  
 Tecom: Chatsworth, CA  
 Stinger

Natel Engineering: Chatsworth, CA  
 Tactical Exploitation System (TES)  
 Wenzlau Engineering: South Pasadena, CA  
 Paragon Systems: Oakland, CA  
 Theater High Altitude Area Defense (THAAD) System  
 Lockheed Martin: Sunnyvale, CA  
 Boeing: Canoga Park, CA  
 Warfighter Information Network-Tactical (WIN-T) New Start  
 TRW: Carson, CA  
 XM777 Joint Lightweight 155mm Howitzer (LW155)  
 Hydro-Mill: Chatsworth, CA

#### **COLORADO**

Aerial Common Sensor (ACS)  
 Lockheed Martin: Denver, CO  
 All Source Analysis System (ASAS)  
 Lockheed Martin: Denver, CO  
 Defense Satellite Communications System (DSCS)  
 ITT: Colorado Springs, CO  
 Joint Tactical Ground Station (JTACS)  
 GenCorp: Colorado Springs, CO  
 Lockheed Martin: Boulder, CO

#### **CONNECTICUT**

Black Hawk  
 United Technologies: Stratford, CT  
 Chinook  
 PECS: Hartford, CT  
 Comanche  
 Boeing and Sikorsky Team: Stratford, CT  
 Countermine  
 Ensign Bickford Aerospace and Defense: Simsbury, CT  
 Small Arms  
 Colt's Manufacturing: Hartford, CT  
 Tactical Electrical Power  
 Fermont: Bridgeport, CT

#### **FLORIDA**

Abrams  
 General Dynamics: Tallahassee, FL  
 Advanced Threat Infrared Countermeasures (ATIRCM)  
 Northrop Grumman: Winter Haven, FL  
 Aerial Common Sensor (ACS)  
 Northrop Grumman: Melbourne FL  
 Apache  
 Lockheed Martin: Orlando, FL  
 Army Ammunition  
 General Dynamics Ordnance Tactical Systems: St. Petersburg, FL  
 Army Key Management System (AKMS)  
 Sypris Electronics LLC: Tampa, FL  
 Army Tactical Missile System (ATACMS)  
 Blocks I and IA  
 Honeywell: Clearwater, FL  
 Bradley Upgrade  
 DRS Technologies: Palm Bay, FL  
 Close Combat Tactical Trainer (CCTT)  
 Lockheed Martin: Orlando, FL  
 Advanced System Technology: Orlando, FL  
 Comanche  
 Lockheed Martin: Orlando, FL  
 Sikorsky Aircraft: West Palm Beach, FL  
 Common Missile  
 Lockheed Martin: Orlando, FL  
 Countermine  
 CyTerra Corp.: Orlando, FL  
 Defense Satellite Communications System (DSCS)  
 Northrop Grumman: Orlando, FL  
 Harris Corporation: Melbourne, FL  
 Engagement Skills Trainer (EST 2000)  
 ECC: Orlando, FL  
 Excalibur XM982  
 General Dynamics Ordnance and Tactical Systems: St. Petersburg, FL  
 Force XXI Battle Command Brigade-and-Below (FBCB2)

Paravant: Melbourne, FL  
 Heavy Expanded Mobility Tactical Truck (HEMTT)/HEMTT Extended Service Program (ESP)  
 Oshkosh Truck: Bradenton, FL  
 Javelin  
 Lockheed Martin: Orlando, FL  
 Joint Biological Point Detection System (JBPDS)  
 Intellitec: Deland, FL  
 Joint Service Lightweight Stand-off Chemical Agent Detector (JSLSCAD)  
 Intellitec: Deland, FL  
 Joint Tactical Ground Station (JTGS)  
 Harris Corporation: Melbourne, FL  
 Lockheed Martin: Orlando, FL  
 TRW: Orlando, FL  
 Raytheon: St. Petersburg, FL  
 Lightweight Laser Designator Rangefinder (LLDR)  
 Northrop Grumman (Litton Laser Systems): Apopka, FL  
 Long Range Advanced Scout Surveillance System (LRAS3)  
 DRS Optronics: Palm Bay, FL  
 Longbow Hellfire  
 Longbow LLC: Orlando, FL  
 Lockheed Martin: Orlando, FL  
 Medium Extended Air Defense System (MEADS)  
 Lockheed Martin: Orlando, FL  
 Mortar (120mm)  
 Multiple Launch Rocket System (MLRS)  
 Harris: Melbourne, FL  
 Precision Guided Mortar Munition (PGMM)  
 Lockheed Martin: Orlando, FL  
 Prophet  
 Titan Systems: Melbourne, FL  
 Reserve Component Automation System (RCAS)  
 Tech Data Corporation: Clearwater, FL

Second Generation Forward Looking Infrared (FLIR)  
 DRS Technology: Palm Bay, FL  
 GDLS: Deland, FL  
 Secure Mobile Anti-Jam Reliable Tactical Terminal (SMART-T)  
 Raytheon: Largo, FL  
 Single Channel Ground and Airborne Radio System (SINCGARS)  
 General Dynamics: Tallahassee, FL  
 Smoke Generator (M56 Coyote)  
 Titan Systems Corporation: Melbourne, FL  
 Tank Main Armament System  
 Alliant Techsystems: Clearwater, FL  
 General Dynamics-Ordnance and Tactical Systems: St. Petersburg, FL  
 Theater High Altitude Area Defense (THAAD)  
 Honeywell: Clearwater, FL  
 Warfighter Information Network (WIN)-Tactical  
 Harris: Melbourne, FL  
 Warfighters Simulation 2000 (WAR-SIM)  
 Lockheed Martin Information Systems: Orlando, FL  
 Veridian: Orlando, FL

#### GEORGIA

Army Key Management System (AKMS)  
 Communications Systems Support: Augusta, GA  
 Digital Topographic Support System (DTSS)  
 ERDAS Inc.: Atlanta, GA  
 Engagement Skills Trainer (EST 2000)  
 FATS, Inc.: Suwanee, GA  
 Fixed Wing Aircraft (UC-35 Medium Range Aircraft)  
 Gulfstream: Savannah; GA

Global Command and Control System-Army (GCCS-A)  
 SAIC: Atlanta, GA  
 Land Warrior (LW)  
 Omega Training Group: Columbus, GA  
 Objective Individual Combat Weapon (OICW)  
 Omega Training Group: Columbus, GA

#### ILLINOIS

Construction Equipment  
 Caterpillar Defense Products: Peoria, IL  
 John Deere Forestry and Construction Equipment: Moline, IL  
 Family of Medium Tactical Vehicles (FMTV)  
 Caterpillar: Moline, IL  
 Integrated Family of Test Equipment (IFTE)  
 Northrop Grumman: Rolling Meadows, IL  
 Tank Main Armament System (TMAS)  
 General Dynamics-Ordnance and Tactical Systems: East Alton, IL

#### INDIANA

Advanced Field Artillery Tactical Data System (AFATDS)  
 Raytheon: Ft. Wayne, IN  
 Army Airborne Command and Control System (A2C2S)  
 Raytheon: Ft. Wayne, IN  
 Avenger  
 AM General: South Bend, IN  
 Comanche  
 Light Helicopter Turbine Engine Company (LHTEC), Honeywell/Rolls-Royce Team: Indianapolis, IN  
 Enhanced Position Location Reporting System (EPLRS)  
 Raytheon: Ft. Wayne, IN

Family of Medium Tactical Vehicles (FMTV)  
 Allison: Indianapolis, IN  
 Phoenix Battlefield Sensor System (PBS2)  
 Raytheon: Ft. Wayne, IN  
 High Mobility Multipurpose Wheeled Vehicle (HMMWV)  
 AM General: South Bend, IN  
 Joint Tactical Radio System (JTRS)  
 Raytheon: Ft. Wayne, IN  
 Kiowa Warrior  
 Rolls Royce/Allison Engines: Indianapolis, IN  
 Single Channel Ground and Airborne Radio System (SINCGARS)  
 International Telephone and Telegraph (ITT): Ft. Wayne, IN

#### IOWA

CH-47 Chinook/Improved Cargo Helicopter (CH-47F)  
 Rockwell Collins: Cedar Rapids, IA  
 Construction Equipment  
 Cedarapids Inc.: Cedar Rapids, IA  
 Global Positioning System (GPS)  
 Rockwell Collins: Cedar Rapids, IA  
 Joint Tactical Radio System (JTRS)  
 Rockwell Collins: Cedar Rapids, IA

#### KANSAS

Fixed Wing Aircraft (UC-35 Medium Range Aircraft)  
 Cessna Aircraft Company: Wichita, KS  
 Raytheon-Beechcraft: Wichita, KS  
 Heavy Expanded Mobility Tactical Truck (HEMTT)  
 Detroit Diesel: Emporia, KS

**KENTUCKY**

Joint Service Lightweight Integrated Suit Technology (JSLIST)  
South Eastern Kentucky Rehabilitation Industries: Corbin, KY

**LOUISIANA**

Theater Support Vessel  
Bolinger/Incat USA: Lockport, LA

**MAINE**

Joint Service Lightweight Integrated Suit Technology (JSLIST)  
Creative Apparel: Belfast, ME  
Group Home Foundation: Belfast, ME  
Small Arms  
General Dynamics: Saco, ME

**MARYLAND**

Aerial Common Sensor (ACS)  
Northrop Grumman: Baltimore MD  
Airborne Reconnaissance Low (ARL)  
Northrop Grumman: Belcamp, MD  
Litton Advanced Systems (Northrop Grumman): Gaithersburg, MD  
Apache  
Northrop Grumman: Linthicum, MD  
Biological Vaccine Program/Joint Vaccine Program  
DynPort LLC: Frederick, MD  
Joint Land Attack Cruise Missile Defense Elevated Netted Sensors System (JLENS)  
TCOM: Columbia, MD  
BTG Nations: Ft Meade, MD  
Joint Warning and Reporting Network (JWARN)  
Bruhn NewTech, Inc.: Columbia, MD  
Longbow Hellfire  
Northrop Grumman: Baltimore, MD  
Reserve Component Automation System (RCAS)

Digicon: Rockville, MD  
Shadow Tactical Unmanned Aerial Vehicle (TUAV)  
AAI Corporation: Hunt Valley, MD  
Smoke Generator (M56 Coyote)  
General Dynamics: Westminster, MD  
Tactical Exploitation System (TES)  
Northrop Grumman: Baltimore, MD  
Tactical Operations Center (TOC)  
CSTI: Westminster, MD  
Warfighter Information Network (WIN)-Tactical  
Lockheed Martin: Gaithersburg, MD

**MASSACHUSETTS**

Advanced Field Artillery Tactical Data System (AFATDS)  
General Dynamics: Taunton, MA  
Advanced Tactical Parachute System (ATPS)  
GEO-Centers: Newton, MA  
Aerial Common Sensor (ACS)  
Raytheon: Marlborough MA  
Raytheon: Sudbury, Marlborough, MA  
All Source Analysis System (ASAS)  
General Dynamics: Taunton, MA  
Black Hawk  
General Electric: Lynn, MA  
Combat Service Support Control System (CSSCS)  
General Dynamics: Taunton, MA  
Common Hardware Systems (CHS)  
General Dynamics: Taunton, MA  
Countermine  
CyTerra Corp.: Waltham, MA  
Forward Area Air Defense Command and Control (FAAD C2)  
General Dynamics: Taunton, MA  
Global Command and Control System-Army (GCCS-A)  
General Dynamics: Taunton, MA

Integrated System Control (ISYSCON) V(1)/V(2)  
General Dynamics: Taunton, Needham MA  
Joint Biological Point Detection System (JBPDS)  
MIT Lincoln Laboratories: Lexington, MA  
Joint Land Attack Cruise Missile Defense Elevated Netted Sensors Systems (JLENS)  
Raytheon: Bedford, MA  
Raytheon: Hanscom AFB, MA  
Maneuver Control System (MCS)  
General Dynamics: Taunton, MA  
PATRIOT (PAC-3)  
Raytheon: Bedford, MA  
Precision Guided Mortar Munition (PGMM)  
Draper Laboratory: Cambridge, MA  
Secure Mobile Anti-Jam Reliable Tactical Terminal (SMART-T)  
Raytheon: Marlborough, MA  
MIT Lincoln Labs: Lexington, MA  
Tactical Exploitation System (TES)  
Wolf Coach: Auburn, MA  
Tactical Operations Center (TOC)  
General Dynamics: Taunton, MA  
Theater High Altitude Area Defense (THAAD) System  
Raytheon: Bedford, MA  
Warfighter Information Network (WIN)-Tactical  
BBN Technology: Cambridge, MA  
General Dynamics: Taunton, MA

**MICHIGAN**

Abrams Upgrade  
General Dynamics: Muskegon, MI;  
Sterling Heights, MI; Warren, MI  
Heavy Expanded Mobility Tactical Truck (HEMTT)  
Detroit Diesel: Redford, MI

High Mobility Multipurpose Wheeled Vehicle (HMMWV)  
General Motors: Warren, MI  
Joint Service Lightweight Integrated Suit Technology (JSLIST)  
Peckham Vocational Industries:  
Lansing, MI  
Kiowa Warrior  
Smiths: Grand Rapids, MI  
Nuclear, Biological and Chemical Reconnaissance System (NBCRS)-Fox  
General Dynamics: Detroit, MI  
Paladin  
Detroit Diesel: Detroit, MI  
Stryker  
General Dynamics: Sterling Heights, MI

**MINNESOTA**

Army Ammunition  
Alliant Techsystems: Hopkins, MN  
Construction Equipment  
Caterpillar: Minneapolis, MN  
Land Warrior (LW)  
PEMSTAR: Rochester, MN  
Line-of-Sight Anti-Tank (LOSAT)  
Honeywell: Minneapolis, MN  
Objective Individual Combat Weapon (OICW)  
Alliant Techsystems: Hopkins, MN  
Stinger  
Honeywell: Minneapolis, MN  
Tank Main Armament System (TMAS)  
Alliant Techsystems: Hopkins, New Brighton, MN

**MISSISSIPPI**

Enhanced Position Location Reporting System (EPLRS)  
Raytheon: Forest, MS  
Phoenix Battlefield Sensor System (PBS2)  
Raytheon: Forest, MS



Lightweight 155mm Howitzer (LW155)  
BAE Systems: Hattiesburg, MS  
High Mobility Artillery Rocket System (HIMARS)  
Vickers: Jackson, MS  
Multiple Launch Rocket System (MLRS)  
Vickers: Jackson, MS

#### MISSOURI

Army Ammunition Program  
Alliant Techsystems: Independence, MO  
Fixed Wing Aircraft (UC-35 Medium Range Aircraft)  
Saberliner: St. Louis, MO  
Lightweight 155mm Howitzer (LW155)  
Seiler Instrument and Mfg.: St. Louis, MO

#### NEBRASKA

Fixed Wing Aircraft (UC-35 Medium Range Aircraft)  
Duncan: Lincoln, NE

#### NEVADA

Tactical Unmanned Aerial Vehicle (TUAV)  
Sierra Nevada Corp.: Sparks, NV

#### NEW HAMPSHIRE

Advanced Threat Infrared Countermeasures (ATIRCM)  
BAE Systems: Nashua, NH  
Longbow Hellfire  
BAE Systems: Nashua, NH  
Theater High Altitude Area Defense (THAAD)  
BAE Systems: Nashua, NH

#### NEW JERSEY

Advanced Field Artillery Tactical Data System (AFATDS)

CSC: Tinton Falls, NJ  
Advanced Tactical Parachute System (ATPS)  
Para-Flite: Pennsauken, NJ  
Army Key Management System (AKMS)  
Information Systems Support, Inc.: Tinton Falls, NJ  
Booz Allen Hamilton: Eatontown, NJ  
Combat Service Support Control System (CSSCS)  
Lockheed Martin: Tinton Falls, NJ  
Common Ground Station  
Booz Allen Hamilton: Eatontown, NJ  
CACI: Eatontown, NJ  
Enhanced Position Location Reporting System (EPLRS)  
Innolog: Wall Township, NJ  
BAE Systems: West Long Branch, NJ  
Guardrail/Common Sensor (GR/CS)  
CACI: Eatontown, NJ  
ILEX: Shrewsbury, NJ  
Joint Computer-Aided Acquisition & Logistics Support (JCALS)  
CSC: Morristown, NJ  
Titan: Shrewsbury, NJ  
Joint Tactical Radio System (JTRS)  
BAE Systems: Wayne, NJ  
Land Warrior (LW)  
Computer Science Corporation: Eatontown, NJ  
Maneuver Control System (MCS)  
Lockheed Martin: Tinton Falls, NJ  
Mortar System (120mm)  
ARDEC: Picatinny, NJ  
Multiple Launch Rocket System (MLRS)  
Allied Signal: Teterboro, NJ  
Precision Guided Mortar Munition (PGMM)  
ARDEC: Picatinny, NJ  
Secure Mobile Anti-Jam Reliable Tactical Terminal (SMART-T)

EPS: Eatontown, NJ  
Single Channel Ground and Airborne Radio System (SINCGARS),  
EPS: Shrewsbury, NJ  
BAE Systems: W. Long Branch, NJ  
Titan: Shrewsbury, NJ  
Tactical Electric Power  
Dewey Electronics: Oakland, NJ  
Warfighter Information Network (WIN)-Tactical  
BAE Systems: Wayne, NJ

#### NEW MEXICO

Countermine  
EG&G Management Systems, Inc.: Albuquerque, NM  
Integrated Meteorological System (IMETS)  
Army Research Lab: White Sands, NM  
New Mexico State University: Las Cruces, NM  
Integrated System Control (ISYSCON) V(1)/V(2)  
Laguna Industries: Laguna, NM  
Kiowa Warrior  
Honeywell: Albuquerque, NM

#### NEW YORK

Apache  
Lockheed Martin: Owego, NY  
Line-of-Sight Anti-Tank (LOSAT)  
BAE Systems: Long Island, NY  
Medium Extended Air Defense System (MEADS)  
Lockheed Martin: Syracuse, NY

#### OHIO

Abrams Upgrade  
General Dynamics: Lima, OH  
Construction Equipment  
Trimble Navigation E&C: Dayton, OH

Excalibur 155mm Precision-Guided Extended Range Artillery Projectile Family  
L-3 KDI: Cincinnati, OH  
Family of Medium Tactical Vehicles (FMTV)  
Rockwell/Meritor: Newark, OH  
High Mobility Artillery Rocket System (HIMARS)  
O'Gara-Hess & Eisenhardt: Fairfield, OH  
High Mobility Multipurpose Wheeled Vehicle (HMMWV)  
O'Gara-Hess & Eisenhardt: Fairfield, OH  
GEP: Franklin, OH  
Defiance: Defiance, OH  
Joint Biological Point Detection System (JBPDS)  
Battelle: Columbus, OH  
Joint Tactical Information Distribution System (JTIDS)/Multifunctional Information Distribution System (MIDS)  
Xetron: Cincinnati, OH  
Mortar (120mm)  
L3 Communications: Cincinnati, OH  
Stryker  
General Dynamics Land Systems: Lima, OH

#### OKLAHOMA

Advanced Field Artillery Tactical Data System (AFATDS)  
Titan Systems: Lawton, OK  
EPS: Lawton, OK

#### PENNSYLVANIA

2.75 Inch Rocket System/Advanced Precision Kill Weapon System  
Action Manufacturing: Philadelphia, PA  
Abrams Upgrade

General Dynamics: Scranton, PA  
 Apache  
 Boeing: Philadelphia, PA  
 Bradley Upgrade  
 United Defense, L.P.: Fayette, York, PA  
 CH-47 Chinook/Improved Cargo  
 Helicopter (CH-47F)  
 Boeing: Philadelphia, PA  
 Comanche  
 Boeing and Sikorsky Team:  
 Philadelphia, PA  
 Common Hardware System (CHS)  
 CTC: Johnstown, PA  
 Construction Equipment  
 Grove NA: Shady Grove, PA  
 Digital Topographic Support System  
 (DTSS)  
 Sechan Electronics: Lititz, PA  
 Integrated Family of Test Equipment  
 (IFTE)  
 Kuchera Defense: Johnstown, PA  
 Mortar (120mm)  
 Chamberlain Manufacturing  
 Corporation: Scranton, PA  
 Multiple Launch Rocket System (MLRS)  
 United Defense, L.P.: York, PA  
 Objective Individual Combat Weapon  
 (OICW)  
 Brashear LP: Pittsburgh, PA  
 Paladin  
 United Defense, L.P.: York, PA

#### **SOUTH CAROLINA**

Countermine  
 Technical Solutions Group: North  
 Charleston, SC  
 Heavy Expanded Mobility Tactical Truck  
 (HEMTT)  
 Michelin: Greenville, SC  
 Small Arms  
 FN Manufacturing: Columbia, SC

#### **TENNESSEE**

Tank Main Armament System (TMAS)  
 Johnson City, TN

#### **TEXAS**

Arams Upgrade  
 Raytheon: McKinney, TX  
 Advanced Threat Infrared  
 Countermeasures (ATIRCM)  
 BAE Systems: Austin, TX  
 Air/Missile Defense Planning and  
 Control System (AMDPCS)  
 TRW: Killeen, TX  
 RDA: Killeen, TX  
 APC: Austin, TX  
 All Source Analysis System (ASAS)  
 Austin Information Systems: Austin, TX  
 MANTECH: Killeen, TX  
 Army Airborne Command and Control  
 System (A2C2S)  
 Raytheon: Waco, TX  
 Army Tactical Missile System (ATACMS)  
 Blocks I and IA  
 Lockheed Martin: Dallas, Horizon City,  
 TX  
 Aviation Combined Arms Tactical Trainer  
 (AVCATT)  
 L-3 Communications  
 Bradley Upgrade  
 Raytheon: McKinney, TX  
 EFW: Ft Worth, TX  
 Countermine  
 BAE Systems: Austin, TX  
 Enhanced Position Location Reporting  
 System (EPLRS)  
 Raytheon: Garland, TX  
 Family of Medium Tactical Vehicles  
 (FMTV)  
 Stewart & Stevenson Services, Inc.:  
 Sealy, TX  
 Scott Manufacturing: Lubbock, TX

Phoenix Battlefield Sensor System  
 (PBS2)  
 Raytheon: Dallas, TX  
 Fixed Wing Aircraft (UC-35 Medium  
 Range Aircraft)  
 DynCorp: Ft. Worth, TX  
 Fairchild: San Antonio, TX  
 Guided Multiple Launch Rocket System  
 (GMLRS)  
 Lockheed Martin: Dallas, TX  
 High Mobility Artillery Rocket System  
 (HIMARS)  
 Lockheed Martin: Dallas, TX  
 Stewart & Stevenson, Inc.: Sealy, TX  
 Joint Chemical Agent Detector (JCAD)  
 BAE Systems: Austin, TX  
 Joint Service Lightweight Integrated Suit  
 Technology (JSLIST)  
 National Center for the Employment of  
 the Disabled (NCED): El Paso, TX  
 Kiowa Warrior  
 Bell Helicopter, Textron: Ft. Worth, TX  
 Line-of-Sight Anti-Tank (LOSAT)  
 Lockheed Martin: Grand Prairie, TX  
 Raytheon: Plano, TX  
 BAE Systems: Austin, TX  
 Long Range Advanced Scout  
 Surveillance System (LRAS3)  
 Raytheon: McKinney, TX  
 Material Handling Equipment (MHE)  
 Kalmar RT Center: Cibolla, TX  
 Medium Extended Air Defense System  
 (MEADS)  
 MEADS International, Inc.(Lockheed  
 Martin): Dallas, TX  
 Multiple Launch Rocket System (MLRS)  
 Lockheed Martin: Dallas, TX  
 PATRIOT  
 Lockheed Martin: Grand Prairie, Lufkin,  
 TX  
 Second Generation Forward Looking  
 Infrared (FLIR)

Raytheon: McKinney, TX  
 DRS Technologies: Dallas, TX  
 Stinger  
 Tyco: Austin, TX

#### **UTAH**

Close Combat Tactical Trainer (CCTT)  
 Evans & Sutherland: Salt Lake City, UT  
 Guardrail/Common Sensor (GR/CS)  
 L-3 Communications: Salt Lake City, UT

#### **VERMONT**

2.75 Inch Rocket System/Advanced  
 Precision Kill Weapon System  
 General Dynamics Armament and  
 Technical Products (GDATP): Burlington,  
 VT  
 General Dynamics: Burlington, VT  
 Army Tactical Missile System (ATACMS)  
 Blocks I and IA  
 B.F. Goodrich: Vergennes, VT  
 Joint Lightweight 155mm Howitzer  
 (LW155)  
 General Dynamics: Burlington, VT

#### **VIRGINIA**

2.75 Inch Rocket System/Advanced  
 Precision Kill Weapon System (APKWS)  
 Alliant Techsystems: Radford VA  
 Galaxy Lightbeam: Arlington, VA  
 All Source Analysis System (ASAS)  
 Sytex, Inc.: Mclean, VA  
 Airborne Reconnaissance Low (ARL)  
 CACI: Berryville, VA  
 Army Ammunition  
 Alliant Techsystems: Radford, VA  
 Automatic Chemical Agent  
 Detector/Alarm (ACADA)  
 Science and Tech Research, Inc.:  
 Fredericksburg, VA  
 Biological Vaccine Program – Smallpox  
 Vaccine

DynPort LLC: Reston, VA  
 Bradley Upgrade  
 United Defence L.P.: Arlington, VA  
 Digital Topographic Support System (DTSS)  
 Northrop Grumman: Chantilly, VA  
 Distributed Learning System (DLS)  
 ACS: Virginia Beach, VA  
 Sprint: Herndon, VA  
 IBM: Fairfax, VA  
 Future Combat Systems  
 SAIC: McLean, VA  
 Global Combat Support System-Army (GCSS-A)  
 TRW: Chester, VA  
 Global Command and Control System-Army (GCCS-A)  
 Lockheed Martin: Springfield, VA  
 FCBS: Springfield, VA  
 Getronics: Springfield, VA  
 Guardrail/Common Sensor (GR/CS)  
 Raytheon: Falls Church, VA  
 Line-of-Sight Anti-Tank (LOSAT)  
 ARC: Gainesville, VA  
 Reserve Component Automation System (RCAS)  
 SAIC: Vienna, VA  
 GRC International: McLean, VA  
 Tactical Unmanned Aerial Vehicle (TUAV)  
 DPA: Arlington, VA  
 Tank Main Armament System

Alliant Techsystems: Radford, VA  
 Tactical Electric Power  
 Radian: Alexandria, VA  
 Modern Technologies Corporation: Springfield, VA  
 Tactical Exploitation System  
 TRW: Chester, VA  
 Transportation Coordinators' Automated Information for Movements System II (TCAIMS II)  
 SRA: Fairfax, VA  
 DynCorp: Chantilly, VA

#### **WEST VIRGINIA**

Joint Computer-Aided Acquisition & Logistics Support (JCALS)  
 CSC: Fairmont, WV  
 Tank Main Armament System  
 Alliant Techsystems: Rocket Center, WV

#### **WISCONSIN**

Heavy Expanded Mobility Tactical Truck-Load Handling System (HEMTT-LHS)  
 Oshkosh Truck: Oshkosh, WI  
 Material Handling Equipment (MHE)  
 Trak International: Port Washington, WI  
 Tactical Electrical Power  
 Miller USA: Berlin, WI

#### **OTHER COUNTRIES**

##### **CANADA**

Fixed Wing Aircraft (UC-35 Medium Range Aircraft)  
 De Havilland Aviation:  
 CanadaLightweight 155mm Howitzer (LW155)  
 Computing Devices Corporation: Ottawa, Canada  
 Stryker  
 General Motors Defense: London, ONT

##### **GERMANY**

Medium Extended Air Defense System (MEADS)  
 MEADS International consortium comprises Lockheed Martin (Orlando, FL), Alenia-Marconi (Italy) and DaimlerChrysler Aerospace (Germany).  
 Mortar (120mm)  
 Junghans: FRG  
 Nuclear, Biological and Chemical Reconnaissance System (NBCRS)-Fox  
 Henschel Wehrtechnik: Kassel, Germany

##### **IRELAND**

Fixed Wing Aircraft (UC-35 Medium Range Aircraft)  
 Shorts Brothers: Belfast, Ireland

##### **SWEDEN**

Excalibur XM982  
 Bofors Defence (UDLP) teamed with Raytheon Corporation: Karlskoga, Sweden

##### **ITALY**

Medium Extended Air Defense System (MEADS)  
 MEADS International consortium comprises Lockheed Martin (Orlando, FL), Alenia-Marconi (Italy) and DaimlerChrysler Aerospace (Germany)

##### **UNITED KINGDOM**

Automatic Chemical Agent Detector/Alarm (ACADA)  
 Graseby Dynamics, Ltd: Watford, U.K.  
 XM777 Joint Lightweight 155mm Howitzer (LW155)  
 BAE Systems: U.K.





**2.75 Inch Rocket System/Advanced Precision Kill Weapon System (APKWS)**

Aviation Rockets and Missiles Project Office  
SFAE-MSL-ARM  
PEO Tactical Missiles  
5250 Martin Rd  
Redstone Arsenal, AL 35898-8000

**Abrams**

Abrams Tank System  
Project Manager  
ATTN: SFAE-GCSS-AB  
Warren, MI 48397-5000

**Advanced Field Artillery Tactical Data System (AFATDS)**

Product Manager Advanced Field Artillery Tactical Data System (AFATDS)  
Project Manager Effects and Fires Command and Control Systems (PM EFCCS)  
ATTN: SFAE-C3S-EF  
Ft Monmouth, NJ 07703

**Advanced Tactical Parachute System (ATPS)**

Product Manager Clothing and Individual Equipment  
Project Manager-Soldier Sensors and Equipment  
ATTN: SFAE-SDR-SEQ-CIE  
10125 Kingman Road  
Ft Belvoir, VA 22060-5820

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

Project Manager  
ATIRCM/CMWS  
ATTN: SFAE-AV-IR  
Wood Road  
Redstone Arsenal, AL 35898

**Aerial Common Sensor (ACS)**

Signals Warfare  
Project Manager  
SFAE-IEW & S-SG  
Building 296, Main Post  
Ft Monmouth, NJ 07703-5301

**Airborne Reconnaissance Low (ARL)**

Signals Warfare  
Project Manager  
Attn: SFAE-IEW & S-SG  
Building 296, Main Post  
Ft Monmouth, NJ 07703-5301

**Air Warrior (AW)**

Product Manager-Air Warrior  
Project Manager-Soldier Warrior  
ATTN: SFAE-SDR-AW  
Bldg 5681  
Redstone Arsenal, AL 35898-4346

**Air/Missile Defense Planning and Control System (AMDPCS)**

Air Defense Command and Control Systems (PM ADCCS)  
Project Manager  
ATTN: SFAE-C3S-AD  
Redstone Arsenal, AL 35898-5600  
Project Manager  
SFAE-C3S-INT  
Building 296, Main Post  
Ft Monmouth, NJ 07703-5040

**All Source Analysis System (ASAS)**

Project Manager Intel Fusion  
ATTN: SFAE-C3S-INT  
BLDG 363  
10115 Duportail Road  
Ft Belvoir, VA 22060-5812

**Anthrax Vaccine Absorbed Production Program**

Program Manager Chemical Biological Medical Systems  
1436 Porter Street  
Ft Detrick, MD 21702-5041

**Apache**

Apache  
Product Manager  
ATTN: SFAE-AV-AAH  
Building 5681  
Redstone Arsenal, AL 35898

**Army Airborne Command and Control System (A2C2S)**

Project Manager, Tactical Operations Centers/Air and Missile Defense Command and Control Systems (PM TOCs/AMDCCS)  
ATTN: SFAE-C3S-AD-A2  
145 Research Blvd.  
Madison, AL 35758

**PEO AMMO**

Attn: SFAE-AMO-P  
Picatinny Arsenal, NJ 07806-5000

**Army Data Distribution System/Enhanced Position Location Reporting System (ADDS/EPLRS)**

Project Manager, Tactical Radio Communications Systems (PM TRCS)  
ATTN: SFAE-C3S-TRC  
Bldg 456  
Ft Monmouth, NJ 07703-5505

**Army Key Management System (AKMS)**

Warfighter Information Network-Tactical (PM WIN-T)  
Project Manager  
ATTN: SFAE-C3S-WIN  
Building 744  
Ft Monmouth, NJ 07703-5506

**Army Tactical Missile System (ATACMS) Blocks I and IA**

Army TACMS  
Project Manager  
ATTN: SFAE-MSL-AB  
Redstone Arsenal, AL 35898-5650

**Automatic Chemical Agent  
Detector/Alarm (ACADA)**

NBC Defense Systems  
Project Manager  
ATTN: AMSSB-PM-RNN  
Aberdeen, MD 21010-5423

**Aviation Combined Arms Tactical  
Trainer - Aviation Reconfigurable  
Manned Simulator (AVCATT-A)**

Air and Command Tactical Trainers  
Product Manager  
PEO STRI-PMACCT  
12350 Research Parkway  
Orlando, FL 32826-3276

**Avenger**

Assistant Project Manager, SHORAD  
ATTN: SFAE-AMD-SHO  
Bldg 5308  
Redstone Arsenal, AL 35898-5000

**Black Hawk**

Utility Helicopters  
Project Manager  
U.S. Army Aviation and Missile  
Command  
ATTN: AMSAM-DSA-UH  
Building 5308  
Redstone Arsenal, AL 35898

**Bradley Upgrade**

Bradley Fighting Vehicle System  
Product Manager  
ATTN: SFAE-GCSS-W-BV  
Warren, MI 48397-5000

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

Cargo Helicopters  
Project Manager  
ATTN: SFAE-AV-CH  
Building 5681  
Redstone Arsenal, AL 35898

**Close Combat Tactical Trainer (CCTT)**

Combined Arms Tactical Trainer  
Project Manager  
ATTN: PEO STRI-PMACCT  
12350 Research Parkway  
Orlando, FL 32826-3276

**Comanche**

Comanche  
Project Manager  
ATTN: SFAE-AV-RAH  
Building 5681  
Redstone Arsenal, AL 35898

**Combat Service Support Control  
System (CSSCS)**

Project Manager Ground Combat  
Command and Control (PM, GCC2)  
Product Manager  
ATTN: SFAE-C3T-GC  
6052 Meade Road, Suite 103  
Ft Belvoir, VA 22060

**Common Ground Station (CGS)**

Joint STARS  
Project Manager  
SFAE-IEW&S-JS  
Ft Monmouth, NJ 07703-5304

**Common Hardware Systems (CHS)**

Project Manager Army Tactical  
Command & Control System (ATCCS)  
Tactical Operations Centers (TOCs)  
Air Defense Command and Control  
Systems (ADCCS)  
Project Manager  
SFAE-C3S-AT SFAE-C3T-AD-CHS  
Ft Monmouth, NJ 07703-5402

**Common Missile**

Program Executive Officer,  
Tactical Missiles  
ATTN: SFAE-MSL  
Redstone Arsenal, AL 35898-8000

**Construction Equipment**

Product Manager Construction  
Equipment/Materiel Handling  
Equipment  
ATTN: SFAE-CSS-CM-C  
6501 East 11 Mile Road  
Mail Stop 401  
Warren, MI 48397-5000

**Countermine**

Office of the Project Manager,  
Close Combat Systems  
ATTN: SFAE-AMO-CCS (Bldg 162-N)  
Picatinny Arsenal, NJ 07806-5000

**Defense Satellite Communications  
System (DSCS)**

Project Manager, DCATS  
ATTN: SFAE-PS-TS  
Bldg 209 Rm 104  
Ft Monmouth, NJ 07703-5509

**Digital Topographic Support System  
(DTSS)**

Project Director, Combat Terrain  
Information Systems (CTIS) U.S. Army  
Topographic Engineering Center  
ATTN: CEERD-TS-T  
7701 Telegraph Road  
Alexandria, VA 22315-3864

**Distributed Learning System**

Project Manager, DLS  
ATTN: SFAE-DL  
11846 Rock Landing Drive Suite B  
Newport News, VA 23606

**Engagement Skills Trainer 2000**

Ground Combat Tactical Trainers  
Product Manager  
PEO STRI-PMGCTT  
12350 Research Parkway  
Orlando, FL 32826-3276

**Excalibur 155mm Precision-Guided  
Extended Range Artillery Projectile  
Family**

Product Manager Excalibur  
OPM Artillery Munitions Systems  
SFAE-GCS-ARMS  
Picatinny Arsenal, NJ 07806-5000

**Family of Medium Tactical Vehicles  
(FMTV)**

FMTV  
Project Manager  
ATTN: SFAE-GCSS-W-MTV  
Warren, MI 48397-5000

**Fixed Wing Aircraft**

Product Manager, Fixed Wing  
ATTN: AMSAM-DSA-AS-FW  
Bldg 5308  
Redstone Arsenal, AL 35898-5000

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

Project Manager Force XXI Battle  
Command Brigade and Below (PM  
FBCB2)  
Project Manager  
ATTN: SFAE-C3S-FB  
Building 2525  
Ft Monmouth, NJ 07703-5408

**Forward Area Air Defense  
Command, and Control (FAAD C2)**

ADCCS  
Project Manager  
ATTN: SFAE-C3S-AD  
Redstone Arsenal, AL 35898

**Future Combat Systems (FCS)**

Program Manager  
ATTN: SFAE-GCS-FCS  
Warren, MI 48397-5000

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

Project Manager Ground Combat  
Command and Control (PM, GCC2)  
ATTN: SFAE-C3T-GC-GCCS-A  
10109 Gridley Road  
Ft Belvoir, VA 22060-5860

**Global Combat Support System-  
Army (GCSS-A)**

Project Manager, GCSS-A  
ATTN:SFAE-PS-RS  
800 Lee Ave  
Ft Lee, VA 23801-1718

**Global Positioning System (GPS)**

GPS  
Product Manager  
ATTN: AMSEL-DSA-GPS  
CECOM SMC  
Ft Monmouth, NJ 07703

**Guardrail/Common Sensor (GR/CS)**

Signals Warfare  
Project Manager  
ATTN: SFAE-IEW&S-SG  
Building 296, Main Post  
Ft Monmouth, NJ 07703-5301

**Guided Multiple Launch Rocket  
System (GMLRS)**

Multiple Launch Rocket System  
Project Manager  
ATTN: SFAE-MSL-ML  
Redstone Arsenal, AL 35898

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

Heavy Tactical Vehicles (HTV)  
Project Manager  
ATTN: AMSTA-DSA-HT  
Warren, MI 48397-5000

**High Mobility Artillery Rocket  
System (HIMARS)**

MLRS  
Project Manager  
ATTN: SFAE-MSL-ML  
Redstone Arsenal, AL 35898

**High Mobility Multipurpose Wheeled  
Vehicle (HMMWV)**

Light Tactical Vehicles  
Project Manager  
AMSTA-DSA-LT  
Warren, MI 48397-5000

**Integrated Family of Test Equipment  
(IFTE)**

Product Manager – Test,  
Measurement and Diagnostic  
Equipment  
Building 5300  
Redstone Arsenal, AL 35898-5000

**Integrated Meteorological System  
(IMETS)**

Project Director IMETS  
ATTN: SFAE-C3T-IE-II  
BLDG 1622  
WSMR, NM 88002

**Integrated System Control  
(ISYSCON)**

Warfighter Information Network-  
Tactical (WIN-T)  
Product Manager  
ATTN: SFAE-C3S-WIN  
Ft Monmouth, NJ 07703

**Javelin**

Javelin  
Project Manager  
ATTN: SFAE-MSL-AM  
Redstone Arsenal, AL 35898-5720

**Joint Biological Agent Identification  
and Diagnostic System (JBAIDS)**

Project Management Office -  
Chemical Biological Medical Systems  
1436 Porter Street  
Ft Detrick, MD 21702-5041

**Joint Biological Point Detection  
System (JBPDs)**

NBC Defense  
Joint Program Office for Biological  
Defense Systems  
ATTN: SFAE-BD/Skyline #3  
Falls Church, VA 22041-3203

**Joint Chemical Agent Detector  
(JCAD)**

PM Air Force NBC Defense Systems  
Brooks Air Force Base, TX 78235

**Joint Computer-Aided Acquisition &  
Logistics Support (JCALS)**

Project Manager, JCALS  
ATTN:SFAE-PS-CAL  
Ft Monmouth, NJ 07703-5000

**Joint Land Attack Cruise Missile  
Defense Elevated Netted Sensors  
Systems (JLENS)**

U.S. Army Space and Missile Defense  
Command  
Project Manager  
P.O. Box 1500  
Huntsville, AL 35807

**Joint Network Management System (JNMS)**

Project Manager, Warfighter Information Network-Tactical (PM WIN-T)  
ATTN: SFAE-C3S-WIN  
Bldg 744  
Ft Monmouth, NJ 07703-5506

**Joint Service Lightweight Integrated Suit Technology (JSLIST)**

Marine Corps Systems Command (MAR-CORSYSCOM)  
NBCD Systems  
2033 Barnett Ave, Suite 315  
Quantico, VA 22134-5010

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

NBC Defense Systems  
Project Manager  
ATTN: AMSSB-PM-RNN  
Aberdeen Proving Ground, MD 21010-5423

**Joint Service Light Nuclear Biological Chemical Reconnaissance System (JSLNBCRS)**

Program Manager, NBC Defense Systems  
2033 Barnett Ave, Suite 315,  
Quantico, VA 22134-5010

**Joint Tactical Ground Station (JTAGS) Multi-Mission Mobile Processor (M3P)**

PEO Air and Missile Defense  
Product Manager  
ATTN: SFAE-AMD-JTG  
106 Wynn Drive  
Huntsville, AL 35805

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

Project Manager, Tactical Radio Communications Systems (PM TRCS)  
Project Manager  
ATTN: SFAE-C3S-TRC  
Ft Monmouth, NJ 07703

**Joint Tactical Radio System (JTRS) Program Director**

JTRS Joint Program Office  
1777 North Kent Street  
Rosslyn, VA 22009

**Joint Vaccine Acquisition Program**

PM Chemical Biological Medical Systems  
1436 Porter Street  
Ft Detrick, MD 21702-5041

**Joint Warning and Reporting Network (JWARN)**

Marine Corps System Command, (MAR-CORSYSCOM C4I Ground C2)  
2033 Barnett Ave, Suite 315  
Quantico, VA, 22134-5010

**Kiowa Warrior**

Product Manager  
ATTN: AMSAM-DSA-AS-ASH  
Building 5308, Sparkman Center  
Redstone Arsenal, AL 35898

**Land Warrior**

Project Manager Soldier Systems  
U.S. Army Soldier and Biological Chemical Command  
10125 Kingman Road  
Ft Belvoir, VA 22060

**Lightweight Laser Designator Rangefinder (LLDR)**

Product Manager Sensors and Lasers  
Project Manager Soldier Sensors and Equipment  
10125 Kingman Road  
ATTN: SFAE-SDR-SEQ-SEN  
Ft Belvoir, VA 22060-5820

**Line-of-Sight Anti-Tank (LOSAT)**

LOSAT  
Project Manager  
ATTN: SFAE-ASM-LS  
Redstone Arsenal, AL 35898-8051

**Long Range Advanced Scout Surveillance System (LRAS3)**

GEN II FLIR  
Project Manager  
10221 Burbeck Road, Suite 430  
Ft Belvoir, VA 22060-5806

**Longbow Hellfire**

Aviation Rockets and Missiles Project Office  
SFAE-MSL-ARM  
PEO Tactical Missiles  
5250 Martin Rd  
Redstone Arsenal, AL 35898-8000

**Maneuver Control System (MCS)**

MCS  
Project Manager Ground Combat Command and Control (PM, GCC2)  
ATTN: SFAE-C3S-AT  
Ft Monmouth, NJ 07703-5405

**Materiel Handling Equipment**

Product Manager Construction Equipment/ Materiel Handling Equipment  
ATTN: SFAE-CSS-CM-C  
6501 East 11 Mile Road  
Mail Stop 401  
Warren, MI 48397-5000

**Medium Extended Air Defense System (MEADS)**

Project Manager MEADS  
P.O. Box 1500  
Huntsville, AL 35807-3801

**Mobile Tactical High Energy Laser (MTHEL)**

U.S. Army Space and Missile Defense Command  
Program Manager  
ATTN: SMDC-RD-TC-MT-D (Wilson)  
106 Wynn Drive  
Huntsville, AL 35805

**Mortar (120mm)**

U.S. Armament Research, Development, and Engineering Center  
Product Manager  
ATTN: SFAE-AMO-CAS-MS  
Picatinny Arsenal, NJ 07806-5000

**Multiple Launch Rocket System (MLRS)**

Project Manager  
ATTN: SFAE-MSL-ML  
Redstone Arsenal, AL 35898



**Networked Fires System Technology (NETFIRES)**

Non-Line-of-Sight Launch System (NLOS LS)  
Director, NLOS LS Task Force  
ATTN: SFAE-MSL-NF  
Redstone Arsenal, AL 35898

**Nuclear, Biological and Chemical Reconnaissance System (NBCRS)-Fox**

NBC Defense Team  
Project Manager  
ATTN: AMSSB-PM-RNN  
Aberdeen Proving Ground, MD 21010-5423

**Objective Individual Combat Weapon (OICW)**

Product Manager Individual Weapons  
Project Manager Soldier Weapons  
ATTN: SFAE-SDR-SEQ-IW  
BLDG 151, Picatinny Arsenal

**Paladin**

Paladin/FAASV  
Product Manager  
ATTN: AMSTA-DSA-PF  
Picatinny Arsenal, NJ 07806-5000

**PATRIOT**

Project Manager  
ATTN: SFAE-AMD-PA  
P.O. Box 1500  
Huntsville, AL 35807-3801

**Phoenix Battlefield Sensor System (PBS2)**

Project Manager  
ATTN: AMSEL-DSA-FF  
Ft Monmouth, NJ 07703

**Precision Guided Mortar Munition (PGMM)**

U.S. Armament Research, Development, and Engineering Center  
Product Manager  
ATTN: SFAE-AMO-CAS-MS  
Picatinny Arsenal, NJ 07806-5000

**Prophet**

Signals Warfare  
Project Manager  
ATTN: SFAE-IIEWS-SG  
Ft Monmouth, NJ 07703-5303

**Reserve Component Automation System (RCAS)**

Project Manager  
1411 Jefferson Davis Highway,  
Jefferson Plaza 1  
ATTN: NGB-RCS-PM  
Arlington, VA 22202-3231

**Second Generation Forward Looking Infrared (FLIR)**

GEN II FLIR  
Product Manager  
10221 Burbeck Road, Suite 430  
Ft Belvoir, VA 22060-5806

**Secure Mobile Anti-Jam Reliable Tactical - Terminal (SMART-T)**

Product Manager, WIN-T SATCOM  
ATTN: SFAE-C3T-WIN (Bldg 911)  
Ft Monmouth, NJ 07703

**Single Channel Ground and Airborne Radio System (SINCGARS)**

Project Manager, Tactical Radio Communications Systems (PM TRCS)  
SINCGARS  
Product Manager  
ATTN: SFAE-C3S-TRC  
Ft Monmouth, NJ 07703

**Small Arms (M4 Carbine, M16A4 Rifle, M24B Medium Machine Gun, MK19-3)**

Small Arms U.S. Army Armament Research, Development and Product Manager  
ATTN: AMSTA-DSA-SA  
Picatinny Arsenal, NJ 07806-5000

**Smallpox Vaccine**

Program Manager Chemical Biological Medical Systems  
1436 Porter Street  
Ft Detrick, MD 21702-5041

**Smoke Generator (M56 Coyote)**

Smoke/Obscurants  
Product Manager  
ATTN: AMSSB-PM-RSM  
Aberdeen Proving Ground, MD 21010-5423

**Stinger**

Assistant Project Manager, SHORAD  
ATTN: SFAE-AMD-SHO  
Bldg 5308  
Redstone Arsenal, AL 35898-5000

**Stryker Interim Armored Vehicle (IAV)**

Brigade Combat Team  
Project Manager  
ATTN: SFAE-GCSS-W-BCT  
Warren, MI 48397-5000

**Super High Frequency (SHF) Terminal**

Product Manager, WIN-T SATCOM  
ATTN:SFAE-C3T-WIN (Bldg 912)  
Ft Monmouth, NJ 07703

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

PROJ MGR  
PM SHORAD  
Attn: SFAE-AMD-SHO  
Bldg. 5308  
Redstone Arsenal, AL 35898-5000

**Tactical Electric Power**

Project Manager – Mobile Electric Power  
ATTN: AMSEL-DSA-MEP  
10205 Burbeck Road, Suite 105  
Ft Belvoir, Virginia 22060-5863

**Tactical Exploitation System (TES)**

U.S. Army Space Program Office  
Director  
ATTN: SMDC-AO  
77-1 Telegraph Road  
Building 2592A  
Alexandria, VA 22315

**Tactical Operations Centers (TOCs)**

Air Defense Command and Control  
Systems (ADCCS)  
Project Manager  
ATTN: SFAE-C3S-AD ATTN: SFAE-C3T-AD  
Redstone Arsenal, AL 35898-5600  
Madison, AL 35758

**Tactical Unmanned Aerial Vehicle  
(TUAV)**

Joint Tactical Unmanned Aerial Vehicle  
Project Manager  
ATTN: PEO-CU-UAV  
Redstone Arsenal, AL 35898

**Tank Main Gun Ammunition**

Maneuver Ammunition Systems - Direct  
Fire  
Project Manager  
ATTN: SFAE-AMO-MAS  
Picatinny Arsenal, NJ 07806-5000

**Theater High Altitude Area Defense  
(THAAD) System**

Project Manager  
ATTN: SFAE-AMD-THA  
P.O. Box 1500  
Huntsville, AL 35807-3801

**Theater Support Vessel (TSV)**

PROD MGR  
PM Watercraft System  
Attn: SFAE-CSS-FP-W  
Warren, MI 48397-5000

**Transportation Coordinators'  
Automated Information for Movement  
System II (TC-AIMS II)**

Product Manager, TC-AIMS II  
SFAE-PS-TC  
8000 Corporate Court  
Springfield, VA 22153

**Warfighter Information Network  
(WIN)-Tactical**

Tactical Internet Management System  
WIN-T, CMS  
Project Manager  
ATTN: SFAE-C3S-WIN-CMS  
Ft Monmouth, NJ 07703

**Warfighters' Simulation (WARSIM)**

Project Manager  
ATTN: PEO STRI-PM WARSIM  
12350 Research Parkway  
Orlando, FL 32826-3276

**XM777 Joint Lightweight 155mm  
Howitzer (LW155)**

Project Manager  
ATTN: SAFE-GCSS-LW  
Picatinny Arsenal, NJ 07806-5000

**A**

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**Prepared by:**

OASA (ALT)

SAAL-SI

103 Army Pentagon

Washington, DC 20310-0103

**Cover Illustration & Design:**

Integrated Communications Team, SAIC

ISBN 0-16-051357-X

