WEAPON SYSTEMS

United States Army 1994

To the Reader:

As the world security environment has changed, so has the Army. With the dissolution of a monolithic threat, national security planning and the Army are now focusing on the growing potential that small regional conflicts may become threats to our national security. To prepare for the future, the Army is building a smaller, power projection Army that will capitalize on America's technologies to improve critical areas of development, such as protection of the individual soldier, lethality, battlefield mobility, and information management.

This handbook provides an overview of the major weapon systems and support equipment the Army is currently developing or has fielded. It highlights our efforts to ensure that our trained and ready soldiers form the best equipped Army in the world. Superior warfighting capabilities are built slowly and over time—we cannot afford to let our advantages slip away.

Together we are working to maintain the most capable and modern Army in the world. To that end, we hope you find this handbook useful.

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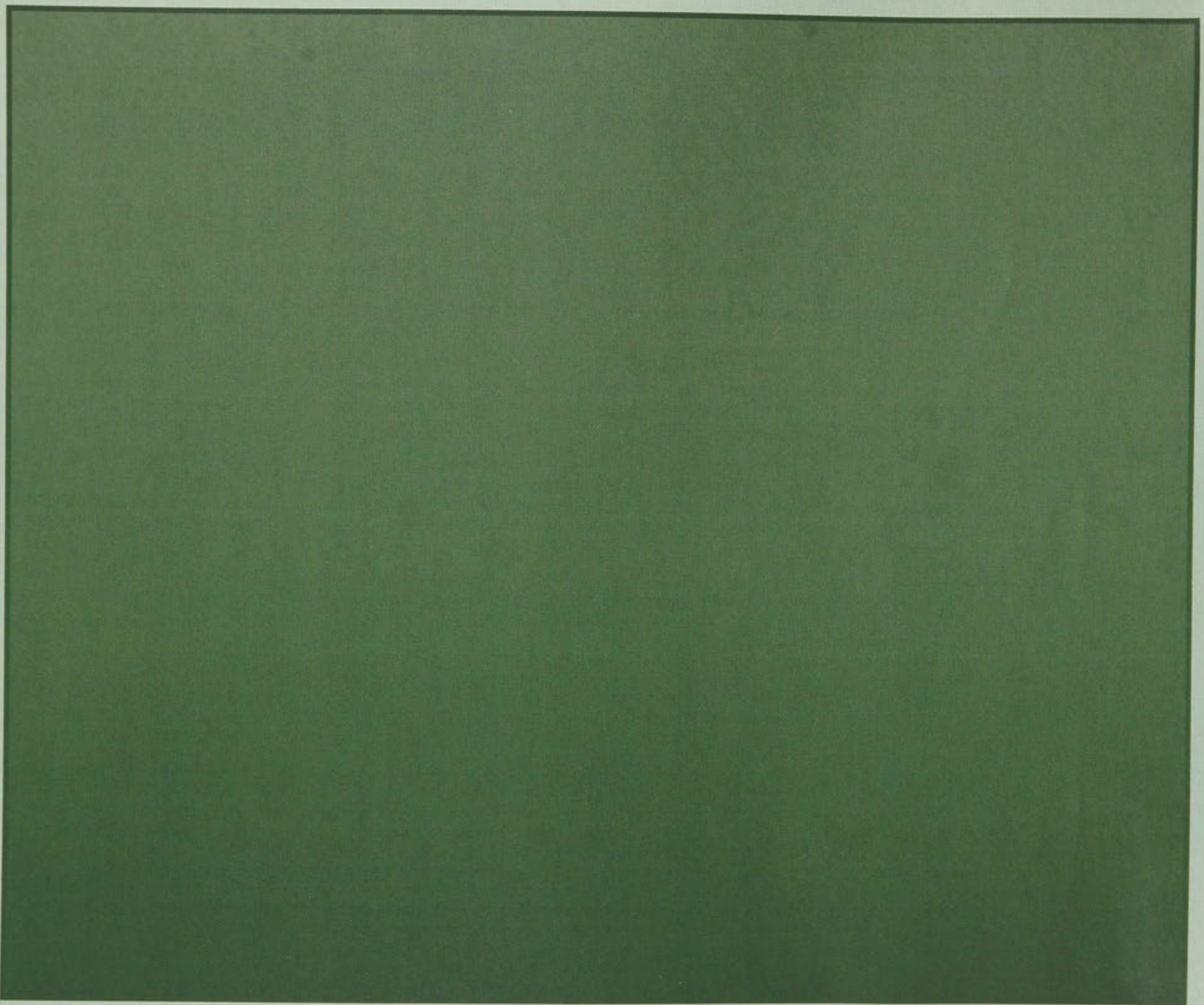


Army Weapon Systems Handbook

A. The Changing Security Environment

The disintegration of the Soviet Union dramatically changed the world security environment. Instead of focusing on global conflict and the containment of a monolithic threat, U.S. strategy must now focus on the potential that smaller but far more numerous hot spots may quickly turn into threats to our national security. The National Military Strategy cites four dangers to that security:

- Proliferation of weapons of mass destruction.
- Regional, ethnic, and religious threats to U.S. interests.
- The possible failure of democratic reforms, especially in the former Soviet Union.
- The possible failure to build a strong and growing U.S. economy.

Iraq's invasion of Kuwait, the ethnic and religious civil wars in Bosnia, the tensions in Korea, and the anarchy in Somalia vividly illustrate the changing threat and the impact of changing U.S. security interests and commitments in this new world environment.

Accompanying the changing and less predictable threat is the steady decline in the size of both U.S. military manpower and spending. To date, the Army has deactivated four active and two National Guard divisions, releasing more than 400,000 active, National Guard, and Reserve soldiers and civilian employees from service, and at the same time has significantly reduced its forward deployed forces. For the first time since WWII, the Army is primarily CONUS-based, relying on strategic lift to project the bulk of its military power to protect overseas interests. While reductions in Army forward deployed forces present new challenges for deterrence, they need not undercut it. Our ability to project land power, both from the United States and from the remaining forward deployment sites, is a day-in and day-out contributor to deterrence, regional stability, and collective security.

Because it is much smaller than the Army of the 1980s, the Army we build in the 1990s for the 21st century must capitalize on technology to improve critical areas, such as protection of individual soldiers, lethality, battlefield mobility, and information management.

In operations other than war, the Army's versatility makes it uniquely qualified to support national interests and fulfill domestic commitments at home and international commitments abroad. Following civil disturbances or natural disasters, the Army can quickly move to directly assist local, state, and national authorities. Providing medical support to the sick and injured, feeding thousands of people whose homes and businesses have been destroyed, containing the spread of disease and damage, assisting local governments to begin clean-up and repairs, meeting the basic needs of the local population, and providing security

are examples of how America's Army helps in times of national need. The Army also will continue to support America's allies through security and humanitarian assistance, such as that provided in Somalia and Macedonia.

The United States Army is and will continue to be the finest land force in the world, capable of dominance on any battlefield. In addition, the Army will possess the versatility to apply its organizational skills and operational capabilities, in support of operations other than war. However, to achieve these capabilities we must continue to capitalize on our technological strengths through steady and consistent investment in modernization.

B. Land Force Dominance: The Army's Role

While the Army may be assigned to conduct or participate in operations other than war, its primary mission is to fight and win our nation's wars. Because people live on and derive their resources from the land, wars must be won on land. Certainly, the U.S. will continue to need capable naval and air forces, but the ultimate measure of the nation's defensive strength, and potential enemies' perceptions of that strength, will be our capability to close with and destroy an enemy on land. Notwithstanding having fewer resources, the Army of the future must be more lethal and more flexible than in the past. We can do that if we capitalize on the technological advantages we have enjoyed in the past to maintain land force dominance in the future.

The best way to win a conflict is to keep it from starting, to deter it, and to do that, the U.S. must have—and must be recognized as having—the dominant land force in the world. If deterrence fails, *land force* dominance is required to win swiftly and *decisively,* with *minimal casualties* to our soldiers. Future conflicts, besides being less predictable than in the past, may begin as relatively small, confined, low-level conflicts but quickly escalate and become more lethal due to the proliferation of weapons of mass destruction among the United States' potential enemies. Rapid, continuous, simultaneous, and synchronized attacks on multiple objectives, 24 hours a day, using forces projected from the United States, will be the norm. Fulfilling the Army's modernization objective is the key to swift, decisive victories with minimal casualties in the future.

To achieve and maintain land force dominance, the Army is taking steps to ensure that austere budgets do not atrophy its capabilities. One of those steps, our modernization strategy, addresses the full range of combat operations while recognizing the reduced spending levels that are currently foreseen. The strategy includes five objectives in which we must maintain our decisive edge if we are to continue to be the dominant land force:

■ ***Project and sustain the force:*** Civil War General Nathan Bedford Forrest said, to paraphrase, "The key to victory is to get there the firstest with the mostest." The capabilities to deploy Army forces rapidly, by air and by sea, and to keep the deployed forces supplied, are critically

important if the U.S. is to continue to carry out its global commitments. Army forces, on the ground, demonstrate U.S. resolve, deter further or new aggression, protect critical ports and airfields, and provide the combat capability to ensure a decisive victory as no other force can.

To be effective and credible, our forces must be armed with strategically deployable weapons more lethal than those any potential enemy might have. While the "first-to-fight" contingency forces must be modernized first, the entire Army needs that same equipment—the national defense strategy of being able to fight successfully in two nearly simultaneous major regional contingencies demands it.

Weapons alone are not enough. Since no combat force is any better than its ability to sustain itself, we need a logistics network that moves the right parts and products to the right place at the right time.

■ ***Protect the force:*** Protecting the lives of our soldiers from both enemy and friendly fires is a goal that we must use all of our technological capabilities to achieve. Our potential enemies learned from Desert Storm the effectiveness of ballistic and cruise missiles, and the lesson will surely not be lost on them. We can expect potential enemies to arm themselves with the same types of weapons, and to use them against us in the future. Protecting our soldiers from missile attack, perhaps with chemical or biological warheads, is a key mission. Missile defense will be required in any foreseeable contingency to protect critical bases, ports, maneuver forces, and population centers, and the Army has the training, the experience, and the equipment to do it. Systems such as Patriot PAC-3, THAAD, and Corps SAM are critical to our ability to protect our forces.

As engagement ranges increase and the pace of combat requires us to fight at night and in adverse weather, combat identification becomes even more crucial to identify friend from foe in all conditions and at ranges compatible with weapons engagement ranges. Using our technology, we can help eliminate fratricide.

We must continue to protect our forces from weapons of mass destruction while maintaining the capability to operate in a chemical or biological warfare environment. Advances in nuclear, biological, and chemical (NBC) defenses will allow the Army to operate effectively with minimal risk to our soldiers, while allowing our forces to maintain the initiative against the enemy.

■ ***Win the battlefield information war:*** Winning the information battle is the key to decisive victory and is essential to success in the four other modernization objectives. To win, we must destroy, disrupt, and control enemy information sources and distribution while ensuring that our commanders get accurate intelligence in time to use it. Knowing, at the shooter level, where the enemy is—and is not—and having real-time information on the progress of the battle while denying it to the enemy will allow us to seize and retain the initiative and win quickly.

■ ***Conduct precision strikes throughout the extended battlefield:*** To dominate the battlefield, the Army must strike and destroy enemy forces throughout the battlefield—close to our own forces and deep in the enemy's rear. To do this, the Army must have modern artillery, attack helicopters, and missile systems with the requisite range, munitions, and interfaces with mission control and target acquisition systems. We must have munitions that defeat moving vehicles, as well as high-priority targets and fixed or semi-mobile targets, such as command centers, reserves, artillery, tactical missile launchers, and enemy air defenses.

■ ***Dominate the maneuver battlefield:*** Decisive operations require the destruction of the enemy's land combat capability with the least cost of American lives. The Army must always possess the dominant maneuver forces—if not in numbers, then in the quality of the force fielded. Highly maneuverable and survivable systems, such as the M1A2 Abrams and the Bradley Fighting Vehicle, will give our soldiers the edge in combat while providing maximum protection.

Maneuver commanders need real-time intelligence and other information to synchronize the battle. Digital sensors and data-sharing systems will give our forces the edge in any future battle by providing greater control over the maneuvers needed for that synchronization.

C. Research, Development and Acquisition (RDA) Strategy

The Army Research, Development and Acquisition (RDA) strategy is *continuous modernization*. For every class of major weapon system that makes up our key war-fighting capability, our goal is to have either a system in production, in upgrade, or a next generation replacement system in development to ensure overmatching capability against any foe. Our goal is to equip the Army with world-class equipment in the shortest possible time, so that the American soldier can win decisively, quickly, and with minimum casualties. We will continue to modernize by upgrading in the near term and initiate only selective new program starts as we reshape to a smaller force.

D. Horizontal Technology Integration

A key component of the modernization strategy that is essential to effective system upgrades and that capitalizes on new technology in the near-to-mid term is Horizontal Technology Integration (HIT). HTI is the simultaneous integration of complementary technologies into families of systems that fight and operate together on the battlefield. Integrating complementary technologies into every combat system in a unit creates a synergy that gives that unit greater combat power sooner than would upgrading in the old manner—a system at a time across the entire force. HTI will increase the combat power of the Army a unit at a time, with priority given to the contingency forces, the first to be deployed. This will maximize the combat power of those forces sooner, honing the spearhead of any force the Army must deploy.

The Army is currently moving out on four HTI initiatives: digitizing the battlefield, "owning the night," battlefield identification technology, and Enhanced Land Warrior.

■ Digitization is the application of the "information highway" to the battlefield, ensuring that all shooters and decision-makers "see" the same things and "know" the same information to enable decisive maneuver and reduce fratricide. Digitizing the battlefield multiplies combat power by exchanging information and graphics between the fighting forces in real time, allowing U.S. forces to make decisions on a common data base. It allows commanders to sequence the battle to their advantage and to synchronize their forces to strike the enemy at the critical time and place.

■ Second and Third Generation Forward Looking Infrared (FLIR) systems will preserve the Army's combat edge in "owning the night" by providing night and adverse weather target sensors to all members of the combined arms task force. The ability to operate effectively during periods of limited visibility enhances our ability to achieve surprise and exploit success while minimizing American casualties.

■ Battlefield Combat Identification technology will prevent engagement of friendly targets by other friendly forces. It will help reduce the confusion on the battlefield and, most importantly, it will save lives.

■ Enhanced Land Warrior is an umbrella program that catapults the individual soldier into a fully integrated head-to-toe fighting system. Enhanced Land Warrior creates a complete fighting system utilizing advanced technology/components, such as the soldier computer/radio, helmet-mounted display technology, objective individual combat weapon, global positioning capability, and protective clothing/armor. This integrated system plugs the individual warrior into the data network of the 21st century's digitized battlefield. Enhanced Land Warrior and its companion programs—Air Warrior (aviation crews), Mounted Warrior (mounted crews), and 21st Century Land Warrior (next generation technology P3I)—provide the soldiers of today and the future with improved situational awareness, lethality, mobility, survivability, and overmatch capability

Although we will reduce the number of new weapons we produce, the need to maintain technological superiority will drive us to increase our efforts and investment to develop new and innovative technologies. Leap-ahead technologies that overmatch any potential adversary, and can be quickly fielded, represent a key combat force multiplier for the smaller force we will have.

E. Modernization Imperatives

As the Army reshapes to a smaller force, a sound, continuous modernization program is essential. The strategy of continuous modernization has served the U.S. well by deterring open conflict for 45 years in Europe and by providing the structure for an overwhelming victory in the Persian Gulf. It is the success of the Army's long-term modernization program that we must preserve and protect. We cannot emphasize too strongly the need to continually modernize our equipment so that our soldiers have a wide advantage over any adversary at any time. This requires balanced investment from the technology base to production. Without the proper balance, the acquisition system will deteriorate and cease to put superior technology into the hands of the soldier.

The Army has constructed its modernization program around combat-proven capabilities, leveraging America's commercial and technical capabilities. We are pursuing only a few new programs of highest priority while improving the synergy of our existing systems through HTI. The program is austere but sound. This handbook outlines the systems and system upgrades critical to the achievement of land force dominance.

Project and Sustain the Force

To be effective and credible, our CONUS-based Army must be able to project and sustain its forces anywhere in the world. Acquiring sufficient strategic mobility to rapidly deploy and sustain overwhelming combat power is an Army priority. The Army is pursuing initiatives to enhance its capabilities to project power. These include increasing the combat power of light forces, improving the deployability of heavy forces, increasing automation, and minimizing the size of support units that must be located in the battle areas.

Life Cycle Management Model

TECH BASE

- Advanced Airdrop for Land Combat Advanced Technology Demonstration (ATD)
- Total Distribution ATD
- Family of Operational Rations
- Medical

DEVELOPMENT

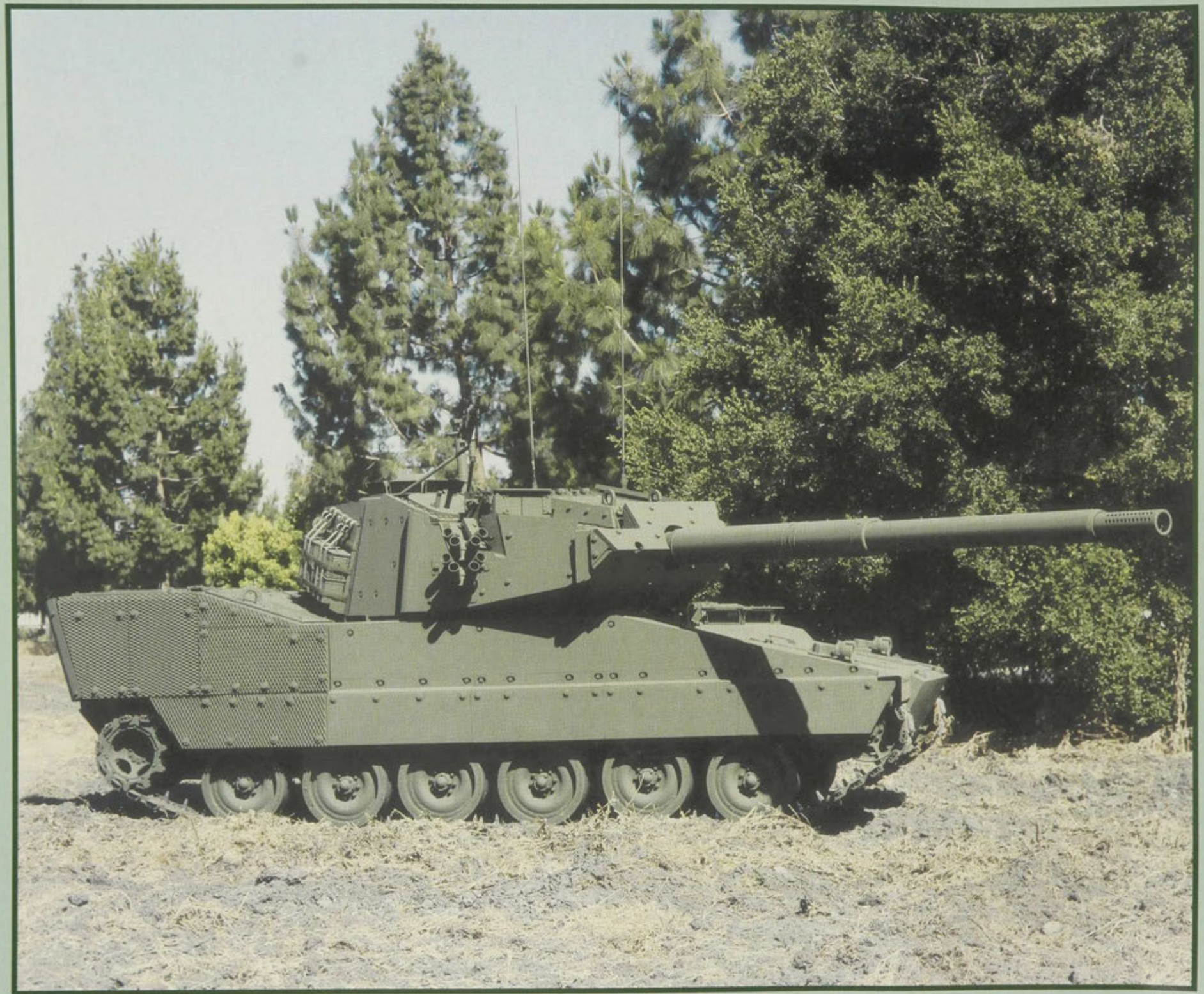
- Armored Gun System (AGS)
- Force Provider (FP)

PRODUCTION

- Black Hawk
- Family of Medium Tactical Vehicles (FMTV)
- High Mobility Multipurpose Wheeled Vehicle (HMMWV)
- Integrated Family of Test Equipment (IFTE)
- Javelin
- Kiowa Warrior
- Palletized Load System (PLS)
- Reverse Osmosis Water Purification Unit (ROWPU)
- Tactical Quiet Generators (TQG)

FIELDED

- Deployable Medical Systems (DEPMEDS)



Armored Gun System (AGS)

MISSION: The XM8 Armored Gun System (AGS) is a lightly armored direct fire weapon system that will replace the M551A1 Sheridan. Its primary mission is to provide direct fire support to light forces. Emphasis is placed on rapid strategic deployability through air transportability. The AGS will be capable of Low Velocity Air Drop (LVAD) and roll-on/roll-off air transportability. The AGS provides improved tactical mobility, lethality, and survivability over the Sheridan.

CHARACTERISTICS:

Weight:	RO/RO < 44,000 lbs
	LVAD Drop Package 42,000 lbs
Mobility:	> M551A1 Sheridan
Range:	160 km (LVAD configuration)
	480 km (combat loaded)
Speed:	64 kph hard surface roads
	40 kph secondary roads
Ordnance:	Main gun (XM-35) 105 mm/30 rds, with autoloader
Crew:	3

FOREIGN COUNTERPART: The Russian-developed counterpart is the ASU-85, a versatile air-transportable and air-droppable weapon system principally employed in an antitank role, but capable of providing general-purpose direct fire support.

PROGRAM STATUS: Milestone I/II Review was completed in May 1992. The Engineering and Manufacturing Development contract was awarded to FMC Corporation, Ground Systems Division, in June 1992 for a ballistic structure, six test vehicles, and technical data. A Critical Design Review was completed in September 1993.

POINT OF CONTACT: Project Manager
Armored Gun System
ATTN: SFAE-ASM-AG
Warren, MI 48397-5000

CONTRACTOR: FMC, Ground Systems Division (Santa Clara, CA)

Black Hawk

MISSION:

The UH-60 Black Hawk is replacing the UH-1 "HUEY" in air assault, air cavalry, and aeromedical evacuation missions. The Black Hawk can carry more than twice the payload and is capable of transporting an entire 11-man, fully equipped infantry squad faster and in most weather conditions. The Black Hawk is the first utility/assault helicopter that adds to the Army's Division-level mobility; for example, it can reposition a 105mm howitzer, its crew of six, and up to 30 rounds of ammunition in a single lift. Its critical components and systems are armored or redundant to enable it to withstand multiple small arms hits, and its airframe is designed to progressively crush on impact to protect the crew and passengers in a crash. Ease of maintenance in the field was designed into the Black Hawk from the beginning. Black Hawk's full squad carrying ability significantly improves the small-unit commander's ability to retain control of his forces under combat conditions, and permits more rapid replacement of ammunition and other combat consumables.

CHARACTERISTICS:

	UH-60A	***UH-60L***
Max gross weight:	22,000 lbs	22,000 lbs
Cruise speed:	139 kts	150 kts
Endurance:	2.3 hrs	2.1 hrs
Max range:	320 nm	306 nm
Crew:	2 pilots, 1 crew chief	2 pilots, 1 crew chief
Armament:	two 7.62mm machine guns	two 7.62mm machine guns
Payload:	2,640 lbs (or 11 combat equipped troops)	2,640 lbs (or 11 combat equipped troops)
External load:	8,000 lbs	9,000 lbs

FOREIGN COUNTERPART:

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

PROGRAM STATUS:

Black Hawk is being procured under a new five-year, multiyear contract covering FY92 to FY96. This multiyear program will allow the Army to modernize the National Guard and Reserves with the Black Hawk. The Army began fielding the UH-60A in FY78, procuring 980 aircraft. The Army also began fielding the UH-60L to its high priority units in FY89 and has procured 287 through FY93. Procurement will continue at 60 per year through FY96.

POINT OF CONTACT:

Project Manager
Utility Helicopters
ATTN: SFAE-AV-BH
St. Louis, MO 63120-1798

CONTRACTORS:

Sikorsky (Stratford, CT)
General Electric (West Lynn, MA)

Deployable Medical Systems (DEPMEDS)

MISSION: The Deployable Medical Systems (DEPMEDS) family of equipment is Department of Defense (DoD)–approved equipment packaged into standardized modules for use by all Services to equip their theater of operations deployable hospitals. There are four types of Army hospitals under the Army's reorganization title Medical Force 2000, ranging from forward deployed Mobile Army Surgical Hospital units in the combat zone to General Hospitals in the Communications Zone. Each is composed of different configurations of standard modules, such as operating rooms, laboratories, x-ray units, and wards. The DEPMEDS hospital sets standardize the use of the latest medical technology and equipment, expendable supplies, major non-medical support equipment power units, Tent Extendable Modular Personnel Tents, tactical shelters, heating, and air conditioning throughout the DoD. Standard modules improve medical unit mobility and patient distribution densities. The hospital sets can be deployed under all climatic conditions. The fielding of the 88 Army hospital sets will eliminate serious shortages of field medical equipment and achieve major advances in equipping the Total Army. Gaining units will receive their DEPMEDS equipment in one package under the Total Package Fielding concept. This is the largest Total Package Fielding effort ever undertaken by the Army Medical Department.

CHARACTERISTICS: System characteristics vary by type of hospital set. All provide adequate but austere care, are maintainable and relocatable, have modular configuration and quad-service compatibility, and are transportable by strategic air.

FOREIGN COUNTERPART: No known foreign counterpart.

PROGRAM STATUS: The DoD Medical Standardization Board ensures compatibility among the Services. The Army program is managed by the DEPMEDS Project Manager, operating under the authority of the Secretary of the Army. Fielding began in 4QFY87. As of September 1993, 69 hospitals have been fielded and 72 minimum Essential Equipment Sets have been fielded.

POINTS OF CONTACT:

PM DEPMEDS
ATTN: DASG-HCP
Frederick, MD 21702-5001

HQ, U.S. Army Aviation and Troop Command
4300 Goodfellow Blvd.
ATTN: AMSAT-W-TV
St. Louis, MO 63120-1798

CONTRACTORS: A large number of contractors are involved in providing the 3,400-plus medical and non-medical components of DEPMEDS. These components are assembled into modules and hospital sets by the Defense Logistics Agency, Defense Depot, Ogden, UT.

Family of Medium Tactical Vehicles (FMTV)

MISSION: The Family of Medium Tactical Vehicles (FMTV) consists of a family of vehicles based on a common truck chassis. The Light Medium Tactical Vehicle (LMTV) has a 2½-ton payload capacity consisting of cargo and van model variants. The Medium Tactical Vehicle (MTV) has a 5-ton payload capacity and consists of the following models: cargo with and without material handling equipment, tractor, wrecker, and dump truck (van and tanker models to be developed concurrent with production of other models). The FMTV will perform line haul, local haul, unit mobility, unit resupply and other missions in combat, combat support, and combat service support units. Vehicles will operate worldwide on primary and secondary roads and trails. The FMTV will replace overaged and maintenance-intensive trucks currently in the fleet.

CHARACTERISTICS:

	LMTV cargo	*MTV cargo*
Payload:	5,000 lbs	10,000 lbs
Towed load:	7,500 lbs	21,000 lbs
Engine:	Diesel	Diesel
Transmission:	Automatic	Automatic
Horsepower:	225	290
Drive:	4x4	6x6

FOREIGN COUNTERPARTS:

	LMTV	*MTV*
Russia:	ZIL-131; GAZ-66	URAL-375; 6A2 9301; KAW 4430 (same as 5-ton)
Italy:	Fiat 75PM	Fiat 6602
Germany:	Unimog U11OOL	Mercedes 1017A, MAN 5-ton
France:	RVI Saviem TRM-2000	RVI Saviem TRM-4000
Spain:	Santana 2000	Peguso 3050
Austria:	Steyr 630M3	Steyr 1291M

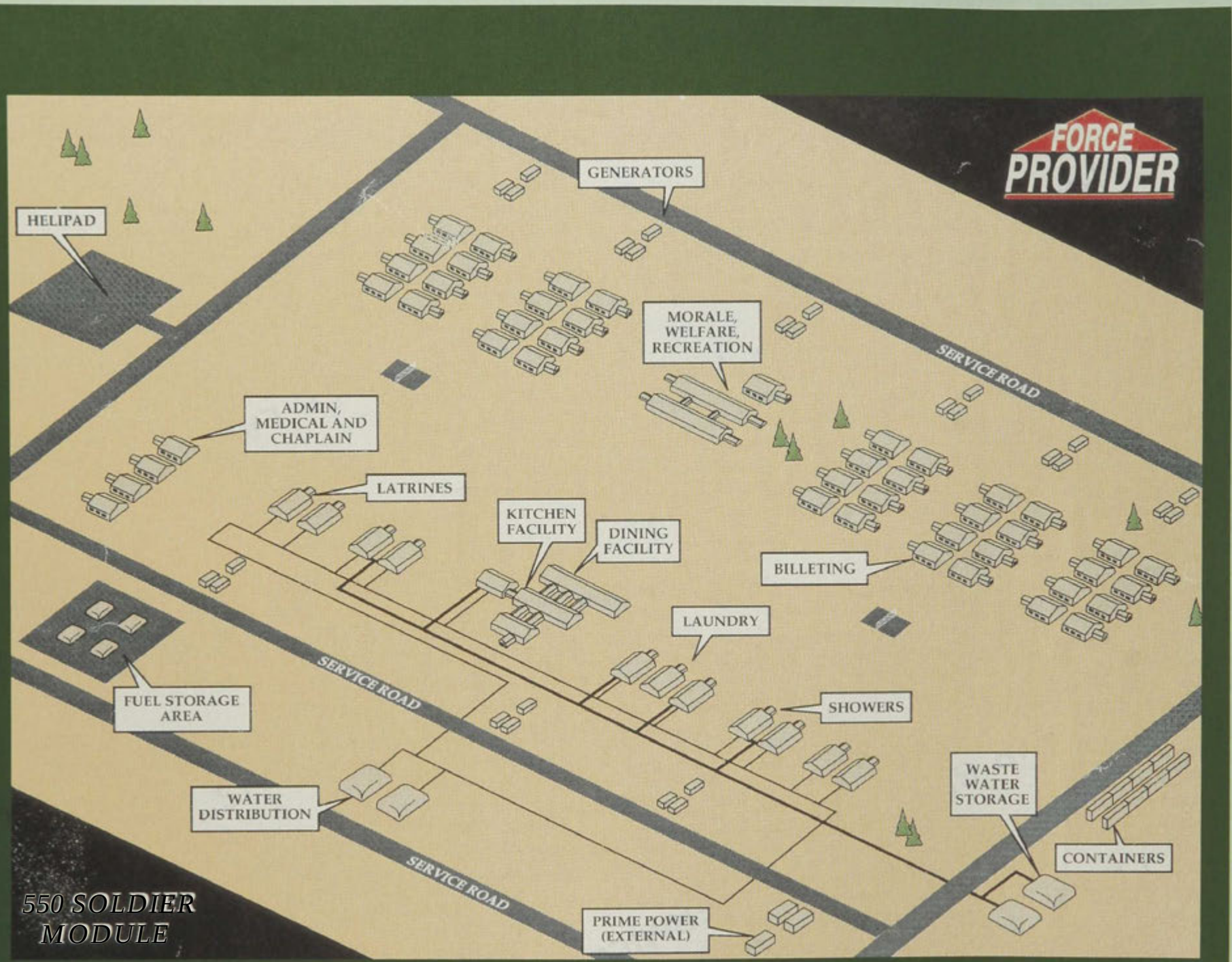
PROGRAM STATUS: The FMTV production contract was awarded on 11 October 1991. Production Qualification Testing (PQT) is ongoing. The program is currently in the Low-Rate Initial Production phase and will be limited to 200 per month for the first two program years.

POINTS OF CONTACT:

PM–Medium Tactical Vehicles
ATTN: SFAE-CS-TVM
Warren, MI 48397

PEO–Combat Support
ATTN: SFAE-CS
Warren, MI 48397

CONTRACTORS: Stewart and Stevenson Services (Houston, TX)
Caterpillar (Peoria, IL)


FORCE PROVIDER
HELIPAD
GENERATORS
MORALE, WELFARE, RECREATION
SERVICE ROAD
ADMIN, MEDICAL AND CHAPLAIN
LATRINES
KITCHEN FACILITY
DINING FACILITY
BILLETING
LAUNDRY
SERVICE ROAD
FUEL STORAGE AREA
SHOWERS
WASTE WATER STORAGE
WATER DISTRIBUTION
CONTAINERS
SERVICE ROAD
PRIME POWER (EXTERNAL)
550 SOLDIER MODULE

Force Provider (FP)

MISSION: The Force Provider (FP) will provide a capability to give the front-line soldier a brief respite from the rigors of a combat theater. Its primary function is to improve the quality of life for combat soldiers on extended operations in remote areas. Additionally, it will provide a capability for theater of operations reception missions, reconstitution missions, humanitarian aid missions, and disaster relief missions.

CHARACTERISTICS: The FP is a Non-Developmental Item integration effort, which will result in a tent-based system with some containerized components to provide billeting, feeding, hygiene services, and morale and welfare activities. The FP components will consist of existing DoD equipment to the maximum extent possible. Equipment for this system will include: tent-based billeting and dining areas, shower/sink units, latrines, laundries, and containerized kitchens. Other support equipment required for the FP includes power generation and distribution equipment, material handling equipment, area lighting, and climate control.

FOREIGN COUNTERPART: No known foreign counterpart.

PROGRAM STATUS: The FP is in the Demonstration and Validation phase. The Mission Needs Statement (MNS) has been validated, and the Operational Requirements Document (ORD) was approved on 23 June 1993. An operational test of the first 550-Soldier Module was conducted between October-December 1993. Milestone III is scheduled for May 1994, with production to begin in FY95.

POINT OF CONTACT: HQ, U.S. Army Aviation and Troop Command
St. Louis, MO 63120-1798

CONTRACTOR: TBD

High Mobility Multipurpose Wheeled Vehicle (HMMWV)

MISSION: The High Mobility Multipurpose Wheeled Vehicle (HMMWV) is a light, highly mobile, diesel-powered, four-wheel drive tactical vehicle that uses a common 1¼-ton payload chassis. The HMMWV can be configured through the use of common components and kits to become a cargo/troop carrier, armament carrier, S250 shelter carrier, two- or four-litter ambulance, or TOW missile carrier. The HMMWV provides a successor to the ¼-ton Jeep, M718A1 Ambulance, ½-ton M274 Mule, 1¼-ton Gamma Goat, and M792 Ambulance. The HMMWV is a Tri-Service program that also provides vehicles to satisfy Marine Corps and Air Force requirements. The HMMWV program is complementary to the 1¼-ton Commercial Utility and Cargo Vehicle, a Non-Developmental Item program. Other Developmental models include a prime mover for the light howitzer, towed VULCAN system, and heavy variant shelter carriers.

CHARACTERISTICS:

	Cargo/Troop Carrier	*Armament Carrier*	*TOW Carrier*	*Ambulance Carrier*	*S250 Carrier*	*Heavy Variant*
Curb weight:	5,200 lbs	5,960 lbs	6,051 lbs	7,180 lbs	5,483 lbs	5,600 lbs
Payload:	2,500 lbs	2,240 lbs	2,149 lbs	1,920 lbs	3,177 lbs	4,400 lbs
GVW:	7,700 lbs	8,200 lbs	8,200 lbs	9,100 lbs	8,660 lbs	10,000 lbs
Crew/cab:	2/4	4	4	2/4 (litters)	2	2/4
Length:	180 in	180 in	180 in	203 in	188 in	180 in
Height:	72 in	72 in w/o launcher	74 in	72 in w/o carrier	105 in	104 in
Width:	85 in	85 in	85 in	85 in	85 in	85 in
Trailer Towing						
Capacity:	3,400 lbs					4,200 lbs
Range:	300 mi					

FOREIGN COUNTERPART: No known foreign counterpart.

PROGRAM STATUS: A new five-year letter contract was awarded in August 1989. Total multiyear procurement is approximately 33,000 vehicles.

POINTS OF CONTACT:

Project Manager
Light Tactical Vehicle
ATTN: SFAE-CS-TVL
Warren, MI 48397-5000

PEO–Combat Support
ATTN: SFAE-CS
Warren, MI 48397-5000

CONTRACTOR: AM General (South Bend, IN)

Integrated Family of Test Equipment (IFTE)

MISSION: The Integrated Family of Test Equipment (IFTE) supports weapon systems state-of-the art electronics technology, ensuring combat readiness for the 1990s and beyond. It allows the isolation of weapon systems faults to the electronic Line Replaceable Unit (LRU) at Direct Support (DS) level, both on and off system. This supports rapid return to the battlefield. At General Support (GS) and Depot, IFTE further diagnoses an LRU to the facility Shop Replaceable Unit (SRU).

CHARACTERISTICS: IFTE is a modular Test, Measurement, and Diagnostic Equipment (TMDE) system, that consists of four interrelated systems that provide generic automatic test equipment (ATE) capability through all levels of maintenance. Two tactical systems, the AN/PSM-80, or Contact Test Set (CTS), and the AN/TSM-191, or Base Shop Test Facility (BSTF), provide on- and off-system support, respectively. The CTS is also the host for Electronic Technical Manuals (ETM). Electro-Optical (EO) test capability for the CTS and BSTF is in development. The CTS is man-portable and augments supported systems Built-in-Test/Built-in-Test-Equipment (BIT/BITE) to isolate weapon systems failure to the bad LRU. The BSTF consists of the AN/USM-632 Base Shop Test Station (BSTS) in an S-280 shelter mounted on a 5-ton truck. A second shelter and truck store Test Program Sets (TPS). TPS is the weapon systems-specific software that ATE uses to diagnosis faults in major items or components. A 60kW powerplant powers the BSTF. Base Shops will serve at both DS and GS. The two non-tactical systems are the Automatic Test Set Support Environment (ATSE) and the Commercial Equivalent Equipment (CEE). The ATSE is the software tool used to develop a BSTF/CEE TPS. The CEE is a non-ruggedized equivalent of the BSTF, designed for completion of TPS development and to support requirements at depots, contractor facilities, and Special Repair Activities.

FOREIGN COUNTERPART: No known foreign counterpart.

PROGRAM STATUS: The IFTE Full-Scale Production (FSP) decision took place in March 1992. Improvements identified at Initial Operational Test and Evaluation will be retrofitted to all BSTFs. First Unit Equipped (FUE) for the BSTF occurred in December 1992. FUE for the CTS is scheduled for 2QFY94.

POINT OF CONTACT: Product Manager
Automatic Test Support Systems
ATTN: PM-ATSS
Redstone Arsenal, AL 35898-5400

CONTRACTORS SAIC (San Antonio, TX)
Grumman Aerospace (Great River, NY)

Javelin

MISSION: The Javelin is a man-portable, anti-tank system for the U.S. Army and U.S. Marines Corps. The system provides high lethality against conventional and reactive armor and will replace the Dragon. The Javelin comprises two major components: a reusable Command and Launch Unit (CLU) and a missile sealed in a disposable Launch Tube Assembly. The CLU incorporates an integrated day/night sight and provides target engagement capability in adverse weather and countermeasure environments. The CLU may be used in the stand-alone mode for battlefield surveillance and target detection.

CHARACTERISTICS: The Javelin system will weigh less than 49.5 pounds and will have a maximum range of 2,000 meters. Dismounted infantry and U. S. Marines are the primary users. The key feature of the Javelin is the utilization of fire-and-forget technology. This technology allows the gunner to fire and immediately take cover. Additional special features are the top attack or direct fire mode (for targets under cover), integrated day/night sight, tandem warhead, imaging infrared seeker, target lock-on, and soft launch (can be safely fired from enclosures and covered fighting positions).

FOREIGN COUNTERPART: No other fire-and-forget systems exist. Similar systems are the Russian AT-7, Swedish BOFORS BILL, and French MILAN 2.

PROGRAM STATUS: The Javelin program has completed the 54-month Engineering and Manufacturing Development phase. Low-Rate Initial Production will begin in FY94, with hardware deliveries expected to begin in late 1995.

POINT OF CONTACT: Javelin Project Manager
ATTN: SFAE-MSL-AM
Redstone Arsenal, AL 35898-5720

CONTRACTORS: Texas Instruments/Martin Marietta Javelin Joint Venture (Lewisville, TX)
Texas Instruments (Lewisville, TX)
Martin Marietta (Orlando, FL)

Kiowa Warrior

MISSION:

The OH-58D Kiowa Warrior is the Army's first true armed scout helicopter. It is currently the only practical armed reconnaissance aircraft in the inventory until RAH-66 fieldings begin early in the next decade. The OH-58D performs reconnaissance, security, command and control, target acquisition/designation, and defensive air combat missions. The Kiowa Warrior adds armed reconnaissance, light attack, and Multipurpose Light Helicopter (MPLH = rapid deployment, troop lift, cargo, and Medevac) to the basic OH-58D Kiowa mission capabilities. The OH-58D has a Mast-Mounted Sight that houses a Thermal-Imaging System, Low-Light Television, and a Laser Rangefinder/Designator. A highly accurate navigation system permits precise target location that can be handed off to other engagement systems via the Airborne Target Handover System. The Laser Designator can provide autonomous designation for the laser HELLFIRE or for other laser-guided precision weapons. Air-to-Air Stinger (ATAS) provides security against threat aircraft. The armed retrofit program began in FY91 and provides Air-to-Ground weapons and other improvements to previously produced OH-58Ds.

CHARACTERISTICS:

Max gross weight:	5,500 lbs
Max speed:	118 kts—clean; 113 kts—armed
Crew:	2
Armament:	ATAS, .50 caliber machine gun, 2.75" Hydra 70 rockets (7-shot pod), HELLFIRE missiles choices; one system per side

FOREIGN COUNTERPART:

Germany:	BO-105
France:	Gazelle, Alloutte
Russia:	HINDs, HIPs, Hoplites

PROGRAM STATUS:

The OH-58D Kiowa is in the 11th year of production. Kiowas began retrofit/remanufacture in FY93 for the Armed Kiowa Warrior version. There have been 291 aircraft accepted through November 1993. Aircraft deployments include the training bases at Fort Rucker and Fort Eustis, and operational units in CONUS, USAREUR, and Korea. The Procurement Objective is currently 366, with a total Army requirement of 507 aircraft. Deliveries will end in July 1996. Armed retrofit is scheduled to conclude in FY97.

POINT OF CONTACT:

Project Manager
Kiowa Warrior
ATTN: SFAE-AV-ASH-T
St. Louis, MO 63120-1798

CONTRACTORS:

Bell Helicopter Textron (Ft. Worth, TX)
Allison Gas Turbine Division (GM) (Indianapolis, IN)
McDonnell Douglas Government Aerospace West (Monrovia, CA)
Northrop (Anaheim, CA)
Litton Laser Systems (Orlando, FL)
Honeywell (Albuquerque, NM)

Palletized Load System (PLS)

MISSION: The Palletized Load System (PLS) will be deployed in the Army's Maneuver Oriented Ammunition Distribution System (MOADS). The PLS will perform line haul, local haul, unit resupply, and other missions in support of modernized, highly mobile organizations. The PLS is a 16½-ton tactical vehicle consisting of a prime mover with integral self-load/unload capability, a 16½-ton trailer, and flatracks (demountable cargo beds). Vehicles can also be equipped with material handing equipment and/or winch. The PLS prime movers with associated trailers will selectively replace or augment the standard tactical vehicles currently authorized in such units as Field Artillery and Transportation. The flatrack will be interoperable with United Kingdom and German flatracks. The PLS will improve ammunition transport with greater efficiency and productivity in the supply distribution role and will reduce dedicated personnel, material handing equipment, line haul, and heavy cargo transport vehicle requirements in the current ammunition distribution system.

CHARACTERISTICS:

Truck payload:	16½ tons
Trailer payload:	16½ tons
Flatrack dimensions:	8x20 ft
Engine type:	Diesel
Transmission:	Automatic
Number of driven wheels:	10
Range, integral fuel at gross combined weight:	255 mi

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

Payload:	15 tons
Engine type:	Diesel
Horsepower:	350
Transmission:	ZF
Number of driven wheels:	8

PROGRAM STATUS: The PLS entered Full Rate Production in May 1993. The contract was signed in September 1990. The PLS is a Non-Developmental Item program. The system completed Production Qualification Testing in December 1992. The flatrack design is being upgraded to allow for its transportation as an International Standards Organization container.

POINTS OF CONTACT:

PM–Heavy Tactical Vehicles	PEO–Combat Support
ATTN: SFAE-CS-TVH	ATTN: SFAE-CS
Warren, MI 48397-5000	Warren, MI 48397-5000

CONTRACTOR: Oshkosh Truck (Oshkosh, WI)

Reverse Osmosis Water Purfication Unit (ROWPU)

MISSION: The 3,000-Gallons-Per-Hour (GPH) Reverse Osmosis Water Purification Unit (ROWPU) provides fresh drinking water worldwide. The ROWPU purifies fresh, saline, and brackish, as well as nuclear, biological, and chemical (NBC)-contaminated water. It is used in Echelon Above Divisions.

CHARACTERISTICS: The 3,000-GPH ROWPU represents state-of-the-art technology in water purification equipment. The unit consists of a raw water subsystem, clarification subsystem, reverse osmosis (RO) subsystem, NBC post-treatment subsystem, chemical feed subsystem, process control station, piping, fittings, and a storage area for pumps and operating supplies. The chemical feed, clarification, RO, and NBC post-treatment subsystems, along with the process control station, are enclosed in an 8-foot-wide by 8-foot-high by 20-foot-long container. Support system components of the system include collapsible water storage tanks, hoses, chemicals, tools, distribution and raw water pumps, a 60kW generator set, and an M871 semitrailer. This equipment is designed to operate 20 hours a day at a production rate equivalent to 3,000 GPH of fresh water and 2,000 GPH of sea water. This unit is transportable by two C-130s, one C-141, rail, ship, or standard military vehicles. The ROWPU replaces the existing equipment, which can purify only fresh water.

FOREIGN COUNTERPARTS: The Russians have developed two pieces of equipment to accomplish the task for which the United States has developed the ROWPU. To purify fresh water and NBC-contaminated water, they currently use the MAFS-3. To purify brackish or saline water, they use distillation process equipment, called OPS, incorporated into their current standard desalinization equipment. Japan offers similar commercial equipment of the same size and capacity.

PROGRAM STATUS: The 3000-GPH ROWPU is in production. The initial production contract was for 147 systems. Production is ongoing, and the First Unit Equipped date was 18 September 1992. A requirements contract for 78 systems was awarded to Keco Industries on 30 December 1992.

POINT OF CONTACT: U.S. Army Aviation and Troop Command
ATTN: AMCPM-PWL
4300 Goodfellow Blvd.
St. Louis, MO 63120-1798

CONTRACTORS: Aqua Chem (Milwaukee, WI)
Keco Industries (Florence, KY)


FAULT INDICATOR
ENGINE SHUTDOWN
RESET LIGHTS
CONTACTOR TRIP
GROUND FAULT CIRCUIT INTERRUPTER
FUEL LEVEL
COOLANT TEMP
EMERGENCY STOP
ENGINE
POWER
BATTERY CHARGE
OIL PRESSURE
VOLTAGE
MASTER SWITCH
AC CIRCUIT INTERRUPTER
PANEL LIGHTS
BATTLE SHORT
CAUTION
HIGH
VOLTAGE
STORAGE BOX

Tactical Quiet Generators (TQG)

MISSION: The Tactical Quiet Generators (TQG) set is the new DoD standard family of power sources. The 3kW-200kW TQG provides DoD with single fuel sets that are more reliable, provide better mobility, reduce noise and infrared (IR) signatures, are survivable in a nuclear environment, and provide quality electrical power for command posts, C³I systems, weapon systems, logistics and maintenance functions, and other battlefield support equipment. The new power generators will limit a threat force's ability to locate critical targets through reduced aural and thermal signatures.

CHARACTERISTICS:

	Current Fleet Performance	***TQG Requirements***
Aural signature:	79-85 dBA @25 m	70 dBA @7 m
Fuel:	GAS/DSL/JP4	JP8/DSL
kW:	1.5-200	3-100
Hertz:	DC/50/60/400	DC 60, 50/60, 400
HAEMP:	No	Yes
IR suppressed:	W/nets	W/nets
Reliability (MTBOMF):	140-180 hrs	500-600 hrs
Standard voltage connections:	Yes	Yes
Slave receptacle:	Ordnance	NATO

FOREIGN COUNTERPART: No known foreign counterpart.

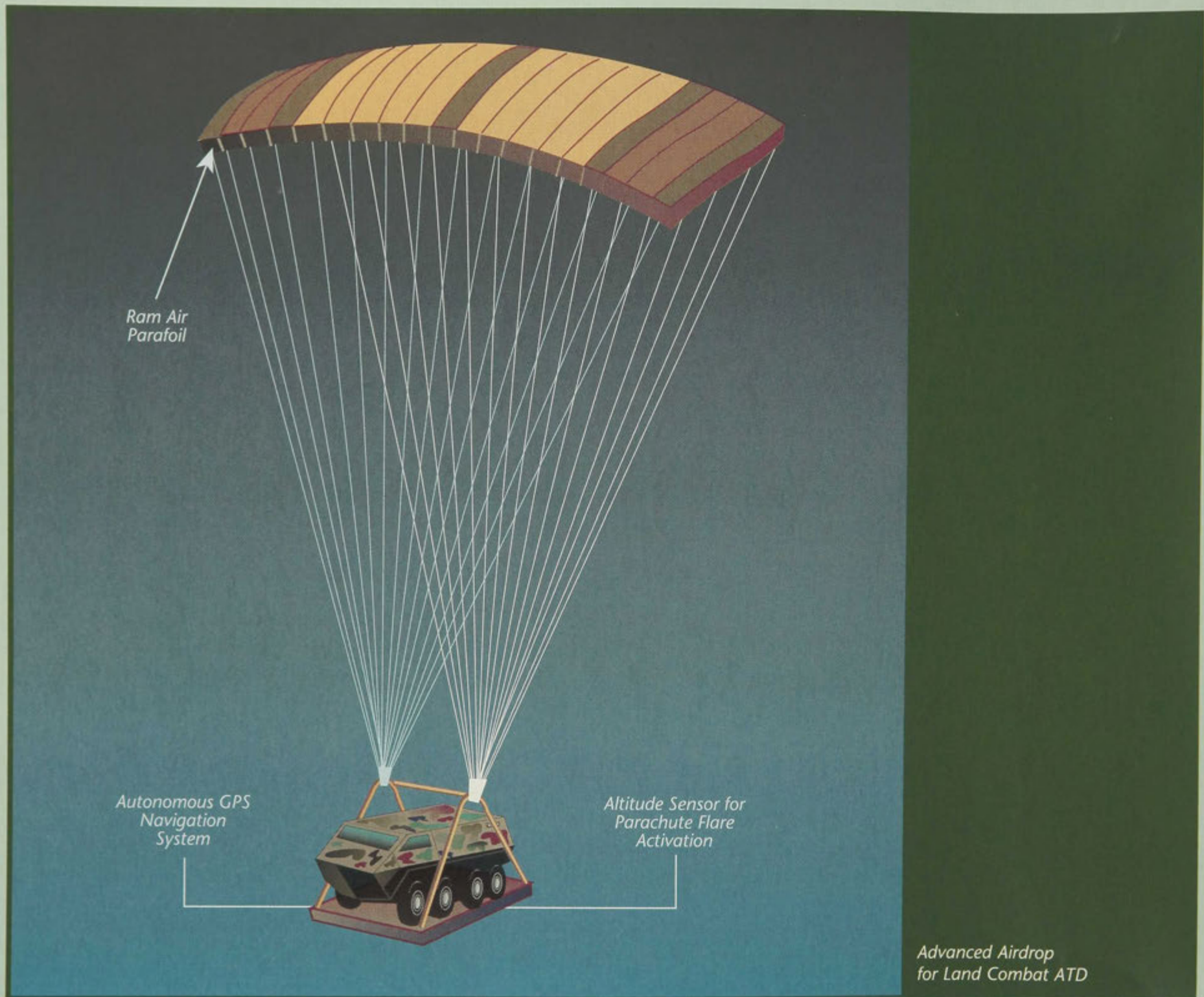
PROGRAM STATUS: TQG contract award for 5kW-60kW TQG sets was made in August 1988. During April 1989, a contract was awarded for the 3kW TQG. The first unit was equipped with TQG sets at Fort Bragg in December 1993.

POINTS OF CONTACT:

DoD Project Manager–Mobile Power
Mobile Electric Power
7500 Backlick Road
Springfield, VA 22150-3107

Department of the Army
HQ, U.S. Army Aviation and Troop Command
St. Louis, MO 63120-1798

CONTRACTORS: Libby (Kansas City, MO)
Dynamics (Bridgeport, CT)



Advanced Airdrop
for Land Combat ATD

Project and Sustain the Force

OVERVIEW:

The goal of the Army Science and Technology program in Project and Sustain the Force is to integrate technologies that will improve the proficiency and effectiveness of tasks such as maintaining, arming, fueling, manning, and moving the soldier. In the Power Projection Army as it is emerging Post Cold War, the capability to rapidly deploy, both by air and sea, and sustain that deployment is paramount for the United States to continue to carry out its global commitments with decreased force structure. Key to these capabilities is a highly responsive logistics network, which exploits both technology and Non-Developmental Items to improve combat power effectiveness, with total asset visibility and light, highly mobile yet lethal weapons for the first-to-fight contingency forces. Improved combat medical care through real-time tele-imaging is also an essential contributor to manning and sustaining the force.

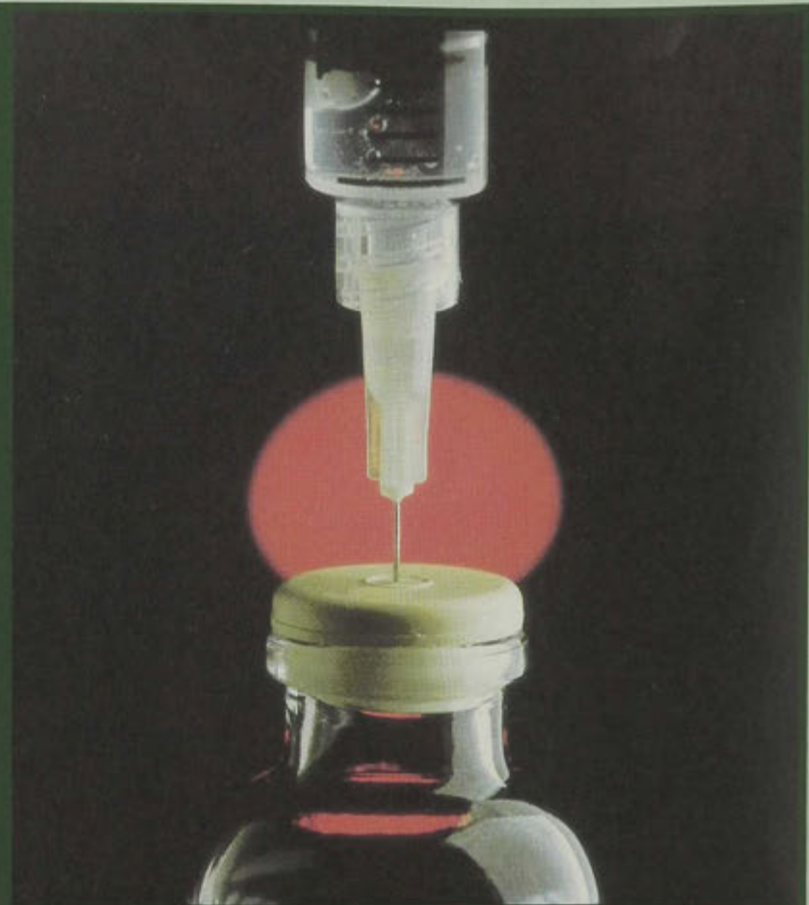
ADVANCED AIRDROP FOR LAND COMBAT ADVANCED TECNOLOGY DEMONSTRATION (ATD):

The capabilities for rapid deployment of combat-essential payloads required by DoD Science and Technology Thrust 5, Advanced Land Combat, will be demonstrated by the Advanced Airdrop for Land Combat Advanced Technology Demonstration (ATD), collectively called the Advanced Precision Airborne Delivery System (APADS). APADS is a high-altitude, offset delivery system with Global Positioning System (GPS)-based precision guidance and soft landing. This gliding parachute system will allow delivery of loads weighing up to 21 tons (gross) from 25,000 feet above ground level with increased accuracy (100 meters) and reduced impact velocity (8 feet per second). APADS will provide a high-altitude, high-opening capability for minimum payload exposure time. APADS will enhance mission flexibility, increase areas of operation, and augment rapid deployment stressed in Thrust 5. APADS will consist of a large ram-air canopy integrated with a GPS-based guidance, navigation, and control system to program destination coordinates and provide control inputs to the canopy. Winches and control lines will maneuver and control the canopy, and a ground sensor will initiate the flared soft landing.

TOTAL DISTRIBUTION ATD:

The Total Distribution (TD) ATD will integrate existing and emerging advanced, logistically relevant technologies and capabilities, such as Distributive Interactive Simulation (DIS), Microcircuit Technology for Logistic Applications (MITLA) tags, and the GPS Azimuth Determining System. For a planned operation, this capability will allow senior commanders to know in near real time the logistics requirements and the support capabilities available for conducting logistics course-of-action analyses. The TD ATD will interconnect and modify existing logistics applications software into a total distribution, user-friendly modular display system to support logistics situational awareness. The products of the TD ATD will support a capability to provide logistics situational awareness to the senior military leadership. In FY95, the TD ATD will participate in the Louisiana Maneuvers General Headquarters Exercise and will test its initial capabilities in a field training exercise. The TD ATD will be completed during FY97.

Self-Heating Individual Meal



Medical Countermeasures

Basic Medical Research

Project and Sustain the Force (Continued)

FAMILY OF OPERATIONAL RATIONS:

The Family of Operational Rations (FOR) is scenario-driven, supports highly mobile and forward deployed troops, and is suitable throughout the world under all climatic conditions. The FOR represents a technologically advanced food system that consists of self-heating, ready-to-eat rations with extended shelf life, reduced cube/weight, and reduced packaging waste. This family includes an individual ration, the Self-Heating Individual Meal (SHIM), designed for use during periods of high-intensity conflict, and a group ration, the Self-Heating Group Ration (SHGR), designed to support consolidated groups of soldiers in remote areas and far forward without the need for equipment and with a minimum of cooks. The built-in heating mechanism in the polymeric tub containing the SHIM, when activated, will heat a meal in 10 minutes. The SHGR consists of A-ration-quality prepared foods packaged with an integral, water-activated heating mechanism that will provide hot food in 20 minutes and keep it warm for five hours. The FOR is linked to several Battle Lab Operational Capability Requirements and the U.S. Army Quartermaster Center and School's Vision of the Future. The FOR will benefit our warfighters by providing state-of-the-art rations with increased acceptability/consumption, resulting in improved mission performance, operational flexibility, and sustainability.

MEDICAL:

The focus of Army medical research and development is on casualty prevention through protection from both battle and non-battle threats to health, maintenance, and amplification of individual capability by medical countermeasures that prevent/arrest disease progression and its manifestations, sustainment of optimum military operational capabilities, and provision of state-of-the-art casualty management.

Medical countermeasures (information, drugs, and vaccines) aim to protect the force from disease, illness, and injury, whether from natural sources, health hazards of our own combat systems, the combat environment, or aggressor weapons. Future products will include improved vaccines against chemical agents and new or improved vaccines against naturally occurring infectious diseases and potential biological weapons.

Sustainment of optimum military capabilities will be accomplished by protecting soldiers from climatic (i.e., heat, cold, altitude) and operational (i.e., high stress, continuous operations) hazards and by protecting performance, as well as health, from chemical, biological, and disease threats. Future products will include new anticonvulsants, treatment/antidotes for vesicant injuries, and non-obtrusive measures of physiological and psychological states.

Combat casualty care research has improved the prospects for soldiers wounded in combat. The care given in the first hour after being wounded—the "Golden Hour"—is the most important in determining survival. Because of improvements in far-forward care to support the wounded soldier during the critical "Golden Hour," and because of the increased speed of evacuation to definitive care, a wounded soldier has an excellent chance of reaching a military hospital and surviving his wounds. Success in developing new drugs, replacement fluids, wound stabilization materials, and artificial blood to manage shock and organ failure will improve support for the wounded soldier.

Telemedicine will use global telecommunications, digital technology, and video imaging to bring medical expertise out of the hospital and onto the battlefield to improve far-forward care. Miniaturization of powerful computing and telecommunications technologies will make possible a paperless, digital field hospital as a vital link between the medic on the battlefield and the medical expert in CONUS. Future products envisioned include advanced physiological monitoring and telerobotic, virtual-reality treatment mechanisms.

Protect the Force

Protecting U.S. forces is a critical capability now and will be of even greater importance in the future. Effective counterfire systems are required to destroy threat armor and artillery forces. Protection from chemical and biological weapons must be improved as threat capabilities expand. Finally, as we learned from Operation Desert Storm, tactical missile defense of critical areas will be required in all foreseeable contingencies.

Life Cycle Management Model

21st Century Land Warrior (21CLW) Top-Level Demonstration (TLD)

Countermine TLD

The Army's Combined Arms Weapon System (TACAWS) Program

Nuclear, Biological, and Chemical (NBC) Defense

Battlefield Combat Identification (BCID) ATD

Bistatic Radar for Weapons Location ATD

Stingray

Corps Surface-to-Air Missile (Corps SAM)

Ground-Based Interceptor (GBI)

Ground-Based Radar (GBR)

Patriot Advanced Capability-3 (PAC-3) Missile

Theater High Altitude Area Defense (THAAD)

Battlefield Combat Identification System (BCIS)—Near Term

Generator, Smoke, Mechanical: Motorized for Dual Purpose Units (XM56)

Forward Area Air Defense (FAAD) Ground-Based Sensor (GBS)

Nuclear, Biological, and Chemical Reconnaissance System (NBCRS)—Fox

Avenger

M40 Series Protective Mask

Nuclear, Biological, and Chemical (NBC) Detection

Stinger

Hawk

Patriot

Soldier System

9mm Personal Defense Weapon


•S^piC

Avenger

MISSION: Avenger's function is to provide air defense to divisions, armored cavalry regiments, separate heavy brigades, and corps air defense brigades. Avenger is designed to protect the force by countering hostile cruise missiles, unmanned aerial vehicles, and low-flying, high-speed, fixed-wing aircraft and helicopters attacking or transiting the division. Avenger fills the Line of Sight-Rear (LOS-R) portion of the Forward Area Air Defense System (FAADS).

CHARACTERISTICS: The Avenger system is a lightweight, highly mobile/transportable surface-to-air missile/gun weapon system mounted on a High Mobility Multipurpose Wheeled Vehicle (HMMWV). It is operated by a two-man crew for air defense in day or night, and in clear or adverse weather conditions. The system incorporates an operator's position with displays, fire controls electronics, and the Standard Vehicle Mounted Launcher (SVML). The SVML supports and launches multiple Stinger missiles (Basic Stinger, Stinger-Post, or Stinger-RMP).

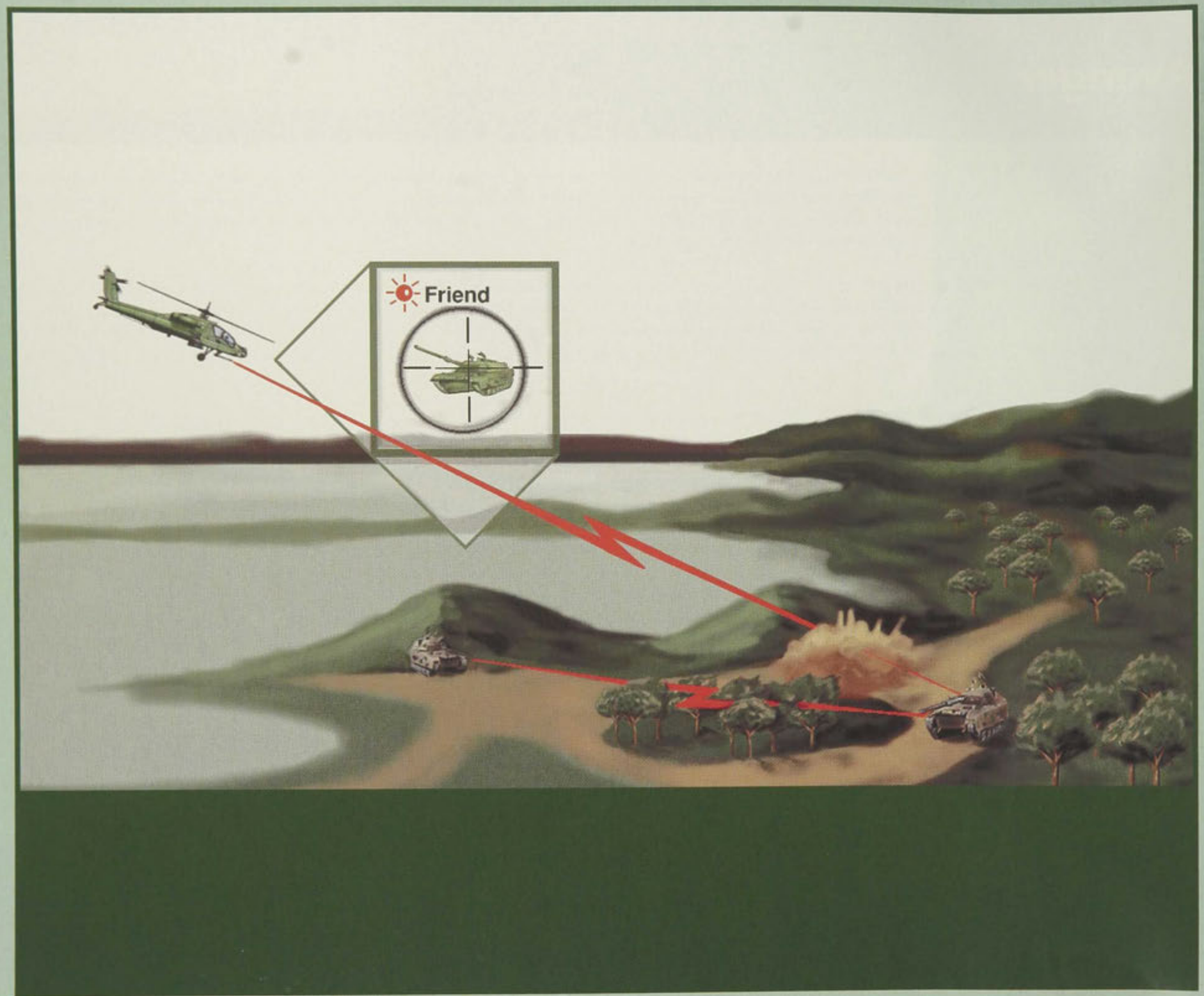
Crew:	2
Armament:	8 ready Stinger missiles/.50 caliber machine gun
Sensors:	FLIR/laser/optical
Chassis:	Modified HMMWV
Fire control:	Digital fire control computer/gyro-stabilized electronic turret

FOREIGN COUNTERPART: The Russian SA-9, introduced in the late 1960s, is the counterpart to Avenger. It has approximately the same range and also uses an infrared homing guidance system. The SA-9 is mounted on a two-axle amphibious vehicle.

PROGRAM STATUS: The initial production contract was awarded competitively to the Boeing Aerospace Company in August 1987. Avenger was Type-Classified Standard in February 1990 and began full-scale production in April 1990. A five-year, multiyear contract was awarded in February 1992 to procure fire units for the U.S. Army and Marine Corps. The program is reviewing candidate missiles for an adjunct or complementary missile for Avenger, Bradley, and Light Armored Vehicle air defense (LAV-AD) platforms.

POINT OF CONTACT: FAAD Project Office
ATTN: SFAE-MSL-FAD
Redstone Arsenal, AL 35898-5630

CONTRACTOR: Boeing Aerospace (Huntsville, AL)


Friend

Battlefield Combat Identification System (BCIS)—Near Term

MISSION: The Battlefield Combat Identification System (BCIS) is the near-term solution to provide an effective and survivable ground-to-ground and air-to-ground (rotary-wing) combat identification system, which will enhance combat effectiveness by precluding the engagement of friendly targets by other friendly forces. BCIS will greatly reduce the risk of fratricide during military operations. The BCIS is a question-and-answer system that comprises a combination of interrogating and transponding components. The BCIS will be installed and integrated with selected Army ground and rotary-winged aviation platforms. Target identification will be performed by those platforms that have a direct fire capability and those that are instrumental in initiating indirect fire missions by transmitting an interrogating millimeter wave (MMW) signal toward the suspected target. Friendly platforms will be equipped with a transponding component that will respond with its identification as a friend or unknown. BCIS will be developed, produced, and fielded to a heavy division of the contingency force by the end of 1997.

CHARACTERISTICS:

Operating frequency range:	MMW (ground-to-ground; air-to-ground) or UHF (air-to-ground)
Antenna coverage:	Directional (interrogator)
	Omni or 360 deg (transponder)
Range:	150 m–5,500 m (ground-to-ground)
	150 m–8,000 m (air-to-ground)
Target identification time:	< 1 sec

FOREIGN COUNTERPART: No known foreign counterpart.

PROGRAM STATUS: The BCIS is currently in the Engineering and Manufacturing Development phase. Approximately 160 BCISs will be manufactured during a Low-Rate Initial Production phase following developmental and operational testing.

POINTS OF CONTACT:

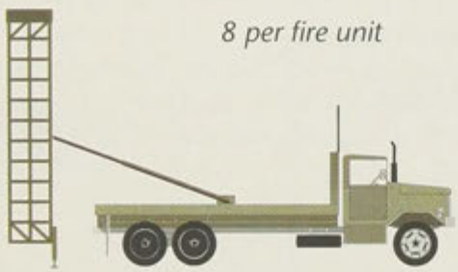
PM Combat Identification
ATTN: SFAE-IEW-CI-BCIS
Ft. Monmouth, NJ 07703

PM Combat Identification
Skyline 6, Suite 309
Falls Church, VA 22041

CONTRACTORS:

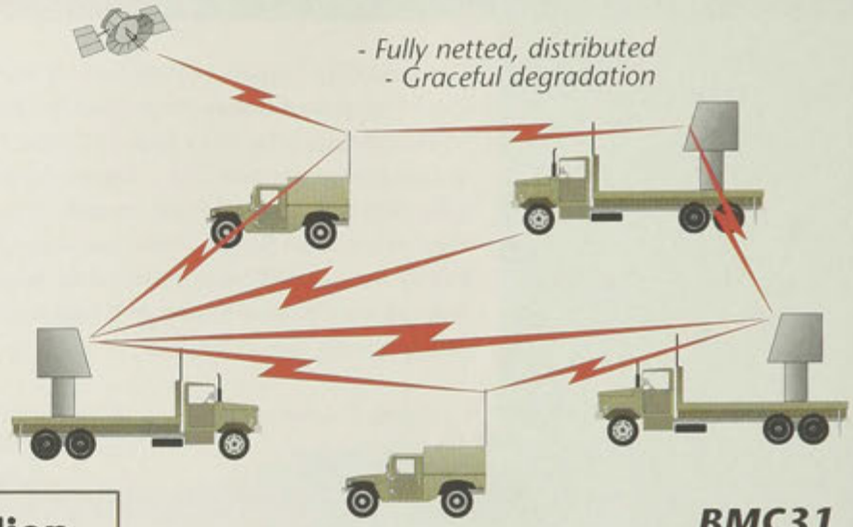
TRW (Redondo Beach, CA)
Magnavox (Ft. Wayne, IN)

General Dynamics (Sterling Heights, MI)
FMC (Santa Clara, CA)



8 per fire unit

Launcher



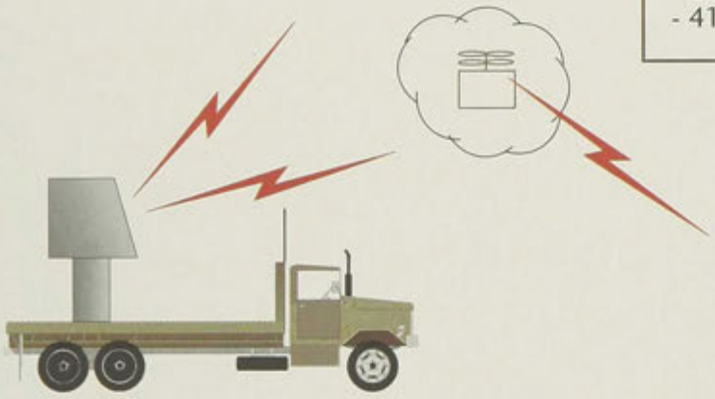
- Fully netted, distributed
- Graceful degradation

BMC31

Battalion

- 4 batteries
- 6 organic sensors
- 32 launchers
- 6 TOCs/BN
- 256 ready missiles
- 411 personnel

Sensors



Interceptor

8-12 per launcher

Corps Surface-to-Air Missile (Corps SAM)

MISSION: The Corps Surface-to-Air Missile (Corps SAM) is a Major Defense Acquisition program and a key element of the Theater Missile Defense (TMD) segment of the Ballistic Missile Defense (BMD) architecture that is developed to support both U.S. Army and Marine Corps operations. It is a critical lower-tier component of the active defense pillar, which is required to provide low-to-medium–altitude air defense (AD)/TMD in the context of the early entry, movement to contact, and rapid force projection needs of the U.S. national warfighting strategy. It will protect critical fixed assets in the Echelons Above Corps and corps rear, and mobile assets of the maneuver forces located in the expanding forward area of the corps. Emphasis is placed on force protection against weapons capable of inflicting mass casualties.

CHARACTERISTICS: The Corps SAM system will consist of missiles, launchers, sensor(s), and a battle management, command, control, communication, and intelligence (BMC^{3}I) element. It will be deployable via C-130 aircraft, and provide a 360-degree defense against multiple and simultaneous attacks by a wide variety of tactical missiles and air-breathing threats that employ both conventional and unconventional warheads. These threats include short- and very short-range tactical ballistic missiles as well as cruise missiles, unmanned aerial vehicles, and both fixed- and rotary-wing aircraft. Corps SAM will be compatible and interoperate with other Army, Services, and allied systems. The BMC^{3}I architecture will be netted/distributed and capable of sharing information with external sources/systems.

FOREIGN COUNTERPART: Germany: Taktisches Luftverteidigungs System (TLVS)

PROGRAM STATUS: Corps SAM was approved by the Defense Acquisition Board (DAB) for entry into the Concept Exploration and Definition phase on 6 August 1990. Extensive Government and industry studies and analyses were conducted to define feasible and cost-effective concepts. The Corps SAM Operational Requirements Document was approved in October 1993. The Corps SAM program is pursuing international cooperation with Germany. Concept Development contracts are planned for award in FY95. Major development effort will begin in the FY98 timeframe. Fielding is expected in the 2005 timeframe.

POINT OF CONTACT: Project Manager, Corps SAM
ATTN: SFAE-MD-SM
Redstone Arsenal, AL 35898-5797

CONTRACTORS: TBD

-V/-

Forward Area Air Defense (FAAD) Ground-Based Sensor (GBS)

MISSION: The Forward Area Air Defense (FAAD) Ground-Based Sensor (GBS) provides key target acquisition and tracking capabilities for the division's FAAD system and command, control, and intelligence (C^2I) component. The GBS consists of a radar sensor with its prime mover/power, Identification, Friend or Foe (IFF), and C^2I interfaces. GBS automatically detects and tracks fixed- and rotary-wing targets infiltrating below the protective umbrella provided by air defense sensors. GBS is designed not only to alert friendly forces of air attack but also to cue air defense weapons with accuracy to improve weapon effectiveness. GBS operates under all battlefield conditions, including day and night operations, adverse weather, and discrete, distributed, and precipitation clutter environments. GBS is the prime contributor to FAAD C^2I's development of the recognized air picture over the division area and beyond the Forward Line of Own Troops (FLOT). Air targets include fixed- and rotary-wing aircraft, cruise missiles, and Remotely Piloted Vehicles/Unmanned Aerial Vehicles (RPV/UAV). With a SINCGARS/EPLRS-compatible data link, GBS provides near real-time data to cue Avenger fire units and protect friendly aircraft from fratricide.

CHARACTERISTICS:

- X-band, phased-array, pulse doppler
- Low-altitude, medium-range air defense sensor
- Detects fixed- and rotary-wing aircraft, cruise missiles, and UAVs at reduced ranges
- Azimuth: 360 deg; altitude: 0–4 km; range: 40 km
- Electronic Countermeasures (ECM) and Anti-Radiation Missile (ARM) resistant
- High mobility, transportability, and reliability
- Standard Army wheeled carrier (5-ton or HMMWV)
- Provides identification of friendly and hostile aircraft through IFF

FOREIGN COUNTERPART: Russia: Straight Flush radar; Long Track radar

PROGRAM STATUS: The contract was awarded in 2QFY92. FAAD GBS is in the Engineering and Manufacturing Development phase.

POINT OF CONTACT: FAAD Sensor Product Office
ATTN: SFAE-IEW-GSI
Redstone Arsenal, AL 35898-5796

CONTRACTOR: Hughes Aircraft (Fullerton, CA)

Generator, Smoke, Mechanical: Motorized for Dual Purpose Units (XM56)

MISSION: The XM56 is a large-area smoke generator system providing visual, infrared, and millimeter wavelength obscuration. The system, which is mounted on the M1097 HMMWV, can obscure high-priority targets, such as airfields, bridges, and ammunition depots, as well as convoys and troop movements. The system is modular and uses a gas turbine engine as a power source to disseminate obscurants. The visual screening module is capable of vaporizing fog oil at a rate equal to the M157 smoke generator for up to 60 minutes. The infrared and millimeter wave (MMW) screening modules will be capable of disseminating a particulate material to provide 30 minutes of screening. The MMW module will be developed under a P3I task.

CHARACTERISTICS:

Modular design
Gas turbine engine-powered

visual screening (fog oil):	1.33 gal/min
	1 hr continuous
Infrared screening (graphite):	10 lbs/min
	30 min continuous

FOREIGN COUNTERPART: Countries using Soviet doctrine emphasize extensive use of smoke during tactical exercises. Many nations, especially those in the Middle East, are realizing the benefits of smoke and have developed programs in this area.

PROGRAM STATUS: The XM56 Smoke Generator is currently in the Engineering and Manufacturing Development phase of the program. Pre-Production Testing has been completed and the system has been redesigned to correct failures identified. In FY94, we will complete Pre-Production Qualification Testing, conduct Initial Operational Test and Evaluation, and conduct Milestone III/Type Classification. A competitive production contract will be awarded in FY95. Fieldings will begin in FY97.

POINT OF CONTACT:

Program Manager
SMOKE
ATTN: AMCPM-SM
Aberdeen Proving Ground, MD 21010-5423

CONTRACTOR: MRC Division of Chamberlain Manufacturing (Hunt Valley, MD)

Ground-Based Interceptor (GBI)

MISSION: The Ground-Based Interceptor (GBI) is designed to conduct non-nuclear intercepts of reentry vehicles (RV) dispersed from Intercontinental Ballistic Missiles (ICBM) and Submarine-Launched Ballistic Missiles during the mid-course phase of their trajectories. Upon receipt of weapons release authorization from the ground-based Battle Manager, the GBI is launched toward an incoming target or target cluster based on pre-commit sensor data. GBI's onboard computer receives additional updates from the Battle Manager and executes intercept course correction maneuvers during the initial stage of the flight. The GBI uses cluster track information from onboard sensors or a target object map based on data provided by pre-commit sensors to perform tracking and target selection. The sensor data enable the GBI to discriminate RVs in the presence of decoys. Once uncapped, the onboard seeker acquires, designates, and tracks the target, executing "end game" maneuvering of the kill vehicle to achieve a direct-impact intercept.

CHARACTERISTICS: The GBI is a ground-based, multistage missile containing a lightweight kill vehicle that incorporates a sophisticated multiband seeker with onboard data processing. The interceptor is designed to provide low cost kills of RVs. Target destruction is accomplished through the transfer of kinetic energy during target impact to cause a non-nuclear kill. A lethality enhancement device may be used to increase the interceptor lethal radius and negate threat countermeasures. GBIs will be deployed at fixed sites in underground launch stations.

FOREIGN COUNTERPART: Russia: GALOSH

PROGRAM STATUS: The Missile Defense GBI Project Office recently completed the Exoatmospheric Reentry Vehicle Interceptor Subsystem (ERIS) Functional Technology Validation Program, which included a successful intercept of a mock reentry vehicle in the presence of decoys. Currently, the GBI program is pursuing an Advanced Concept Technology Demonstration (ACTD) program. The ACTD will focus on GBI Experiment (GBI-X) Kill Vehicles and on integrating them into the payload Launch Vehicle. The GBI-X Kill Vehicle demonstration will advance in complexity from seeker flights through prototype Kill Vehicle flights. The ACTD program leads to a Kinetic Kill Vehicle (KKV), which uses the ERIS as a baseline capability and increases military utility through periodic integration of GBI-X–proven technology, thereby reducing lead time to a deployable capability.

POINT OF CONTACT: Program Executive Office
ATTN: SFAE-MD-GBI
P.O. Box 1500
Huntsville, AL 35807-3801

CONTRACTORS: The KKV program contractor teams include Martin Marietta, Hughes Aircraft, and Rockwell International. The Launch Payload contractor is Lockheed Missile Systems.

Ground-Based Radar (GBR)

MISSION: The Ground-Based Radar (GBR) encompasses the development of a family of radars that will support Theater Missile Defense (TMD) and National Missile Defense (NMD) interceptors in the acquisition, tracking, and discrimination of incoming targets.

CHARACTERISTICS: Each GBR is an X-band, phased-array radar. Radar missions, transportability, threats, and operational concepts influenced the physical sizes and configurations of the designs. The TMD-GBR is a 9.2-square-meter, C-130 air-transportable, solid-state system that will serve as the fire control radar for the Theater High Altitude Air Defense System. The NMD-GBR is currently configured to be an 84-square-meter, fixed-site radar that employs conventional traveling wave tube (TWT) technology. This radar would support a strategic Ground-Based Interceptor. Modularity and commonalty (other than antenna technology) have been emphasized to reduce system life-cycle cost.

FOREIGN COUNTERPART: The Russian counterpart to the NMD-GBR seems to consist of a suite of three anti-ballistic missile (ABM) radar systems: the long-range Hen House radars; the Dog House radars; and the Try Adds radars. The Hen House radars appear to function as early warning surveillance radars. The system has large-array antennas and operates at about 150 MHz. The Dog House radars accept targets from the Hen House network and pass them to the Try Adds radars for engagement. The Dog House radars also employ large-array antennas and operate at about 100 MHz.

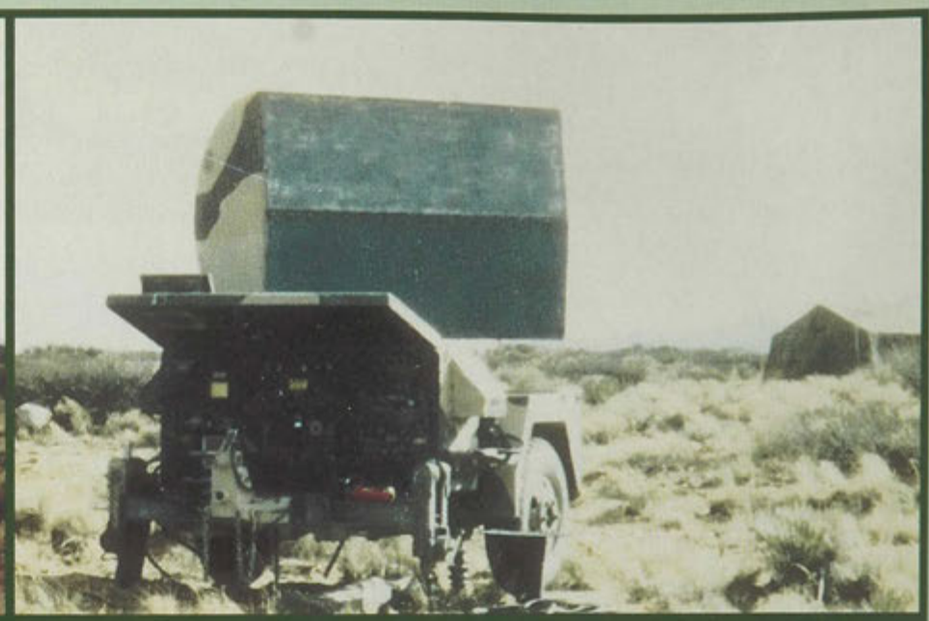
The Russian SA-12 is thought to have capability against high-performance aircraft and tactical ballistic missiles similar to the TMD-GBR. The SA-12 system consists of two radars that appear to be phased-array radars. The acquisition radar is deployed at the brigade and battalion levels and designates targets for the fire control radar. The fire control radar is an X-band radar deployed with the firing battery and appears to have autonomous search capability.

PROGRAM STATUS: With the sponsorship of the Ballistic Missile Defense Organization (BMDO), the GBR program office will develop a family of radars to support both TMD and NMD requirements. Raytheon Company won the competitive procurement for the radars. A TMD Demonstration/ Validation (DEM/VAL) test radar will be delivered and tested at White Sands Missile Range (WSMR) in FY95. The two User Operational Evaluation (UOE) radars will be delivered and tested at WSMR in FY96. The NMD radar will continually be developed to study critical long-pole technology areas, such as discrimination, kill assessment, and target-object mapping (TOM). BMDO plans to use an NMD radar technology demonstrator to validate these long poles.

POINT OF CONTACT: Program Executive Office
Missile Defense
ATTN: SFAE-MD-GBR
P.O. Box 1500
Huntsville, AL 35807-3801

CONTRACTOR: Raytheon (Marlborough, MA)

High-Power Illuminator



Continuous Wave Acquisition Radar

Launcher

Hawk

MISSION: Hawk is a medium-range, surface-to-air guided missile system designed to provide air defense protection for critical assets and maneuver forces against tactical air threats. First fielded in 1960, Hawk has been continually upgraded through a series of pre-planned product improvements, which have enhanced all aspects of the Hawk system. Each Hawk firing platoon comprises a platoon command post, an acquisition radar, a tracking radar with optical tracking system, and four launchers with three missiles each.

CHARACTERISTICS: The system is transportable by helicopter and provides all-weather, day or night coverage. The missile has a two-stage, solid propellant motor with supersonic speed and a high-explosive, proximity-fuzed warhead. It has semi-active homing guidance.

Range:	40 km
Speed:	800 m/sec
Diameter:	14.8 in
Weight:	1,400 lbs
Length:	198 in

FOREIGN COUNTERPART: The Russian SA-6 is similar to Hawk. Its range and altitude capabilities are less than Hawk, but the SA-6 is more mobile. The basic SA-6 unit is a regiment that includes five missile batteries.

PROGRAM STATUS: Hawk is fielded with the active U.S. Army through 1994. Thereafter, it will remain only with the Army National Guard and the U.S. Marine Corps.

POINT OF CONTACT: Hawk Project Office
ATTN: AMCPM-AP
Redstone Arsenal, AL 35898-5660

CONTRACTORS:

Raytheon (Andover, MA)
Aerojet (Sacramento, CA)
General Electric (Huntsville, AL)
Westinghouse (Baltimore, MD)
Universal Technology (Estill Springs, TN)
Electro Design (Decatur, AL)
Northrop (Anaheim, CA)
Summa Technology (Huntsville, AL)
Harris (Melbourne, FL)

M42 Chemical/Biological Combat Vehicle Masks

M40 Chemical/Biological Field Mask

M43 Aviator Mask

M40 Series Protective Mask

MISSION: The M40 series masks provide respiratory, eye, and face protection against chemical/biological (CB) agents, toxins, radioactive fallout particles, and battlefield contaminants.

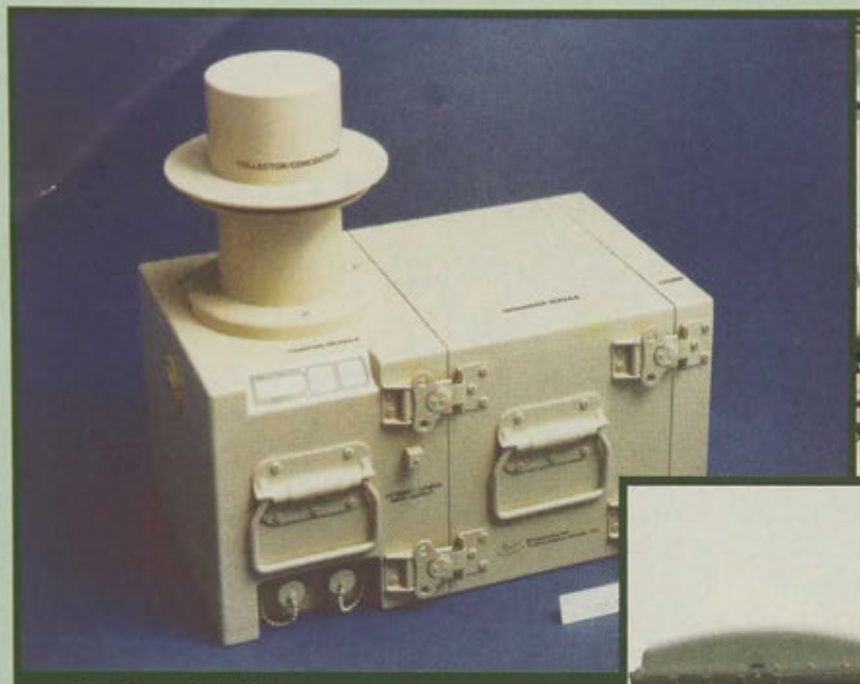
CHARACTERISTICS: The M40 is the CB field mask that replaces the M17 series, while the M40 special-purpose mask replaces the M9 series. The M42 is the CB combat vehicle mask, which replaces the M25 series. The masks are a silicone rubber facepiece with in-turned periphery, binocular eye lens system, and elastic head harness. Features include front and side voicemitters, drink tube, clear and tinted outserts, and a filter canister with NATO-standard threads. The canister on the M42 combat vehicle crewman mask is attached to the end of a hose and has an adapter for connection to the Gas Particulate Filter Unit. The M42 also has a built-in microphone for wire communication. The M40 and M42 masks are issued with a butyl-coated fabric hood to protect the facepiece, head, and neck areas. The M40 special-purpose hood is a heavyweight, butyl-coated fabric with a double skirt and is compatible with the M3 TAP suit.

FOREIGN COUNTERPART: Other countries have masks designed to meet their needs, but these have not been judged to contain all essential features required for the M40 series. In fact, the British S10 was evaluated during the development phase of the program, but was eliminated from the list of candidates.

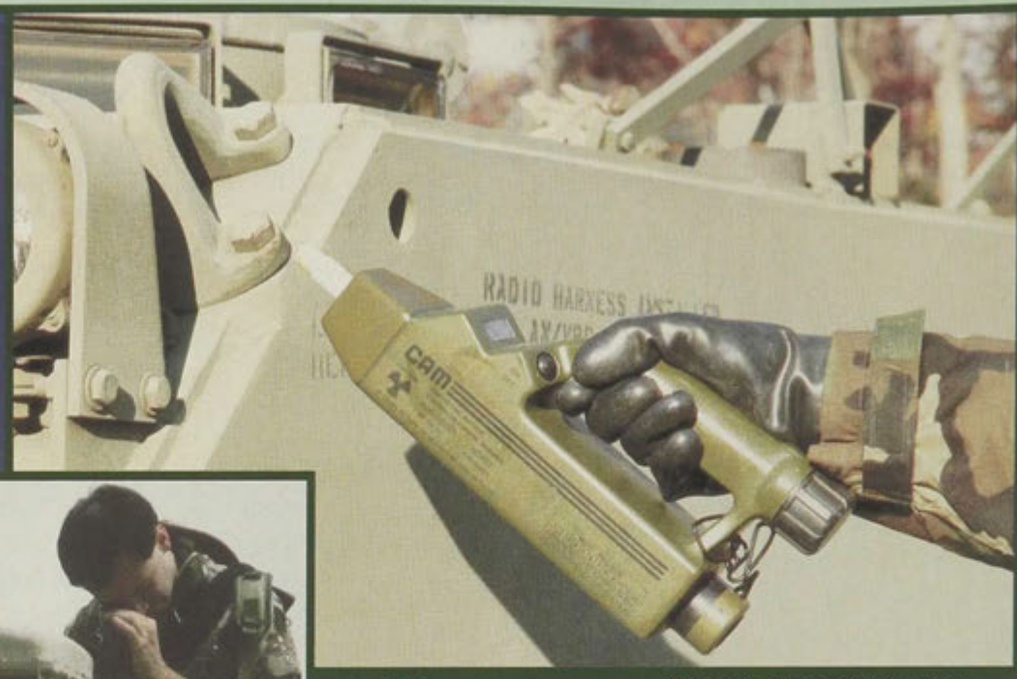
PROGRAM STATUS: Production of both M40 and M42 masks is currently ongoing at both ILC and MSA facilities. Fielding is complete at Army Materiel Command (AMC) surety sites and has begun with Forces Command (FORSCOM) units with anticipated completion in FY94. Fielding of the five remaining Major Commands (MACOM) will continue as scheduled.

POINT OF CONTACT:
Project Manager
NBC Defense
ATTN: AMCPM-NN
Aberdeen Proving Ground, MD 21010

CONTRACTORS:
ILC Dover (Dover, DE)
Mine Safety Appliance (Pittsburg, PA)

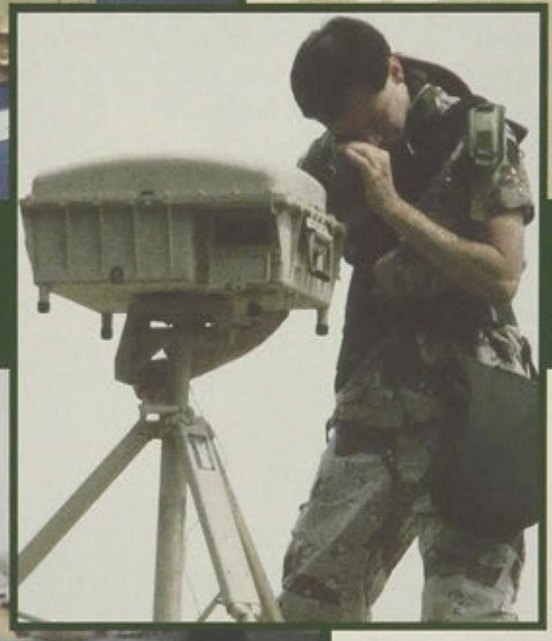


Bio-Chemical Detector



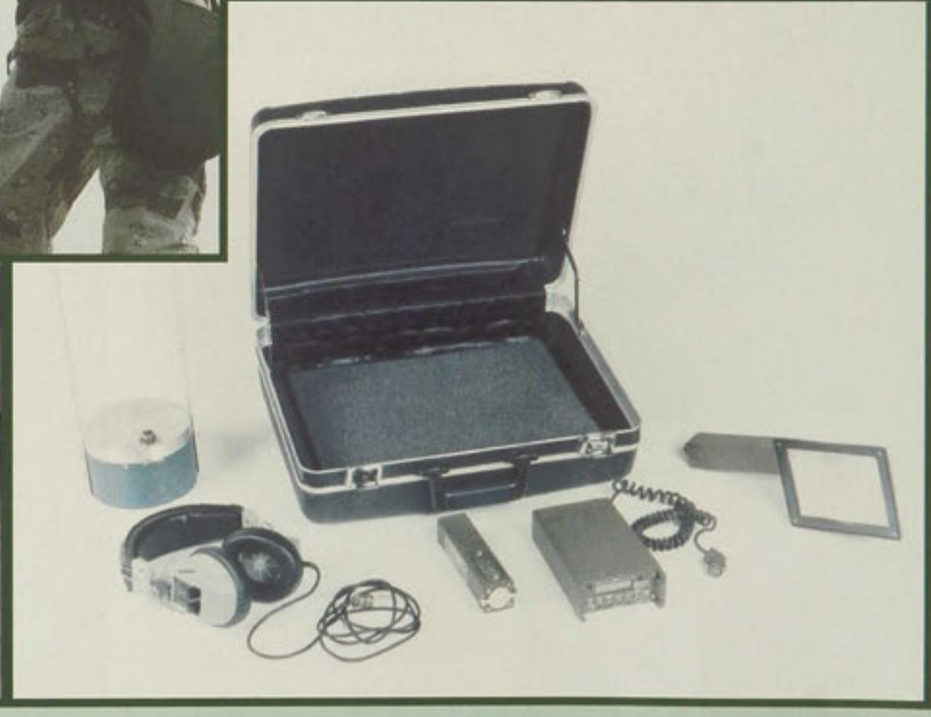
Chemical Agent Monitor

AN/PDR-77 Hand-Held Radiac and Accessories



XM21 Remote Sensing Chemical Agent Alarm

Biological Integrated Detection System



Nuclear, Biological, and Chemical (NBC) Detection

MISSION: Nuclear biological, and chemical (NBC) detection provides battlefield-essential early warning and monitoring capabilities for U.S. Forces. There are four pillars of NBC defense: detection, avoidance, protection, and decontamination. U.S. doctrine stresses contamination avoidance when the scheme of maneuver permits. Detection is key to avoidance and timely protection measures. Monitoring devices are important to survey and decontamination operations. A strong NBC early detection, warning, and monitoring capability will save lives on the contaminated battlefield.

FOREIGN COUNTERPART: Even though the U.S. is negotiating chemical and biological weapons treaties, many nations still have an extensive chemical weapons and biological arsenal. These weapons are becoming especially widespread in third world countries.

PROGRAM STATUS: The U.S. is currently developing or producing NBC detection and monitoring equipment. The AN/PDR-77 detects and measures alpha, beta, gamma, and x-ray radiation. It is currently in Production Qualification Testing at White Sands Missile Range, NM. The Biological Integrated Detection System (BIDS) is a system of biological detectors. The BIDS will have detectors, weather sensors, collective protection, and direct communication to Division Headquarters, enabling continuous monitoring and rapid alarm notification to field commanders. A Joint Program Office for Biological Defense was established, with the Army's accepting the lead. The DoD Biological Defense Program consists of both medical (vaccines) and non-medical (detection) assigned programs for all services. The Remote Sensing Chemical Agent Alarm, XM21, detects and warns U.S. forces of toxic chemical agent attacks. The XM21 has been type classified for low-rate production. The Chemical Agent Monitor (CAM) is a post-attack monitor employed in both monitoring and survey missions to determine the effectiveness of decontamination procedures and the limits of a contaminated area. The CAM is in production in the United States.

POINTS OF CONTACT:

Project Manager
NBC Defense
ATTN: AMCPM-NN
Aberdeen Proving Ground, MD 21010

Office of Program Director
Biological Defense Systems
ATTN: AMSCB-BD
Aberdeen Proving Ground, MD 21010

Joint Program Office for Biological Defense
ATTN: SFAE-BD/Skyline #5
5111 Leesburg Pike
Falls Church, VA 22041

CONTRACTORS:

Nuclear Research (Dover, NJ)
Battelle (Edgewood, MD)
Brunswick (Deland, FL)
Environment Technologies Group (Baltimore, MD)
Graseby Ionics (Watford, Herts, UK)

Nuclear, Biological, and Chemical Reconnaissance System (NBCRS)—Fox

MISSION: The XM93 and XM93E1 are wheeled armored vehicles equipped with a fully integrated NBC detection, warning, and communication capability. They will detect, identify, and mark areas of NBC contamination; collect soil, water, and vegetation samples for later analysis; mark areas of nuclear and chemical contamination; and transmit NBC information to unit commanders in the area of operation. The hazards to the NBCRS crew are minimized through the inclusion of vehicle NBC collective protection, providing overpressure with heating and cooling for crewmen.

CHARACTERISTICS:

Body style:	6-wheel, armored-collective protection
Engine:	V8 Diesel—320 HP
Weight:	XM93: 18.7 tons; XM93E1: 20.2 tons
Speed:	65 mph
Range:	500 mi
Crew:	XM93: 4 soldiers; XM93E1: 3 soldiers

FOREIGN COUNTERPART: Russian-developed: BRDM-ZRKH, MTLB, RKHM, UAZ-469RKH. The Chinese also have an NBC Reconnaissace System.

PROGRAM STATUS: The NBCRS is a German Non-Developmental Item (NDI) program consisting of four phases: (1) Proposal Evaluation and Shoot-Off phase, during which proposals were evaluated, competition conducted, and a winner selected; (2) XM93: Interim System Production phase, which provides 48 contractor-supported (FY90–08, FY91–15, FY92–25) interim systems for urgent fielding (additionally, for Operation Desert Storm, the German Government donated 60 German XM93 NBCRSs to the U.S. Government. Fifty systems were fielded with the Army forces and 10 with the Marine Corps during Operation Desert Storm. These systems have been redeployed worldwide primarily in CONUS and USAREUR); (3) System Improvement phase to design, fabricate, and test the XM93E1 NBCRS to satisfy all Required Operational Capabilities (ROC) requirements; (4) A production program to upgrade all XM93 NBCRSs to the XM93E1 configuration.

POINT OF CONTACT: Office of Project Manager
ATTN: AMCPM-NN
Aberdeen Proving Ground, MD 21010

CONTRACTORS: General Dynamics Land Systems (GDLS) (Detroit, MI)
Thyssen Henschel (Germany)

Patriot

MISSION: The Patriot Missile System provides high- and medium-altitude defense against aircraft and tactical ballistic missiles at the Theater and Corps levels.

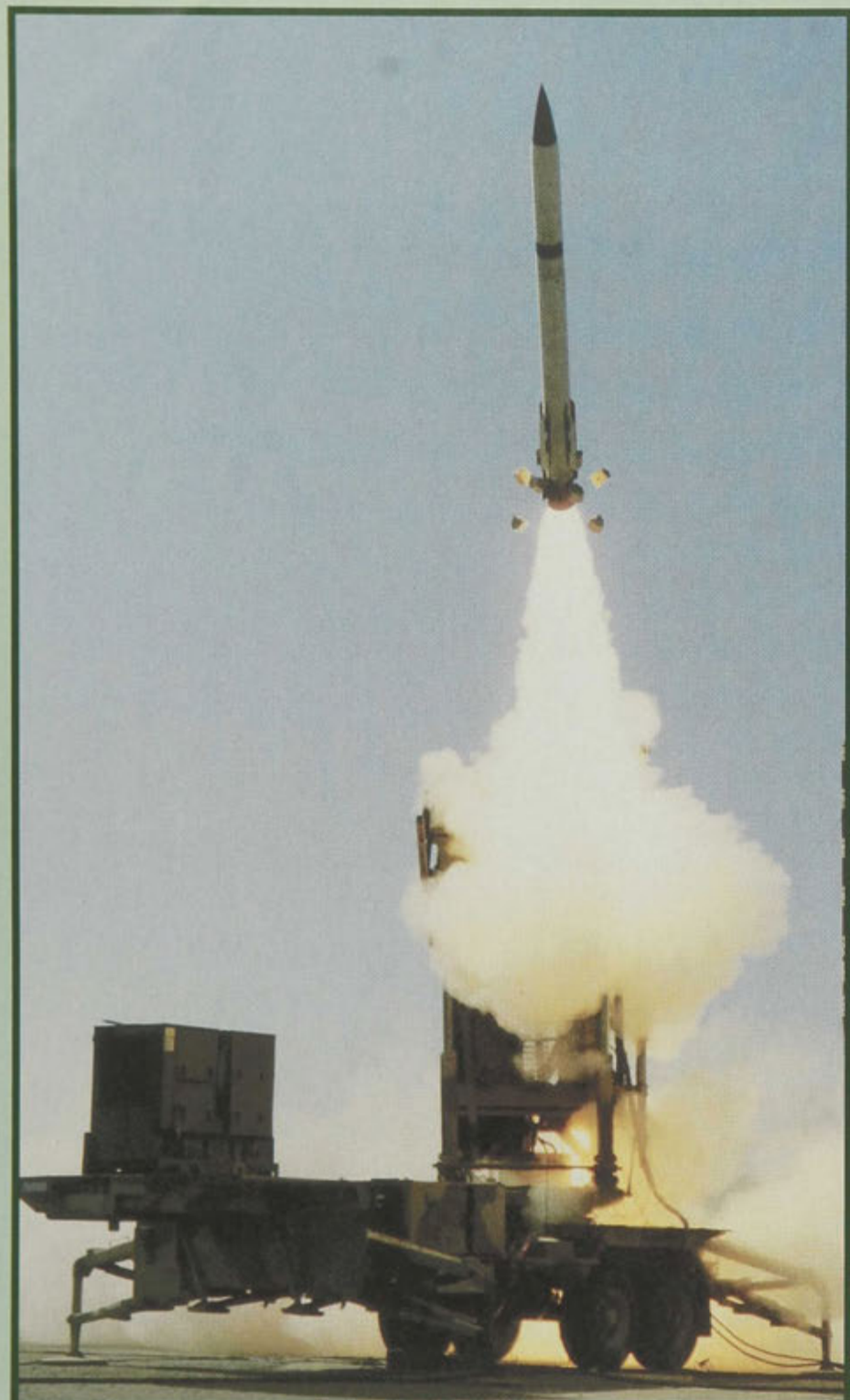
CHARACTERISTICS: Patriot's fast reaction capability, high firepower, and ability to operate in a severe electronic countermeasure environment are features not previously available in the systems the Patriot replaces. The Patriot design eases the field logistics burden because its overall performance is achieved with less equipment, less manpower, and fewer repair parts than previous systems. The combat element of the system is the fire unit, which consists of a radar set, an engagement control station, a powerplant, an antenna mast group, and eight remotely located launchers. The single-phased–array radar provides all tactical functions of airspace surveillance, target detection and track, and missile guidance. The engagement control station provides the human interface for control of operations. Each launcher contains four ready-to-fire missiles, sealed in canisters, which serve a dual purpose as shipping containers and launch tubes. Maximum range is 37 nautical miles. It has the ability to track 50 targets simultaneously.

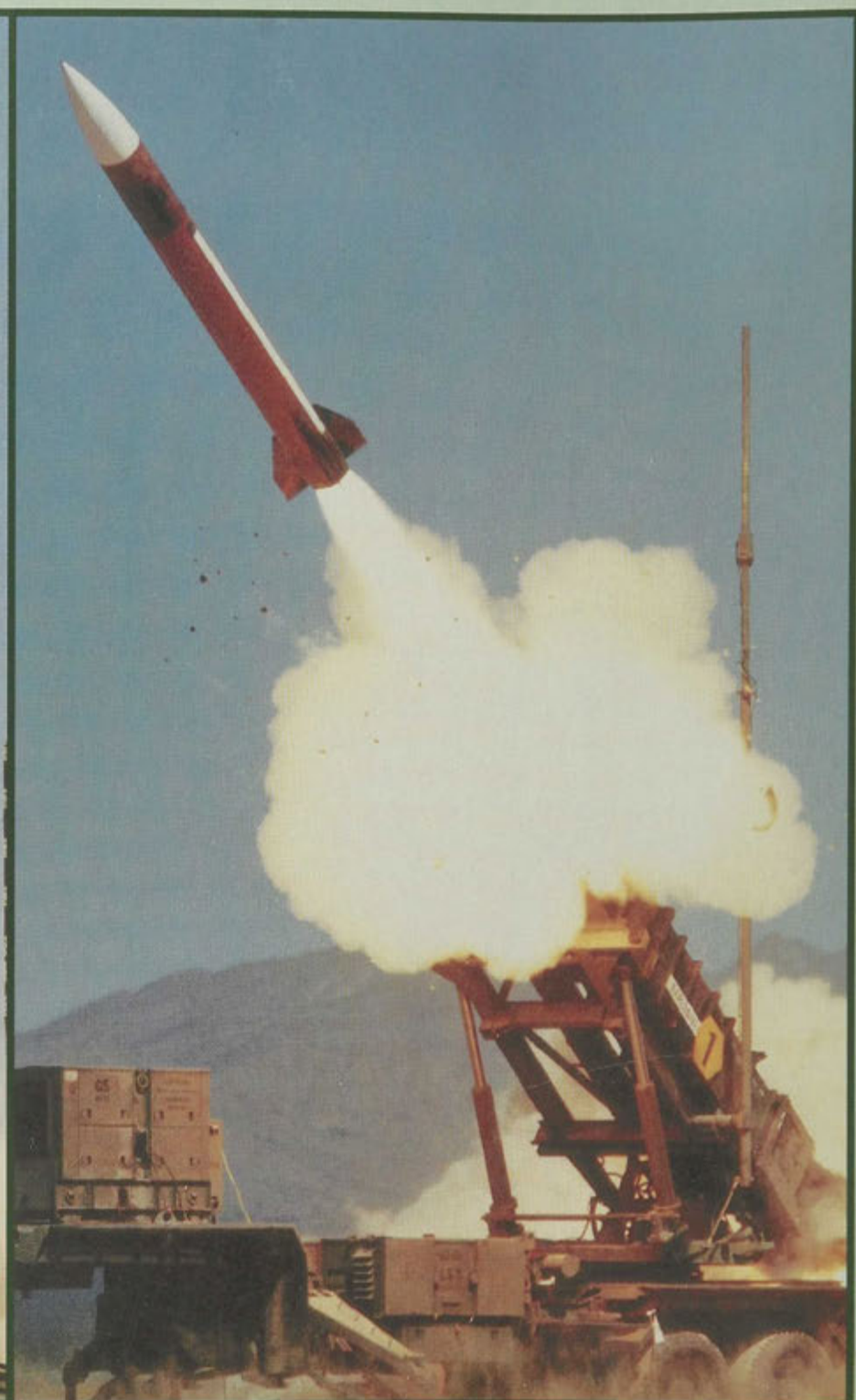
FOREIGN COUNTERPART: The Russians have developed several missile systems, including the SA-1, SA-2, SA-4, SA-5, SA-10, and SA-12, that are used to attack aircraft in the regime for which Patriot was designed. Only the SA-10 and SA-12 are considered as advanced or effective as Patriot.

PROGRAM STATUS: Patriot has completed fielding to U.S. forces and is deployed in CONUS, Europe, and Southwest Asia. U.S. missile production deliveries include Patriot Anti-Tactical Missile (ATM) Capability-Level 2 (PAC-2). The Patriot Advanced Capability-3 (PAC-3) comprises system improvements that will result in a time-phased series of system hardware and software changes designed to improve performance against an evolving threat, meet user needs, and correct existing system deficiencies in a timely, affordable manner. The PAC-3 missile is a key component of overall system improvements with a projected Milestone IV Decision in FY94. Germany, the Netherlands, Italy, Japan, Saudi Arabia, Kuwait, and Israel are currently participating in Patriot acquisition programs. Discussions with other interested allies for Patriot acquisition are ongoing.

POINT OF CONTACT: Patriot Project Office
ATTN: SFAE-AD-PA
Redstone Arsenal, AL 35898-5620

CONTRACTORS: Raytheon (Bedford, MA)
Martin Marietta (Orlando, FL)





Patriot Advanced Capability-3 (PAC-3) Missile

MISSION: The PAC-3 missile will add an advanced anti-tactical missile capability to the Patriot system. The primary mission of the PAC-3 missile is to kill both maneuvering and non-maneuvering tactical ballistic missiles. The PAC-3 missile will also have a capability to counter cruise missiles and aircraft.

CHARACTERISTICS: The following two missiles have the potential to meet the PAC-3 missile requirements:

	Extended Range Interceptor (ERINT)	***Multimode Missile***
Warhead:	Kinetic energy (hit-to-kill)	Blast-fragment
Seeker:	Active	Active/C-band TVM
Guidance:	Inertial flyout/uplink	Command/uplink
Launch weight	713 lbs	2,000 lbs
Length:	15.7 ft	17.8 ft
Diameter:	10 in	16 in
Missiles/launcher:	16	4
Approximate speed:	Mach 5	Mach 5.6

FOREIGN COUNTERPART: The Russian SA-10 and SA-12 missiles are comparable in advanced technology and potential effectiveness.

PROGRAM STATUS: Both the ERINT and Multimode missiles are in the Demonstration/Validation phase of development and are undergoing flight tests. One missile will be selected in FY94 to proceed into the Engineering and Manufacturing Development phase. Fielding is planned to begin in FY98.

POINTS OF CONTACT:

ERINT Project Office
ATTN: SFAE-MD-ERT
P.O. Box 1500
Huntsville, AL 35807-3801

Patriot Project Office
ATTN: SFAE-MD-PA
Redstone Arsenal, AL 35898-5620

CONTRACTORS: Loral Vought Systems (Grand Prairie, TX)—(ERINT)
Raytheon (Bedford, MA)—(Multimode Missile)


U.S. 9mm M9-P.BERETTA-65490 PB
1125713

9mm Personal Defense Weapon

MISSION: The M9 9mm pistol replaces the M1911A1 .45 caliber pistol and the four-inch–barrel, .38 caliber revolver previously used throughout the DoD. The M9 is a semiautomatic, double-action pistol that is more lethal, lighter, and safer than the M1911A1 pistol. It can be used effectively by either right- or left-handed shooters. The weapon is carried by service members who are not issued rifles, and by others who have a personal defense requirement, such as law enforcement personnel and aviators.

CHARACTERISTICS:

Caliber:	9 mm
Weight:	2.6 lbs (loaded)
Range:	50 m
Trigger action:	Double
Magazine capacity:	15 rds

FOREIGN COUNTERPART: The Soviet-developed 9mm Makarov is the standard pistol for many Eastern European forces. 9mm semiautomatic pistols used by NATO allies include Beretta's 92F series, Heckler & Koch's P7/P9 series, Walther's P5/P88 series, Browning's Highpower, and weapons manufactured by Glock, SIG, and Star. Performance of the M9 pistol and foreign counterparts is comparable.

PROGRAM STATUS: The M9 pistol is in production. An initial five-year, multiyear, firm fixed price contract was awarded in April 1985 for 315,930 weapons for all DoD uniformed services. A follow-on competition was conducted in FY88–89, resulting in the award of additional option quantities totaling 56,705 pistols to Beretta beginning in May 1989. As of January 1994, Beretta has delivered more than 364,000 M9 pistols.

POINTS OF CONTACT: Armament, Munitions, and Chemical Command
Product Manager, Small Arms

ATTN: AMCPM-SA	ATTN: AMSMC-ASW
Picatinny Arsenal, NJ 07806-5000	Rock Island, IL 61299- 6000

CONTRACTOR: Beretta (Accokeek, MD)

Multi-Faith MRE

Laser Eye Protection (SPECS)

M249 Assault Pack

Soldier System

MISSION:

The mission of the soldier system is to provide the soldier with everything he wears, carries, and consumes into combat for individual use to include improved individual equipment, weapons, clothing, C4I, subsistence items, and quality-of-life equipment to enhance his overall effectiveness and survivability on the battlefield. Soldier system items include several related programs that respond to changing threat requirements and advances in state-of-the-art technology.

CHARACTERISTICS:

Soldier Modernization (Annex K of the Army Modernization Plan) is the basis for soldier system efforts. It provides a cohesive plan for the coordinated development of soldier system items and is the road map for near-term, mid-term, and far-term efforts. In the near term, one key element of the soldier support and modernization process is the Soldier Enhancement Program (SEP). SEP projects are primarily modified non-developmental items and are focused in four general areas: weapons and munitions, combat clothing and individual equipment (CIE), communications and navigation aids, and food/water and shelter. SEP projects include Enhanced Load Bearing Vest, Inconspicuous Body Armor, Second Generation Extended Cold Weather Clothing System (ECWCS), M249 Lightweight Tripod, AT4 Night Vision Bracket, Modular Weapon System, M249 Vehicle Mount, Fighting Position Excavator, Lightweight Video Reconnaissance System, Lightweight Leader Computer, Monocular Night Sight Device, Mounted Ration/Water Heater, Multi-Faith/Vegetarian Rations, and Small Unit Shower. Mid-term research and development CIE efforts are focused on the design of lighter-weight equipment, ballistic and laser eye protection, and improved chemical protective clothing that takes advantage of the latest technology and advanced materials. These efforts concentrate on Self-Contained Toxic Environmental Protective Outfit (STEPO), Joint Service Lightweight Integrated Chemical Suit Technology (JLIST), and Individual Soldier Microclimatic Cooling. Other key elements include the Land Warrior (LW), Air Warrior (AW), and Mounted Warrior (MW) systems. LW is a first generation integrated fighting system for dismounted combat soldiers. It enhances soldiers' battlefield capabilities through the development and integration of Army components and technologies into a cohesive, timely, and cost-effective system. LW subsystems include an individual soldier computer, global positioning system (GPS), and communications system; enhancements to CIE; integrated headgear with heads-up display and image intensifier; improved chemical/biological mask; and modular weapon system with thermal sight and infrared laser aiming light. Similar efforts have been started for mounted and air crew personnel. AW and MW efforts are being defined. Far-term efforts include the 21st Century Land Warrior (21CLW), which will identify less mature technologies to meet longer-term soldier deficiencies. Emphasis will be on the design of lightweight equipment and high technology areas in computer, communications, and night vision devices.

PROGRAM STATUS:

There are 65 SEP projects in FY94, of which 21 are weapons and munitions; 25 CIE; 9 communications and navigation; and 10 food/water and shelter. Thirty projects are new starts in FY94. In Research and Development efforts other than SEP, there are 24 projects in FY94. Land Warrior research, development, and test and evaluation begin in FY94, with Milestone I projected for 4QFY94.

POINTS OF CONTACT:

PM Soldier
14050 Dawson Beach Rd.
Woodbridge, VA 22919

ATCOM
4300 Goodfellow Blvd.
St. Louis, MO 63120

AMCCOM
ATTN: AMSMC-RT
Rock Island, IL 61299

CECOM
ATTN: AMSEL-RD
Ft. Monmouth, NJ 07703

Stinger

MISSION: Stinger's function is to protect the force by providing short-range air defense coverage to combat units throughout the battlefield. Stinger is a shoulder-fired, infrared missile system that homes in on the heat emitted by either jet or propeller-driven, fixed-wing aircraft or helicopters.

CHARACTERISTICS: The Stinger system employs a proportional navigation system that allows it to fly an intercept course to the target. Once the missile has traveled a safe distance from the gunner, its main engine ignites and propels it to the target. It can attack much faster targets than Redeye and can destroy aircraft from any aspect. A follow-on seeker (Stinger-Post) improved the capability of the system in certain infrared countermeasures environments. Stinger-Reprogrammable Microprocessor (RMP) further enhances the performance in infrared countermeasures environments and provides the capability for software upgrades to the missile as the threat evolves. Stinger has been proliferated on a number of platforms in the forward area, including MANPADS, Avenger, Kiowa, Kiowa Warrior, and LAV-AD.

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

FOREIGN COUNTERPART: There are several similar Russian systems. The SA-14, fielded in the late 1970s, has similar performance characteristics to the Stinger. The SA-14 is replacing the SA-7. The SA-16, fielded in the 1980s, is replacing the SA-14.

PROGRAM STATUS: Stinger-RMP is currently in production. Basic Stinger was operationally deployed to Germany in 1981, and production has been completed. Stinger-Post entered production in FY83 and was deployed in FY87. Stinger-RMP entered development in September 1984; transition to production began in November 1985, and initial deliveries began in FY89; fielding began in FY90. Stinger-RMP production was accelerated to meet Desert Shield/Storm requirements. Further improvements to Stinger-RMP performance are being developed under a Block I product improvement program scheduled for production cut-in by FY95 and retrofit to fielded systems by FY96. The FY93 buy allows the Army to avoid a costly break in the production line prior to initiation of the Block I upgrade program. The Army has initiated the Block I Stinger improvement program to extend service life and develop improvements to increase its accuracy and resistance to countermeasures, its effectiveness against low observable targets (UAVs and cruise missiles) and standoff helicopters in clutter, and to eliminate the need for super-elevation (a safety hazard when Stinger is fired from a hovering helicopter).

POINT OF CONTACT: FAAD Project Office
ATTN: SFAE-MSL-FAD
Redstone Arsenal, AL 35898-5630

CONTRACTORS: Hughes Missiles Systems (Tucson, AZ)
Raytheon (Lowell, MA)

Stingray

MISSION: Stingray is a Combat Protection System (CPS) that improves the overall survivability and lethality of ground combat vehicles through the application of Electro-Optical Countermeasures (EOCM) technology. Stingray will provide a revolutionary capability for the future battlefield. The system uses in-band laser energy to acquire and defeat threat optical and electro-optical fire control systems that are: exposed, in hull defilade, camouflaged, airborne or ground based, moving or stationary. The system provides a robust target acquisition capability and increases combat survivability and effectiveness by denying the Opposing Force the ability to use its target acquisition and fire control systems. When countermeasured, the threat is rendered vulnerable to defeat by direct or indirect fire weapons via handoff from the Stingray system. Stingray is installed and integrated as an adjunct to the Bradley Fighting Vehicle System (BFVS). The CPS technology also has application to a wide variety of combat vehicles.

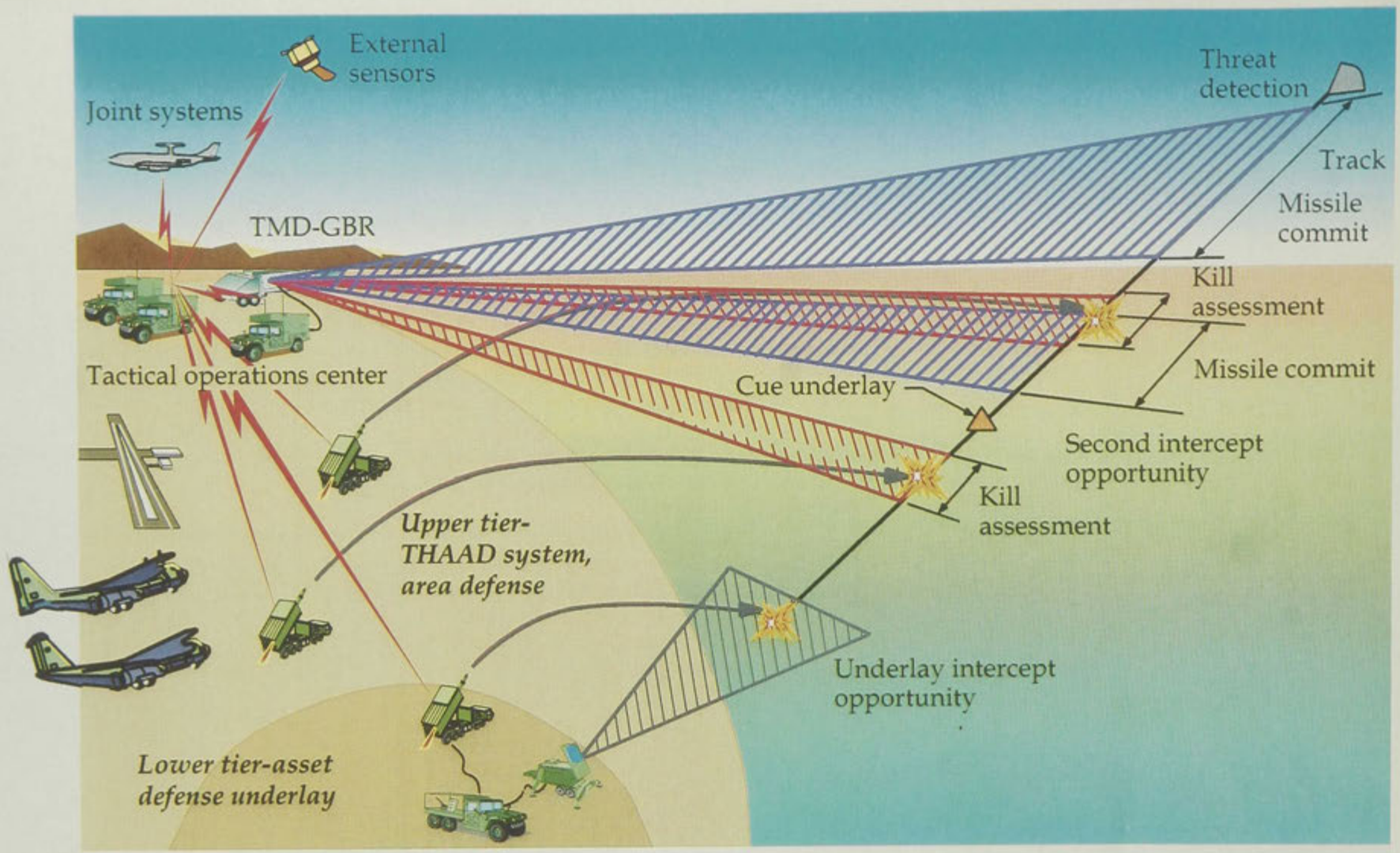
CHARACTERISTICS: The system consists of five basic components: (1) sensor assembly; (2) LASER transmitter; (3) commander's controls and display; (4) system electronics; and (5) the Tactical Engagement Simulation System (TESS). The system operates in three primary modes: automatic, semiautomatic, and manual. In automatic mode, Stingray searches and countermeasures autonomously. In semiautomatic mode, the system performs the target search automatically and cues the operator to provide positive target verification before initiating countermeasures. The manual mode provides the operator with a visual search and manual countermeasure capability.

FOREIGN COUNTERPART: It is believed that the Russians developed significant numbers of similar-type weapons. With the break-up of the Soviet Union, other nations may try to obtain some of these systems. France is also developing a similar system.

PROGRAM STATUS: The Stingray Advanced Technology Demonstration (ATD) program consists of a progressive Distributed Interactive Simulation (DIS) effort along with the development and testing of four demonstrator units. The program utilizes DIS to influence hardware development, test design, training, and to address key program issues. The hardware contract is structured to develop the demonstrator units and provide for technical testing. A Government technical and operational test program is also part of the effort. Since program initiation in October 1992, Phase I of the DIS effort has been performed, and the Phase II efforts are scheduled for 2QFY94. The demonstrator system design has been completed, and the first demonstrator unit is scheduled for field testing in 3QFY94. Government testing is scheduled to begin in 4QFY94.

POINT OF CONTACT:
Project Manager
Stingray
Attn: SFAE-IEW-EW
Ft. Monmouth, NJ 07703-5000

CONTRACTORS:
Martin Marietta (Orlando, FL)
Westinghouse (Baltimore, MD)


External sensors
Joint systems
Threat detection
Track
Missile commit
TMD-GBR
Kill assessment
Tactical operations center
Missile commit
Cue underlay
Second intercept opportunity
Kill assessment
Upper tier-THAAD system, area defense
Underlay intercept opportunity
Lower tier-asset defense underlay

Theater High Altitude Area Defense (THAAD)

MISSION: The Theater High Altitude Area Defense (THAAD) system is a Theater Missile Defense (TMD) weapon system designed to intercept short- and intermediate-range missile threats that increasingly will employ sophisticated warhead technologies. The THAAD system will provide a high-altitude defense overlay above existing and other planned TMD capabilities. The THAAD system also provides the capability to destroy enemy missiles at ranges and altitudes sufficient to avoid damage due to debris or chemical agent fallout. Due to its hit-to-kill guidance approach, the system provides a high degree of lethality compared to existing systems with fragmentation warheads.

CHARACTERISTICS: The THAAD system will consist of missiles, launchers, Ballistic Missile/Command, Control, Communication, and Intelligence (BM/C^{3}I) units, TMD-Ground–Based Radar (GBR), and support equipment. The missile will be a hypervelocity, kinetic energy weapon that will ensure destruction of its target by directly colliding with it. The launcher will be a Palletized Loading System (PLS) truck and will have two to three times the firepower of current air defense systems. The BM/C^{3}I system is the THAAD Tactical Operations Center, which is housed in truck-mounted shelters. These units will interface and coordinate with the Theater Air Defense C^2 system and control THAAD engagement and force operations. The TMD-GBR will be integrated into the THAAD system to provide surveillance, track, and other required sensor functions. The THAAD system will be fully transportable by current military airlift aircraft. Once arriving in theater, the system will be mobile on unimproved roads and highways. These capabilities will allow THAAD to be rapidly deployed to any theater on short notice and with minimal transport resources.

FOREIGN COUNTERPART:

United States and Israel:	Arrow/ACES
France and Italy:	SAAM; SAMP/N; SAMP/T
Germany:	MSAM

PROGRAM STATUS: The THAAD program is currently in the early phases of the Demonstration and Validation (DEM/VAL) program. The contract for the DEM/VAL program was awarded on 4 September 1992 to a team headed by Lockheed Missiles and Space Company of Sunnyvale, CA. A series of 10 flight tests will begin in 1994, followed by 10 system tests. Completion and delivery of a User Operational Evaluation System (UOES) prototype is scheduled for FY96–97.

POINT OF CONTACT:

THAAD Project Office
ATTN: SFAE-MD-THA
P.O. Box 1500
Huntsville, AL 35807-3801

CONTRACTOR: Lockheed Missiles and Space (Sunnyvale, CA)

Focus: Data Network and Survivibility

Soldier Integrated Protective Ensemble

Life Support
- Ballistic Protection
- Laser Flash Protection
- Microclimate Cooling
- Chemical Detection*
- Mine Detection
- Medical Sensors*
- Individual Power

Individual C³
- Voice Communications*
- IFF*
- Image Transfer*
- Individual POS/NAV*

Computer
- Software Modules*

Augmented Day/Night Vision
- New Night Vision Goggles
- New I² Video
- Helmet-Mounted Display*

Lethality
- OICW*
- MPIM
- TWS*
- FO/FAC*
- Aiming Light*

*Integrated into Data Network

Data Network Provides Situation Awareness, C², and Target Handover

Protect the Force

OVERVIEW:

The goal of the Army Science and Technology program in *Protect the Force* is to provide technologies to identify, locate, and classify high-priority targets and direct weapon systems for engagement. Tomorrow's soldier, whether mounted or on foot, must have the benefit of the best protection available, not only from enemy fires, but also from inadvertent friendly rounds and from the ever-present environment. The Army, in a combined arms scenario, must have the means to detect and neutralize battlefield obstacles, identify friendly forces, quickly deploy defense against weapon of mass destruction, and bring countervailing fire to bear on enemy weapons, both mobile and fixed. It must be able to overwhelm the enemy with minimum casualties in the presence of a heavily armored threat and smart weaponry. Improved target acquisition, accelerated positive identification, and missile engagement technologies provide the leap-ahead capabilities required to meet the ever-increasing threat.

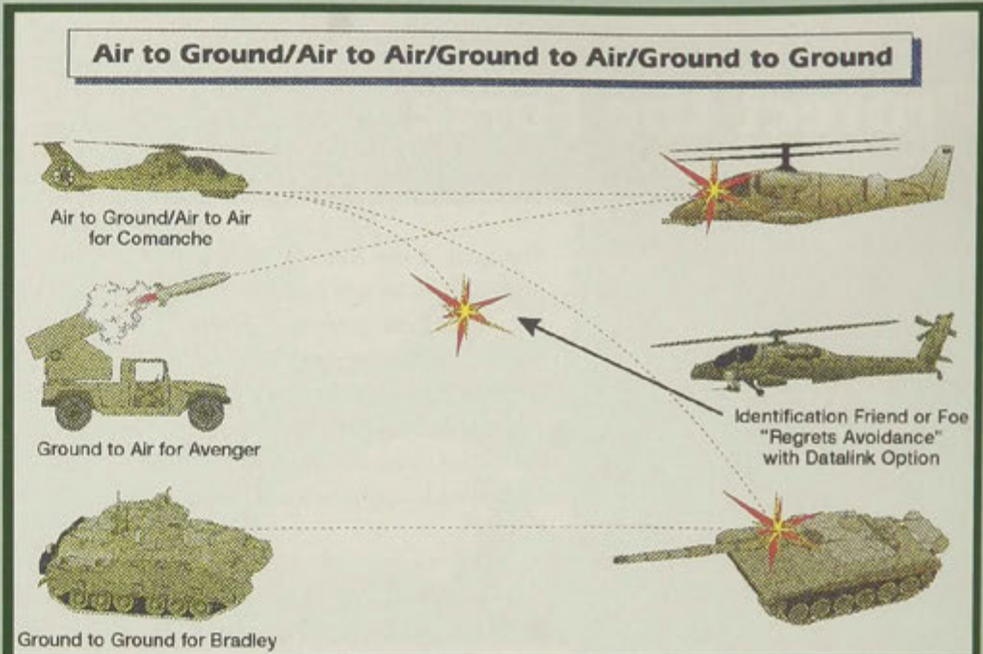
21st CENTURY LAND WARRIOR (21CLW) TOP-LEVEL DEMONSTRATION (TLD):

The 21st Century Land Warrior (21CLW) Top-Level Demonstration (TLD), the third TLD under DoD S&T Thrust 5, Advanced Land Combat, brings the following elements together in one demonstration scheduled for FY98: the core and integrating Advanced Technology Demonstration (ATD), the Generation II Soldier System, the Objective Individual Combat Weapon Technology Demonstration (TD), the USMC Forward Observer/Forward Air Controller ATD, the Thermal Weapon Sight mine detection demo, the Commercial Communication Technology Testbed TD, the Multipurpose Individual Munition, plus simulation of the various elements via live, constructive, and distributed interactive simulation. The focus of 21CLW is twofold: (1) to provide total situational awareness and (2) to provide near real-time automated targeting via personal warrior communications linked to the force structure via a data network and sensors to the dismounted Army infantry, dismounted Marines, and Special Operations Forces. This should result in linkage and integration of the individual warrior to the total force, increased controlled dispersion, and overmatching lethality and survivability. It is the intention of this TLD to leverage the industrial/commercial telecommunications and microelectronics explosion, making lightweight, man-portable, communications data-networking and sensor modules possible.

The ***Generation II (GEN II) Soldier System ATD*** is the core element of 21CLW. The GEN II ATD encompasses all elements that the individual warrior wears from head to toe, or has integrated onto his person, and it serves as the integrator of the other aforementioned elements of 21CLW. GEN II will demonstrate improved individual warrior and small-unit operational effectiveness afforded by the modular systems' integration of the following technologies: rugged, miniaturized command, control, communications, computers, and intelligence (C^4I) electronic components networked to a soldier's tactical computer; high-resolution, head-mounted displays; wide field-of-view night vision mobility sensor; thermal sight with integrated eye-safe laser rangefinder and compass; combat identification; personal status monitor, including chemical agent sensors and medical monitoring; lightweight power sources for microclimate conditioning; small arms ballistic protection; and integrated chemical-biological respiratory protection. GEN II builds on the Soldier Integrated Protective Ensemble (SIPE) ATD (FY90–93), the pioneering effort of soldier system-focused R&D.

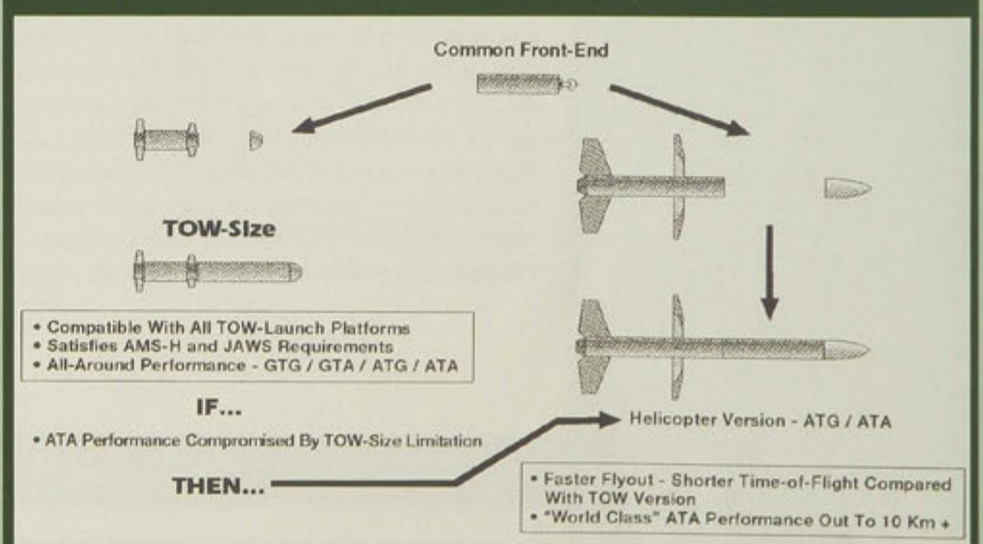
Portable Mine Detector

Off-Route Smart Mine Clearance



Combined Arms: Multi-Role/Multi-Platform

TACAWS Multi-Configuration Capability



Protect the Force (Continued)

COUNTERMINE TLD:

Operation Desert Storm highlighted the capabilities in landmine warfare possessed by hostile countries. The Army will aggressively exploit novel mine neutralization and detection technologies to counter both anti-personnel and anti-armor mines possessed by potential adversaries. Neutralization technologies include dispersed explosives, magnetic signature silencing, and wide-area neutralization devices. The detection technologies rely on novel uses of ground-penetrating radars and thermal imagers to detect both non-metallic and metallic mines. These technologies will provide a more rapid fielding of a next generation countermine solution and will leverage industry efforts.

The Close-In, Man-Portable Mine Detector ATD will demonstrate protection for vehicles and soldiers by detecting metallic and non-metallic mines and determining minefield boundaries. It will counter scattered and nuisance mines to provide for self-extraction of vehicles and a hasty breach capability. This ATD will show an enhanced, dismounted, close-in mine detection system. Four technologies will be evaluated to determine the best technical solution. Technology from this ATD will be integrated into the 21st Century Land Warrior (21CLW) TLD.

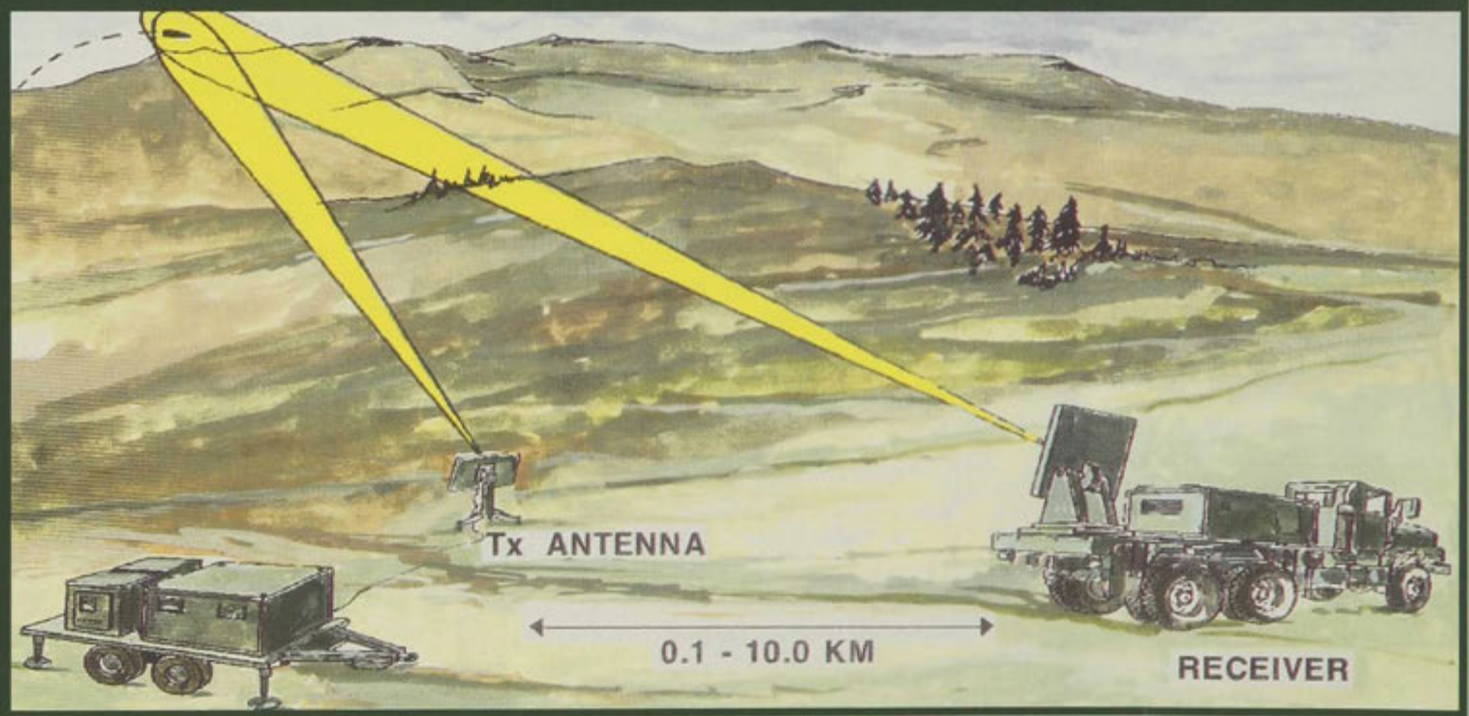
The Off-Route Smart Mine (ORSM) Clearance ATD consists of a series of three individual demonstrations. The first will focus on top attack mine; the second will counter off-route mines; and the third is an anti-helicopter mine demonstration. Advances in sensor and digital signal processing technologies are resulting in the development of a family of mines capable of identifying and attacking targets from ranges of several hundred meters. These mines will utilize acoustics and seismic sensors to detect, classify, track, and launch a submunition, typically with its own terminal sensors, toward a target. ORSM will provide the capability to neutralize this evolving threat by using a remotely controlled vehicle that will emulate the acoustic and seismic signature of combat vehicles and spoof the mines into a premature launch. It will enhance survivability of combat and logistics vehicles in situations ranging from breaching operations to logistics resupply of heavy and light forces.

THE ARMY'S COMBINED ARMS WEAPON SYSTEM (TACAWS) PROGRAM:

TACAWS demonstrates lightweight, multirole missile technology in support of air-to-air, ground-to-air, air-to-ground, and ground-to-ground missions. The missile system demonstration includes the integration of guidance, control, propulsion, airframe, and warhead technologies capable of performing in high clutter/obscurants, adverse weather environments, and under countermeasure conditions. Missile control and guidance system technology will explore capabilities such as lock-on before/lock-on after launch, fire-and-forget, guidance, signal and image processing, and wideband secure data links. Demonstrated missile system performance (i.e., weight, range, kill ratio, speed, lethality) must be optimized to exceed current baseline parameters of air-to-air Stinger, air-to-ground HELLFIRE, ground-to-ground TOW, and ground-to-air Stinger. TACAWS technology supports RAH-66 Comanche, AH-64 Apache Improved, Avenger, and Armored Systems Modernization.

Nuclear, Biological, and Chemical Defense

Bistatic Radar for Weapons Location



Protect the Force (Continued)

NUCLEAR, BIOLOGICAL, AND CHEMICAL (NBC) DEFENSE:

The NBC defense science and technology program has three broad goals: (1) research efforts to be technologically and scientifically capable of developing timely countermeasures; (2) protection of the individual soldier; and (3) adequate treatment of casualties. Specifically, these program goals include material for individual physical and medical protection, collective protection, contamination avoidance, and decontamination. Individual protective equipment will offer increased respiratory protection against current and emerging NBC threats while providing improved weapon systems interface and minimizing the physiological burden imposed by NBC protective equipment. The medical chemical defense program will provide new pre-treatment antidotes and topical skin protectants for chemical warfare agents and novel therapies for chemical agent casualties. The medical biological defense program will provide medical countermeasures to deter, constrain, and defeat the use of biological threats and agents, as well as advanced diagnostic devices. Improved casualty care practices doctrine will increase the return-to-duty rate for troops exposed to chemical and biological agents, thus adding to force sustainment. The emphasis of the contamination avoidance component of NBC defense includes development of multi-agent sensors and detectors to provide real-time detection and identification of chemical and biological agents. Additionally, detectors will be more compact so they may be placed on a variety of platforms and will not have large space and power requirements. The decontamination component consists of an absorbent decontamination system for personal equipment, which will reduce mission turn-around time off-gassing by 50 percent, decrease the logistics burden, and extend useful life of equipment.

BATTLEFIELD COMBAT IDENTIFICATION (BCID) ATD:

This ATD is aimed at solving the combat identification problem underscored by the lessons learned from Operation Desert Storm. This effort will leverage existing technologies and pursue new ones to develop and demonstrate systems that will solve the ground-to-ground and air-to-ground battlefield identification problems, emphasizing covert and secure operation in the mid-to-far term (FY96–98). Different approaches will be considered to include both active/cooperative target ID systems and covert, secure, active/non-cooperative technologies. A situational awareness capability will be attained through the Combined Arms Command and Control ATD, which will provide the information required to create a common picture (display) of the battlefield situation, including the position of both friendly and enemy forces. Displayed information will be available at various echelons, facilitating the distribution of data to reduce friendly casualties while improving command and control. Solutions will address weapons platforms and dismounted soldiers.

BISTATIC RADAR FOR WEAPONS LOCATION ATD:

This ATD will employ bistatic radar (transmitter and receiver are physically separated) techniques to detect, locate, and classify enemy mortar, artillery, and rockets for weapons location. Bistatic radar offers the following significant advantages over conventional monostatic radars: significantly enhanced crew survivability, covert passive receiver, jamming resistance, and receiver immunity to Anti-Radiation Missile threat.

Win the Battlefield Information War

Information is power. On the battlefield, information is deadly power. A key factor in modern warfare is the ability to collect, process, and use information about your adversary while preventing him from obtaining similar information about your forces. To win the information war, the Army will employ a wide array of electronic warfare systems to disrupt, deny, and damage threat information-gathering systems. Then, while the threat is blind, we will use our sensors to accurately locate targets, disseminate that information through digitization, and then engage and destroy these targets.

Life Cycle Management Model

Combined Arms Command and Control (CAC^2) ATD

Global Grid Communications ATD

Survivable Adaptive System (SAS) ATD

Battlefield Distributed Simulation—Developmental (BDS-D) ATD

Command and Control Vehicle (C^2V)

Advanced Field Artillery Tactical Data System (AFATDS)

Comanche Helicopter

Integrated System Control (ISYSCON)

Joint Tactical Ground Station (JTAGS)

All Source Analysis System (ASAS)

Forward Area Air Defense Command and Control ($FAADC^2$)

Ground-Based Common Sensor (GBCS)

Maneuver Control System (MCS)

UAV—Short Range

Combat Service Support Control System (CSSCS)

Military-Strategic/ Tactical Relay (MILSTAR) System

Army Data Distribution System (ADDS)

Guardrail

Light and Special Division Interim Sensor (LSDIS)

Lightweight, Man-Portable Radio Direction-Finding System

Military Satellite Communications (MILSATCOM)

Common Hardware/Software (CHS)

NAVSTAR Global Positioning System (GPS)

Circuit Switch and Message Switch

Digital Transmission Assemblages

Mobile Subscriber Equipment (MSE)

Mohawk Surveillance System

Quickfix

Single Channel Ground and Airborne Radio System (SINCGARS)

Standardized Integrated Command Post System (SICPS)

Trackwolf


MILTOPE
MILTOPE

Advanced Field Artillery Tactical Data System (AFATDS)

MISSION: The Advanced Field Artillery Tactical Data System (AFATDS) is the multiservice (Army/Marine Corps) automated fire support command, control and communication system of the Army Tactical Command and Control System (ATCCS), which satisfies the fire support command and control, close, rear, and deep operations requirements of AirLand Battle doctrine. AFATDS will provide integrated, automated support for the planning, coordination, and control of all fire support assets (field artillery, mortars, close air support, naval gunfire, attack helicopter, and offensive electronic warfare), execution of counterfire, interdiction, and suppression of enemy targets for close and deep operations. AFATDS V1 will replace TACFIRE.

CHARACTERISTICS: AFATDS uses non-developmental ruggedized Common Hardware/Software (CHS). AFATDS software is being developed in modular, object-oriented Ada computer code. Successive versions each implement additional functionality and interoperability. The system will fully automate fire support tasks as follows: Version 1 - 19 percent; Version 2 - 46 percent; Version 3 - 100 percent.

FOREIGN COUNTERPART: AFATDS will interoperate with United Kingdom, French, and German Fire Support Systems. An automated artillery tactical command and control system was previously fielded by the former Warsaw Pact, which provided digital linkage from battery to brigade or regiment level for fire planning, targeting, logistics, and terrain management calculations.

PROGRAM STATUS: Version 1 detailed design, coding, integration, and testing are ongoing. Formal technical testing took place in FY93–94. Operational testing will take place in FY94. Version 2 development was placed on contract in October 1993.

POINT OF CONTACT: Project Manager
AFATDS
ATTN: SFAE-CC-FS
Ft. Monmouth, NJ 07703

CONTRACTORS: Magnavox (Ft. Wayne, IN)
MILTOPE (Melville, NY)
SAIC (San Diego, CA)

All Source Analysis System (ASAS)

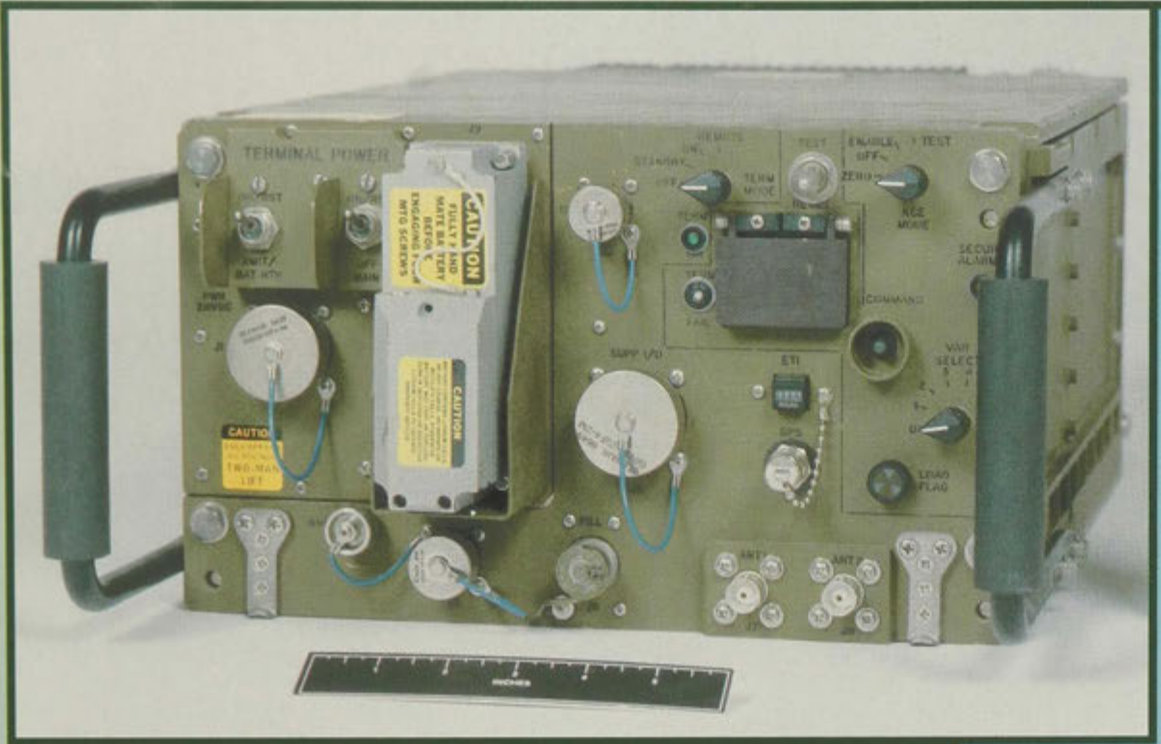
MISSION: The All Source Analysis System (ASAS) is the Intelligence Electronic Warfare (IEW) subelement of the Army Tactical Command and Control System (ATCCS). ASAS will provide combat leaders the all source intelligence needed to view the battlefield and more effectively conduct the land battle. ASAS provides a tactically deployable ADP system with a capability to: receive and correlate data from strategic and tactical intelligence sensors/sources, produce enemy situation displays, rapidly disseminate intelligence information, nominate targets, manage collection requirements, and provide operations security support. ASAS is designed to operate in a joint environment across the spectrum of conflict.

FOREIGN COUNTERPART: No known foreign counterpart.

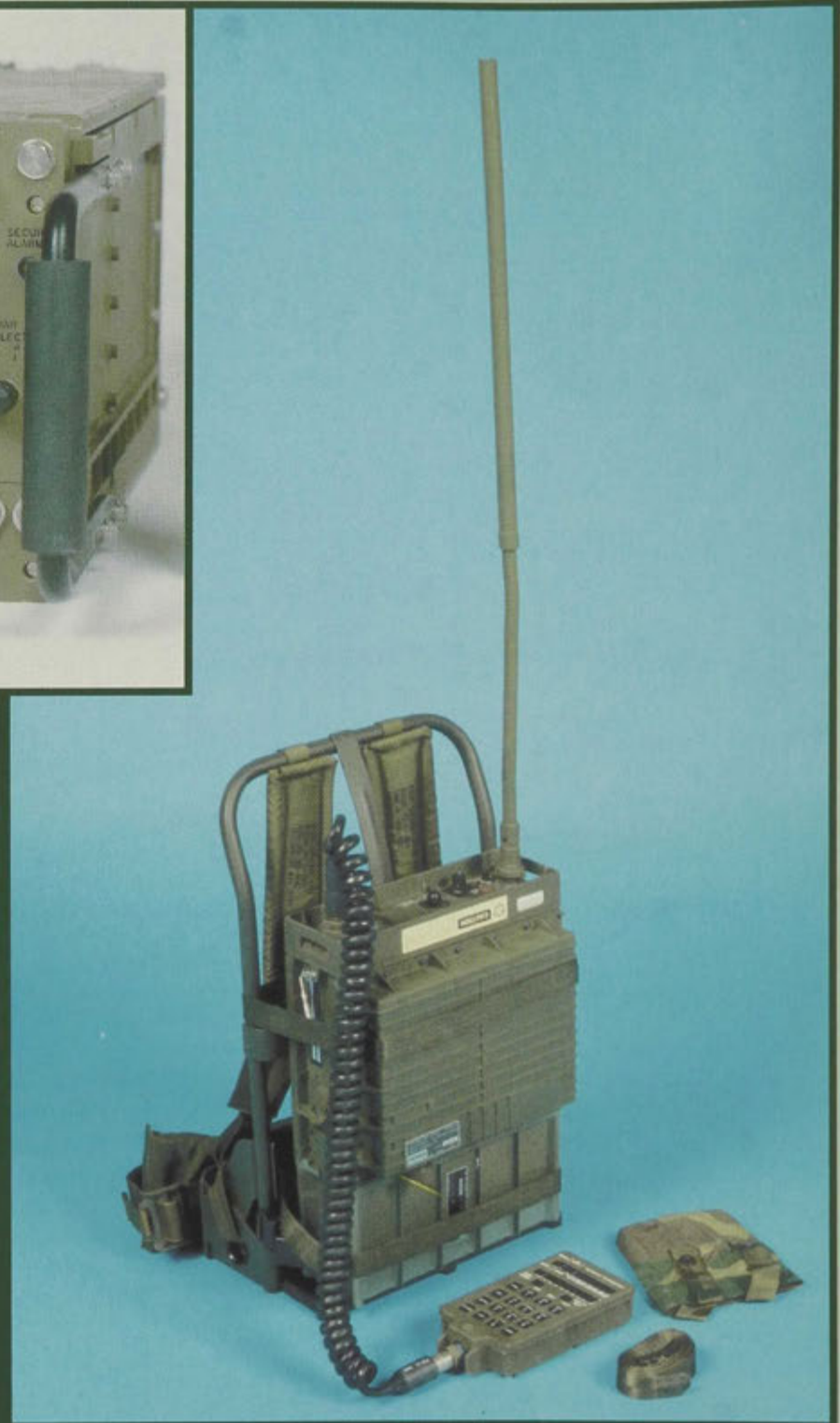
PROGRAM STATUS: ASAS is an evolutionary acquisition program with three development blocks to reach the objective system. Block I provides an initial capability, which is being fielded to 11 selected priority units and the training base during FY93–95. Block II Engineering and Manufacturing Development started in 1QFY94. The Block II streamlined development program will build upon Block I, upgrade capabilities, and transition ASAS to the ATCCS common hardware/software open systems architecture. Block III will be primarily a software upgrade, which will provide the objective ASAS capability. Block III development starts in FY99.

POINT OF CONTACT: All Source Analysis System Project Management Office
1616 Anderson Rd.
McLean, VA 22102-1616

CONTRACTORS: Jet Propulsion Laboratory (Pasadena, CA)—Prime Integrator for Block I
Martin Marietta—Prime Contractor for Block II



Joint Tactical Information Distribution System (JTIDS)



Enhanced Position Location Reporting System (EPLRS)

Army Data Distribution System (ADDS)

MISSION: The Army Data Distribution System (ADDS) functions to provide a tactical data distribution system designed specifically to support the needs of the multitude of computers being fielded as part of the Army Tactical Command and Control System (ATCCS) and other battlefield automated systems. ADDS consists of two major products: the Enhanced Position Location Reporting System (EPLRS) for medium-speed data distribution and the Joint Tactical Information Distribution System (JTIDS) for high-speed data distribution. ADDS provides near real-time data distribution in the Division and Corps areas under the anticipated electronic countermeasure environment.

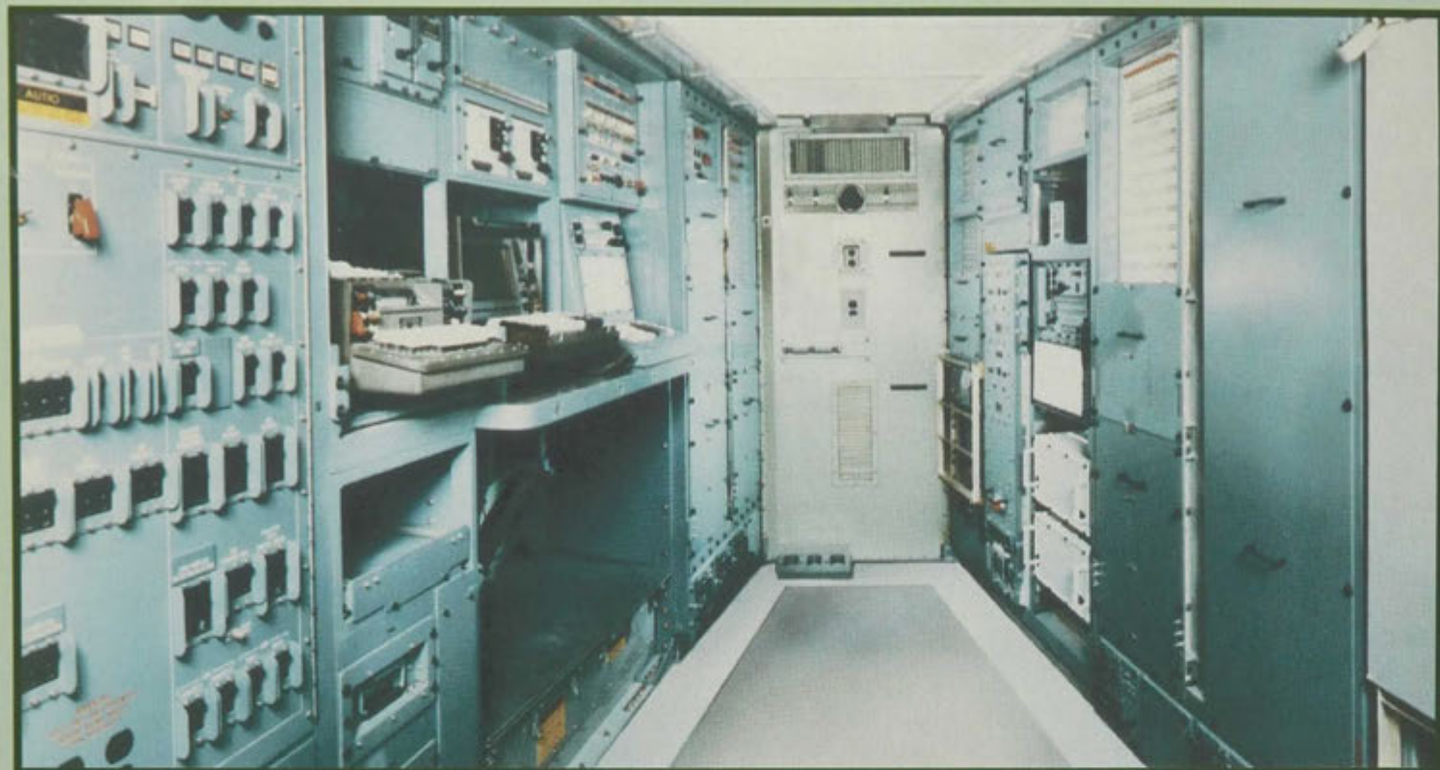
CHARACTERISTICS: ADDS uses Time Division Multiple Access (TDMA) communications architecture to avoid transmission contention. Frequency hopping and spread spectrum technology provide jam resistance. The EPLRS user unit (28 lbs manpack size) and JTIDS terminal (94 lbs rack mounted) will be operated by the user of the host computer. Net Control Stations and dedicated relay functions will be provided by signal units.

FOREIGN COUNTERPART: No known foreign counterpart. JTIDS is a joint and multinational system that will be interoperable with NATO units.

PROGRAM STATUS: EPLRS is in Low-Rate Initial Production, and IOTE is scheduled for 4QFY94. JTIDS has completed engineering development and system technical testing for the Class 2M Terminal. A Limited User Test for the Class 2M Terminal is planned in March 1994, with a follow-on Limited Production Decision scheduled for September 1994.

POINT OF CONTACT: Project Manager
ADDS
ATTN: SFAE-CM-ADD
Ft. Monmouth, NJ 07703

CONTRACTORS: Hughes Aircraft (Fullerton, CA and Forest, MS)
GEC-Marconi (Totowa, NJ and San Marcos, CA)



Nodal Control Mobile Subscriber Access Circuit Switch (AN/TTC-39D)

Message Switch (AN/TYC-39A)

Circuit Switch and Message Switch

MISSION: This equipment provides automatic switching service—interconnecting analog and digital users—between tactical and Defense Communication System (DCS) switches, and between U.S. and NATO national switches. The AN/TTC-39A/D system is the heart of the multichannel switched network and is a highly efficient means of connecting telephones, message traffic, and data users in both a secure and nonsecure mode in the area network at Echelons Above Corps (EAC). The AN/TYC-39 system provides corps and theater echelons with tactical, automatic store, and forward record traffic capability. The EAC extension system is based on Mobile Subscriber Equipment (MSE) identical switches: the AN/TTC-46 (LEN) and AN/TTC-48 (SEN).

CHARACTERISTICS: The AN/TTC-39 circuit switch family consists of three fielded versions. The "A" model switches are an S-280, 744-line analog/digital switch with integral COMSEC and a downsized, modified S-250, 324-line analog/digital switch. Both provide up to 7,500 calls per hour service, 5-level precedence, conference, and many other subscriber features. The "D" model is an S-280, 708-line analog/digital switch that incorporates the same affiliation and flood search routing as provided in MSE. A packet switch (PS) overlay provides a data transfer capability similar to that in MSE. Most "A" features are still available in the "D" model. The AN/TYC-39 message switch family consists of three fielded versions. All are in S-280 shelters. There are a dual-shelter, 50-line switch and single-shelter, 24- and 48-line switches. All are tactical, automatic store, and forward switches that provide service for both strategic (R) and intelligence (Y) communities. The switches provide interface with inventory, TRI-TAC, and Automatic Digital Network (AUTODIN) equipment with precedence, security, and other subscriber features.

FOREIGN COUNTERPART: No known foreign counterpart.

PROGRAM STATUS: The circuit and message switches are currently deployed and were initially authorized for production in FY80. Both switches are currently in product improvement phases. The circuit switch "A" model has been fully fielded to the Army, Air Force, and Joint communities. The "D" model with PS fielding is finishing in USAREUR and continues in CONUS. Fielding in Korea begins in 3QFY94. The message switch is currently in the initial production of a product improvement, which will result in an "A" model. The fielding of the "A" model is anticipated to begin in FY94.

POINTS OF CONTACT:

JTACS–Project Manager
ATTN: SFAE-CM-MSC-CSW
Ft. Monmouth, NJ 07703

CECOM Commodity Command
ATTN: AMSEL-LC-MMR-T
Ft. Monmouth, NJ 07703

CONTRACTOR: GTE Government Systems, Command and Control Communications (Needham Heights, MA)

Comanche Helicopter

MISSION: The Comanche (RAH-66) is the Army's next generation and the first helicopter designed from concept onward as an armed reconnaissance helicopter. It will replace aging scout and Cobra attack helicopters. This aircraft, in the Army's air cavalry and attack organizations, will significantly expand the Army's capability to conduct tactical operations in all types of terrain, in adverse weather and battlefield environments, and during day/night operations with increased survivability. The Comanche is not just another helicopter. With its increased speed, survivability, air-to-air capability, and mission equipment, it will support forward deployed and contingency forces by conducting both close and deep operations with improved lethality and survivability. Force agility will be significantly improved. Its 1,260 nautical miles self-deployment range and smaller size will improve Army aviation's rapid strategic deployment. One helicopter, the Comanche, will better perform the missions of three current types of helicopters (AH-1, OH-58, and OH-6) with greater operational and support efficiency.

CHARACTERISTICS:

Weight:	7,765 lbs (weight empty)
Crew:	2 pilots (single-pilot operable)
Speed:	175 kts (cruise)
Endurance:	2.5 hrs (plus 20-minute reserve)
Armaments:	Air-to-ground and air-to-air missiles

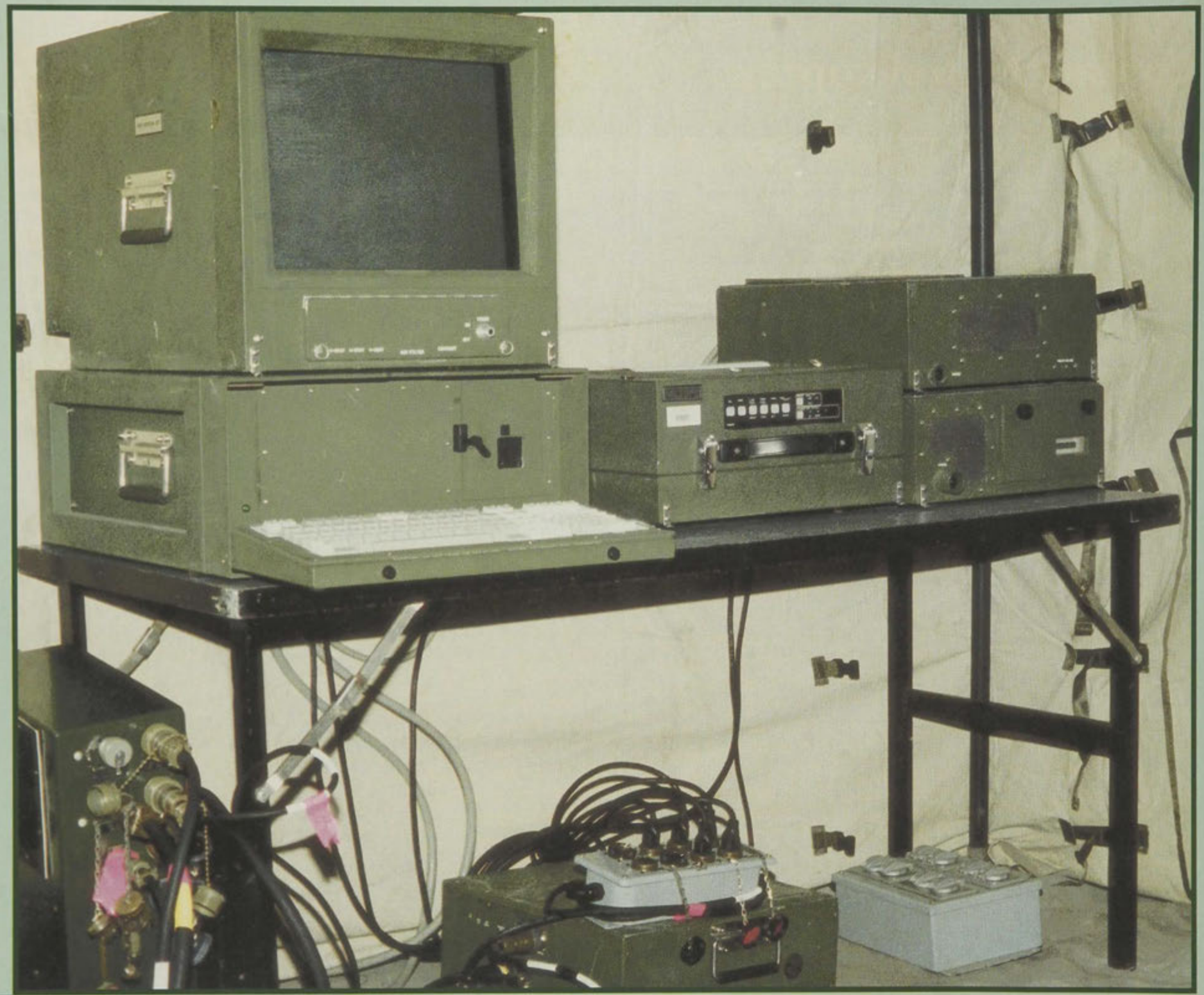
Mission Equipment Package: Turret-mounted cannon, night vision pilotage system, helmet-mounted display, electro-optical target acquisition and designation system, aided target recognition, and integrated displays. Each aircraft will have Longbow capability and provisions for additional stores.

FOREIGN COUNTERPART: The Russian-developed HOKUM is the Comanche's closest counterpart. The Russians have deployed significant numbers of HINDS in Europe and have exported these to many third world countries. The Italian A-129 is currently the nearest NATO counterpart to the Comanche. The Germans and French are co-developing the PAH-2 Tiger attack helicopter, which will have some capabilities of the Comanche.

PROGRAM STATUS: The program is on target for a 2003 Initial Operational Capability. The Demonstration and Validation phase is scheduled for completion in FY97, followed by the the Engineering and Manufacturing Development phase. In an attempt to reduce outyear funding shortfalls, Team Comanche is investigating various streamline options to reduce costs and eliminate inefficiencies.

POINT OF CONTACT:
Project Manager
Comanche
ATTN: SFAE-AV-RAH (Bldg. 105)
St. Louis, MO 63120-1795

CONTRACTORS:
Boeing/Sikorsky (Stratford, CT)
Garrett/Allison (LHTEC) (Indianapolis, IN)



Combat Service Control System (CSSCS)

MISSION: The Combat Service Control System (CSSCS) is a computer software system designed to assist commanders and their staffs in the planning and execution of logistics operations. The CSSCS will rapidly collect, store, analyze, and disseminate critical CSS information to support the functions of command, control, and resource management. CSS commanders and staffs are currently participating in the force-level planning and decision-making processes through a manual effort of gathering, correlating, and analyzing volumes of technical data from the existing Standard Army Management Information Systems (STAMIS). CSSCS will provide timely situational awareness and force projection to determine capability to support current operations and sustain future operations. The CSSCS can extract summary information from the CSS STAMIS, accept input from other elements of the CSS community, and exchange information with other automated systems to evaluate CSS information with respect to the force-level commander's tactical courses of action. CSSCS will be organic to CSS units and headquarters staffs within the maneuver brigades, separate brigades, armored cavalry regiments, Divisions, Corps, and Echelons Above Corps.

CHARACTERISTICS: The CSSCS will comprise transportable and lightweight computer units (TCUs and LCUs) procured through the Project Manager (PM) Common Hardware/Software (CHS), shelters provided by PM CHS, Common ATCCS Support Software (CASS), CSSCS-unique software, and any CSSCS-unique hardware/software identified during development.

FOREIGN COUNTERPART: Great Britain, Canada, and Australia are monitoring the status of CSSCS development.

PROGRAM STATUS: The CSSCS is currently in the Engineering and Manufacturing Development phase. Program development has been structured to evolve over five versions. Version 1 was the subject of an experiment during 1QFY89, which baselined initial capabilities and the processing architecture. Version 2 established automated interfaces with selected CSS STAMIS and the Maneuver Control System (MCS), and provided initial Division-level CSS functional applications software on ATCCS CHS. Version 2 was completed in January 1991. In February 1991, TRW was awarded the software development contract for Versions 3 and 4. In FY94, Version 3 will provide the Army with an integrated ATCCS capability. Improvements and added capabilities for all echelons will continue in Versions 4 and 5. Version 3 is to be completed and tested by the end of FY94. Version 4 will be completed and tested by the end of FY96. Fielding of the CSSCS is scheduled to begin in February 1995. Version 5 is scheduled to be completed and tested in FY98.

POINT OF CONTACT: Project Manager, CSSCS
6020 Meade Rd., Suite 103
Ft. Belvoir, VA 22060-5259

CONTRACTOR: TRW, Systems Engineering and Development Div. (Carson, CA)

Command and Control Vehicle (C^2V)

MISSION: The Command and Control Vehicle (C^2V) will provide a fully tracked, armored vehicle that will ensure a mobile, responsive, and survivable command and control platform for the heavy force. The C^2V will provide battalion-through-corps–level command and control capabilities in support of mobile operations and will accommodate the Army Tactical Command and Control Systems (ATCCS). The need for the C^2V was confirmed during Operation Desert Storm, when the lack of a survivable command post vehicle capable of keeping pace with the Abrams tanks and Bradley Fighting Vehicles was identified as a critical operational deficiency.

CHARACTERISTICS:

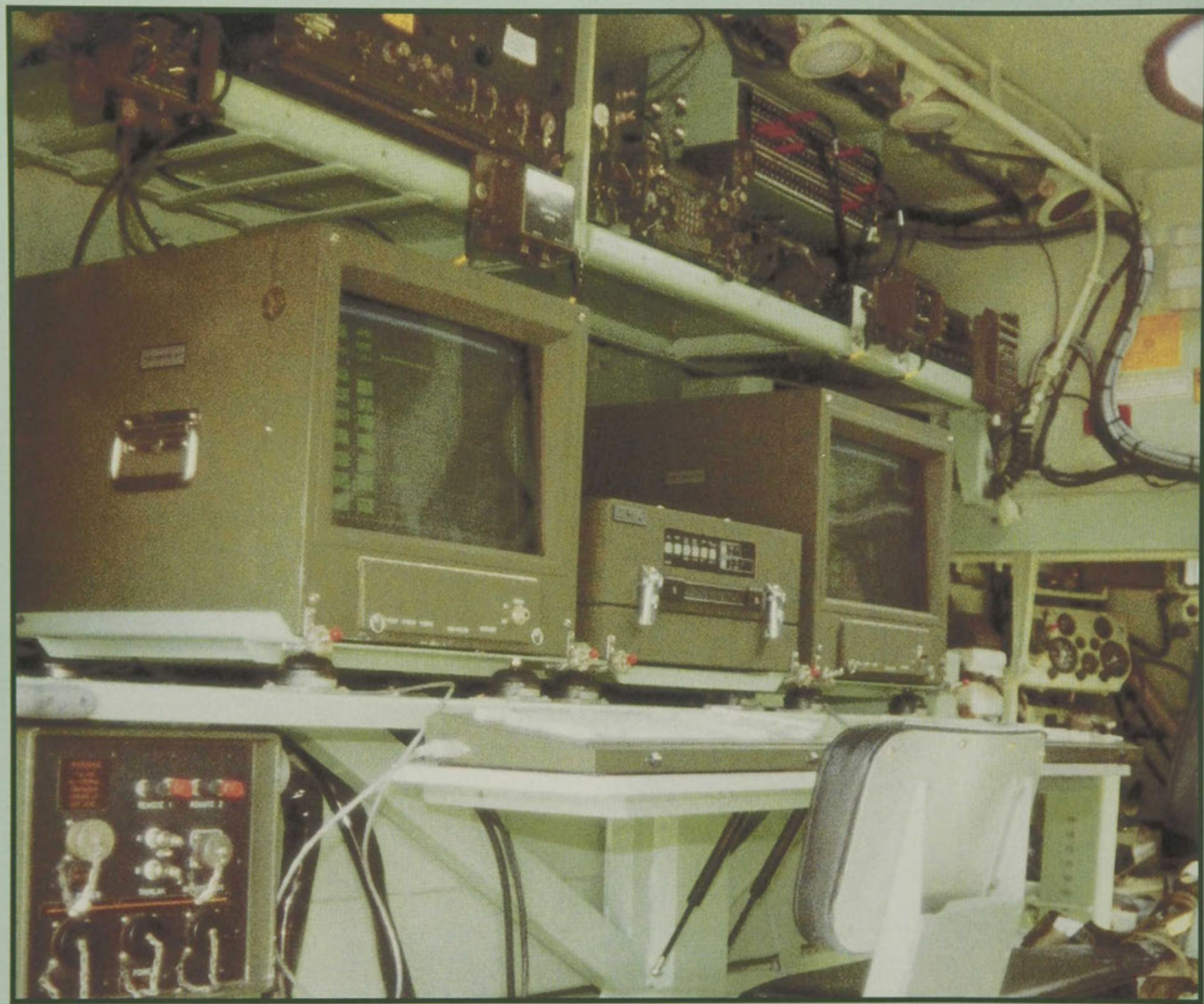
Weight:	57,000 lbs (66,000 lbs max capacity)
Crew:	8
Transportability:	C-5/C-17
Speed:	38 mph
Range:	275 mi
Maximum grade:	60 %
Fording depth:	40 in
NBC protection:	Full collective over pressure protection (shirt-sleeve environment)
Cooling:	40,000 Btu/hr
Electrical power:	43 kW
Antenna :	10-m telescoping mast

FOREIGN COUNTERPART: No known foreign counterpart.

PROGRAM STATUS: The C^2V program achieved Milestone (MS) 0 in March 1993 and a combined MS I/II in December 1993. During REFORGER 92, CINC USAREUR conducted demonstrations of the C^2V concept using two prototypes as division- and brigade-level command post vehicles. These vehicles are being refurbished for use in the April 1994 National Training Center Rotation. In addition, an advanced prototype vehicle, built by FMC, has been used in contractor testing and user experimentation. Following MS I/II, the program will initiate EMD with the objective of fielding the C^2V system in 1998.

POINT OF CONTACT:
Product Manager
Command and Control Vehicle
ATTN: SFAE-ASM-BV
Warren, MI 48397-5000

CONTRACTORS:
FMC (San Jose, CA)
RDA (Tacoma, WA)



Common Hardware/Software (CHS)

MISSION: Common Hardware/Software (CHS) is the Army's program to equip all five Battlefield Functional Areas (BFA)—from Corps to foxhole—with common hardware/software. The program's mission is to improve interoperability and lower life-cycle costs by standardizing battlefield command and control (C^2) automation through centralized buys of Non-Developmental Items (NDI), standardized protocols, and reusable common software. PM CHS provides single NDI vehicles for all Army computer equipment and manages the overall program that places emphasis on the use (reuse) of common software for the functional areas of the tactical battlefield.

CHARACTERISTICS: Four hardware versions are available to meet the specific needs of each BFA (i.e., hand-held [HTU], portable [PCU], transportable [TCU], and lightweight computer [LCU]).

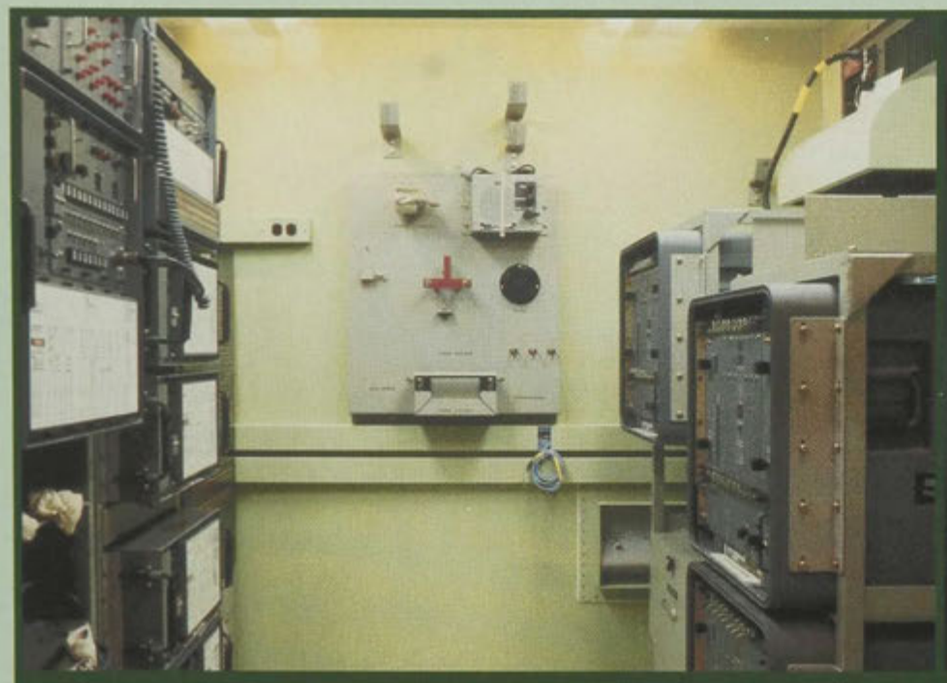
	HTU	***PCU***	***TCU***	***TCU***	***LCU***
Processor:	80c286	68020	68040	Risc	80486
MHz clock:	6 or 12	16	25	99	25/33/66
Mips:	.5 or 1	2	22	124	10/14/20
Ram:	2-6 MB	4-20 MB	8-128 MB	80-400 MB	8-32/8-32/8-128 MB
CHS/LCU software:	UNIX/ POSIX	SQL Dbms/ Sbms	LAN SW/ LAN SW	GKS Graphic/ GUI	Uniplex/ Motiff

FOREIGN COUNTERPART: No known foreign counterpart.

PROGRAM STATUS: The CHS contract has been extended to August 1995. A source selection board has been initiated to award the CHS-2 contract during 3QFY94.

POINT OF CONTACT: Project Manager, Common Hardware/Software
ATTN: SFAE-CC-CHS
Ft. Monmouth, NJ 07703-5402

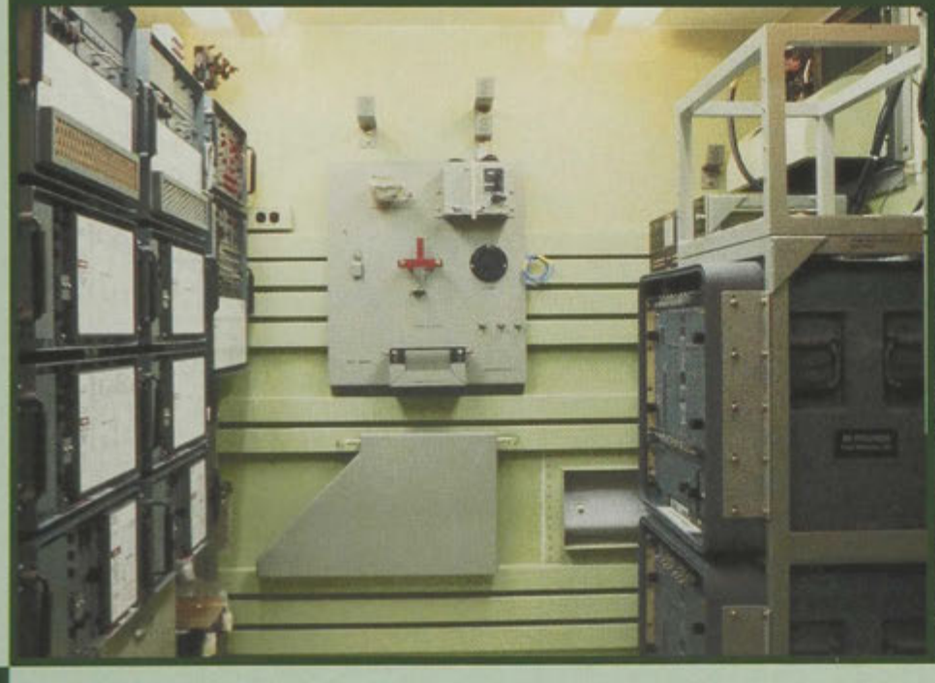
CONTRACTORS: MILTOPE (Melville, NY)
SAIC (San Diego, CA)



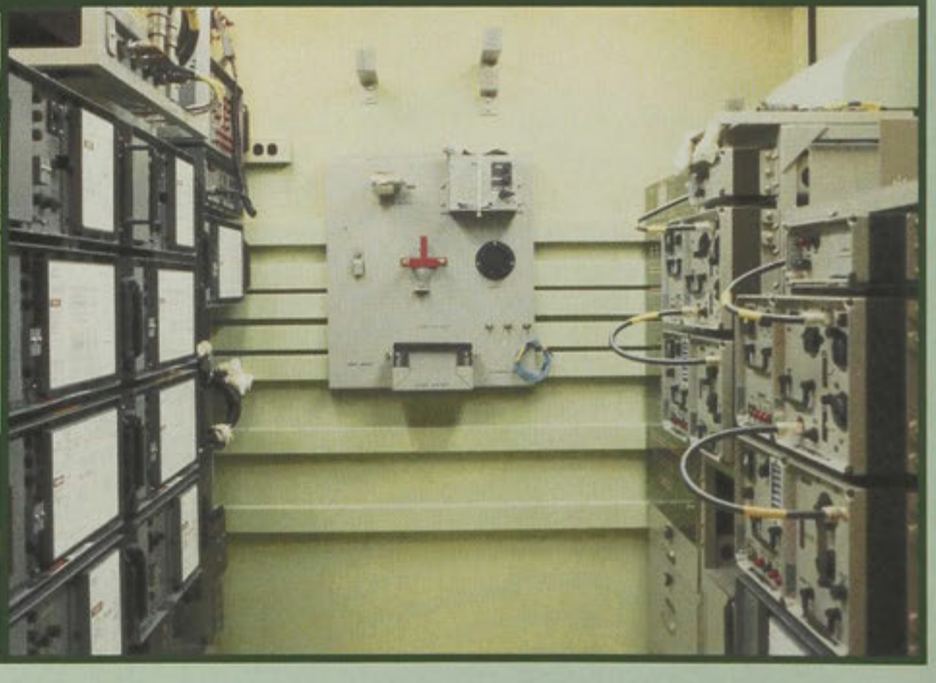
Radio Terminal Set (AN/TRC-173)

Radio Repeater Set (AN/TRC-174)

Radio Terminal Set (AN/TRC-175)



Radio Repeater Set (AN/TRC-138A/B)



Digital Transmission Assemblages

MISSION: This equipment represents a family of high-capacity, digital radio systems that link circuit and message switches into communications networks supporting telephone and message traffic at the theater-tactical level. They also provide the transmission path for linking extension switches at subscriber locations into the main switching network.

CHARACTERISTICS: The digital transmission assemblages provide a series of radio relay and radio terminal equipment in a variety of sizes, capabilities, and characteristics. The following provides a listing of the available systems.

AN/TRC-173	(fullsize)	Radio Terminal Set:	Single Shelter (S-280C)
AN/TRC-173A	(downsize)	Radio Terminal Set:	Single Shelter (S-749)*
AN/TRC-174	(fullsize)	Radio Repeater Set:	Single Shelter (S-280C)
AN/TRC-174A	(downsize)	Radio Repeater Set:	Single Shelter (S-749)*
AN/TRC-175	(fullsize)	Radio Terminal Set:	Single Shelter (S-280C)
AN/TRC-175A	(downsize)	Radio Terminal Set:	Single Shelter (S-749)*
AN/TRC-138A	(fullsize)	Radio Repeater Set:	Single Shelter (S-280C)
AN/TRC-138B	(downsize)	Radio Repeater Set:	Single Shelter (S-749)*

*S-749 is essentially an S-280C shelter reduced in length from 12 ft to 7 ft

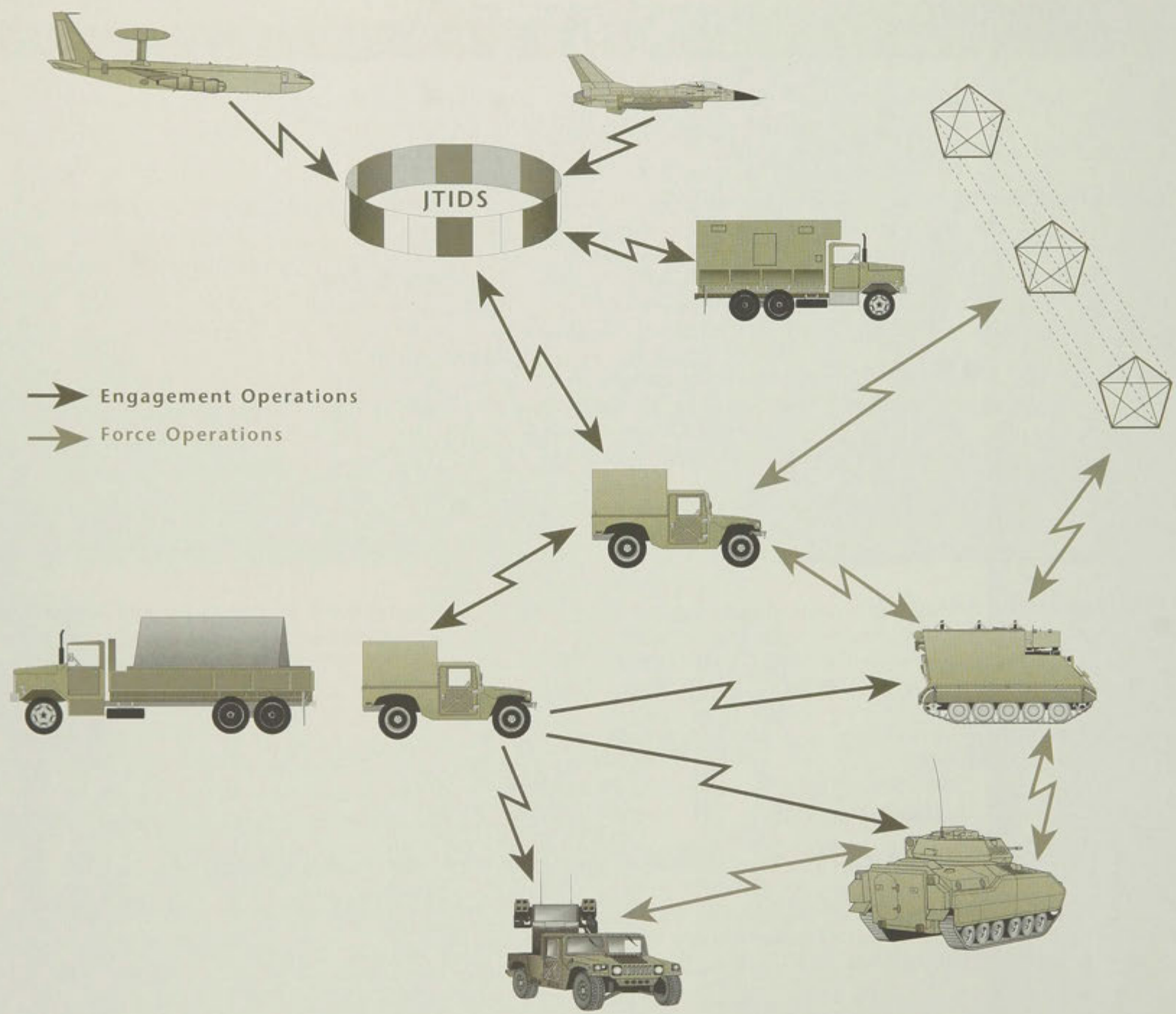
FOREIGN COUNTERPART: No known foreign counterpart.

PROGRAM STATUS: Fielding was begun in FY88 and is expected to be completed in FY95. Production was completed in FY93, and set assembly is expected to be completed in FY94. A new generation of assemblages is currently being designed and tested by Laguna Industries. These are known as the High Mobility DGM Assemblage (HMDA) and are transported on two heavy HMMWVs. Production of these systems is to begin in FY94. Fielding will begin in FY95.

POINTS OF CONTACT:

Project Manager	Commodity Command
JTACS (P)	CECOM-DMM
ATTN: SFAE-CM-MSC-CTS	ATTN: AMSEL-LC-MMR-T
Ft. Monmouth, NJ 07703	Ft. Monmouth, NJ 07703

CONTRACTORS:
Raytheon (Marlboro, MA) and Group Technologies (Tampa, FL)—Digital Group Multiplex Equipment
Harris (Melbourne, FL)—Antenna Masts
Laguna Industries (Laguna Pueblo, NM)—Assemblages
Tobyhanna Army Depot (Tobyhanna, PA)—Set Assembly
Aydin (San Jose, CA)—Microwave Radio Equipment


JTIDS
Engagement Operations
Force Operations

Foward Area Air Defense Command and Control (FAADC²)

MISSION: The mission of the Forward Area Air Defense Command and Control (FAADC²) is to provide an automated means of providing timely target data to FAAD weapons, to protect friendly aircraft, and to facilitate management of the air battle. The system consists of non-developmental computers, displays, and printers that are common to the Army Tactical Command and Control System (ATCCS), non-developmental ground sensors, and the requisite software. The system will be fully integrated with other FAAD elements and the ATCCS. The initially deployed light system will use the Single Channel Ground and Airborne Radio System (SINCGARS) for data transfer, while the objective heavy system will use the Army Data Distribution System (ADDS). The system will provide an automated exchange of Air Defense Artillery command information, dissemination and acknowledgement of Air Defense Artillery air battle management data, air track, and remote sensors.

CHARACTERISTICS: The system consists of multiple subsystems for deployment to various echelons of command. The subsystems are tailored to the functions to be performed and vary in size and complexity from the fire unit laptop processor to the Air Battle Management Operation Center (ABMOC) tabletop computers The fire unit subsystem consists of a simplified, hand-held terminal unit weighing approximately 8 pounds with battery, cables, and carrying case. The ABMOC is in a standard, integrated command post shelter (rigid wall).

FOREIGN COUNTERPART: No known foreign counterpart.

PROGRAM STATUS: The FAADC² system is currently in the Engineering and Manufacturing Development phase. The basic development effort consists primarily of software development, which is being developed incrementally. Versions 1 and 2 have been completed and successfully passed a laboratory demonstration. Version 3 successfully completed all contractor and Government testing and was fielded to the 101st Airborne (Air Assault) Division on 30 September 1993. It is currently envisioned that the system will ultimately be fielded to five heavy divisions, five light and special divisions, two ACRs, three Corps Missile Battalions, and a training base. Fielding will occur between FY94 and FY99.

POINT OF CONTACT: U.S. Army Missile Command
ATTN: SFAE-FAAD
Redstone Arsenal, AL 35898

CONTRACTOR: TRW Defense System (Redondo Beach, CA)

Ground-Based Common Sensor—Light

Ground-Based Common Sensor—Heavy

Ground-Based Common Sensor (GBCS)

MISSION: Ground-Based Common Sensor—Light (GBCS-L) and Ground-Based Common Sensor—Heavy (GBCS-H) are mounted signals intercept and emitter location systems that search, intercept, locate, identify, and provide electronic countermeasures against enemy communications and noncommunications emitters. GBCS-L is HMMWV mounted, while GBCS-H is mounted in an Electronic Fighting Vehicle System (EFVS), which uses a Bradley variant chassis. Both GBCS-L and GBCS-H are elements of the Intelligence Electronic Warfare Common Sensor (IEWCS) program and interoperate with Advanced Quickfix to locate and acquire targets beyond the Forward Line of Own Troops. Situation development information is transmitted to the Technical Control and Analysis Element (TCAE) of the All Source Analysis System (ASAS), and targeting information is transmitted through the TACFIRE system to their respective users. Both GBCS-L and GBCS-H are being built with "open systems architecture" to accommodate rapid technology insertion to keep pace with changes in threat characteristics worldwide across the spectrum of conflict in the post-cold war era. The light and heavy variants of the IEW-GBCS have the same common sensor subsystems as the Advanced Quickfix.

CHARACTERISTICS:

Vehicular operation:	All terrain
Mission operation:	24 hrs
Intercept, locate:	HF, VHF, UHF, SHF, L, S, C, X, KU, K, KA
Jam:	HF, VHF
Setup/teardown time:	10 min/3 min
Roll-on, roll-off (RO-RO):	C-130, C-141 (GBCS-L); C-5 (GBCS-H)

FOREIGN COUNTERPART: No known foreign counterpart.

PROGRAM STATUS: Both light and heavy variants are in the Engineering and Manufacturing Development phase. The Technical Test/User Test is scheduled for FY94–95.

POINT OF CONTACT:

Project Manager
Signals Warfare
ATTN: SFAE-IEW-SG
Vint Hill Farms Station
Warrenton, VA 22186-5116

CONTRACTORS:

ELECTROSPACE Systems (Richardson, TX)
IBM (Owego, NY)
Sanders/AEL (Hudson, NH)—Joint Venture
Magnavox (Ft. Wayne, IN)
Motorola (Scottsdale, AZ)
FMC (Santa Clara, CA)

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Guardrail

MISSION: Guardrail's function is to provide a fixed-wing communication and electronic emitter intercept and direction-finding system. Guardrail operations support Corps, Division, and Joint Land Force Component Commanders in precision strike operations, winning the information war, and digitization of the battlefield by providing timely information via the Commander's Tactical Terminal.

CHARACTERISTICS:

	RU-21H	*RC-12D/H*	*RC-12K/N/P*
Mission weight/payload:	10,200/1,126 lbs	14,200/1,600 lbs	16,000/2,000 lbs
Cruise speed:	176 kts	200 kts	250 kts
Endurance:	4 hrs	5(+) hrs	5(+) hrs
Max range:	1,000 naut mi	1,200 naut mi	1,200 naut mi

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

PROGRAM STATUS: The Guardrail systems currently in service include the Guardrail V (RU-21H aircraft), the Guardrail Common Sensor Minus (RC-12H aircraft), and the Guardrail Common Sensor (RC-12K/N/P aircraft). Guardrail Common Sensor (GRCS) combines the Improved Guardrail V (IGRV) Communication Intelligence (COMINT) sensor package with the Advanced Quicklook electronics signals (ELINT) intercept, classification, and direction-finding capability, and a Communication High Accuracy Airborne Location System (CHAALS). GRCS (Minus) was fielded to Korea in 1988. The first GRCS system was fielded to Europe in 1991, and the second will be fielded to XVIII Corps in 1994 with a remote relay capability that allows forward deployment of aircraft while the ground processing facility remains in CONUS. The last GRCS system is in the Engineering and Manufacturing Development phase and will be fielded in FY97. GRCS shares technology with the Ground-Based Common Sensor, Airborne Reconnaissance Low, and other airborne systems.

POINT OF CONTACT:
Program Manager
Signals Warfare
ATTN: SFAE-IEW-SW
Ft. Monmouth, NJ 07703-5303

CONTRACTORS:
ESL (Sunnyvale, CA)
IBM (Owego, NY)
Beech Aircraft (Wichita, KS)
UNISYS (Salt Lake City, UT)
ESCO (St. Louis, MO)

Operations Shelter (AN/TYQ-30[V]1)

Automatic Data Processing Shelter (AN/TYQ-30[V]1)

Integrated System Control (ISYSCON)

MISSION: The Integrated System Control (ISYSCON) is an automated, theater-wide system that Signal S3 staffs will use to manage battlefield communications systems. ISYSCON performs network planning and engineering, spectrum management, COMSEC management, wide area network management, and signal command and control for ADDS, Automatic Calling Unit System (ACUS), and Combat Net Radio (CNR) networks. The system has a flexible, four-tier architecture that allows deployment with Theater, Corps, and Division Signal units.

CHARACTERISTICS: An ISYSCON node consists of a Standard Integrated Command Post Shelter (SICPS), two extension tents, two client servers, six workstations, and peripherals. An ISYSCON node can support up to 20 remote terminals distributed by the S3 to various signal officers.

FOREIGN COUNTERPART: No known foreign counterpart.

PROGRAM STATUS: ISYSCON is currently in development. Block I protyptes are scheduled to be delivered beginning in FY95. A production contract award is scheduled for 1QFY97, and production deliveries are scheduled to begin in 3QFY97.

POINT OF CONTACT: Project Manager, JTACS CECOM
ATTN: SFAE-CM-MSC-CMS (Product Manager, CMS)
Ft. Monmouth, NJ 07703

CONTRACTOR: GTE (Taunton, MA)

Joint Tactical Ground Station (JTAGS)

MISSION: The Joint Tactical Ground Station (JTAGS) supports the Theater Missile Defense (TMD) architecture by providing timely and tailored reporting on tactical ballistic missile launches. This is accomplished by in-theater stereo ground processing of infrared data from Defense Support Program (DSP) sensors. Space-based warning data and other tactical parameters are provided to end users utilizing existing communications networks. The ability of JTAGS to process and disseminate data within the theater minimizes the risk of single-point failures, provides improved reporting time lines, and minimizes the loading on high-priority communications links between CONUS and the theater user.

CHARACTERISTICS: JTAGS is a theater-tactical ground station contained in an 8- by 20-ft ISO shelter. The system is transportable by C-130 aircraft and can be operational within hours. For redundancy, during contingency situations, the system is deployed in pairs. It is envisioned that the system will be jointly operated during crisis situations. To reduce cost and accelerate fielding, JTAGS utilizes commercial off-the-shelf hardware with minor modifications to enhance transportability and deployment options. This system is being developed to interface with major existing and planned communication systems.

FOREIGN COUNTERPART: No known foreign counterpart.

PROGRAM STATUS: JTAGS is a Program Executive Office Missile Defense TMD-managed project and is a cooperative effort with the Navy. The program is in transition from a BMDO/USASSDC Advanced Technology Demonstration to a formal acquisition program. The technical feasibility of JTAGS was validated by the Tactical Surveillance Demonstration proof-of-principle prototype, which was successfully tested at White Sands Missile Range. A transportable Demonstration/Validation prototype was delivered during FY93 and underwent developmental and operational testing during 4QFY93 and 1QFY94. Both prototypes are currently available for contingency operations. After a successful user evaluation and an MS II/III decision, production units may be fielded in the FY96 timeframe.

POINT OF CONTACT: Program Executive Office
Missile Defense
ATTN: SFAE-GPL-TMD-SS-P
P.O. Box 1500
Huntsville, AL 35807-3801

CONTRACTOR: Technology Demonstation: Aerojet Electronic Systems (Azusa, CA)
EMD/Production: TBD

Light and Special Division Interim Sensor (LSDIS)

MISSION: The Light and Special Division Interim Sensor (LSDIS) provides short-range, low-altitude airspace surveillance coverage over the supported force. The LSDIS system consists of the radar, a commercial 1.5 kW generator, and a FAADC² interface. LSDIS is modularly designed, easy to operate, and easy to maintain. These characteristics are essential to a highly mobile force that must deploy rapidly in response to contingency missions. It provides detection of moving fixed- and rotary-wing targets, as well as hovering helicopters, at reduced ranges. These capabilities allow it to be employed either autonomously or integrated with FAADC² on the modern battlefield.

CHARACTERISTICS:

- Short-range air defense sensor
- Continuous volume surveillance of aircraft
- Azimuth: 360 deg; altitude: 0-3 km; range: 20 km
- Ruggedized, airdroppable, sling load, and HMMWV transportable
- Simple, reliable, lightweight
- FAADC² interface

FOREIGN COUNTERPART: No known foreign counterpart.

PROGRAM STATUS: The contract was awarded in 3QFY91. It is fielded by the 101st Airborne (Air Assault) Division. The next fielding is planned for 1QFY95.

POINT OF CONTACT: FAAD Sensor Product Office
ATTN: SFAE-IEW-GSI
Redstone Arsenal, AL 35898-8052

CONTRACTOR: Lockheed-Sanders (Nashua, NH)

Lightweight, Man-Portable Radio Direction-Finding System

MISSION: The Lightweight, Man-Portable Radio Direction-Finding System (AN/PRD-12) is a man-transportable, ground-based communications intercept and direction-finding (DF) system. It consists of a receiver-processor, a hand-held keyboard, and two antenna subsystems. The system can be deployed by two people. The system provides intercept and direction finding of enemy HF/VHF/UHF communications emitters. The system nets with the AN/TRQ-32(V) Teammate and shares common components with the USMC Team-Portable Collection System.

CHARACTERISTICS:

Intercept frequency range:	0.5–500 MHz
DF frequency range:	0.5–500 MHz
Weight:	53 lbs

FOREIGN COUNTERPART: There are several commercially available systems similar to the AN/PRD-12 available from United States and United Kingdom firms.

PROGRAM STATUS: The system is in production and began fielding in 2QFY93. There is currently a materiel change underway to provide a smaller, lighter, and more rugged antenna. Contract deliveries are scheduled to begin in 4QFY94.

POINT OF CONTACT:
Project Manager
Signals Warfare
ATTN: SFAR-IEW-SG
Vint Hill Farms Station
Warrenton, VA 22186-5116

CONTRACTOR: ESL (Sunnyvale, CA)

Maneuver Control System (MCS)

MISSION: The Maneuver Control System (MCS) provides Army tactical commanders and their staffs (corps through battalion) automated, on-line, near real-time systems for planning, coordinating, and controlling tactical operations and for receiving, processing, and displaying the increasing volume and variety of tactical command and control information available. MCS software is written in Ada. The MCS capability continues to expand in planned, time-phased steps toward the objective system in the mid 1990s. Maneuver Control is one of the five battlefield functional areas (BFA) of the Army Tactical Command and Control Systems (ATCCS). MCS is the force-level commander's information system and integrates the maneuver function with the command and control (C2) systems of the other four functional areas (Fire Support, Air Defense, Intelligence/Electronics Warfare, and Combat Service Support).

CHARACTERISTICS: Non-Developmental Item (NDI) equipment and Common Hardware will be used with MCS. Additionally, the Common Hardware will be fielded with the Standardized Integrated Command Post Systems (SICPS) (XM-1068, M998 Soft Top, and Rigid Wall Shelter).

NDI Analyst Console (AC) weight:	318 lbs
Tactical Computer Processor (TCP) weight:	798 lbs
Common Hardware TCU weight:	89 lbs
LCU weight:	27.5 lbs

FOREIGN COUNTERPART: No known foreign counterpart.

PROGRAM STATUS: NDI deliveries began in FY89 (III Corps) and were completed in FY93. Common Hardware fieldings begin in FY94. Currently, MCS Version 10.03.1G software is fielded to all heavy Army units with NDI. Release Request for Proposal MCS Block IV is scheduled in 2QFY94. MCS Initial Operational Test and Evaluation (IOTE) is scheduled for October 1996. Application software will be prototyped until Block IV products become available.

POINT OF CONTACT: Project Manager
Operations Tactical Data Systems
ATTN: SFAE-CC-MVR
Ft. Monmouth, NJ 07703-5405

CONTRACTORS: Block IV products—TBD
Prototype Application Software—Consortium of:
- Martin Marietta (Philadelphia, PA)
- Mitre (Eatontown, NJ)
- Telos (Shrewsbury, NJ)
- CECOM Software Engineering Directorate (Ft. Monmouth, NJ)

Command Hardware/Software—MILTOPE (Melville, NY)

MILSATCOM Tactical Manpacks

MILSATCOM Strategic Terminals

MILSATCOM Tactical Terminals

Military Satellite Communications (MILSATCOM)

MISSION: The Army is the DoD's executive agent for all satellite communications ground equipment per Joint Chiefs of Staff (JCS) Memorandum of Policy #37, dated 1992. This equipment satisfies JCS-validated command, control, communications, and intelligence requirements supporting the President, Commander-in-Chief (CINC), National Command Authority (NCA), Military Departments, Intelligence community, and NATO. The satellite equipment uses all DoD MILSATCOM systems, including the Fleet Satellite/Air Force Satellite (FLTSAT/AFSAT) system; the Defense Satellite Communications System (DSCS); and the future Military-Strategic/Tactical Relay (MILSTAR) system.

CHARACTERISTICS: Fixed strategic, theater, and mobile tactical satellite communications terminals.

PROGRAM STATUS: The Army is procuring commercial Non-Developmental Item (NDI) terminals and related equipment in support of contingency force and Special Operations Forces (SOF) unit requirements for use on FLTSAT/AFSAT. Efforts to embed Communications Security (COMSEC) and develop a demand-assigned, multiple-access capability to increase the capacity of the existing system are underway. In the tactical DSCS, the Army is modifying the AN/TSC-85B/93B terminals to provide commanders with an anti-jam capability. Strategically, the Army will continue to modify its large fixed-site facilities, provide digital equipment upgrades, and expand the control subsystem to enhance satellite and communications payload control operations. The Army is supporting a more tactically oriented MILSTAR program by developing low-data–rate manpack terminals and medium-data–rate multichannel terminals.

POINTS OF CONTACT:

PM SATCOM
ATTN: SFAE-CM-SC
Ft. Monmouth, NJ 07703

PM MILSTAR (Army)
ATTN: SFAE-CM-MS
Ft. Monmouth, NJ 07703

CECOM
ATTN: AMSEL-SS
Ft. Monmouth, NJ 07703

CONTRACTORS:

General Electric (Valley Forge, PA)
Motorola (Scottsdale, AZ)
Harris (Melbourne, FL)
Titan (San Diego, CA)
Loral (Colorado Springs, CO)
Cincinnati Electronics (Cincinnati, OH)
Magnavox (Ft. Wayne, IN)

SMART-T MILSTAR

SMART-T MILSTAR

SCAMP

Military-Strategic/Tactical Relay (MILSTAR) System

MISSION: The Army is DoD's lead military department for all satellite communications ground equipment per Joint Chiefs of Staff (JCS) Memorandum of Policy #37, dated 1992. This equipment satisfies Army-deployed warfighters as well as JCS-validated command, control, communications, and intelligence requirements supporting the President, Commander-in-Chief (CINC), National Command Authority (NCA), Military Departments, and Intelligence community. The terminal equipment uses various DoD Military Satellite Communications (MILSATCOM) systems, including Fleet Satellite/Air Force Satellite (FLTSAT/AFSAT), Navy ultra-high frequency follow-on (UFO) satellite, and the MILSTAR system. This equipment supports the AirLand Operations (ALO) concept by providing uninterrupted communications beyond the line-of-sight capability for our advancing tactical forces.

CHARACTERISTICS: Mobile tactical satellite communications terminals and fixed strategic terminals.

PROGRAM STATUS: The MILSTAR program was approved for Milestone II, Engineering and Manufacturing Development, by the Army in May 1992, and Defense Acquisition Board approval was granted in October 1992. The Army is supporting the tactically oriented MILSTAR program by developing low-data–rate manpack terminals (SCAMP) and medium-data–rate multichannel terminals (SMART-T). The contracts to initiate development of the SCAMP and SMART-T MILSTAR terminals were awarded in 1992. The SCAMP terminal will provide a man-portable, secure, anti-jam, low probability of interception/detection (LPI/LPD) system operating in the extremely high frequency (EHF) range for both voice and data at 75 to 2,400 bps in a 30-lb package. The SMART-T provides secure, anti-jam, LPI/LPD, EHF range extension capability to the Army's Mobile Subscriber Equipment (MSE) on a High Mobility Multipurpose Wheeled Vehicle (HMMWV). Other MILSTAR efforts include the integration of eight Air Force-developed and -procured Ground Command Post terminals into the Army force structure and the use of MILSTAR EDM terminals to minimize developmental risk and support testing of the low-data–rate capabilities of SCAMP and SMART-T.

POINT OF CONTACT:
Program Manager
MILSTAR (Army)
ATTN: SFAE-CM-MSA
Ft. Monmouth, NJ 07703

CONTRACTORS:
Magnavox (Ft. Wayne, IN)
Martin Marietta (Camden, NJ)
Raytheon (Marlborough, MA)
Rockwell (Richardson, TX)

Mobile Subscriber Equipment (MSE)

MISSION: Mobile Subscriber Equipment (MSE) provides the tactical U.S. Army commander with a secure, automatic, highly mobile, quickly deployable, survivable, tactical communications system capable of passing data, facsimile, and voice traffic throughout the Division and Corps area of operations.

CHARACTERISTICS: The major items of equipment are integrated into five functional areas. Subscriber Terminals provide the voice and data elements to interface with other functional areas of the MSE system. Mobile Subscriber Access radiotelephone terminals permit mobile and stationary users to automatically communicate secure voice and data throughout the tactical area of operations. Wire Subscriber Access allows non-radio users entry to the MSE system through concentrations of automatic switching equipment. Area coverage of the battlefield from mobile or fixed locations is achieved through secure automatic switching, continuous coverage, and the ability of commanders and staff to retain the same telephone number regardless of their location. System Control provides an automated Corps-wide MSE system management capability, which is itself mobile, moving with the elements it controls.

FOREIGN COUNTERPART: No known foreign counterpart.

PROGRAM STATUS: All Signal Battalions scheduled to receive MSE have been successfully fielded. Final unit fielding was completed in November 1993.

POINT OF CONTACT: Project Manager
MSE
ATTN: SFAE-MSE
Ft. Monmouth, NJ 07703-5210

CONTRACTOR: GTE (Taunton, MA)


5938
UNITED STATES ARMY

Mohawk Surveillance System

MISSION: The OV-1D Mohawk radar surveillance system provides Corps commanders with location and moving target data during daylight, darkness, and in near all-weather conditions, allowing tactical commanders to monitor threat disposition and movement. The OV-1D Mohawk is a two-place, twin-turboprop, combat aircraft equipped with Side Looking Airborne Radar (SLAR) and photographic systems. Radar data are data-linked to ground terminals for near real-time display. The OV-1D Mohawk is assigned to the Military Intelligence Battalion (Aerial Exploitation), Military Intelligence Brigade (Combat Electronic Warfare Intelligence [CEWI]) at Corps.

CHARACTERISTICS:

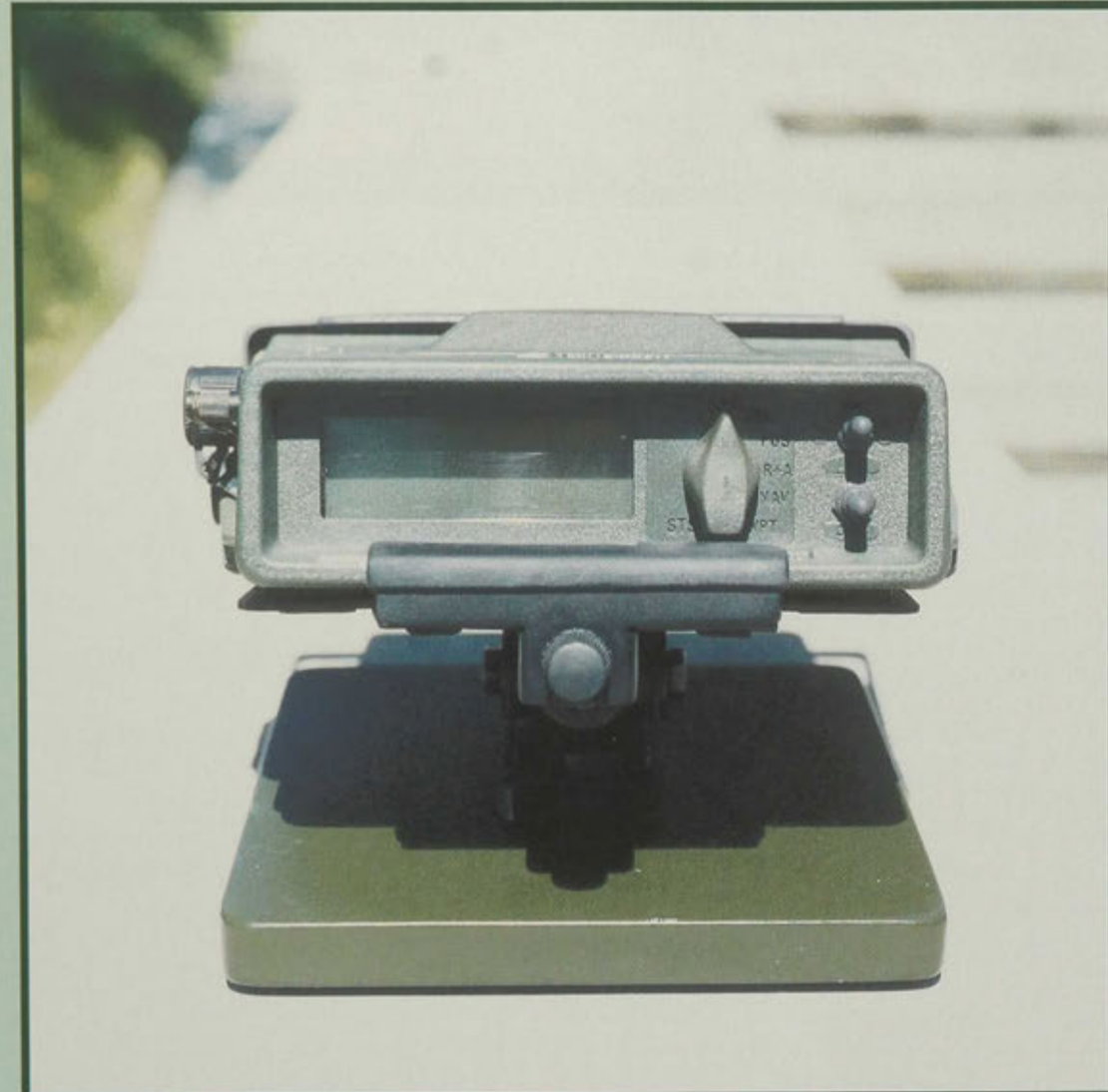
Mission weight:	18,587 lbs
Cruise speed:	210 kts
Crew:	2
Endurance:	4 hrs
Max range:	820 naut mi
Armament:	None
Payload:	2,129 lbs

FOREIGN COUNTERPART: British ASTOR (airborne radar on Pilatus Britten-Norman Defender aircraft); French HORIZON (airborne radar on Aerospatiale Super Puma helicopter).

PROGRAM STATUS: Fielding of the OV-1D Mohawk surveillance system was completed in 1987. The OV-1D Mohawk fleet has begun a phased drawdown to full retirement by FY97, when the Joint Surveillance Target Attack Radar System (Joint STARS) will fulfill the airborne radar mission for the Army.

POINT OF CONTACT: Commander, CECOM
Logistics and Maintenance Directorate
ATTN: AMSEL-LC-LM-ET
Ft. Monmouth, NJ 07703-5000

CONTRACTORS: Grumman (Stuart, FL)
Motorola (Scottsdale, AZ)



Small Lightweight GPS Receiver

Precision Lightweight Receiver
AN/PSN-10 (V)

NAVSTAR Global Positioning System (GPS)

MISSION: The NAVSTAR Global Positioning System (GPS) is a Joint Army, Navy, and Air Force program, with the Air Force as the lead service. It is a space-based navigation, three-dimensional positioning, and time-distribution system that will provide accurate, continuous, all-weather, common grid, worldwide navigation, positioning, and timing information to land, sea, air, and space-based users. GPS has three segments: a space segment, consisting of 24 satellites; a ground control segment; and a user segment. The Army is the lead service in the Joint Program Office (JPO) for the manpack/vehicular and low-to-medium dynamic aircraft receivers.

CHARACTERISTICS: The user segment consists of receiver configurations for manpack/vehicular, low-to-medium and high dynamic aircraft and seacraft applications. The GPS receiver is a passive device that will be deployed extensively at all echelons and with Army aircraft.

FOREIGN COUNTERPART: The Russians have developed a similar system, GLONASS, but insufficient data are available to permit a meaningful comparison to GPS.

PROGRAM STATUS: The JPO conducted an off-the-shelf, non-developmental item procurement of the Precision Lightweight GPS Receiver (PLGR), an inexpensive ground set. The PLGR contract was awarded to Rockwell International in March 1993, with initial production sets delivered in late FY93. Type Classification Standard for the PLGR is projected for 2QFY94 following first article and operational testing. The PLGR procurement will satisfy most other Army ground applications and replace the previously deployed AN/PSN-8 and AN/VSN-8, once sufficient assets are available. During Desert Shield/Desert Storm, waivers were obtained from ASD(C3I) for the Army to acquire more than 8,000 commercially available sets, called the Small Lightweight GPS Receiver (SLGR), as an interim capability until the PLGR is deployed. As SLGRs are displaced by PLGRs, it is planned that the SLGRs will be reallocated. Program Manager (PM) GPS is exploring alternatives for functional substitutes for the 2-channel Air Set, AN/ASN-149: the Miniaturized Airborne GPS Receiver (MAGR), Air PLGRs, and embedded solutions for remaining aircraft GPS requirements.

POINT OF CONTACT:
Project Manager
GPS
ATTN: SFAE-CM-GPS
Ft. Monmouth, NJ 07703

CONTRACTORS:
Magellan (Monrovia, CA)
Texas Instruments (Plano, TX)
SCI (Huntsville, AL)
Rockwell International (Cedar Rapids, IA)
Trimble (Sunnyvale, CA)

Quickfix

MISSION: Quickfix is a tactical heliborne communications intercept, direction-finding (DF), and electronic countermeasures system. Quickfix consists of: AN/ALQ-151 intercept and DF mission equipment, AN/TLQ-17A communications jammer, and airborne self-protection equipment mounted in a modified UH-60A helicopter. Quickfix systems interoperate with each other and Trailblazer in a netted configuration for DF purposes. Advanced Quickfix (AQF) provides Division and Armored Cavalry Regiment commanders with an organic capability to listen to and locate the enemy for targeting and order-of-battle, rendering opposition command and control ineffective through jamming, and identifying/locating fire control nets and countermortar/counterbattery ground surveillance radar emissions. Configured in a Black Hawk helicopter, AQF provides the line-of-sight (LOS) extension necessary to provide for location accuracies sufficient for "steel on target" requirements, as well as for extension of C^2 jamming LOS. AQF will transmit situational development information to the Technical Control and Analysis Element (TCAE) of the All Source Analysis System (ASAS), and targeting information will be transmitted through the TACFIRE system to their respective users. AQF will be interoperable with GBCS-L and GBCS-H. An "open systems architecture" is being used to accommodate rapid technology insertion to keep pace with changes in threat characteristics worldwide across the spectrum of conflict in the post-cold war era.

CHARACTERISTICS:

	Quickfix	***Advanced Quickfix***
Aircraft (crew):	EH-60A (4)	EH-60A (4)
Mission/payload weight:	16,500/2,130 lbs	22,000/3,978 lbs
Cruise speed:	137 kts	128 kts
Max range/endurance:	266 naut mi/2 hrs	675 naut mi/4.5 hrs
Intercept, locate (DF):	VHF,UHF	HF,VHF,UHF,SHF,L,S,C,X,KU,K,KA
Electronics countermeasures (jam):	VHF	HF,VHF

FOREIGN COUNTERPART: The Russian-developed technology consists of an extensive fleet of dedicated MI-8 HIP-J/HIP-K electronic warfare helicopters. The United Kingdom, France, and other nations also have heliborne electronic warfare capability.

PROGRAM STATUS: Quickfix has been fielded. A Materiel Change (MC) was approved on 6 September 1991 that will evolve Quickfix into Advanced Quickfix. The Developmental/Operational Test for Advanced Quickfix is scheduled for FY94–95.

POINT OF CONTACT:
Project Manager
Signals Warfare
ATTN: SFAE-IEW-SG
Vint Hill Farms Station
Warrenton, VA 22186-5116

CONTRACTORS:
ELECTROSPACE Systems (Richardson, TX)
Sikorsky (Stratford, CT)
IBM (Owego, NY)
Chrysler Technologies Airborne Systems (Waco, TX)
Magnavox (Ft. Wayne, IN)
Motorola (Scottsdale, AZ)
Sanders/AEL (Hudson, NH)—Joint Venture

Single Channel Ground and Airborne Radio System (SINCGARS)

MISSION: The Single Channel Ground and Airborne Radio System (SINCGARS) provides commanders with a reliable, easily maintained Combat Net Radio (CNR) for command and control, and provides Electronic Counter Counter Measures (ECCM) against Threat Electronic Warfare (EW). SINCGARS configurations include manpack, vehicular (both low and high power), and airborne models. COMSEC is integrated in currently produced versions of the ground and airborne models.

CHARACTERISTICS:

Weight:	22.5 lbs w/battery and COMSEC
Frequency range:	30.000 to 87.975 MHz
Channels:	2,320
Range:	8-35 km

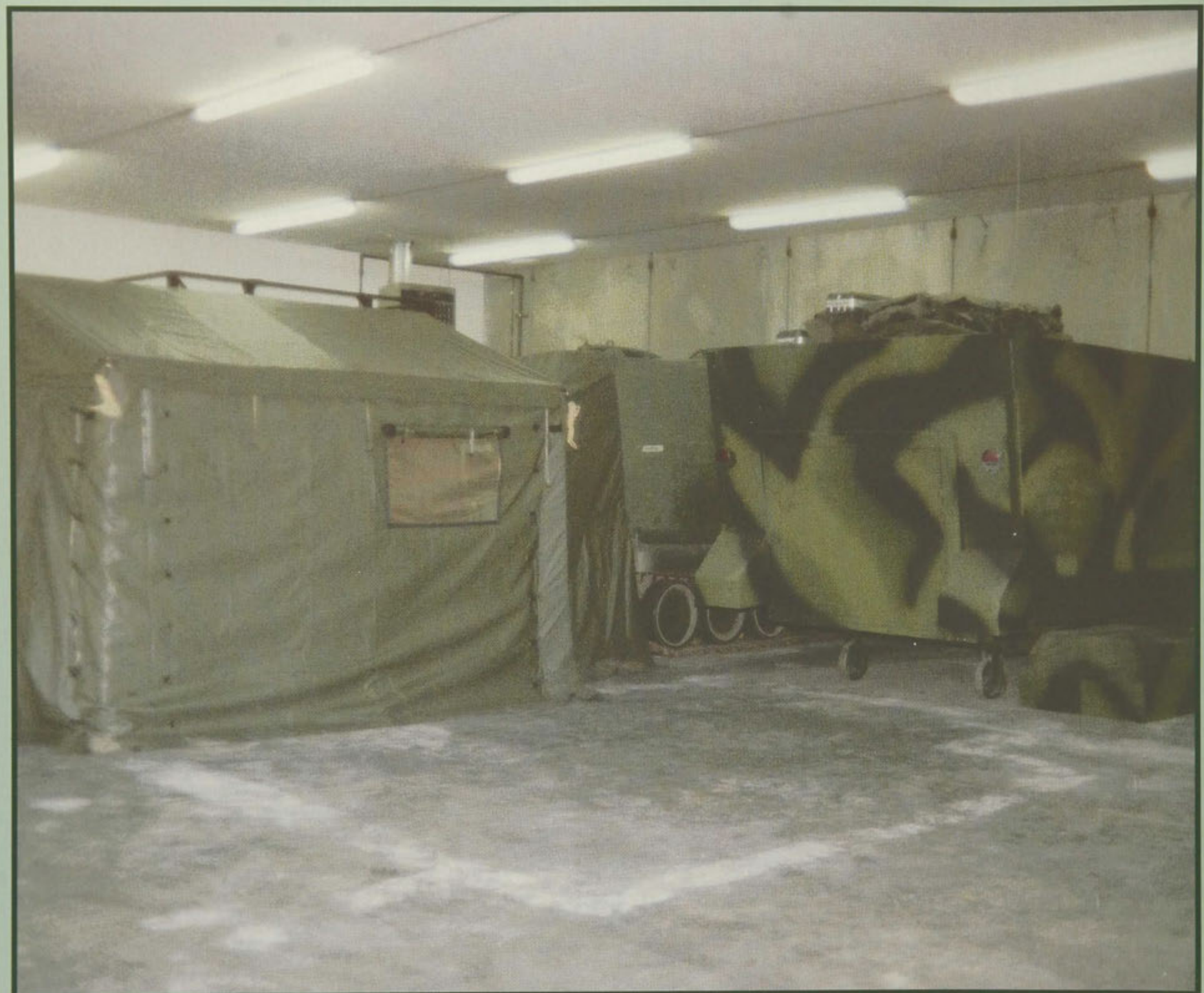
PROGRAM STATUS: First source (ITT) SINCGARS ground radios passed First Article Tests in January 1988, and production deliveries began immediately. A Follow-On Test and Evaluation (FOTE) was successfully completed in May 1988 on the non-integrated Communications Security (COMSEC) (non-ICOM) version of the radio. An Initial Operational Test and Evaluation (IOTE) and FOTE were successfully completed on the ICOM radio in November 1990. Award for Option 3 for 16,000 radios was made in June 1989. Option 4 for l6,000 radios was awarded in 1QFY91, completing the first-source contract of 44,100 ground radios. Subsequently, a new contract for first-source production was awarded for 16,000 radios in March 1992, with another 16,000 radio award in FY93. ITT is also the sole producer of the airborne SINCGARS, with contracts awarded for almost 5,400 units. A second-source of ground radios (General Dynamics) was selected in July 1988 and awarded a firm fixed price, base year contract for 400 radios. Second-source First Article Test was successfully completed in July 1992, and IOTE was successfully completed in February 1993. General Dynamics was awarded a Low-Rate Initial Production contract for an additional 7,500 ground radios. A second-source, full-scale production award for 12,000 radios was made in August 1993. Dual source competition will begin in FY94. The program office has fielded more than 58,000 radios to the training base and Army units in SOUTHCOM, WESTCOM, USARPAC, and CONUS.

POINT OF CONTACT:

Project Manager
SINCGARS
ATTN: SFAE-CM-GAR
Ft. Monmouth, NJ 07703

CONTRACTORS:

ITT Aerospace/Communications Div. (Ft. Wayne, IN)
General Dynamics (Land Systems) (Tallahassee, FL)



Standardized Integrated Command Post System (SICPS)

MISSION: The Standardized Integrated Command Post System (SICPS) is a family of command post facilities developed to house the Army Tactical Command and Control System (ATCCS) across all battlefield functional areas. Variants of SICPS consist of a tent Command Post (CP), a Rigid Wall Shelter CP, a Track Vehicle CP (M1068), a 5-Ton Expanded Van CP, and an M998 HMMWV Soft Top CP. These CP facilities will provide protected work areas for command and control functions at corps through battalion levels. SICPS will be fielded as components of the Maneuver Control Systems, the Forward Area Air Defense Command and Control System, the Advanced Field Artillery Tactical Data System, the All Source Analysis System, and the Combat Service Support Control System.

CHARACTERISTICS: ***Tent CP:*** 11 ft x 11 ft with interchangeable sidewalls, any of which can be removed for combining two or more tents together; supported by a three-piece aluminum frame; fielded with two tables, two mapboards, and a fluorescent light set. The Tent CP can be attached to any of the other SICPS variants by replacing one sidewall with an interface wall. The tent is also part of the Rigid Wall Shelter (RWS), M1068, and M998 CPs.

Rigid Wall Shelter CP: Mounts on the HMMWV shelter carrier and is integrated with a 5 kW power unit, a 9,000 Btu/hr air conditioner, collective chemical/biological protection, command and control (C^2) equipment racks, power and signal import/export panels, intercom, and operator seats.

Track CP: Modification of existing M577 tracked vehicles and addition of an AM installation kit will provide C^2 equipment racks, power and signal import/export panels, operator seats, and a SICPS tent.

5-Ton Expanded Van CP: Installation kit for existing unit vehicles to provide radio and signal equipment racks, power/signal import and export panels, power and signal wiring, and one to four computer workstation racks.

M998 CP: Installation kit for existing unit vehicles to provide C^2 racks, power/signal import and export modules, and a SICPS tent.

FOREIGN COUNTERPART: No known foreign counterpart.

PROGRAM STATUS:

Tent CP:	Type Classified Standard–8 February 1990. The production contract was awarded in August 1991.
Rigid Wall Shelter CP:	A limited production contract was awarded in August 1991; technical testing is ongoing for P3I RWS.
Track CP:	A limited production contract was awarded in June 1992 .
5-Ton Expanded Van CP:	In development.
M998 CP:	In development.

POINTS OF CONTACT: Project Manager, Common Hardware/Software
Product Manager, SICPS
Ft. Monmouth, NJ 07703

CONTRACTORS: Camel (Knoxville, TN)—Tent CP
FMC (San Jose, CA)—Track CP
Brunswick Defense Div. (Marion, VA)—Rigid Wall Shelter CP (R&D)
Gichner Systems Group (Hunt Valley, MD)—Rigid Wall Shelter CP (Production)
Letterkenny Army Depot (Letterkenny, PA)—5-Ton Expanded Van CP
RDA (Tacoma, WA)—M998 CP

Trackwolf

MISSION: The AN/TSQ-152 Special Purpose Receiving System (Trackwolf) is a high-frequency (HF) sky wave, intelligence, and emitter location system. This ground-based system provides Commander, U.S. Army Europe, with an organic capability to intercept, locate, exploit, or initially target sources of threat HF voice communications. This system can be tailored extensively—from a large, fully capable mobile COMINT field station to a small, elusive, four-vehicle field configuration—to meet a wide range of mission objectives, giving early, reliable, and critical intelligence to the theater commander prior to initiation of hostilities. The Trackwolf system comprises two separate interactive subsystems: a Collection and Processing Subsystem (CPS) and a Direction-Finding Subsystem (DFS). The CPS consists of command and control, receiving system, and collection analysis shelters. The DFS consists of a Net Control Station (NCS) collocated with the CPS and three remotely located DF outstations that communicate by landline or HF radio. Trackwolf has two primary missions: signals intercept (performed by the CPS) and direction finding (performed by the DFS). The CPS is normally located in the theater rear area approximately 200 kilometers behind the Forward Line of Own Troops (FLOT). The system supports Echelons Above Corps commanders by supplying intelligence information to the theater-level All Source Analysis System (ASAS). It communicates with the ASAS at Divisions and Corps through the Single Source Processor—SIGINT (SSP-S) link.

CHARACTERISTICS: The DFS is capable of both netted Direction-Finding and Single-Station Location (SSL) operations. The CPS is modular, with all components linked together via a Fiber Optical Digital Data Local Area Network (LAN). This allows systems to be tactically sized to meet contingency operational requirements across the spectrum of conflict, ranging from Field Station operations to rapid deployment Corps operations. The hardware within the CPS is a combination of new non-developmental item (NDI) and older field station components. The software is the NDI Conventional Signal Upgrade (CSU) utilized in field stations.

FOREIGN COUNTERPART: No known foreign counterpart.

PROGRAM STATUS: Trackwolf was delivered to the field in 4QFY92. Continued materiel release was completed in 1QFY94. Procurement of a downsized Trackwolf is scheduled for FY94.

POINT OF CONTACT: Project Manager
Signals Warfare
ATTN: SFAE-IEW-SG
Vint Hill Farms Station
Warrenton, VA 22186-5116

CONTRACTOR: Technology for Communications International (Fremont, CA)

UAV-SR

UAV-SR Ground Data Terminal (GDT)

UAV-SR

Unmanned Aerial Vehicle—Short Range (UAV-SR)

MISSION: The The Unmanned Aerial Vehicle—Short Range (UAV-SR) is the baseline system for the family of UAVs. UAV-SR will provide Reconnaissance, Surveillance, and Target Acquisition (RSTA) to U.S. Army corps, divisions, and U.S. Marine Corps expeditionary brigades in excess of 150 km beyond the Forward Line of Own Troops (FLOT), day or night, and in limited adverse weather conditions. UAV-SR is intended for employment in environments where real-time information feedback is needed, manned aircraft are unavailable, or excessive risk or other conditions render use of manned aircraft less than prudent.

CHARACTERISTICS: The UAV-SR system consists of a Mission Planning Station (MPS) and two Ground Control Stations (GCS); Remote Video Terminals (RVT); eight Air Vehicles (AV), Modular Mission Payloads (MMP), Ground Data Terminals (GDT), and launch and recovery equipment. The Mission Planning and Control Station (MPCS) (the MPS and two GCSs) collects, processes, analyzes, and distributes digitized battlefield information by interfacing with present and planned Service Command, Contol, Communications, and Intelligence (C^3I) systems. Flight and mission commands are sent to the AV(s) from the MPCS. RSTA imagery and AV position data are sent by downlink either through airborne relays or directly to the MPCS or RVTs located in tactical operations centers. Mission capability will be enhanced as advanced mission payloads become available, maximizing battlefield digitization to increase the effectiveness of other weapon systems.

FOREIGN COUNTERPART: Israel has considerable experience with UAVs; however, requirements and specifications of UAV-SR make it unique.

PROGRAM STATUS: Technical Evaluation Test and Limited User Test are complete, data were evaluated by a Source Selection Review Board, and the Source Selection Authority selected Israel Aircraft Industries (IAI) and TRW as the prime contractors for the UAV-SR system. The Defense Acquisition Board approved low-rate production in February 1993, and production options for seven systems were awarded to TRW in February 1993.

POINT OF CONTACT: Program Manager
UAV-SR Project Office
ATTN: SFAE-UAV-SR
Redstone Arsenal, AL 35898-5791

CONTRACTORS: TRW (San Diego, CA)
IAI (Tel Aviv, Israel)


SONY

Win the Battlefield Information War

OVERVIEW:

The goal of the Army Science and Technology program in *Win the Battlefield Information War* is to effectively integrate military and commercial technologies by incorporating simulation and global communications. Today, both commercial and military communication capabilities must be automated and global in scope. In all future conflicts, the Army must have a seamless, worldwide exchange of information linked with local communications and sensing systems. These must be cost effective, surge capable, digitized, robust communications, that are fully integrated from space to soldier.

COMBINED ARMS COMMAND AND CONTROL (CAC^2) ATD:

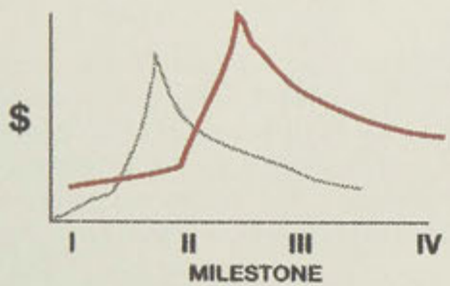
The Combined Arms Command and Control (CAC^2) Advanced Technology Demonstration (ATD) will develop and demonstrate command and control (C^2) functionality and shared situational awareness with Identification, Friend or Foe for battalion and below, including armor, aviation, mounted infantry, and fire support. Digital electronic technology will be used to provide an automated, user-friendly C^2 capability, including threat and friendly picture and target handoff for armor, infantry, aviation, and fire support platforms on the battlefield. This capability allows the C^2 element for each type of platform to have a shared view of the area of the battlefield on which they are fighting, communicate directly with the C^2 element for other types of platforms, and develop a coordinated response to threat activity in real time.

GLOBAL GRID COMMUNICATIONS ATD:

The Army Global Grid Communications program is an essential part of the DoD S&T Thrust 1, Global Surveillance and Communications. Technology will support conduct of Director, Defense Research, and Engineering ATDs on Theater Extension Net (TeNet) and Initial Integrated System. The purpose of the Army's Global Grid Communications program is to extend the Global Grid infrastructure to the tactical user and provide a worldwide, multimedia communications capability to tactical users at all echelons. Global Grid will demonstrate connectivity of communications within a theater joint task force, back to national systems, and to our allies. The approach consists of integrating existing research and development programs and technologies (e.g., local area, wide area, satellite, combat net radio) into a global architecture. The Global Grid infrastructure will make greater processing power and information from smart sources to CONUS and other allied countries directly available as multimedia services to the troops. The Army's program extends the grid to the tactical user. This program, organized and coordinated by the Office of the Secretary of Defense, involves the Services and many Government agencies, including the Advanced Research Projects Agency, Defense Information Systems Agency, and National Security Agency, and is coordinated under the auspices the of the Joint Directors of Laboratories Networks subpanel.

Battlefield Distributed Simulation – Developmental (BDS-D)

Materiel Developments



- Reduce Cost / Time

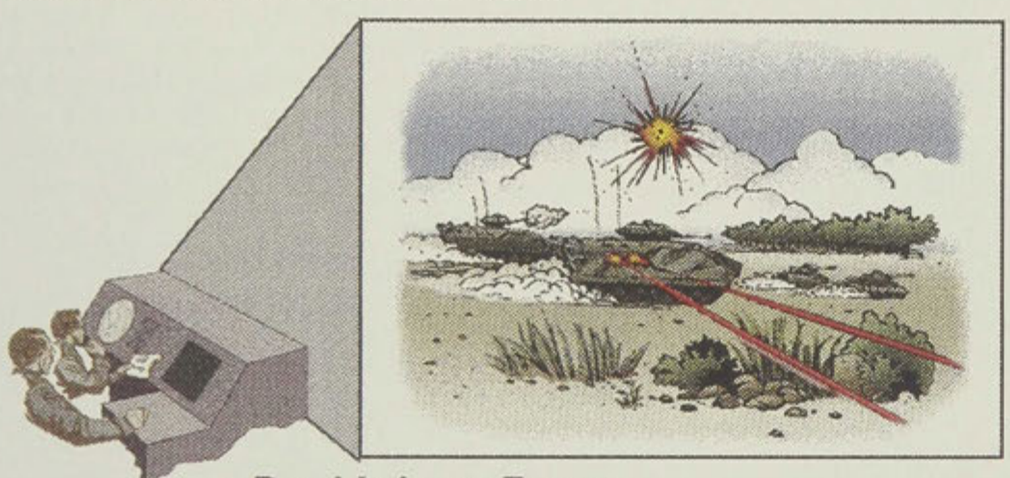
Distributed Interactive Simulation

- Open Extensible Architecture
- Computer Generated Forces
- Dissimilar Simulation Fidelity
- Data Base Standards & Protocols
- Network Security
- Modular Reuseable Designs
- Verification, Validation & Accreditation

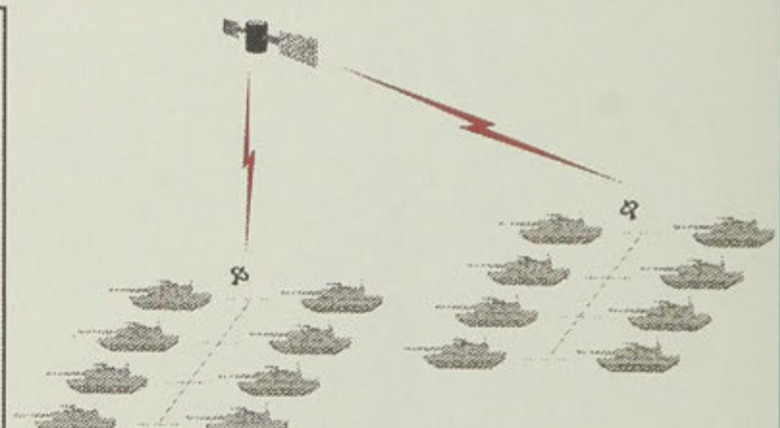
Combat Developments

Test Plus Operational Developments

Training Developments



- Provide Issue Focus



Win the Battlefield Information War (Continued)

SURVIVABLE ADAPTIVE SYSTEM (SAS) ATD:

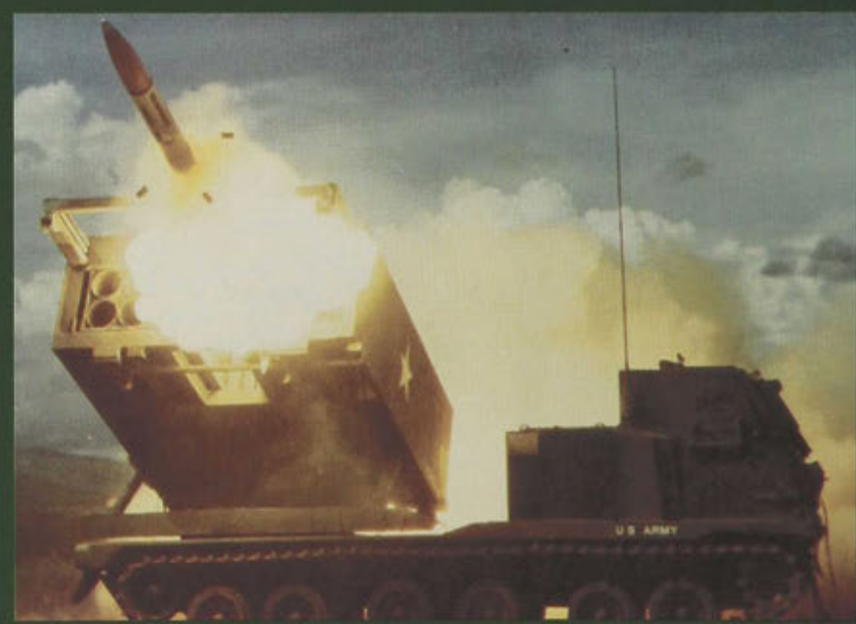
The Survivable Adaptive System (SAS) ATD will demonstrate C2-on-the-move and survivable command, control, and communications (C3) systems of various dispersed assets supported by multimedia connectivity. Through a series of demonstrations, SAS will show enhanced system survivability by merging advanced communications technology (wireless Extremely High Frequency Local Area Networks, high-capacity fiber optics, and automated gateways) with distributed processing technology (e.g., automated network management and multifunction host capability). The objectives are to support expanded command post dispersion and complement common user systems to provide long-haul interechelon connectivity.

BATTLEFIELD DISTRIBUTED SIMULATION—DEVELOPMENTAL (BDS-D) ATD:

The Battlefield Distributed Simulation—Developmental (BDS-D) ATD is established to define and demonstrate an accredited, Version 2.0-standard, system-design architecture required for achieving a real-time, warfighter-in-the-loop, wide area network virtual simulation capability for synchronously linking geographically separated simulators' sites in a combined arms battalion-level, synthetic battlefield environment. The synthetic battlefield environment will be extensively used by the Army's Louisiana Maneuvers, Training and Doctrine Command (TRADOC) Battle Labs, two Army laboratories, and research, development, and engineering centers for the early examination and testing of science and technology concepts, tactics/doctrine, procedures, system upgrades, and next generation/future systems. The ATD deliverables are: (1) soldier-to-battalion task-force level, real-time combined arms battlefield; (2) functional, logical, and temporal interfacing of dissimilar simulators and simulations with different fidelity levels and from different manufacturers; (3) methods and computational approach for fully functional computer-generated forces of both friendly and opposing forces; and (4) addition of night, weather, obscurants, electromagnetic and infrared signatures and effects, dynamic, interactive terrain, and special effects technology. BDS-D ATD technology will transition to the Army's two-pronged distributed interactive simulation strategy in support of acquisition and training, identified as the BDS-D Version 1 and Combined Arms Tactical Trainer (CATT) programs.

Conduct Precision Strikes Throughout the Battlefield

The Army will locate, attack, and destroy the threat's capability to wage war well in advance of friendly lines. This requires precision deep attacks against threat maneuver formations and his logistical and command lines of communication while simultaneously denying him safe sanctuaries. Paramount to achieving this objective are: real-time, near-perfect intelligence, coupled with concentrated, coordinated strikes by weapon systems using smart and brilliant munitions.



Life Cycle Management Model

Joint Precision Strike Demonstration (JPSD)

Radar Deception and Jamming (RD&J) ATD

Multi-Sensor Aided Targeting—Air (MSAT–Air) ATD

Rotorcraft Pilot's Associate (RPA) ATD

Common Ground Station (CGS) ATD

Advanced Field Artillery System (AFAS) and Future Armored Resupply Vehicle (FARV)

Brilliant Anti-Armor Submunition (BAT)

Joint Surveillance Target Attack Radar System (Joint STARS) Ground Station Module (GSM)

Extended Range Multiple Launch Rocket System (ER-MLRS)

Sense and Destroy Armor (SADARM)

Army Tactical Missile System (Army TACMS)

Multiple Launch Rocket System (MLRS)

Special Operations Aircraft (SOA)

M109A6 Self-Propelled Howitzer (Paladin)

Advanced Field Artillery System and Future Armored Resupply Vehicle

Advanced Field Artillery Systems (AFAS) and Future Armored Resupply Vehicle (FARV)

MISSION: The Advanced Field Artillery System (AFAS) and Future Armored Resupply Vehicle (FARV) are the Army's next generation indirect fire cannon and artillery resupply systems for the heavy force. Together, these systems will provide an overmatching fire power capability that will support the force commander's goal of dominating the maneuver battle. AFAS and FARV will incorporate advanced technologies to increase accuracy, rate of fire, survivability, mobility, and ammunition handling speed, and to decrease crew size. When fielded, these systems will displace the M109A6 Paladin self-propelled Howitzer and M992 Field Artillery Ammunition Supply Vehicle in Force Package I units.

CHARACTERISTICS:

	AFAS		***FARV***
Range:	40+ km (assisted)	Automated rearm:	12 rds/min
Rate of fire:	12 rds/min	Automated refuel:	35-50 gal/min
Ammo storage:	60 rds	Ammo storage:	30-200 rds
Crew:	3 (operable by 1)	Crew:	3

Multiple round simultaneous impact:	4 rds from a single AFAS
Range:	465 km
Speed:	40 mph highway; 30 mph cross-country

FOREIGN COUNTERPART: No known foreign counterpart.

PROGRAM STATUS: In 1991, the Army selected liquid propellant (LP) as the propellant of choice for its 21st century artillery weapon system. In 1992, the Army successfully completed LP firings at Yuma Proving Ground, demonstrated fuze and projectile compatibility, demonstrated high output and quality LP manufacturing process, and successfully demonstrated the firing of a single, four-function, Multi-Option Fuze for Artillery. In FY94, the Army will continue howitzer technology development efforts in Regenerative Liquid Propellant Gun technology, extended range armament, extended range accuracy, advanced fire control, and automated ammunition handling, as well as work in other key technologies necessary to meet Milestone I requirements for both AFAS and FARV. FARV-specific rearm technology development activities began in FY93 and are scheduled to conclude in FY95.

POINTS OF CONTACT:

Project Manager	Project Manager
AFAS	FARV
ATTN: SFAE-ASM-AF	ATTN: SFAE-ASM-FR
Picatinny Arsenal, NJ 07806	Picatinny Arsenal, NJ 07806

CONTRACTORS:
FMC, Ground Systems Div. (San Jose, CA)
Olin (Charleston, TN)
Thiokol (Elkton, MD)
Alliant (Edina, MN)
GE Aerospace (Burlington, VT)
GE Aerospace (Pittsfield, MA)

Army Tactical Missile System (Army TACMS)

MISSION: The Army Tactical Missile System (Army TACMS) and Improved Army TACMS provide deep fire missile systems that operate in near all-weather conditions, day or night. They are air transportable and capable of effectively engaging high-priority targets at ranges beyond the capability of cannons and rockets. Army TACMS is used to attack tactical surface-to-surface missile sites, air defense systems, logistics elements, and command/control/communications complexes.

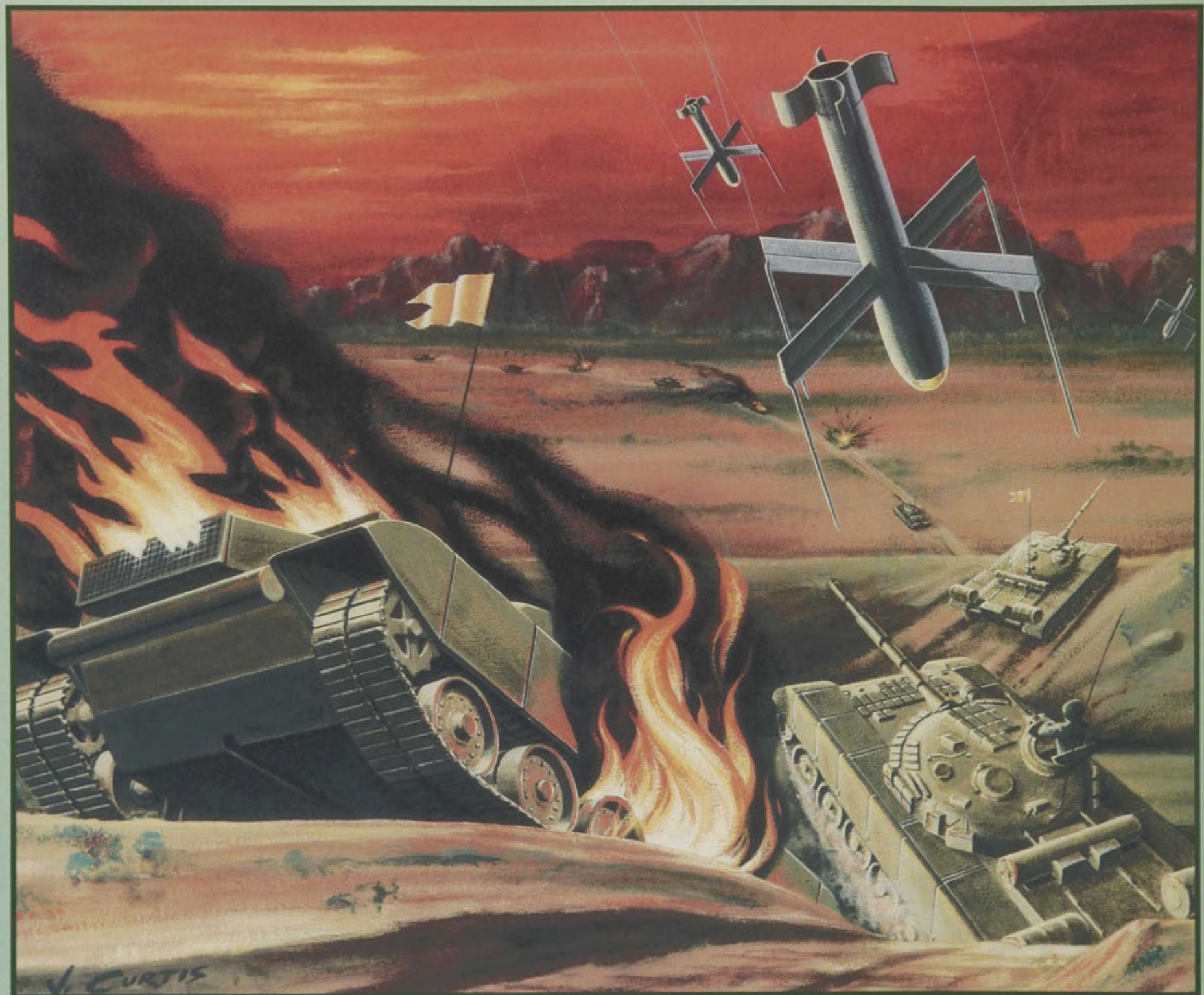
CHARACTERISTICS: Army TACMS and Improved Army TACMS are ground-launched missile systems consisting of a surface-to-surface guided missile with an anti-personnel/anti-materiel (APAM) warhead configuration. The Improved Army TACMS, with enhanced GPS accuracy, will have approximately twice the range of the Army TACMS. Army TACMS missiles are fired from the Multiple Launch Rocket System (MLRS) modified M270 launcher and are being deployed within the ammunition loads of corps MLRS battalions and/or division artillery MLRS batteries. Army TACMS includes Guided Missile and Launching Assembly; M39; Trainer, Launch Pad Container: M68; Training Set, Guided Missile System: M165; Trainer, Test Device, Guided Missile: M78; Modified M270 Launcher; and the Army TACMS Missile Facilities.

FOREIGN COUNTERPART: Russia: SCUD variants; SS-21
Israel: Jericho

PROGRAM STATUS: In December 1993, a contract was awarded for 255 missiles, Full-Rate Production (FRP) IV. Army TACMS is currently in its third year of FRP. The current Procurement Objective for all variants is 3,047 missiles. Army TACMS is the first weapon system to be fielded in the modernization program for a "system of systems" deep fires suite, and it saw combat action in Southwest Asia during Desert Storm. The modifications to be cut into production for the Improved Army TACMS will be fully developed during the Engineering and Manufacturing Development phase, to begin in FY94.

POINT OF CONTACT: Project Manager
Army TACMS
ATTN: SFAE-MSL-AT
Redstone Arsenal, AL 35898-5650

CONTRACTOR: Loral Vought Systems (Dallas, TX)


V. CURTIS

Brilliant Anti-Armor Submunition (BAT)

MISSION: The Brilliant Anti-Armor Submunition (BAT) is a self-guided submunition that uses two sensors: acoustic and infrared. It autonomously locates, attacks, and destroys moving tanks and other armored vehicles. It is this autonomous capability that makes this submunition "brilliant." BAT submunitions can be carried deep into enemy territory by a delivery vehicle, then dispersed over a target to selectively attack and destroy it.

CHARACTERISTICS:

Length:	36 in
Diameter:	5.5 in
Weight:	44 lbs
Seekers:	Acoustic and infrared
Payload:	Tandem-shaped warhead
Guidance:	Autonomous
Delivery vehicles:	Army Tactical Missile System (Army TACMS)—Block II

FOREIGN COUNTERPART: No known foreign counterpart.

PROGRAM STATUS: BAT is in the Engineering and Manufacturing Development (EMD) phase. The BAT system was approved by the Defense Acquisition Executive for entry into EMD on 5 June 1991. The program was initiated in 1985 and has matured under extensive development and testing. (These efforts have successfully demonstrated the system's capability to autonomously acquire, track, and impact moving armor targets with the necessary accuracy and lethality.) As a result of the decision to terminate the Army's participation in the Tri-Service Standoff Attack Missile (TSSAM) program, the BAT program is currently restructuring with Army TACMS—Block II as the carrier.

POINT OF CONTACT:

Project Manager
BAT
ATTN: SFAE-MSL-XB
Redstone Arsenal, AL 35898-7998

CONTRACTORS:

Northrop (Hawthorne, CA)
Raytheon (Manchester, NH)
Physics International (San Leandro, CA)
Motorola (Scottsdale, AZ)
Versatron (Healdsburg, CA)
Systron Donner (Concord, CA)
Eagle Picher Industries (Joplin, MO)
EG&G Power Systems (Covina, CA)
Pioneer Aerospace (South Windsor, CT)

Joint STARS GSM, Light

Joint STARS GSM, Medium

Joint STARS GSM, Heavy

Joint Surveillance Target Attack Radar System (Joint STARS) Ground Station Module (GSM)

MISSION: The Joint Surveillance Target Attack Radar System (Joint STARS) provides tactical air and ground commanders with near real-time wide area surveillance and deep targeting data on both moving and fixed targets during daylight and darkness in near all-weather conditions to detect, locate, track, classify, and assist in attacking targets beyond the Forward Line of Own Troops (FLOT). Joint STARS is a joint Air Force/Army program. Orbiting a safe distance on the friendly side of the FLOT, the Joint STARS radar scans a wide area out to great depths on the battlefield. The radar data are simultaneously received by Air Force and Army operators aboard the aircraft and are downlinked in near real-time to multiple Ground Station Modules (GSM) at Echelons Above Corps, Corps, Corps Artillery, Division, Division Artillery, Armored Cavalry Regiment, and Separate Brigade.

CHARACTERISTICS: The GSM is a mobile, tactical, multi-sensor ground station that receives, displays, processes, and disseminates targeting information. The GSM is being developed utilizing a block approach. The Block I GSM will be produced in two variants: a medium version mounted on a 5-ton truck, and a light version mounted on an HMMWV. The Block II GSM will be the Common Ground Station (CGS), which will also be produced in two versions: a light version on an HMMWV, and a heavy version mounted on the Command and Control Vehicle (C^2V), a Bradley variant. The CGS will be a key node on the digitized battlefield, receiving multiple national, theater, and tactical sensor inputs. The Airborne Platform is a USAF E-8 (Militarized Boeing 707) with multimode radar (wide area surveillance and synthetic aperture), 18 operation and control consoles, a surveillance and control data link, and secure communications.

FOREIGN COUNTERPART: British Astor (airborne radar on Pilatus Britten-Norman Defender aircraft); French Horizon (airborne radar on Aerospatiale Super Puma helicopter). GSM is interoperable with both.

PROGRAM STATUS: The Joint STARS GSM is in the Engineering and Manufacturing Development phase. Five Interim GSMs (IGSM) are being fielded to contingency forces. A successful Defense Acquisition Board was held on 23 July 1993 that resulted in the approval of a Low-Rate Initial Production of 12 medium GSMs and also accelerated the CGS program by four years. The system performed with great success in Operation Desert Storm from January to March 1991. The major contribution of Joint STARS to the overall success of the operation prompted the Army Central Command (ARCENT) Deputy Chief of Staff for Intelligence to state that Joint STARS was the single most valuable intelligence and targeting system in Desert Storm.

POINT OF CONTACT:
Army Project Manager
Joint STARS
ATTN: SFAE-IEW-JS
Ft. Monmouth, NJ 07703-5304

CONTRACTORS:
Motorola (Scottsdale, AZ)
Grumman (Melbourne, FL)
Hughes Simulation Systems (Minneapolis, MN)
CUBIC Defense Systems (San Diego, CA)
Norden Systems Div. of United Technologies (Norwalk, CT)

Multiple Launch Rocket System (MLRS)

MISSION: The primary missions of the Multiple Launch Rocket System (MLRS) are counterfire and suppression of enemy air defenses, light materiel, and personnel targets. The MLRS is a free-flight, area fire, artillery rocket system that supplements cannon artillery fires by delivering large volumes of firepower in a short time against critical, time-sensitive targets. The basic warhead carries improved conventional submunitions. A growth program is underway to add the Sense and Destroy Armor (SADARM) warhead to improve counterbattery fires. The MLRS M270 launcher is being updated to accommodate launching a new MLRS family of munitions (MFOM), including the Army Tactical Missile System (Army TACMS).

CHARACTERISTICS:

Length:	6,832 mm	Width:	2,972 mm
Weight:	24,756 kg	Range:	483 km
Average speed:	40 kph	Max speed:	56 kph
Crew:	3		

FOREIGN COUNTERPART: Similar Multiple Launch Rocket Systems exist that have a broad range of capabilities, some of which are similar to MLRS.

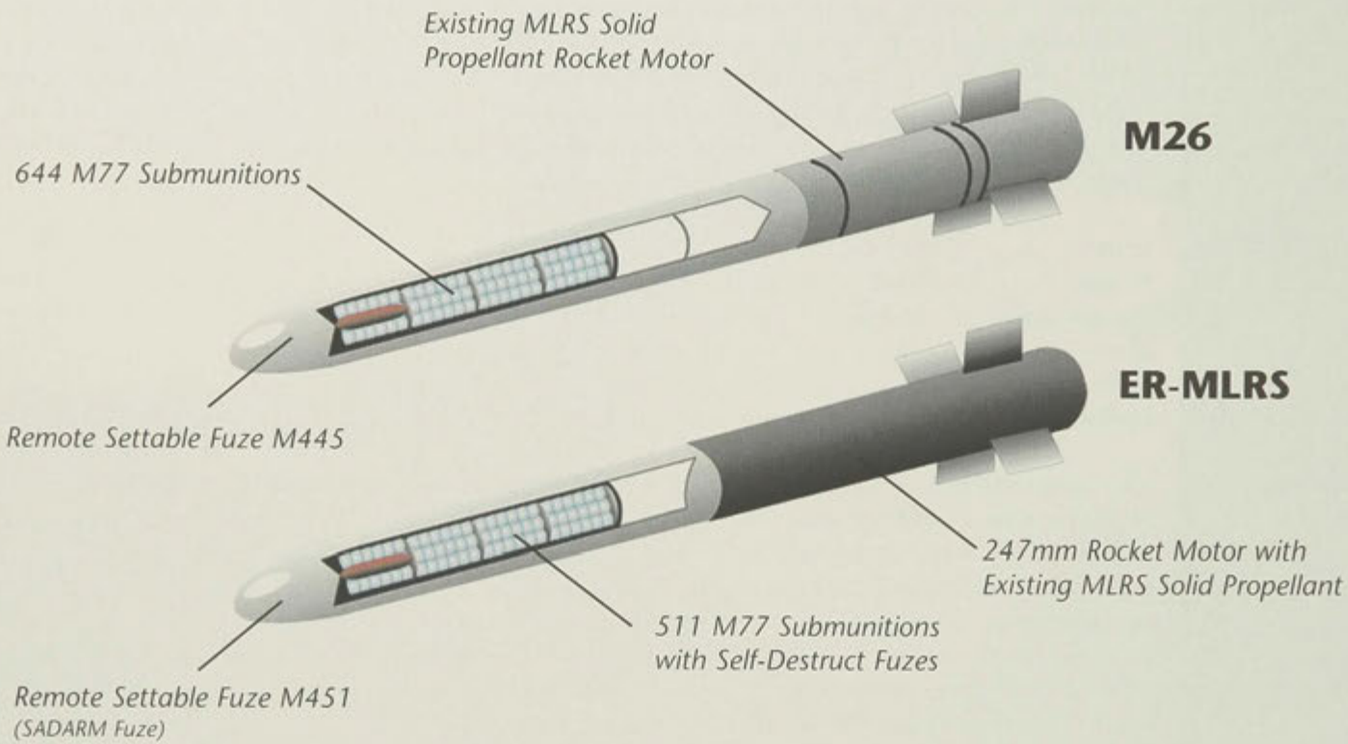
PROGRAM STATUS: The second multiyear procurement contract for FY89–93 was awarded in July 1989 for MLRS. The U.S. initial operational capability for MLRS was achieved in 1983. Starting in FY89, MLRS has been coproduced by the United States, United Kingdom, Germany, France, and Italy. As of November 1993, a total of 727 launchers have been delivered, 610 to the active Army and 117 to the National Guards, foreign military sales, and other. Current plans for improvement to the system include the improved fire control system (IFCS) and the extended range rocket (ER-MLRS). The IFCS will mitigate electronic obsolescence currently existing in the fire control system and will accommodate the needs of the MFOM weapon systems under development and provide growth for future weapon systems. The ER-MLRS will extend the current range of the basic rocket from 31.8 km to a new range of approximately 50 km. Both IFCS and ER-MLRS are in the Engineering and Manufacturing Development phase.

POINT OF CONTACT:

Project Manager
MLRS
ATTN: SFAE-MSL-ML
Redstone Arsenal, Al 35896

CONTRACTORS:

Loral Vought Systems (Dallas, TX)
Brunswick (Camden, AR)
Norden Systems (Norwalk, CT)
Norris Industries (Los Angeles, CA)
Atlantic Research (Camden, AR)
Bendix (Teterboro, NJ)



Extended Range Rocket versus Basic System Rocket

Extended Range Multiple Launch Rocket System (ER-MLRS)

MISSION: The Extended Range Multiple Launch Rocket System (ER–MLRS) is a free-flight, area fire, artillery rocket designed to complement the capabilities of the MLRS. Its mission is to engage targets beyond the range of the existing MLRS up to 50 kilometers. The development program includes the addition of a low-level wind measuring device on the M270 launcher to enhance accuracy and effectiveness, and the incorporation of a self-destruct fuze on the submunitions to increase safety for friendly maneuver forces.

CHARACTERISTICS:
Warhead: Dual-Purpose Improved Conventional Munitions (DPICM)
Propulsion: Solid

FOREIGN COUNTERPART: Several foreign multiple launch rocket systems have a range of 50 km or greater.

PROGRAM STATUS: Following 11 successful firings during an Independent Research and Development program and a Milestone II review, the program entered the Engineering and Manufacturing Development phase in November 1992. The successful hardware Preliminary Design Review held in June 1993 resulted in a decision that the design was mature enough to support 12 actual early flights of production-like variants in May-July 1994. The funded R&D program is on schedule with no technical difficulties.

POINT OF CONTACT:
Project Manager
Multiple Launch Rocket System
ATTN: SFAE-MSL-ML
Redstone Arsenal, AL 35898-5650

CONTRACTORS:
Loral Vought Systems (Dallas, TX)
Raytheon (Tewksbury, MA)

M109A6 SELF-PROPELLED HOWITZER (PALADIN)

MISSION: Like the earlier M109 models, the Paladin (M109A6) will provide the primary indirect fire support to the maneuver brigades of armor and mechanized infantry divisions. The M109A6 includes an onboard ballistic computer and navigation system, secure radio communications, an improved cannon and gun mount, automatic gun positioning, automotive improvements, improved ballistic and nuclear-biological-chemical protection, driver's night vision capability, and built-in test equipment. The Paladin has improved responsiveness, survivability, lethality, and reliability.

CHARACTERISTICS:

Range:	30 km (with rocket-assisted projectile) 24 km (with unassisted projectiles)
Rate of fire	
Maximum:	4 rds/min for 3 min
Sustained:	1 rd/min
Main armament:	M284 155mm cannon
Secondary armament:	.50 caliber machine gun
Weight:	32 tons (combat loaded)

FOREIGN COUNTERPART:

United Kingdom:	AS90
France:	155 GCT
Germany:	PzH 2000
Israel:	Slammer

PROGRAM STATUS: Low-rate production began in September 1991 and achieved a First Unit Equipped in June 1993. A full-rate production contract was awarded in April 1993. The Army will acquire 824 Paladins as a product improvement of the current M109A2/A3 howitzer. The balance of the M109 howitzer fleet will receive the M109A5 upgrade, which includes some automotive and crew nuclear-biological-chemical protection improvements and Paladin's M284 cannon.

POINT OF CONTACT:

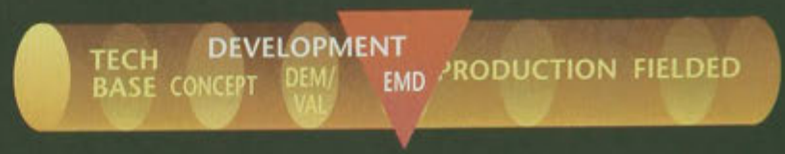
Product Manager
Paladin
ATTN: SFAE-AR-HIP
Picatinny Arsenal, NJ 07806-5000

CONTRACTORS:

FMC (Chambersburg, PA)—Full-Rate Production
BMY (York, PA)—Low-Rate Production
General Electric (Burlington, MA),
Honeywell (Clearwater, FL)
Alliant (Minneapolis, MN)
Carrier (Ft. Washington, PA)

The SADARM System

Sense and Destroy Armor (SADARM)



MISSION: Sense and Destroy Armor (SADARM) is a comparatively low-cost, fire-and-forget, sensor-fuzed submunition designed to detect and destroy lightly armored vehicles, primarily self-propelled artillery. SADARM is delivered to the target area by 155mm artillery projectiles or by the Multiple Launch Rocket System (MLRS). Once dispensed from its carrier, the submunition detects targets using dual-mode millimeter wave and infrared sensors and fires an explosively formed penetrator through the top of the target.

CHARACTERISTICS:

	155mm	***MLRS***
Caliber:	5.8 in	6.9 in
Weight:	26.4 lbs	30.8 lbs
Range:	22.5 km*	30 km**
Number of submunitions:	2/rd	6/rocket

* from M109A6 howitzer
**from M270 MLRS launcher

FOREIGN COUNTERPART: Russia is developing a SADARM-like weapon for application to both cannon artillery and rockets.

PROGRAM STATUS: SADARM entered the Engineering and Manufacturing Development phase in March 1988 and is scheduled for a low-rate production decision in December 1995. SADARM is scheduled to be fielded in FY98 in 155mm and in FY99 in MLRS.

POINT OF CONTACT: Project Manager
Sense and Destroy Armor
ATTN: SFAE-AR-SD
Picatinny Arsenal, NJ 07806-5000

CONTRACTORS: Aerojet (Azusa,CA)
Loral Vought Systems (Grand Prairie,TX)

MH-47E

MH-60K

Special Operations Aircraft (SOA)

MISSION: The Special Operations Aircraft (SOA) are modified Black Hawk (UH-60L) and medium-lift Chinook (CH-47D) helicopters that will provide the U.S. Special Operations Command with the capability for low-level, night, adverse weather, extended range, and precision navigation through unfamiliar mountainous terrain. Both the utility and medium-lift version (designated MH-60K and MH-47E, respectively) will be provisioned with extended range fuel systems, including an aerial refueling capability, upgraded engines, and worldwide communications equipment. Additional improvements include a totally integrated cockpit, improved terrain following/terrain avoidance radar, and forward-looking infrared imaging capability. SOA missions cover rapid deployment, strategic intelligence strikes, and other operational missions supported by the Special Operations Forces.

CHARACTERISTICS:

	MH-60K	***MH-47E***
Mission weight:	24,500 lbs	54,000 lbs
Cruise speed:	145 kts	147 kts
Endurance*:	7.6 hrs	9.8 hrs
Max self-deployment range*:	755 nm	1,260 nm
Crew:	4	5
Payload:	12 troops	44 troops
Armament:	2–7.62 mm (M134) machine guns	2–7.62 mm (M134) machine guns

*unrefueled with 30-minute reserve; however, also has air-to-air refuel capability

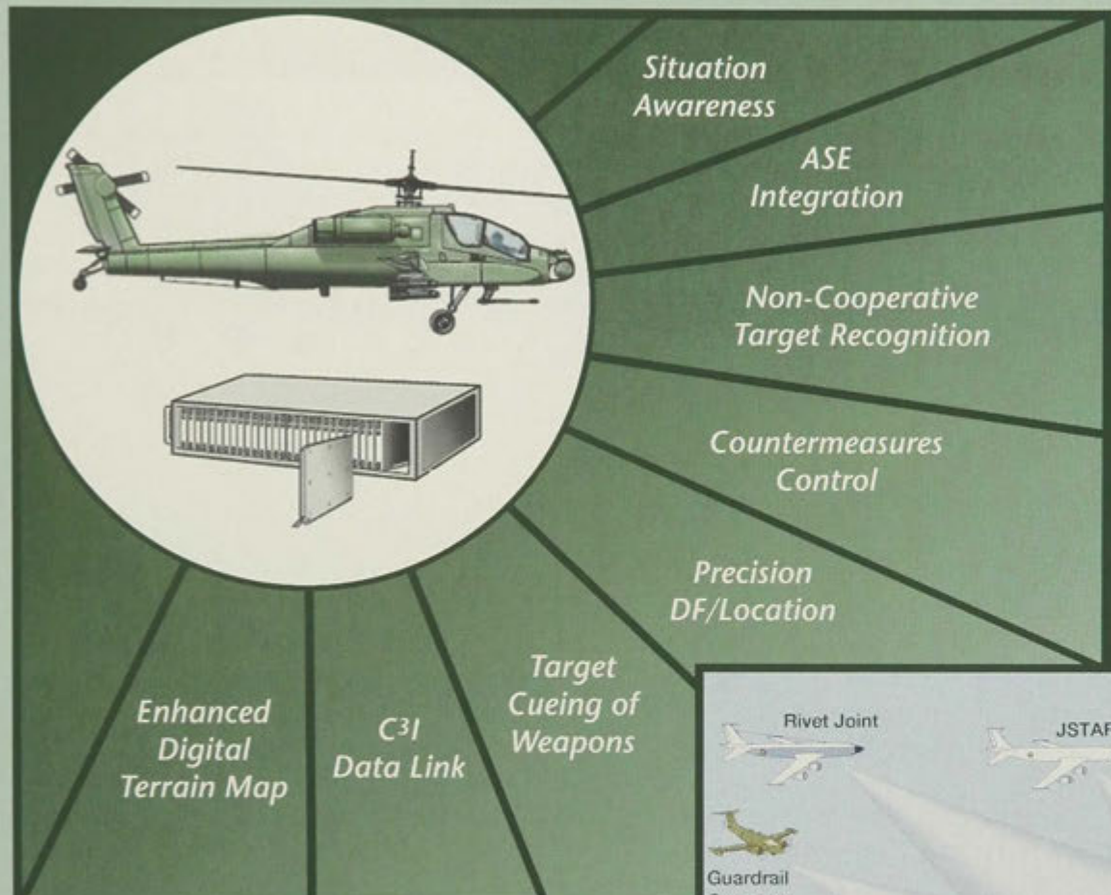
FOREIGN COUNTERPART: At this time, there are no foreign helicopters equivalent to the MH-60K or MH-47E or performing similar missions. A number of foreign helicopters could be modified for SOA-type missions. Listed are foreign helicopters capable of performing reconnaissance, early warning, and search and rescue missions.

Russia		***United Kingdom***	***Others***	
MI-8 (HIP)	KA-27PS	MK2 (Commando)	SA342 (France)	MI-2 (Poland)
MI-26 (HALO)	MI-17	LYNX	SA330 (France)	W-3 (Poland)
MI-14PS	MI-38	EH-101	A-109 (Italy)	NH-90 (four countries)

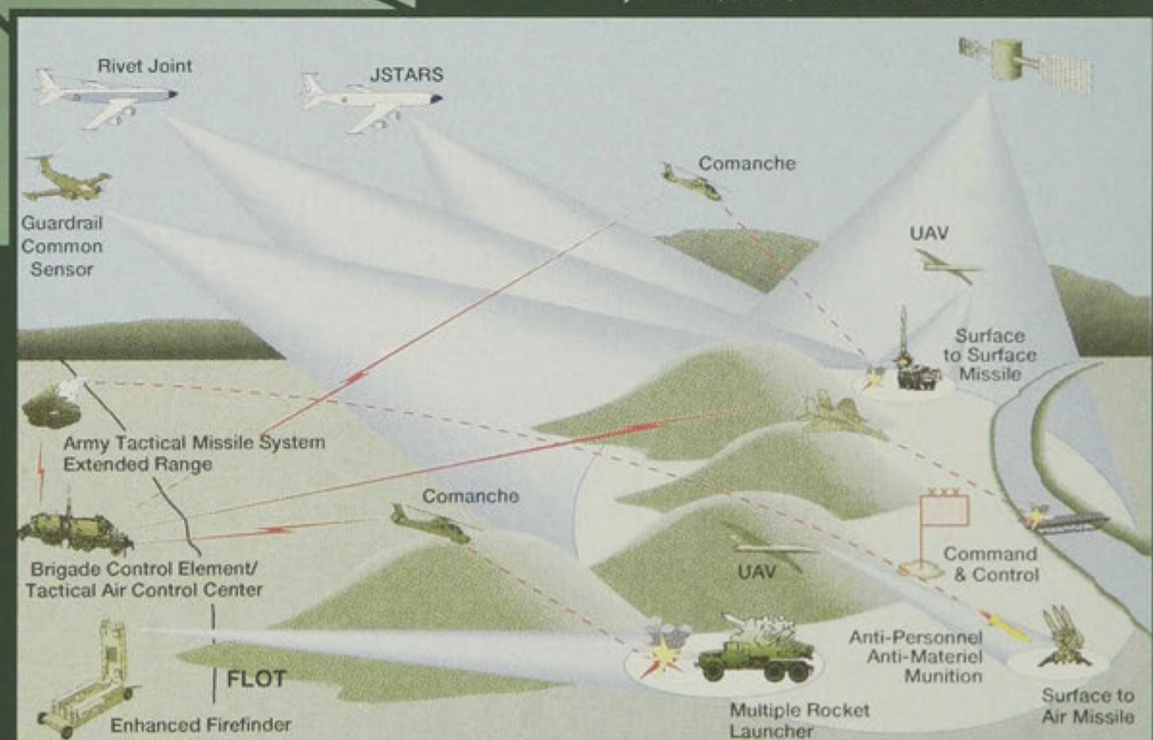
PROGRAM STATUS: The MH-60K and MH-47E have entered initial production, verification testing, and training. Full Materiel Release of these aircraft is scheduled during 2QFY96. The SOA program will provide 23 MH-60K and 26 MH-47E aircraft.

POINT OF CONTACT:
Project Manager
Special Operations Aircraft (SOA)
ATTN: SFAE-AV-SOA
St. Louis, MO 63120-1798

CONTRACTORS:
Boeing Helicopter (Philadelphia, PA)
IBM (Owego, NY)
Sikorsky (Stratford, CT)



Radar Deception and Jamming—ATD



Joint Air/Land/Sea Precision Strike Demo

Conduct Precision Strikes Thoughout the Battlefield

OVERVIEW:

The goal of the Army Science and Technology program in ***Conduct Precision Strikes Throughout the Battlefield*** focuses on producing advanced technologies to improve accuracy, range, mobility, targeting, radar deception, survivability, and lethality while decreasing training and logistics burdens. The Army, both independently and in a joint warfighting environment, must be able to conduct integrated, adverse weather, day/night, end-to-end, sensor-to-shooter precision fires against highly agile enemy forces in minutes. Integrated surveillance, target acquisition, and processing with precision weapons are essential for rapid response execution against high-value, short-dwell targets over extended ranges.

JOINT PRECISION STRIKE DEMONSTRATION (JPSD):

The objective of the Army's Joint Precision Strike Demonstration (JPSD) is to develop and demonstrate an adverse weather, day/night, end-to-end, sensor-to-shooter precision strike capability against high-value, short-dwell targets at extended range within tactically meaningful time lines (minutes, not hours or days). An evolutionary approach will be used to achieve this advanced capability by a series of demonstrations scheduled to build on the Army's current precision strike capability, such as the Army Tactical Missile System (Army TACMS). These demonstrations will address deficiencies in wide-area surveillance, target acquisition, strike planning, weapon systems delivery, and battle damage assessment. The FY94 demonstration will emphasize surface-to-surface weapon systems. There will be a combination of live and simulated sensors, command and control systems, and weapons in this demonstration, including the live firing of two product-improved Army TACMS missiles against scud-like targets prior to launch. The C4I architecture used in the scenario will drive toward a seamless process of linking sensors to shooters, thus allowing the ground force commander an opportunity to apply the targeting doctrine of decide, detect, and deliver to the precision strike process. Lessons learned from this demonstration will be applied in the FY95 precision strike demonstration scenario. The JPSD demonstration process to reduce precision strike time lines and to improve accuracy and effectiveness includes leveraging of the Training and Doctrine Command (TRADOC) Battle Labs to define doctrine, tactics, techniques, and procedures.

RADAR DECEPTION AND JAMMING (RD&J) ATD:

This Advanced Technology Demonstration (ATD) will demonstrate enhanced aircraft survivability and lethality through the integration of avionics and advanced aircraft survivability equipment (ASE) sensors. Fusion of avionics and ASE sensor data will provide a consolidated sensor report to a knowledge-based expert system for situational assessment and response planning. Operationally, the Radar Deception and Jamming (RD&J) system will permit the air crew to avoid or engage threats, assist in identification of friend or foe, reduce weapon systems time to target, and optimize countermeasure deployment against enemy air defense assets. Key developments and technologies from RD&J will be provided to the Rotorcraft Pilot's Associate and Joint Precision Strike programs.

Multi-Sensor Aided Targeting (AIR)

Conduct Precision Strikes Thoughout the Battlefield (Continued)

MULTI-SENSOR AIDED TARGETING—AIR (MSAT–AIR) ATD: This ATD will demonstrate economical fusion of multiple sensor and processor modules with advanced algorithms in an automated target acquisition suite, seeking maximum commonalty between future air and ground applications. The demonstration will be a real-time, fully operational, flying testbed emulation of the RAH-66 target acquisition system evaluated under simulated battlefield conditions. Flight evaluations will be augmented through full mission simulations. The ATD will synergistically process target features from various sensors, such as second generation thermal imager, millimeter wave radar, laser radar, and other devices, to establish the optimal combination of sensors to meet the automatic target recognition requirements of aviation weapon systems.

ROTORCRAFT PILOT'S ASSOCIATE (RPA) ATD: The Rotorcraft Pilot's Associate (RPA) ATD will enhance rotorcraft fightability and revolutionize combat helicopter mission effectiveness. It focuses on critical pilotage and mission management technologies, including the use of artificial intelligence/expert systems to optimize crew workload; advanced command and control techniques necessary to meet new mission requirements and situational awareness needs; advanced pilotage sensors, displays, and controls; and advanced weapon systems to support both air-to-air and air-to-ground engagements. The ATD technology deliverables, as applied to the development of DoD/Army rotorcraft, will contribute greatly to the pilot's ability to "see and comprehend the battlefield" in all conditions; rapidly collect, synthesize, and disseminate battlefield information; and take immediate and effective actions. Measures of performance beyond a "Comanche-like" baseline during day/night, clear and adverse weather include the following: reduction in mission losses by 30 to 60 percent, increased targets destroyed by 50 to 150 percent, and reduction in mission time lines by 20 to 30 percent. Projected plans for transition include support of the RAH-66 Comanche, AH-64 Apache Improved, Special Operations Aircraft (SOA), DoD/Army System Upgrades, and potential future systems beyond 2000.

COMMON GROUND STATION (CGS) ATD: The Common Ground Station (CGS) ATD will demonstrate the receiving, processing, and displaying of multi-spectral intelligence information and the dissemination of intelligence products. The ATD has two specific technology objectives. The first is to simulate a rapid prototype of a new intelligence operational asset to provide near real-time "intel-on-the-move" and "on-demand" for a brigade commander. The second objective is to select, through conceptual rapid prototyping, open architecture hardware and software modules. The rapid prototype will integrate "on-the-move" conformal antenna technologies. The ATD will support the DoD Joint Precision Strike Thrust demonstrations as well as provide the risk reduction baseline necessary to continue into the Engineering and Manufacturing Development phase.

Dominate the Maneuver Battle

Advanced weapon systems and technology will continue to proliferate around the world. To ensure swift, decisive victory, with minimal casualties, the Army combined arms force must be able to outmaneuver and outshoot potential adversaries, consistently engaging them with coordinated fires from unexpected directions and unmatched ranges, day and night. This requires such capabilities as "owning the night," superior situational awareness, and compatible digital data exchange.

Life Cycle Management Model

TECH BASE

- Rapid Force Projection Initiative (RFPI) TDL
- Advanced Vehicle Technologies (AVT) ATD
- Anti-Armor (A^2) ATD
- Target Acquisition ATD

CONCEPT

- Line-of-Sight Antitank (LOSAT)

DEM/VAL

- Breacher

EMD

- Bunker Defeat Munition (BDM)
- Close Combat Tactical Trainer (CCTT)
- Heavy Assault Bridge (HAB)
- Longbow
- Longbow HELLFIRE Missile

PRODUCTION

- Apache
- 40mm Automatic Grenade Launcher (MK19-3)
- Heavy Equipment Transporter System (HETS)
- Mortar (120mm)
- HELLFIRE II Missile
- Night VIsion (NV) and Electro-Optics
- Tank Main Gun Ammunition

FIELDED

- Abrams Tank
- Air-to-Ground Missile System (AGMS)
- Armored Combat Earthmover (ACE)
- Bradley Fighting Vehicle System (BFVS)
- M113 Family of Vehicles System (FOV)
- M119A1 Howitzer
- Recovery Vehicle
- Rifle (M16A2)
- Squad Automatic Weapon (SAW)
- TOW Weapon System

Abrams Tank

MISSION: The mission of the Abrams tank is to close with and destroy enemy forces on the integrated battlefield using mobility, firepower, and shock effect. The 105mm main gun on the M1 and IPM1 and the 120mm main gun on the M1A1, combined with the powerful 1,500 HP turbine engine and special armor, make the Abrams particularly suitable for attacking or defending against large concentrations of heavy armor forces on a highly lethal battlefield. Additional features of the M1A1 are increased armor protection, suspension improvements, and an NBC protection system that provides additional survivability in a contaminated environment. The M1A2 development program builds on the M1A1 to provide an Abrams tank with the necessary improvements in lethality, survivability, and fightability required to defeat advanced threats. Improvements being developed for the M1A2 include a Commander's Independent Thermal Viewer, an Independent Commander's Weapon Station, Position Navigation equipment, a distributed data and power architecture, and a Radio Interface Unit that allows, through the SINCGARS radio, rapid transfer of situational data and overlays to compatible systems on the digital battlefield.

CHARACTERISTICS:

	M1/IPM1	*M1A1*	*M1A2*
Length:	32.04 ft	32.25 ft	32.25 ft
Width:	12.0 ft	12.0 ft	12.0 ft
Height:	7.79 ft	8.0 ft	8.0 ft
Top speed:	45.0 mph	41.5 mph	41.5 mph
Weight:	60 tons	67 tons	68.9 tons
Armament:	105 mm	120 mm	120 mm
Crew:	4	4	4

FOREIGN COUNTERPART: There are numerous main battle tanks throughout the world, such as the British Challenger, the German Leopard, the French Leclerc, and the Russian-developed T-64, T-72, and T-80, that are in the same class as the Abrams series tanks.

PROGRAM STATUS: Production of M1A1 tanks for the U.S. Army is complete. Low-rate production of the M1A2 tank is essentially complete with 61 of 62 new M1A2 tanks accepted by the Army. The final U.S. M1A2 will be tested in March 1994. Abrams tanks will continue to be produced for Foreign Military Sales. The M1A2 tank continues Technical and Operational testing. In lieu of new production, the Army has initiated an Abrams upgrade program to convert approximately 1,000 older M1 tanks to the M1A2 configuration. This program received approval from the Office of the Secretary of Defense on 18 December 1992. A Milestone III decision review is scheduled for May 1994 to approve the M1A2 configuration for the upgrade program.

POINT OF CONTACT: Project Manager
Abrams Tank System
ATTN: SFAE-ASM-AB
Warren, MI 48397-5000

CONTRACTOR: General Dynamics (Sterling Hts, MI)


U.S. ARMY

Air-to-Ground Missile System (AGMS) (Formerly HELLFIRE)

MISSION: AGMS is a family of four generations of HELLFIRE airborne anti-armor weapons. The missile configuration has the capability for modular seeker replacements. The first three generations of HELLFIRE missiles utilize a laser seeker. The fourth generation, Longbow HELLFIRE, utilizes a radar frequency seeker. The first generation of Laser HELLFIRE is presently used as the main armament of the U.S. Army's AH-64 Apache and U.S. Marine Corps' AW-1W Super Cobra helicopters. The second generation is currently available for deployment. Laser HELLFIRE homes on a laser spot that can be projected from ground observers, other aircraft, or the launching aircraft itself. This enables the system to be employed in a variety of modes: autonomous, air or ground, direct or indirect, single-shot, rapid, or ripple fire.

CHARACTERISTICS:

Version:	***Basic***	***Interim***	***HF II***	***Longbow***
Diameter:	7 in	7 in	7 in	7 in
Weight:	100 lbs	107 lbs	100 lbs	108 lbs
Length:	64 in	71 in	64 in	68 in

FOREIGN COUNTERPART: Numerous countries have one or more wire, radio, or laser homing anti-armor missiles of varying accuracy and lethality. There are presently no known capable heliborne millimeter wave missile systems.

PROGRAM STATUS: There are four versions of the AGMS missile in various stages of the life cycle:

Basic HELLFIRE: Semi-active laser seeker, 31,616 produced by both Martin Marietta and Rockwell International since 1982. All deliveries have been completed.

Interim HELLFIRE: (Adds precursor for reactive armor)—Final delivery of the Interim HELLFIRE missiles currently being produced by Rockwell was completed in January 1994. Production for foreign military sales will continue through 4QFY94.

HELLFIRE II: See HELLFIRE II, page 189.

Longbow: See Longbow HELLFIRE, page 195.

POINT OF CONTACT:

Project Manager
Air-to-Ground Missile System
ATTN: SFAE-MSL-HD
Redstone Arsenal, AL 35898-8051

CONTRACTORS:

Rockwell (Duluth, GA)—Interim HELLFIRE
Martin Marietta (Orlando, FL)—HELLFIRE II
Martin Marietta (Orlando, FL) and Westinghouse (Baltimore, MD)—Longbow HELLFIRE

Apache

MISSION: The AH-64 Apache is the Army's primary attack helicopter. It is a quick-reacting, airborne weapon system that can fight close and deep to destroy, disrupt, or delay enemy forces. The Apache is designed to fight and survive during the day, night, and in adverse weather throughout the world. It is equipped with a Target Acquisition Designation Sight and a Pilot Night Vision Sensor that permit its two-man crew to navigate and attack in darkness and in adverse weather conditions. The principal mission of the Apache is the destruction of high-value targets with the HELLFIRE missile. It is also capable of employing a 30mm M230 chain gun and Hydra 70 (2.75-inch) rockets that are lethal against a wide variety of targets. The Apache has a full range of aircraft survivability equipment and has the ability to withstand hits from rounds up to 23mm in critical areas.

CHARACTERISTICS:

Mission gross weight:	14,790 lbs
Cruise speed:	147 kts
Crew:	2
Armament:	HELLFIRE missiles, Hydra 70 rockets, and 30mm M230 chain gun

FOREIGN COUNTERPART: The Russian-developed Mi-24 HIND is the Apache's closest counterpart. The Russians have deployed significant numbers of HINDs in Europe and have exported the HIND to many third world countries. The Russians have also developed the KA-50 HOKUM as their next generation attack helicopter. The Italian A-129 Mangusta is the nearest NATO counterpart to the Apache. The Germans and French are co-developing the PAH-2 Tiger attack helicopter, which has many of the capabilities of the Apache.

PROGRAM STATUS: Apache production began in FY82 and the first unit was deployed in FY86. As of November 1993, 807 Apaches were delivered to the Army. The last Army Apache delivery is scheduled for December 1995. Thirty-three attack battalions are deployed and ready for combat. The Army is procuring a total of 824 Apaches to support a new force structure of 25 battalions with 24 Apaches for each unit (16 Active; 2 Reserve; 7 National Guard) under the Aviation Restructure Initiative. The Apache has been sold to Israel, Egypt, Saudi Arabia, the UAE, and Greece.

POINT OF CONTACT:

Program Manager
Advanced Attack Helicopter
4300 Goodfellow Blvd.
St. Louis, MO 63120

CONTRACTORS:

McDonnell Douglas Helicopter Systems (Mesa, AZ)
General Electric (Lynn, MA)
Martin Marietta (Orlando, FL)

Armored Combat Earthmover (ACE)

MISSION: The M9 ACE is a highly mobile, fully tracked armored earthmover capable of performing mobility, countermobility, and survivability missions in support of forces in both offensive and defensive operations. The ACE can prepare defilade and protected positions for guns, tanks, and other critical battlefield systems. It can prepare combat roads, remove roadblocks, breach berms, and perform limited countermobility tasks, such as preparing anti-tank ditches and hauling obstacle materials. The M9 ACE engine, drive train, and driver's compartment are laid out in the rear of the vehicle, while the front is occupied by an 8.7 cubic yard scraper bowl, apron, and attached dozer blade. Its unique hydropneumatic suspension system has eight high-pressure hydraulic rotary actuators, which connect to the roadwheel stations and ensure a smooth ride during high-speed travel through the use of shock-absorbing accumulators.

CHARACTERISTICS:

Weight:	36,000 lbs (net); 54,000 lbs (ballasted)
Swim capability :	3 mph
Length:	20 ft 5 in
Air transportable:	C130, C141, C5A
Height:	8 ft 9 in
Bowl capacity:	8.7 cu yds
Engine:	Cummins V903, 295 HP
Speed:	30 mph (max, road travel)
Crew size:	1 operator
Suspension:	Hydropneumatic, with rotary actuators
Transmission:	Clark, 6 forward, 2 reverse speeds

FOREIGN COUNTERPART: The UK Combat Engineer Tractor is similar in mission and function.

PROGRAM STATUS: The M9 ACE completed production in 1QFY93. As of October 1993, 435 of the 448 vehicles produced have been fielded to combat engineer units worldwide. Thirty of these are on loan to the U.S. Marine Corps and will eventually be redistributed to Army units. BMY will produce an additional 87 vehicles for the USMC and 34 vehicles for the Army National Guard. As a result of operational experience, a system improvement program has been initiated. Key improvements are steel roadwheels, bolt-on front track retainer plates, steel underbody skid plates, and high-pressure hydraulic filters. Also, selected vehicles are outfitted with ripper blades to improve digging in hard terrain.

POINT OF CONTACT:
M9 Armored Combat Earthmover Management Office
ATTN: AMSTA-WE
Warren, MI 48397-5000

CONTRACTORS:
BMY (York, PA)
AM General (Livonia, MI)

40mm Automatic Grenade Launcher (MK19-3)

MISSION: The MK19-3 40mm Automatic Grenade Launcher is designed to deliver accurate, intense, and decisive firepower against enemy personnel and lightly armored vehicles to a maximum effective range of 1,600 meters against point targets and 2,200 meters against area targets. It is used in offensive and defensive operations in the main battle area and will be the primary suppressive weapon for combat support and combat service support units. The MK19-3 is mounted on the HMMWV, M113 Armored Personnel Carriers, 5-ton trucks, and selected M88A1 recovery vehicles.

CHARACTERISTICS:

Caliber:	40 mm
Weight:	72.5 lbs
Rate of fire:	325-375 rds/min
Max effective range:	1,600 m (point targets); 2,200 m (area targets)
	Anti-armor—2.00 in penetration to maximum range of 2,200 m

FOREIGN COUNTERPART: Russia: 30mm AGS-17 automatic grenade launcher

PROGRAM STATUS: The MK 19-3 was developed and approved for Service use by the Navy in 1981. The Army type classified the MK 19-3 standard "A" in January 1986. Initial procurement of MK 19-3 for the 9th Infantry Division was contracted for by the Navy in October 1983. The Army assumed program management responsibilities from the Navy in FY88. First Unit Equipped occurred in November 1989.

POINT OF CONTACT: Product Manager, Small Arms
ATTN: AMCPM-SA
Picatinny Arsenal, NJ 07806-5000

CONTRACTOR: SACO Defense (Saco, ME)

Bradley Fighting Vehicle System (BFVS)

MISSION: The BFVS is a lightly armored, full-track fighting vehicle that provides cross-country mobility, mounted firepower, and protection from artillery and small-arms fire to mounted infantry and cavalry combat operations, and support to dismounted combat operations.

CHARACTERISTICS:

Weight:	67,000 lbs (combat loaded)
Crew:	3
Length:	21.5 ft
Power train:	600 HP
Height:	9.92 ft
Range:	260 mi
Width:	10.5 ft
Road speed:	38 mph
Main armament:	25 mm cannon
Swim speed:	4 mph
Secondary armament:	TOW, 7.62 coaxial machine gun

FOREIGN COUNTERPART: The BMP is the Russian-developed infantry fighting vehicle. It mounts a 73mm smoothbore cannon, an AT3, AT5, or AT6 anti-tank guided missile, and permits the infantry squad to fire from the inside. The BMP-2 is another variant with a 30mm gun, which fires the AT4 or AT5 and is also being fielded.

PROGRAM STATUS: At the end of the latest contract with FMC in FY94, the Army will have produced a total of 6,724 Bradleys, 4,641 in the M2 or Infantry configuration and 2,083 in the M3 or Cavalry configuration. Both the M2 and M3 were produced in three versions: the Army initially purchased 2,300 basic, or A0 Bradleys; then 1,371 vehicles in the A1 configuration, which incorporates the TOW 2 Subsystem; and currently 3,053 vehicles in the A2 High Survivability configuration. The Army is also in the process of converting all A1s to the A2 configuration at Red River Army Depot while investigating advanced capabilities to increase compatibility with the upgraded M1A2 tank on the digital battlefield.

POINT OF CONTACT:

Program Manager
Bradley Fighting Vehicle System
ATTN: SFAE-ASM-BV
Warren, MI 48397-5000

CONTRACTORS:

FMC (San Jose, CA)
General Electric (Pittsfield, MA)
Cummins (Columbus, IN)
Hughes Aircraft (LaGrange, GA)
Alliant (Minneapolis, MN)
General Electric (Burlington, MA)
Pentastar (Huntsville, AL)
McDonnell Douglas (Mesa, AZ)

Breacher

MISSION: The mission of the Breacher is to provide an in-stride breaching capability to overcome simple and complex obstacles. The system will breach a full-width, clear lane to allow maneuver force mobility through minefields, rubble, tank ditches, wire, and other obstructions. The Army currently has no system with these capabilities.

CHARACTERISTICS: The Breacher is an M1 Abrams chassis-based system. It will be equipped with a full-width mine clearing blade and a power-driven excavating arm. While buttoned-up, the crew of two will be able to operate all systems and drive the vehicle from either crew station.

FOREIGN COUNTERPART: No known foreign counterpart. The Russian-developed IMR vehicle has some of the basic characteristics but is not considered a dedicated breaching vehicle.

PROGRAM STATUS: The Breacher program was initiated in FY92 as a result of lessons reinforced during Operation Desert Storm and as a consequence of the deferral of the Combat Mobility Vehicle (CMV) during the Armored Systems Modernization (ASM) restructure. The Army has leveraged the work conducted under the ASM-CMV Advanced Technology Transition Demonstrator (ATTD) program to accelerate the development cycle. A sole-source contract was awarded to BMY in September 1992 for Demonstration and Validation. Prototype testing will begin in 1QFY95.

POINTS OF CONTACT:

PM Combat Mobility Systems
ATTN: SFAE-ASM-CV
Warren, MI 48397-5000

USA Tank Automotive Command
Warren, MI 48397-5000

CONTRACTOR: BMY (York, PA)

Characteristics

- Single-Shot Disposable Item of Ammunition
- Defeat Earth and Timber Field Fortifications
  - Maximum Weight = 17 Pounds
  - Maximum Length = 40 Inches
  - Effective Range = 15 to 250 Meters

Acquisition Approach

- Competitive Non-Developmental Item Approach
- Side-by-Side Evaluation of Best Candidate Systems
- First Unit Equipped—FY95

Bunker Defeat Munition (BDM)

MISSION: The Bunker Defeat Munition (BDM) is a light-weight, disposable, man-portable throwaway munition for neutralizing earth and timber bunker field fortifications. The goal of this program is to select and field the best candidate of "bunker-busting" weapons from the competing non-developmental item systems that are currently available.

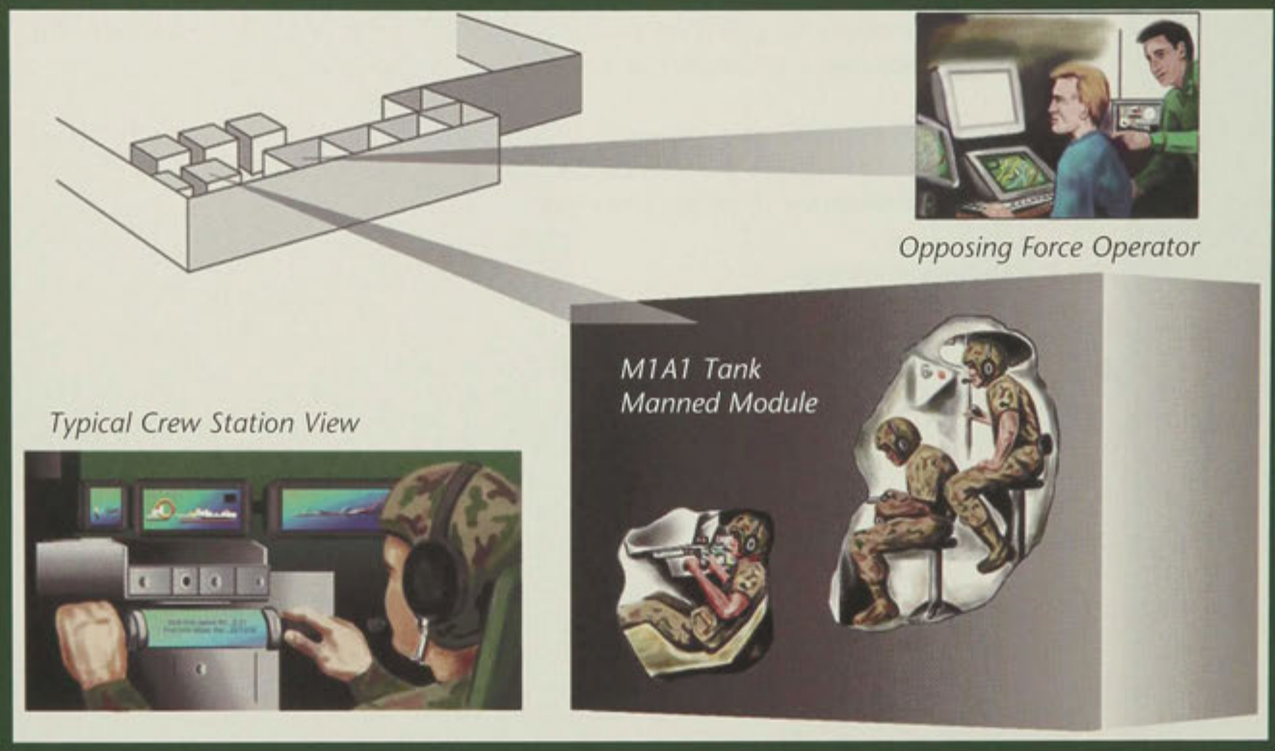
CHARACTERISTICS: The major BDM requirements are a single-shot contained munition, a maximum weight of 17 pounds, a maximum length of 40 inches, an effective range of 150 meters, and compatibility with night firing devices. The BDM can be used in rapid deployment, close combat, urban terrain, and defensively by military police.

FOREIGN COUNTERPART: No known foreign counterpart.

PROGRAM STATUS: The Engineering and Manufacturing Development phase effort will consist of a side-by-side test, followed by a downselect and then operational testing in FY95.

POINT OF CONTACT: Systems Manager
Bunker Defeat Munition
ATTN: SMCAR-CCS-A
Picatinny Arsenal, NJ 07806-5000

CONTRACTORS: Talley (Mesa, AZ)
Alliant (Minneapolis, MN)



Close Combat Tactical Trainer Includes

- Networked Man-in-the-Loop Modules
- Distributed Processing
- Visual-Based Battlefield
- Combined Arms/Collective Training
- Force-on-Force Free Play Simulation
- Comprehensive After-Action Review
- Fixed-Site and Mobile Versions

Close Combat Tactical Trainer (CCTT)

MISSION: The function of the Close Combat Tactical Trainer (CCTT) is to train active and reserve component M1 Tank and M2/3 Bradley crews on individual and collective (crew through battalion task force) tasks and skills in command and control, communications, and maneuver on a simulated, fully interactive, real-time battlefield. CCTT will simulate, in real time, the conduct of combat operations in a realistic environment with an appropriate and challenging opposing force that will require realistic individual, crew, and staff actions, placing the stresses of combat on all participants. The CCTT conducts joint operations involving other U.S. services and members of the allied forces with whom we routinely operate outside CONUS. The system will allow individuals, crews, and units to operate in a simulated combat environment, reducing the impact of restrictions of weapon effects, safety, terrain limitations, and time, and will assist in overcoming the effects of crew turbulence and scarce resources.

CHARACTERISTICS: The CCTT program comprises a group of fully interactive networked simulators and command, control, and communications workstations, replicating the M1 and M2/3 vehicles and weapon systems of a company/team operating on a simulated real-time battlefield. The system will exist in both fixed-site and mobile versions. The fixed-site version will be static at all times during operation. The mobile version will be static during operation but will move over primary and secondary roads during transport from site to site.

PROGRAM STATUS: The CCTT program successfully completed Milestone I/II ASARC. The contract was awarded in November 1992.

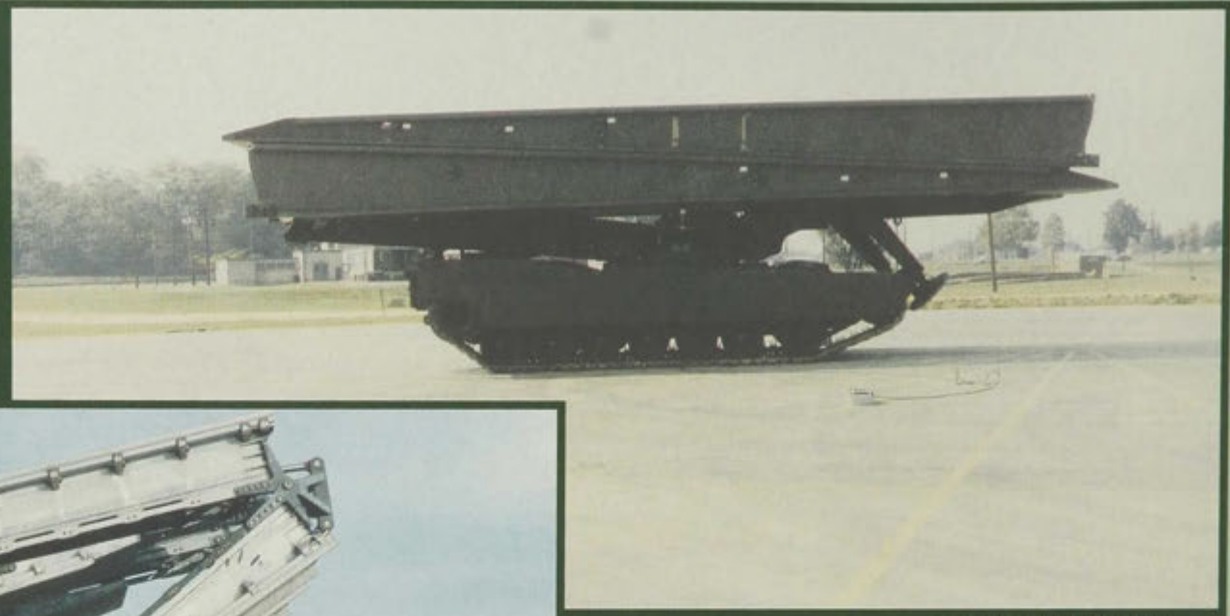
POINTS OF CONTACT:

Headquarters, STRICOM
12350 Research Parkway
Orlando, FL 32826-3276

Army Materiel Command (AMC)
5001 Eisenhower Avenue
ATTN: AMCRD-S
Alexandria, VA 22333-0001

CONTRACTOR: Loral (Manassas, VA)

Candidate Bridges



General Dynamics

BMY

Southwest Mobile Systems

Heavy Assault Bridge (HAB)

MISSION: The mission of the Heavy Assault Bridge (HAB) is to support the crossing of gaps of up to 24 meters of Military Load Class (MLC) 70 traffic. The HAB will increase maneuver force mobility by allowing units to transit gaps such as tank ditches, road craters and partially damaged bridge sections. The current Armored Vehicle Launched Bridge (AVLB) cannot support Abrams tank units.

CHARACTERISTICS: The HAB launcher is mounted on an M1 Abrams chassis and is operated by a two-man crew. The bridge is 26 meters long and can span gaps up to 24 meters. It will support an MLC 70 loading crossing at 16 kph. The bridge is launched from under armor in 5 minutes and retrieved in 10 minutes.

FOREIGN COUNTERPART:

Russia:	MTU-20; MTU-72
China:	Type 84
Slovakia:	MT-55
France:	AMX (AVLB)
Germany:	BLG-60; Biber
United Kingdom:	Chieftain
South Korea:	K-1

PROGRAM STATUS: The program was restarted in FY92 as a result of lessons reinforced during Operation Desert Storm. It is currently in Engineering and Manufacturing Development (EMD). Three competitors completed side-by-side testing at Aberdeen Proving Grounds in November 1992. In FY93, proposals were received from all three competitors for integration of their bridge onto an Abrams chassis. A formal source selection process began in August 1993. The contract for Phase II of EMD is scheduled for award in January 1994. Phase II will include integration of the best bridge onto the M1 chassis. Full-up system testing will begin 2QFY96. A contract for Low-Rate Initial Production will be signed in 1QFY97.

POINTS OF CONTACT:

PM Combat Mobility Systems
ATTN: SFAE-ASM-CV
Warren, MI 48397-5000

USA Tank Automotive Command
Warren, MI 48397-5000

CONTRACTORS:

BMY (York, PA)
General Dynamics (Sterling Heights, MI)
Southwest Mobile Systems (St. Louis, MO)


U.S. ARMY

Heavy Equipment Transporter System (HETS)

MISSION: The HETS is required to transport, deploy, and evacuate the M1 tank and other tracked vehicles on highways, unimproved roads, and cross-country. The HETS consists of the M1070 truck tractor and M1000 semitrailer (70 tons). Each is being procured under separate acquisition programs. The new HETS will transport 70-ton payloads, primarily M1 series tanks. It operates on OCONUS highways and on CONUS highways with permits. The system has automatically steerable axles and load-leveling hydraulic suspension on the semi-trailer. The tractor has front- and rear-axle steering, with a central tire inflation system and cab space for five crewmen.

CHARACTERISTICS:

Speed:	40-45 mph (with 70-ton payload, 25-30 mph)
Range:	300 mi
Transport:	C-5 aircraft
Mobility:	95% on road; 5% off road
RAM:	3,000 mean miles between hardware mission failure for both tractor and trailer

FOREIGN COUNTERPART:

	TATRA-813 (tractor)/ChMZAP-5212 (trailer) (Russian-developed)	***TRH 350 (France)***
Payload:	60 tons	55 tons
Speed:	40 km/hr (10 km/h with 60-ton payload)	65 km/hr
Engine:	Diesel	Diesel

PROGRAM STATUS: The HETS is a Non-Developmental Item (NDI) program currently in Low-Rate Initial Production. It is required to meet the Army's critical need for a 70-ton tank transporter capability in support of fielding the M1 series tank. The current M1A1 tank weighs more than 64 tons, overloading the current HET (M911/M747) to the extent that readiness is below acceptable levels. The Milestone III Full-Rate Production Inprocess Review (IPR) is scheduled for March 1994.

POINTS OF CONTACT:

PM-Heavy Tactical Vehicles
ATTN: SFAE-CS-TVH
Warren, MI 48397-5000

PEO-Combat Support
ATTN: SFAE-CS
Warren, MI 48397-5000

CONTRACTORS: Oshkosh Truck (Oshkosh, WI)
Southwest Mobile Systems (St. Louis, MO)

HELLFIRE II Missile

MISSION: HELLFIRE II is the latest production version of the Laser HELLFIRE missile. Laser HELLFIRE is presently used as the main armament of the U.S. Army's AH-64 Apache and U.S. Marine Corps' AH-1W Super Cobra helicopters. The laser missile homes on a laser spot that can be projected from ground observers, other aircraft, or the launching aircraft itself. This enables the system to be employed in a variety of modes: autonomous, air or ground, direct or indirect, single-shot, rapid, or ripple fire. HELLFIRE II and Longbow HELLFIRE missiles are complementary. The combination of HELLFIRE II's precision guidance and Longbow HELLFIRE's fire-and-forget capability will provide the battlefield commander flexibility across a wide range of mission scenarios, permitting fast battlefield response and high mobility not afforded by other anti-armor weapons.

CHARACTERISTICS: HELLFIRE II incorporates many improvements over the Interim HELLFIRE missile, including solving the laser obscurant/backscatter problem, the only shortcoming identified during Operation Desert Storm. Other improvements include electro-optical countermeasure hardening, improved target reacquisition capability, an advanced technology warhead system capable of defeating reactive armor configurations projected into the 21st century, reprogrammability to adapt to changing threats and mission requirements, shipboard compatibility, and regaining the original HELLFIRE missile weight and length (100 pounds, 64 inches).

FOREIGN COUNTERPART: Numerous countries possess one or more wire, radio, or laser homing anti-armor missiles of varying accuracy and lethality.

PROGRAM STATUS: The Initial Production Facilities and Production Qualification Test contract was awarded to Martin Marietta in November 1992. The initial production contract was awarded in May 1993, and the second production contract is planned for award in February 1994.

POINT OF CONTACT: Product Manager - HELLFIRE II
Air-to-Ground Missile System
ATTN: SFAE-MSL-HD-O
Redstone Arsenal, AL 35898-5650

CONTRACTOR: Martin Marietta (Orlando, FL)

Line-of-Sight Antitank (LOSAT)

MISSION: The LOSAT, in the dedicated anti-tank companies of the Mechanized Infantry Battalions, will provide organic anti-tank fire to fix and destroy enemy-armored formations. This fixing fire will provide tanks and infantry the capability to dominate the maneuver battle, thus allowing rapid maneuver into the enemy's vulnerable flanks and rear. A light, air mobile LOSAT configuration is also being evaluated for use by the early entry forces. The LOSAT weapon system consists of a kinetic energy missile (KEM) launcher mounted on an armored combat vehicle chassis. LOSAT will replace selected mounted TOW systems. The key attraction of the LOSAT is the tremendous overmatch lethality of the KEM (defeats all predicted future armored combat vehicles). LOSAT will also provide increased survivability and countermeasure effectiveness. LOSAT will operate out to the maximum range of direct fire combat engagements and will provide dramatically increased rates of fire and enhanced performance under day/night, adverse weather, and obscured battlefield conditions.

CHARACTERISTICS:

	KEM
Weight:	177 lbs
Length:	112 in
Diameter:	6.4 in
Range:	Greater than TOW
Crew:	3

FOREIGN COUNTERPART: No known foreign counterparts.

PROGRAM STATUS: The LOSAT program began a Technology Demonstration phase of development in 4QFY92. The program addresses the remaining risk issues associated with the KEM and advanced fire control system, and completes the demonstration of these technologies in 1QFY96.

POINT OF CONTACT: Project Manager
LOSAT
ATTN: SFAE-ASM-LS
Redstone Arsenal, AL 35898-8051

CONTRACTORS: Loral Vought Systems (Dallas, TX)
Texas Instruments (Dallas, TX)
Hercules (Rocket City, WV)

Longbow Missile

MISSION: Longbow is a development and acquisition program for a millimeter wave radar air/ground targeting system capable of being used day, night, in adverse weather and through battlefield obscurants. Longbow consists primarily of the integration of a mast-mounted millimeter wave fire control radar (FCR), a radar frequency interferometer (RFI), and a radar frequency fire-and-forget HELLFIRE missile onto the Apache. The Longbow's digitized target acquisition system provides automated detection, location, classification, prioritization, and target handover. Longbow will significantly enhance situational awareness of both friendly and enemy dispositions through secure voice and digital data burst information exchanges to both air (other AH-64Ds, RAH-66 Comanche, F-15/16s, J-STARS, etc.) and ground assets (IVIS, BN/BDE HQs) by utilizing the jointly developed improved data modem (IDM) and the SINCGARS radios. This allows the Apache to provide accurate battlefield information for decision support and reporting purposes. Commanders and their staffs will now have a shared picture of the battlefield for real-time command, control, and battlefield focus, speeding the tempo of the battle while minimizing overkill and fratricide.

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

The AH-64D heavy attack team will enhance the domination of the maneuver battle by giving the ground commander a versatile, rapidly employable, long-range aerial weapon system capable of massed, rapid, fire-and-forget HELLFIRE engagements against a wide range of fixed and moving targets.

CHARACTERISTICS: The Longbow FCR and RFI are housed in a mast-mounted assembly above the helicopter's main rotor system. The processors for the radar are located in the aircraft's avionics bays. The Longbow Apache consists of the AH-64 aircraft modified with changes necessary to effectively and efficiently integrate the Longbow radar and missile. Changes include additional power, expanded avionics bays, additional cooling, upgraded processors, integrated avionics, MANPRINT crewstations, and data modems that allow situation and target data transfer to compatible systems on the digital battlefield.

FOREIGN COUNTERPART: No known foreign counterpart.

PROGRAM STATUS: The Longbow Apache System entered Full Scale Development in December 1990, following an extremely successful Proof of Principle (POP) phase. Technical success during POP culminated with the live firing of missiles against a wide variety of targets, moving and stationary, through smoke and obscurants. The current program objective calls for 227 Longbow Apache (AH-64D) aircraft, with the remainder of the Apache fleet's (584 minus attrition) being upgraded to the new AH-64D baseline configuration (minus the FCR and upgraded engine). The Longbow Apache will add significant warfighting capability to the combined arms team through increased survivability, lethality, and versatility, as well as through long-term reliability improvements.

POINT OF CONTACT:
Project Manager
Longbow
ATTN: SFAE-AV-LB
St. Louis, MO 63120-1795

CONTRACTORS:
McDonnell Douglas (Mesa, AZ)
Martin Marietta (Orlando, FL)
Westinghouse (Baltimore, MD)

Longbow HELLFIRE Missile

MISSION: The Longbow HELLFIRE missile is a millimeter wave fire-and-forget version of the HELLFIRE missile. The Longbow development program also includes development of a fire control radar (FCR) system and numerous modifications to the helicopter. The Longbow FCR will locate, classify, and prioritize targets for the Longbow HELLFIRE missile. The Longbow system is being developed for integration into the Apache attack helicopter and the Comanche armed reconnaissance helicopter. Longbow is planned for integration into the entire fleet of Apache aircraft and into one-third of the Comanche fleet. Longbow HELLFIRE and HELLFIRE II missiles are complementary. The combination of Longbow HELLFIRE's fire-and-forget capability and HELLFIRE II's precision guidance will provide the battlefield commander flexibility across a wide range of mission scenarios, permitting fast battlefield response and high mobility not afforded by other anti-armor weapons.

CHARACTERISTICS: Longbow HELLFIRE incorporates a millimeter wave seeker on a HELLFIRE II aft section bus. The primary advantages of the Longbow missile include adverse weather capability (i.e., rain, snow, fog, smoke, and battlefield obscurants); millimeter wave countermeasures survivability; fire-and-forget guidance, which allows the Apache to launch and then remask, thus minimizing exposure to enemy fire; an advanced technology warhead system capable of defeating dual reactive armor configurations projected into the 21st century; and reprogrammability to adapt to changing threats and mission requirements.

FOREIGN COUNTERPART: No known foreign counterpart.

PROGRAM STATUS: The Engineering and Manufacturing Development contract is scheduled to be completed in May 1995 by a joint venture between Martin Marietta and Westinghouse. The Initial Production Facilities and Long-Lead Item Material contract is anticipated in December 1994. Award of the first Low-Rate Initial Production contract is anticipated in December 1995.

An Army special program review (SPR) of Longbow HELLFIRE in August 1992 modified the program to match Longbow aircraft deliveries and added four incremental milestones to track transceiver development. The last of these milestones was met in November 1993, one month ahead of schedule. A revised Acquisition Program Baseline, which incorporated the changes directed by the SPR, was approved in May 1993.

POINT OF CONTACT: Product Manager—LONGBOW HELLFIRE
Air-to-Ground Missile System
ATTN: SFAE-MSL-HD-G
Redstone Arsenal, AL 35898-5650

CONTRACTORS: Martin Marietta (Orlando, FL)
Westinghouse (Baltimore, MD)


INF - BD
BMS-120-4

Mortar (120mm)

MISSION: The 120mm mortar system will provide improved organic indirect fire support capability to the maneuver unit commander. It is a conventional smoothbore, muzzle-loaded mortar system that provides increased range and lethality over the 4.2-inch heavy mortar system. It will be employed in both towed and carrier-mounted versions. The 120mm mortar will fire a family of enhanced ammunition being produced in the United States. It will replace the WWII-vintage, 4.2-inch heavy mortars in the mechanized infantry, motorized, armored, and cavalry units.

CHARACTERISTICS:

Range:	7,240 m
Weight:	319 lbs
Rate of Fire:	4 rds/min, sustained
Crew:	5 (ground-mounted)
Ammunition:	HE, smoke, illumination

FOREIGN COUNTERPART: The 120mm smoothbore mortar is used by France, Germany, Denmark, and other allied armies. The Russian-developed counterpart is the M43 120mm mortar, which has a range of 5,700 meters, weighs 602 pounds, and has a six-man crew.

PROGRAM STATUS: The 120mm mortar is being producted at Watervliet Arsenal, NY. The 120mm mortar towed system, M120, was fielded in September 1991 to the 199th Infantry Brigade, Fort Lewis, WA. The M121 carrier-mounted version will be fielded to all remaining armor and mechanized units beginning in 4QFY94. The Army plans to field a total of 1,725 systems to replace all 4.2-inch mortars currently in the inventory. The 120mm mortar-enhanced ammunition is currently being produced by Martin Marietta Ordnance Systems. The Army type classified the M933/934 HE and M930 illumination rounds for production in 1991.

POINT OF CONTACT:

Project Manager
U.S. Armament, Munitions, and Chemical Command
ATTN: AMCPM-MO
Picatinny Arsenal, NJ 07806-5000

CONTRACTORS:

Weapon:	Watervliet Arsenal, NY
Ammunition:	Martin Marietta (Milan, TN)
	Loral (Scranton, PA)
	Brockway Standard (Homerville, GA)
	Radford AAP (Scranton, PA)
	United Ammunition Container (Milan, TN)
	Scranton AAP (Scranton, PA)
	ARMTEC Defense Products (Coachella, CA)


M113 FAMILY
RELIABLE – DEPENDABLE

M113 Family of Vehicles (FOV)

MISSION: The M113 FOV was in continuous production from 1960 through November 1992. There are more than 85,000 vehicles, consisting of 35 different variants, in use by more than 40 countries. The Army's fleet of 32,000 vehicles is used for a variety of missions, including transport of infantry and engineer units, medical evacuation, fire support, and command and control functions on the battlefield.

CHARACTERISTICS:

	M113A3
Weight:	27,180 lbs
Height:	8.2 ft
Width:	8.8 ft
Length:	17.4 ft
Range:	300 mi
Power train:	275 HP
Crew:	2
Road speed:	42 mph
Main armament:	.50 caliber machine gun

FOREIGN COUNTERPART: Russia has developed the wheeled BTR-60, BTR-70, and the new BTR-80 series amphibious, armored personnel carriers that are roughly equivalent in function to the M113. The MTLB amphibious, multipurpose, tracked carrier is used to carry infantry and as a prime mover for towed artillery and anti-tank guns.

PROGRAM STATUS: Deliveries of new production M113A3s began in FY86 and were completed in FY92. The A3 configuration adds spall suppression liners, optional bolt-on armor, armored external fuel tanks, and upgraded engine and transmission to provide speed and mobility commensurate with the M1 series tank and the M1/M2 Bradley Fighting Vehicles. Depot conversion programs are ongoing in CONUS and OCONUS to modify fielded M113A2s to the M113A3 configuration. Future conversion programs (FY94-99) will create A3 configurations for seven additional M113 variants: M1068A3, M1064A3, M548A3, M577A3, M981A3, M1059A3, and M901A3.

POINT OF CONTACT:
Program Manager
AMCPM-M113/M60 FOV
U.S. Army Tank and Automotive Command
Warren, MI 48397-5000

CONTRACTORS:
FMC (San Jose, CA)
Detroit Diesel (Detroit, MI)
Allison-GMC (Indianapolis, IN)

M119A1 Howitzer

MISSION: The M119A1 howitzer is a lightweight, 105mm towed howitzer that provides improved artillery fire support for the Army's light forces. It fires all conventional 105mm ammunition in the inventory, the M913 High Explosive Rocket Assisted (HERA) ammunition now in production, and the new Dual Purpose Improved Conventional Munition (DPICM) in development. It is airmobile with the UH-60 Black Hawk helicopter, and its prime mover is the High Mobility Multipurpose Wheel Vehicle (HMMWV).

CHARACTERISTICS:

Range:	14.3 km (high explosive); 19.5 km (HERA)
Weight:	4,000 lbs
Width:	70 in
Length:	241.5 in
Height:	54 in (travelling configuration)
Crew:	7
Ammunition:	HE, smoke, illumination, HERA, ICM

FOREIGN COUNTERPART: The nearest counterpart is the L119 British Light Gun and the Russian-developed D-30 122mm howitzer.

PROGRAM STATUS: The M119 was first fielded to the 7th Infantry Division, Ft Ord, CA, in December 1989. Since the initial fielding, it has been reclassified the M119A1 and fielded to the 82nd Airborne Division in July 1991 and to the 101st Airborne (Air Assault) Division in August 1992.

POINT OF CONTACT: U.S. Armament, Munitions, and Chemical Command
ATTN: AMSMC-ASA-H
Rock Island Arsenal, IL 61299-6000

CONTRACTORS: Watervliet Arsenal, NY
Rock Island Arsenal, IL

Thermal Weapon Sight

Mini Eyesafe Laser Infrared Observation Set

Night Vision Goggle and Infrared Aiming Light

Aviator's Night Vision Imaging System

Night Vision (NV) and Electro-Optics

MISSION: Night vision (NV) image intensification (I^2), laser, and thermal technologies provide today's soldier with the capability to operate more effectively and safely day and night under degraded battlefield conditions.

CHARACTERISTICS: ***Horizontal Technology Integration of Second Generation FLIR:*** The Horizontal Technology Integration of the Second Generation FLIR (HTI SGF) will allow combined arms forces to see the same battlespace while achieving cost reductions through commonalty and potential economies of scale. Initial platforms for integration include the Bradley M2/M3A3, Abrams M1A2, M-8 Armored Gun System, and Long-Range Advanced Scout Surveillance System.

Image Intensification Devices: The AN/AVS-6 Aviator's Night Vision Imaging System (ANVIS) is a lightweight, high-performance, binocular NV goggle for helicopter crews to aid in low-level, nap-of-the-earth (NOE) flight. AN/AVS-7 ANVIS heads-up display (HUD) attaches to ANVIS and displays critical flight data to the helicopter pilot, eliminating the need to look inward. The AN/PVS-7 NV goggle is a lightweight, head-mounted, monocular unit used for walking, operating ground vehicles, navigation, map reading, first aid, and so forth. The Sniper Night Sight is a Third Generation Night Vision image intensification device being procured in limited quantities solely for sniper missions.

Laser Devices: The AN/PAQ-4A/B Infrared Aiming Light (IAL) is an infrared weapon sight. The beam can be seen only when wearing NV goggles. It can be mounted on and boresighted to the M16A1/2 rifle, M60 machine gun, M67 recoilless rifle, and the M72A1 rocket launcher. The AN/PVS-6 Mini Eyesafe Laser Infrared Observation Set (MELIOS) is an eyesafe rangefinder that measures and displays range data. The AN/PLQ-4 Laser Countermeasure System (LCMS) is an adjunct to the M16 rifle. It is designed to detect and counter optical and electro-optical (OEO) systems.

Thermal Devices: The AN/PAS-13 family of thermal weapon sights (TWS) is used for surveillance and fire control of individual, crew-served, and heavy weapons during day/night, under "dirty" battlefield conditions. The AN/VAS-5, driver's vision enhancers (DVE), is a thermal viewer for tracked combat and tactical wheeled vehicles in combat and combat support units. It significantly improves the driver's capability by allowing maneuver and mobility operations during day/night under dirty battlefield conditions.

FOREIGN COUNTERPART: I^2 and thermal devices are produced in many countries, including Russia, France, Germany, and the United Kingdom.

PROGRAM STATUS: Two multiyear contracts are in place (FY93-97) to procure final quantities of ANVIS, AN/PVS-7, and associated spare parts. Initial production test quantities of HUD will be delivered and installed in FY94. Also, 30 TWS prototypes and 9 LCMS prototypes and training devices will be delivered. An Engineering and Manufacturing Development contract for the HTI SGF will be awarded. Two DVE NDI Integration contracts will each result in delivery of 25 "B" kits and 30 "A" kits (15 each for the PLS/HEMTT and HMMWV) in 2QFY95.

POINT OF CONTACT: Project Manager, Night Vision and Electro-Optics
10221 Burbeck Road, Suite 430
Fort Belvoir, VA 22060-5806

CONTRACTORS:
ITT Electro-Optical Products Division (Roanoke, VA)
IMO/Optic-Electronic (Dallas, TX)
Lockheed Sanders (Nahsua, NH)
Magnavox (Mahwah, NJ)
Litton Industries (Tempe, AZ)
Brunswick (Bedford, MA)
Hughes Aircraft (El Segundo, CA)
Electro-Optical Sensors (Palo Alto, CA)
AEL Defense (Alpharetta, GA)
Insight Technology (Manchester, NH)
Texas Instruments (Dallas, TX)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Recovery Vehicle

MISSION: The M88A1 Recovery Vehicle is a full-tracked, armored vehicle designed for hoisting, winching, and towing operations for battlefield recovery and evacuation of tanks and other tracked combat vehicles. The M88A1 is the primary recovery vehicle in the Army inventory for M2/M3 Bradley Fighting Vehicles, M60 series tanks, and heavy, self-propelled artillery. An Improved Recovery Vehicle (M88A1E1) is currently under development, and is being designed specifically for towing the Abrams tank.

CHARACTERISTICS:

Length:	325 in (340 in)	Power train:	12-cyl, 750 Hp (1050 Hp) air-cooled diesel (M88A1E1) engine with 3 speed automatic transmission
Width:	135 in		
Height:	123 in	Cruising range:	300 mi (200 mi)
Weight:	56 tons (70 tons)	Draw bar pull:	45 tons (70 tons)
Top speed:	30 mph (29 mph)	Boom capacity:	25 tons (35 tons)
Armament:	One .50 caliber machine gun		

FOREIGN COUNTERPART: Russia has historically based recovery vehicles on existing chassis. The most current is the BREM-1, based on a T-72 chassis. T-54, T-55, and JSU recovery vehicles are still in the Russian inventory.

PROGRAM STATUS: Approximately 2,400 M88A1s are fielded to date. An Improved Recovery Vehicle (M88A1E1) is currently under development. Developmental and operational testing of prototypes was completed in September 1993. Low-Rate Initial Production is scheduled to begin in 2QFY94.

POINTS OF CONTACT:

For: M88A1E1
Product Manager, Improved Recovery Vehicle
PEO-ASM
ATTN: SFAE-ASM-CV-R
Warren, Michigan 48397-5000

For: M88A1
Commander, U.S. Army TACOM
ATTN: AMSTA-FRM
Warren, MI 48397-5000

CONTRACTORS:

BMY (York, PA)
GMC, Allison Div. (Indianapolis, IN)
Teledyne Continental Motors (Muskegon, MI)
Firestone Tire (Noblesville, IN)
Goodyear Tire (St. Mary's, OH)
Standard Products (Port Clinton, OH)
Bata Engineering (Ontario, Canada)
Adviondack (Watervliet, NY)
Buckeye Steel Casting (Columbus, OH)
Ferguson Gear (Gastonia, NC)
Berwick Forge (Berwick, PA)
Maynard Steel Casting (Milwaukee, WI)
Harnischfeger P&H (Oak Creek, WI)

M16 A2 RIFLE

Rifle (M16A2)

MISSION: The M16A2 is an improved version of the M16A1 and is being issued to front line combat soldiers as the Army's primary combat rifle. The M16A2 is a lightweight, air-cooled, gas-operated, low-impulse rifle. It incorporates improvements in sight, pistol grip, stock, and overall combat effectiveness. Accuracy is improved by incorporating an improved muzzle compensator, three-round burst control, and a heavier barrel, and by using the heavier NATO standard ammunition, which is also fired by the Squad Automatic Weapon.

CHARACTERISTICS:

Caliber:	5.56 mm
Weight:	8.9 lbs
Range:	550 m
Type of fire:	Semi-automatic, three-round burst
Magazine capacity:	30 rds

FOREIGN COUNTERPART: The 5.45mm AK-74 Assault Rifle is currently in service in the armed forces of Russia and of several other countries worldwide.

PROGRAM STATUS: The Army First Unit Equipped (FUE) occurred in January 1987, and, to date, approximately 424,000 new weapons have been fielded. Approximately 100,000 M16A1 rifles are being converted to M16A2 rifles during depot overhaul using modification kits.

POINTS OF CONTACT:

Armament, Munitions, and Chemical Command
ATTN: AMSMC-ASW
Rock Island, IL 61299- 6000

Product Manager, Small Arms
ATTN: AMCPM-SA
Picatinny Arsenal, NJ 07806-5000

CONTRACTORS: Colt's Manufacturing (Hartford, CT)
FN Manufacturing (Columbia, SC)

Squad Automatic Weapon (SAW)

MISSION: The M249 Squad Automatic Weapon (SAW) provides a lightweight, one-man-portable machine gun capable of delivering a large volume of effective fire to support infantry squad operations. It also provides a sustained fire capability and increased range in rifle squads to enhance survivability. This lightweight machine gun replaces the two automatic M16A1 rifles in the rifle squad on a one-for-one basis in all infantry type units and in elements of air cavalry and other non-infantry units. The SAW also replaces non-vehicular mounted M60 machine guns (light machine gun role) on a one-for-one basis.

CHARACTERISTICS:

Caliber:	5.56 mm
Weight:	16.3 lbs
Rate:	750 rds/min
Range:	800 m
Magazine capacity:	200 rds

FOREIGN COUNTERPART: The closest equivalent systems are the Russia-developed 7.62mm PKM and the 5.45mm RPK 74, which are fielded with Eastern European nations.

PROGRAM STATUS: Currently in production, fielding of the M249 started in FY84. Improvements recommended by users have been successfully tested and approved.

POINTS OF CONTACT:

Armaments, Munitions, and Chemical Command
ATTN: AMSMC-ASW
Rock Island, IL 61299-6000

Product Manager, Small Arms
ATTN: AMCPM-SA
Picatinny Arsenal, NJ 07806-5000

CONTRACTOR: FN Manufacturing (Columbia, SC)

M831A1
HEAT Trainer

M830
HEAT Tactical

M830A1
HEAT Tactical

M829A1
KE Tactical

M829
KE Tactical

M865
XE Trainer

XM93

Tank Main Gun Ammuniton

MISSION: The 120mm family of tank ammunition is fired from the M256 cannon on the M1A1/M1A2 tank. There are four basic cartridge types: Kinetic Energy (KE), Armor Piercing, Fin Stabilized, Discarding Sabot-Tracer (APFSDS-T); High Explosive, Multipurpose-Tracer (HE-MP-T); an APFSDS-T Training Cartridge (M865); and an HE-MP-T Training Cartridge (M831).

CHARACTERISTICS: ***APFSDS-T:*** One-piece depleted uranium penetrator, combustible cartridge case, discarding sabot—JA2 propellant—M829, M829A1, M829A2.
HE-MP-T: Shaped charge warhead, combustible cartridge case—JA2 propellant—M830. Saboted projectile with manually selectable air/ground switch for anti-helicopter—M830A1.
STAFF: Smart Target Activated Fire-and-Forget (XM943) munition with explosively formed penetrator (EFP) for defeat of armor targets in defilade.

FOREIGN COUNTERPART: NATO tanks employ similar types of KE and HE-MP ammunition. Russian-designed tanks fire KE, high explosive fragmentation ammunition, and anti-tank guided missiles.

PROGRAM STATUS: The basic 120mm ammunition was fielded with the M1A1 Tank. The Armament Enhancement Initiative (AEI) program provides ammunition required to defeat future threat targets. The M829A2, APFSDS-T and M830A1, HE-MP-T are in low-rate production. The XM943, STAFF cartridge is in the Engineering and Manufacturing Development phase.

POINT OF CONTACT: Project Manager
Tank Main Armament Systems (PM-TMAS)
ATTN: SFAE-AR-TMA
Picatinny Arsenal, NJ 07806-5000

CONTRACTORS: Alliant (Brooklyn Park, MN)
Hercules (Radford, VA)
Olin Ordnance (St. Petersburg, FL)
Nuclear Metals (Concord, MA)
Aerojet Ordnance (Jonesboro, TN)
Mason and Hangar (Middletown, IA)
ARMTEC Defense Products (Coachella, CA)
Martin Marietta (Milan, TN)

TOW Weapon System

MISSION: The TOW (Tube-Launched, Optically-Tracked, Wire Command-Link Guided) missile is a long-range, heavy anti-tank system designed to attack and defeat armored vehicles and other targets, such as field fortifications. It is found at battalion level and is mounted on the Bradley Fighting Vehicle System (BFVS), the Improved TOW Vehicle (ITV), the High Mobility Multipurpose Wheeled Vehicle (HMMWV), and the AH-1S Cobra Helicopter. The system consists of a tripod, traversing unit, missile guidance set, launch tube, optical sight, and battery assembly, and any of the five missile variations. The system also includes a thermal sight that provides a capability for operations at night, in reduced visibility, and in a countermeasure environment. The missiles are all-up rounds encased in a disposable container.

CHARACTERISTICS:

	TOW 2A Missile	***TOW 2B Missile***
Crew size:	3	3
System weight:	280 lbs	280 lbs
Reliability:	95%	95%
Min range:	65 m	200 m
Max range:	3,750 m	3,750 m

FOREIGN COUNTERPART:

Sweden:	BOFORS BILL
Russia:	AT-4/5/6
France/Germany:	HOT 2
France/Germany/United Kingdom:	TRIGAT-Heavy; MILAN 2

PROGRAM STATUS: The TOW Weapon System entered its Production and Deployment phase with the Basic TOW in 1970. Since that time, there have been five variations of the missile and two variations of the TOW subsystem. The TOW 2B replaced the TOW 2A as the standard production missile in 2QFY92, and will join the more than 100,000 missiles and 14,000 platforms already in the field. The TOW is currently in use by more than 40 other nations as their primary heavy anti-armor weapon system. The TOW Integrated Target Acquisition System (ITAS) entered into the Engineering and Manufacturing Development phase in April 1993. ITAS will improve the target detection recognition and engagement capability of the TOW through the incorporation of a second generation FLIR, a laser range finder, and automatic tracking features.

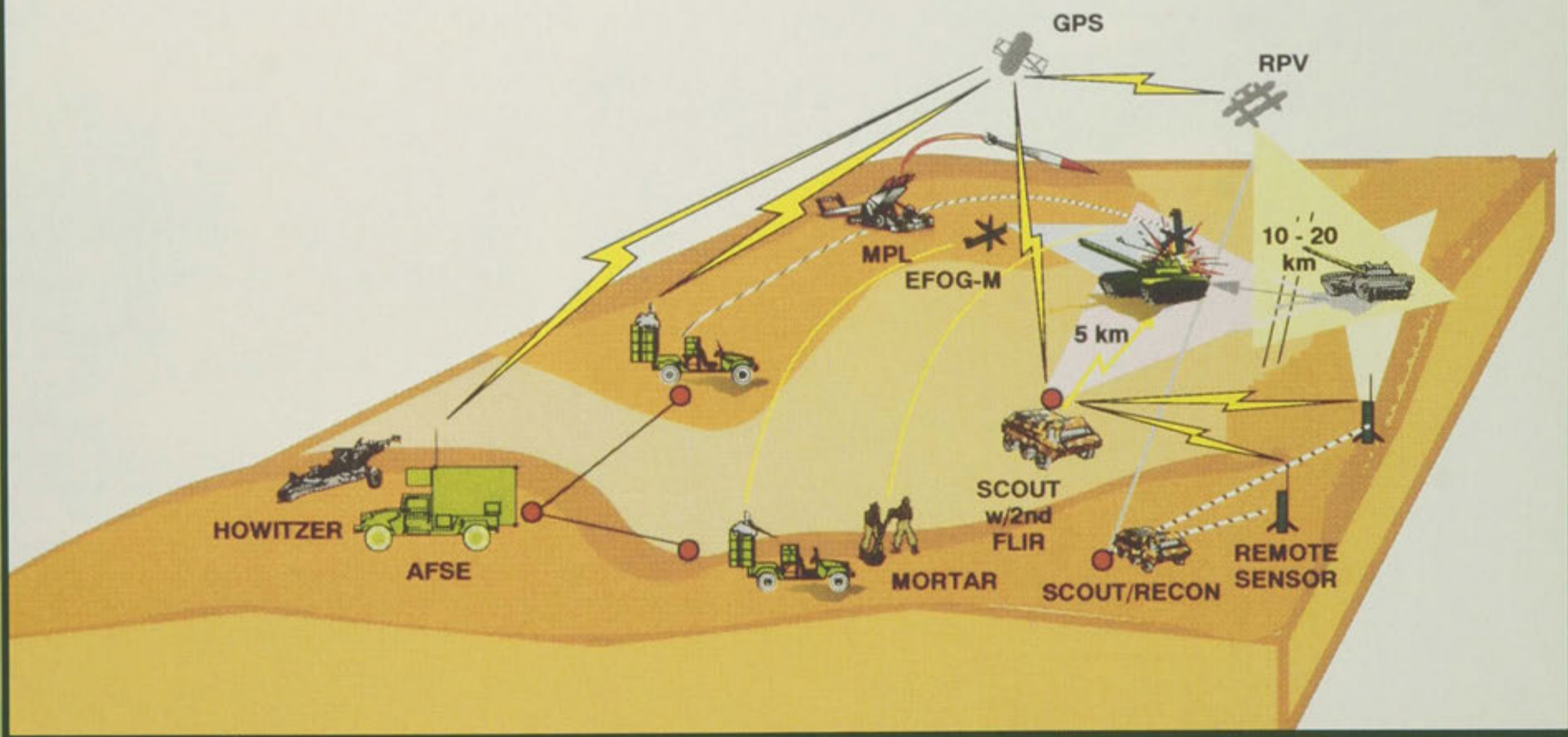
POINT OF CONTACT:

Project Manager
TOW
ATTN: SFAE-FS-TO
Redstone Arsenal, AL 35898-5710

CONTRACTORS:

Missile: Hughes (Tucson, AZ)
ITAS: Texas Instruments (Dallas, TX)

Rapid Force Projection Initiative TLD



More Capable "Lethal Light" Forces

Dominate the Maneuver Battle

OVERVIEW:

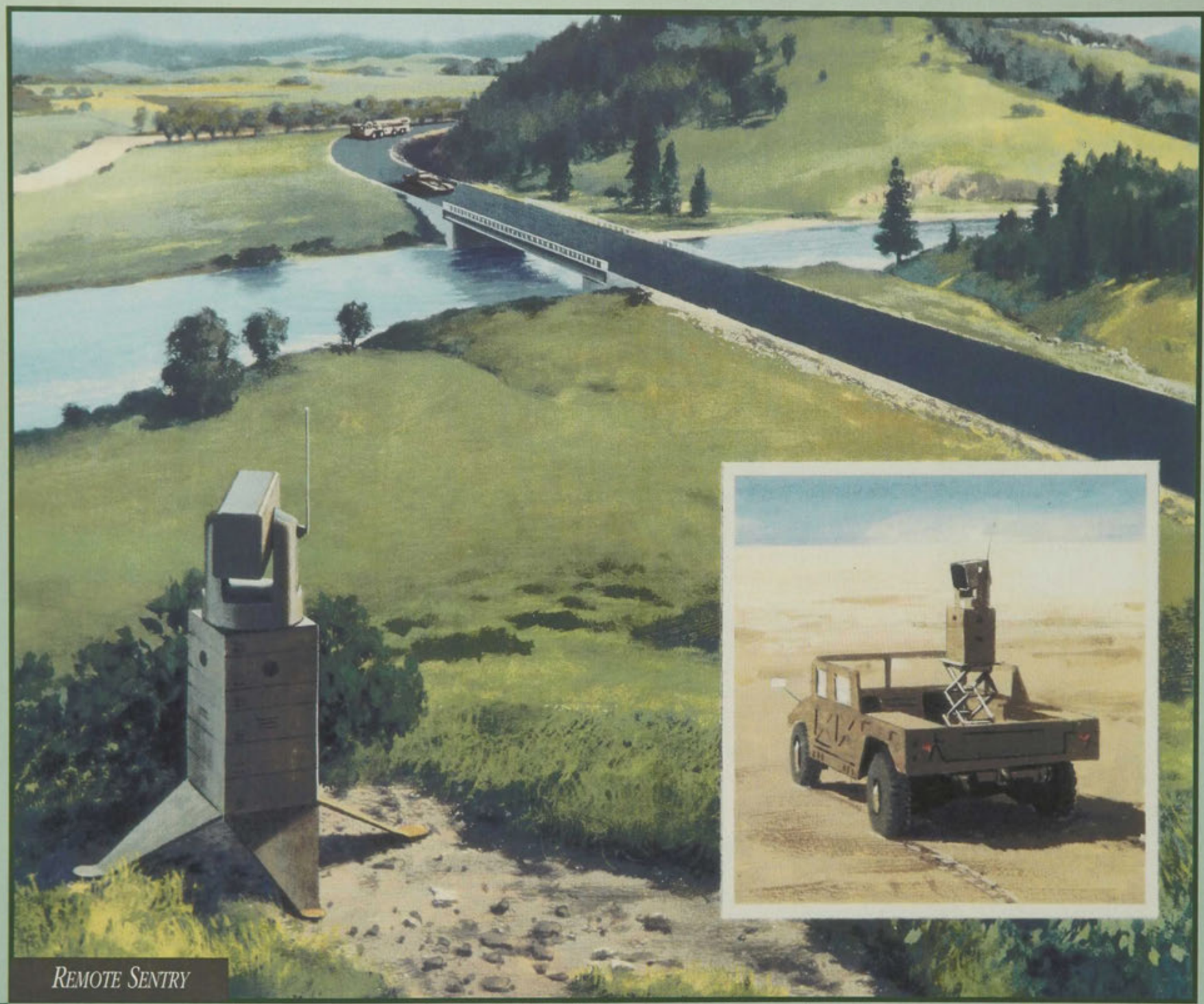
The goal of the Army Science and Technology program in *Dominate the Maneuver Battle* is to provide technology for overmatching enemy air and land systems to give our soldiers the decisive edge on the battlefield. The future battlefield will contain advanced air and land forces because of the rapid proliferation of progressive weapon systems and technologies around the world. To ensure a swift, decisive, low-casualty victory, the Army combined arms force must be able to outmaneuver and quickly destroy these mobile adversaries at long ranges. This requires horizontal technology integration into the combined arms force of such critical capabilities as owning the night, superior situational awareness, digitizing the battlefield, and increased lethality and survivability of first-to-fight forces.

RAPID FORCE PROJECTION INITIATIVE (RFPI) TLD:

The Rapid Force Projection Initiative (RFPI) Top Level Demonstration (TLD), part of DoD Science and Technology Thrust 5, Advanced Land Combat, will provide early entry forces with advanced technologies and systems. RFPI, in conjunction with the Training and Doctrine Command (TRADOC) Battle Labs, will provide technologies to improve the survivability and lethality of air deployable, first-to-fight forces. Near real-time target information is relayed from the hunters through an Automated Fire Support Element (AFSE), a Tactical Operations Center, to the standoff killers. These standoff systems are designed to engage and kill enemy armor forces with long-range precision munitions. This near real-time capability to pair targets with weapons dramatically reduces sensor-to-shooter time lines and provides the commander with the ability to synchronize massed fires on enemy forces. The enhancements to the operational capability requirements of light forces provided by RFPI technologies will significantly reduce threat combat power prior to the occurrence of the direct fire battle. The capability to overmatch any threat force with highly deployable forces is essential for the success of a force projection Army. RFPI consists of three components: simulation, integrated demonstration, and 11 individual Advanced Technology Demonstrations (ATD) and Technology Demonstrations (TD).

RFPI "Hunter" ATDs:

The Scout Sensor Suite ATD will demonstrate an advanced long-range sensor suite on a hunter/scout vehicle, which provides multiple target acquisition capabilities with enhanced target hand-off time lines to standoff killers. This will provide the mounted scout with long-range target acquisition and detection using second generation FLIR and acoustic sensors. Pacing technologies include second generation focal plane arrays, advanced signal processing hardware, image compression/transfer techniques, ground-based aided target recognition algorithms, and reduced signature optics. The Scout Sensor Suite will be integrated with the hunter for use in the RFPI Integrated Demonstration. Additionally, the ATD will provide a sensor for the Dismounted Scout, which couples into the Hunter network, and a Driver's Thermal Viewer (DTV) for enhanced (day/night) vehicle mobility.



REMOTE SENTRY

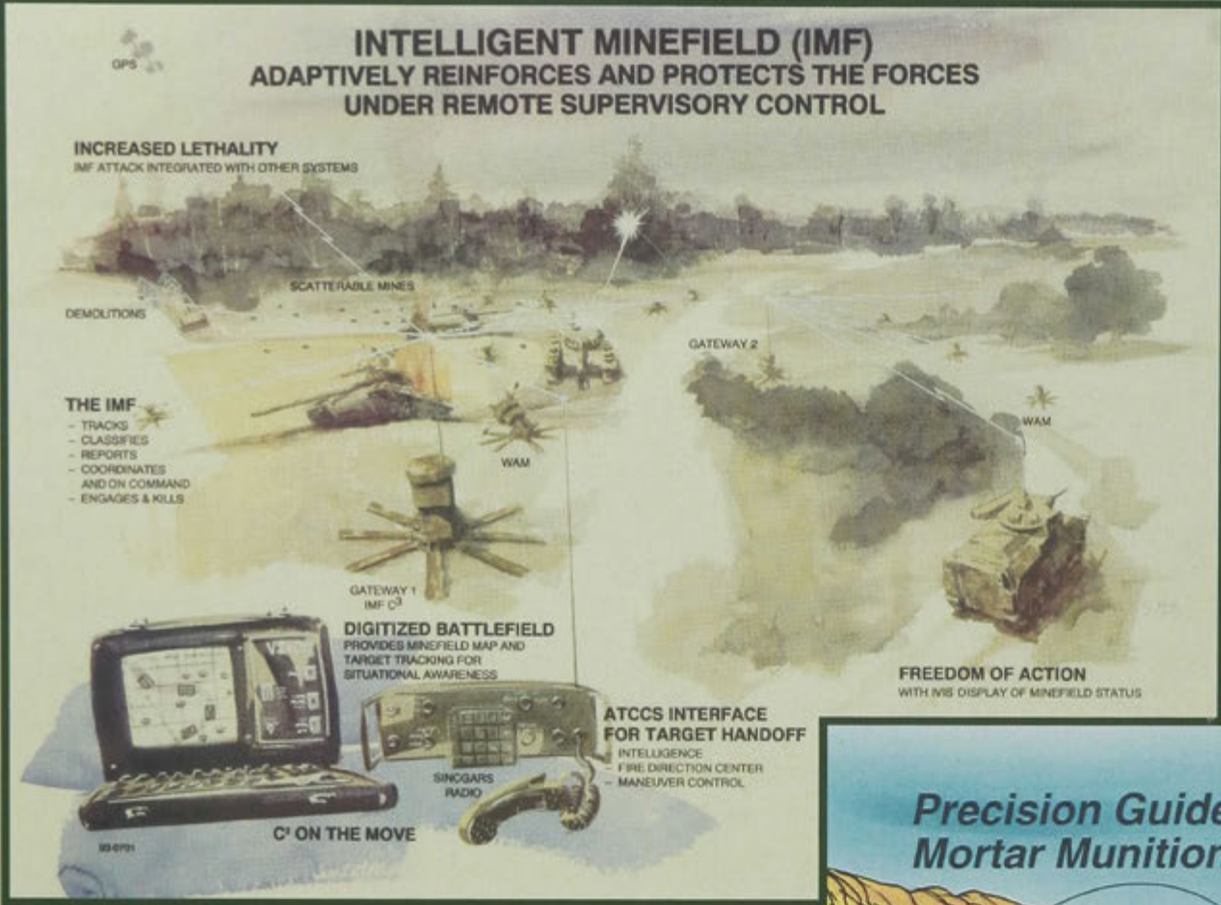
Dominate the Maneuver Battle (Continued)

RFPI "STANDOFF KILLER" ATDs:

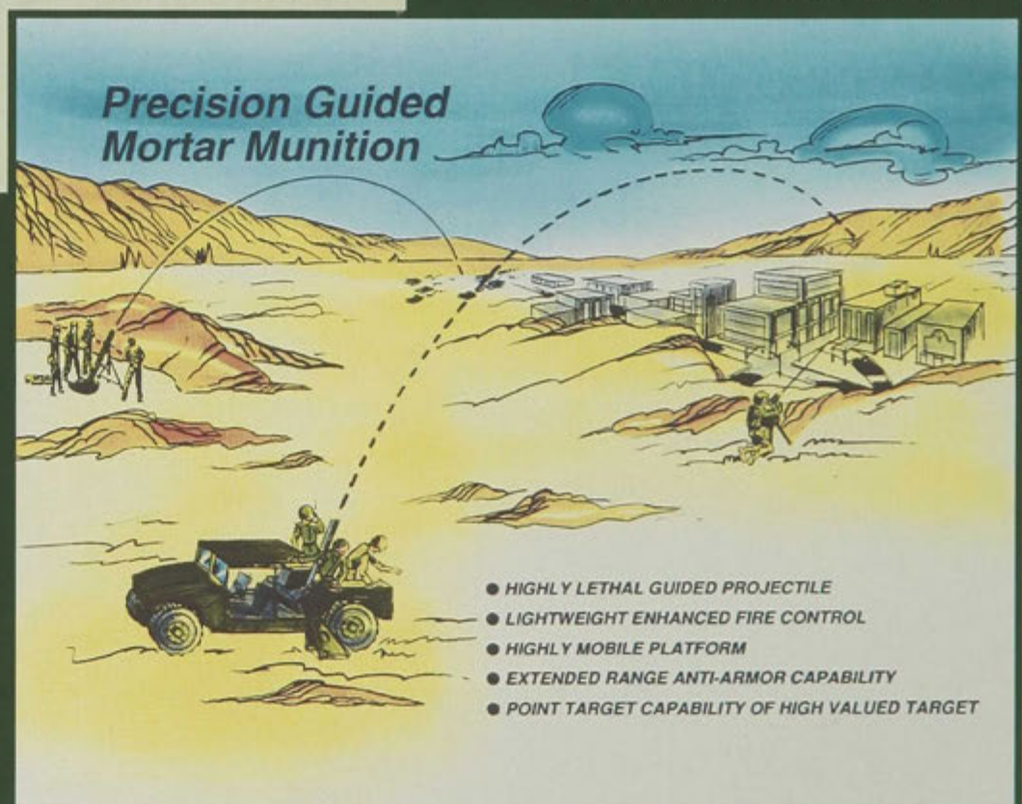
The Remote Sentry ATD provides low-cost, lightweight, autonomous, remote, wide-area, ground-based surveillance and target acquisition during day, night, and limited visibility conditions for early entry forces. This will be accomplished through both imaging (FLIR and day TV) sensors and non-imaging (acoustic, magnetic, and seismic) sensors. These sensors will provide compressed target image handoff to the scout vehicle over the Single Channel Ground and Airborne Radio System (SINCGARS) secure link. Pacing technologies include uncooled FLIR, data compression/transfer techniques, low-level processing, and power sources.

The Hunter Vehicle ATD will evaluate several modified, Non-Developmental Item (NDI) ground systems that can serve as the "Hunter" in the RFPI "Hunter/Standoff Killer" concept. This ATD will demonstrate medium helicopter transportable vehicles, survivability technologies, and Command, Control, Communications, Computers, and Intelligence (C³I) systems to enable the Hunter to survive and operate effectively at a low weight and with a minimum crew size. The Hunter Vehicle will be designed to carry scout sensors, communication, battle management/Identification Friend or Foe (IFF), dismounted scout with man-portable sensors (goal), two to four remote sentries, and lightweight armor. The approach of using several NDI vehicles will allow investigations of a range of technical options (e.g., high to low stealth, wheel versus track) to assess the technical feasibility and operational potential of a vehicle intended to locate targets for standoff weapons and to perform deep reconnaissance missions. The Hunter Vehicle should be capable of carrying the following additional items: integrated projection systems, lightweight armament (medium-caliber cannon/Directed Energy Weapon [DEW], and Javelin-class, lightweight anti-tank missiles). The component technologies that will be demonstrated include structures, vehicle technology, situational awareness, combat identification, sensors, and weapon links.

The Enhanced Fiber Optic Guided Missile (EFOG-M) ATD is a highly lethal, standoff, anti-armor killer that fires from full defilade, thereby providing the soldier a high degree of survivability. The EFOG-M ATD will demonstrate a rapidly deployable system for use by light forces against armored targets beyond the close battle. The missile incorporates an imaging infrared seeker for day/night operations and a Global Positioning System (GPS)-augmented navigation system. The EFOG-M will allow engagement and destruction of targets at longer ranges with a precision that will allow "surgical" removal of selected high-value targets. Advanced sensors to provide target location data, command and control links, accurate missile navigation, and a man-in-the-loop during critical end-game target identification/lock-on will provide this capability, greatly enhancing a commander's ability to reach deeply and lethally into enemy forces and favorably alter the loss/exchange ratio.



Intelligent Minefield (IMF)



Precision Guided Mortar Munition

Dominate the Maneuver Battle (Continued)

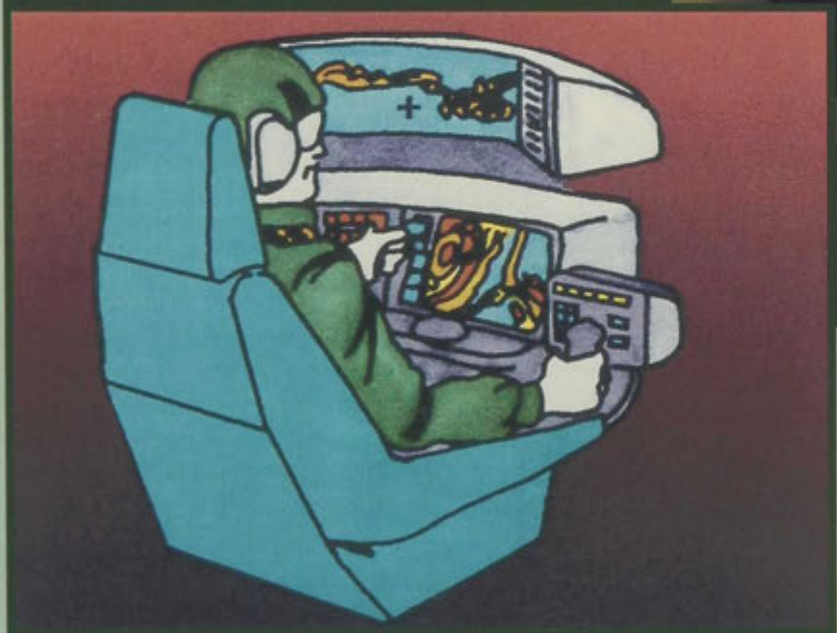
RFPI "STANDOFF KILLER" ATDs:

The Intelligent Minefield (IMF) ATD demonstrates effective command and control of interactive minefields containing sensor arrays and smart anti-tank mines. In contrast to the traditional image of totally passive, distributed conventional mines, the last decade has seen the development of small, scatterable mines that can be delivered by air, ground, or artillery, and that are effective over the width of the entire vehicle. The IMF ATD is tasked to enhance and support standoff warfighting by providing a capability for mines to maintain a command and control link to standoff forces. The ATD focus is on optimized use of smart, wide area anti-tank mines by the light forces, providing first-to-fight forces with the ability to coordinate the action of individual mines, resulting in selective engagements (avoid multiple attacks on single targets) and advanced coordinated tactics (ambush, entrapment, filtration). The ATD will demonstrate a variety of minefield enhancements obtained through advanced sensors and digital communications to help the user determine which alternatives are cost effective for future systems. Additional capabilities will include control of large areas with minimum time, materiel, and personnel on site; and reusable smart mines to maximize available assets and reduce logistics burdens. Critical technologies include sensors, communications, signal processing, and data fusion.

The Precision Guided Mortar Munition (PGMM) ATD will investigate the technologies of infrared and millimeter wave sensors, laser designators, and fiber optics guidance systems into a mortar munition to increase the survivability and lethality of the light forces on the battlefield. An improved man-portable fire control system will be developed, which can be used to upgrade the fire control of other mortar and artillery systems for improved effectiveness. The role of the PGMM ATD is to provide an extremely lightweight, non-line-of-sight anti-armor Standoff Killer system. The component elements are PGMMs with extended ranges, top-attack anti-armor warheads, and precision fire control. Near-term emphasis will be on the evaluation of existing foreign and domestic systems to use or modify NDI technology. The PGMM ATD goal is to rapidly engage specific targets identified by the forward sensors (Hunters), and to provide rapid response to calls for fire through use of a compact, man-portable fire control system. Integration of PGMMs in the Hunter/Standoff Killer first-to-fight forces will provide increased flexibility as compared to current force structures, and reduction in logistics requirements by reduction in numbers of rounds per kill (increased accuracy and lethality).

Composite Armored Vehicle

Hit Avoidance



Crewman's Associate

Dominate the Maneuver Battle (Continued)

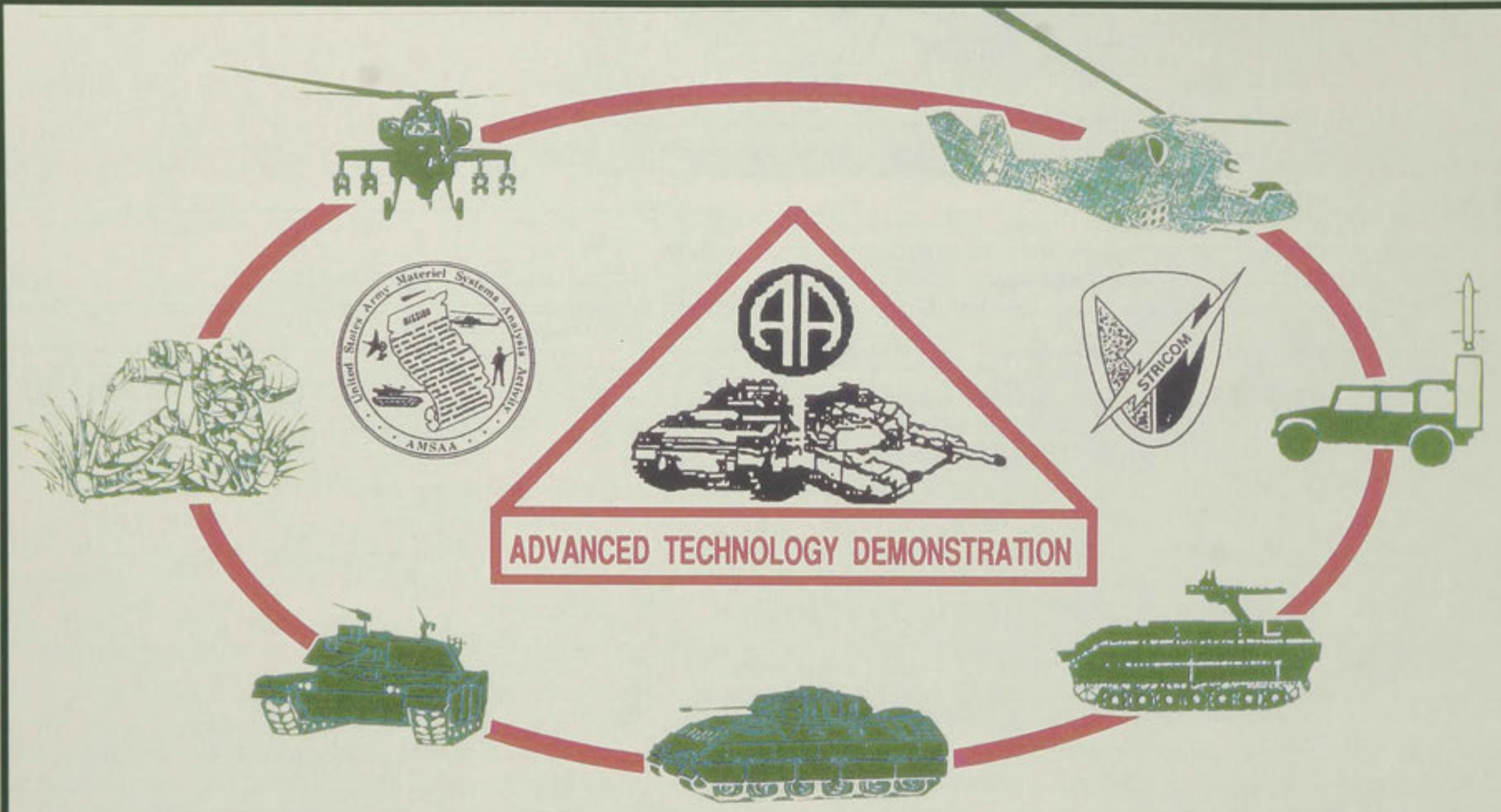
ADVANCED VEHICLE TECHNOLOGIES (AVT) ATD:

The Advanced Vehicle Technologies (AVT) are TLDs applicable to all ground vehicles, but emphasize improvements in medium and heavy systems. The primary goal of AVT is to provide superior combat capabilities at weights and sizes that enhance deployability. AVT will examine ways to lighten combat vehicles through such means as composite structures and protection of ground vehicles with innovative means other than heavy armor. It will also explore techniques to reduce the number of crewmen required to operate these systems.

The Composite Armored Vehicle (CAV) ATD is an AVT program with an ATD contract award in FY94. Future prospects of a smaller Army with fewer forces deployed overseas, combined with growing regional instability, make power projection of survivable forces with decisive advantages an imperative. Technologies must be developed that lead to future lightweight, versatile, survivable, and deployable combat vehicles. The CAV ATD will demonstrate a lighter-weight, ground combat vehicle using advanced composites with integrated signature management. It will consist of a demonstration of advanced composites, signature management technology, and advanced lightweight armors on a 17- to 22-ton platform, emphasizing manufacturability, repairability, non-destructive testing, and structural integrity. The CAV's operational advantages will improve survivability by reducing detectability, improving agility, and improving deployability by reducing structure weight.

The Hit Avoidance ATD is also an AVT program. The premises behind an integrated approach in this ATD are that smart weapons are very effective and are expected to become more prevalent, and that vehicle systems cannot be protected totally by ballistic armor without paying an unacceptable price in system weight. The Hit Avoidance ATD will demonstrate integration of sensors, countermeasures, and active defenses against both top attack and horizontal threats. The types of sensors that could be integrated include laser warning, radar warning, and passive missile warning receivers. Countermeasures might include jammers, obscurants, and counterfire.

The Crewman's Associate ATD is also an AVT program. Recognizing that there is a direct relationship between crew size and vehicle size and weight, the Crewman's Associate ATD will demonstrate crew station concepts utilizing advanced displays and controls that allow effective operation with smaller crews by enabling soldiers to quickly understand and easily react to large amounts of information. It will examine ways to reduce crew workloads by automating certain functions and speeding both inter-vehicle and intra-vehicle information flow. Artificial intelligence (AI) will be used to automate routine crew duties, freeing them to concentrate on more critical matters. The crew station technologies in this approach may include advanced displays, expert systems, and voice interactive technology. Soldier-in-the-loop simulators will be built in FY94.



Advanced Distributed Simulation Technology

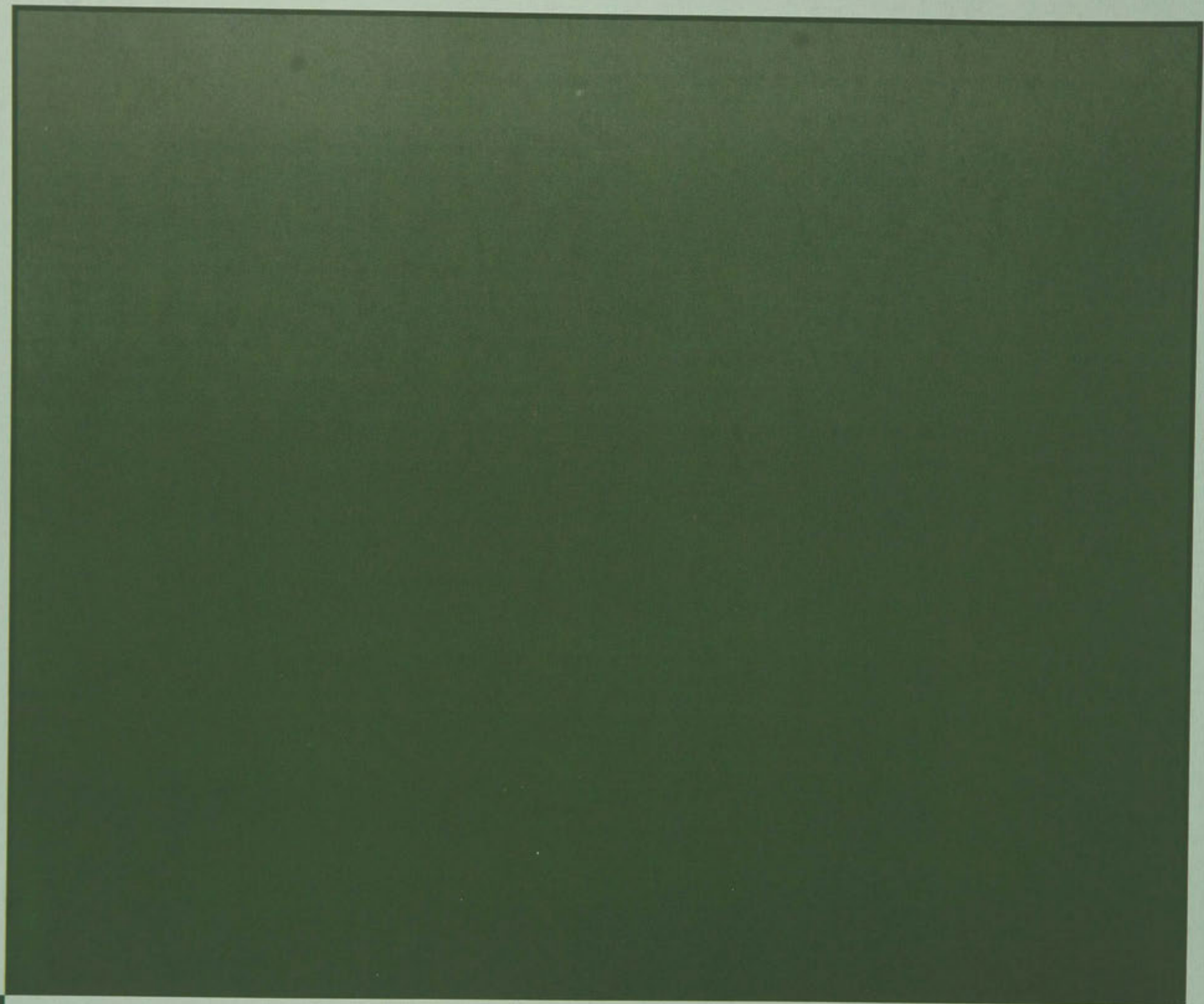
Develop and Demonstrate a Credible Evaluation Tool to Support Acquisition Decisions

Anti-Armor Advanced Technology Demonstration (A²ATD)

Dominate the Maneuver Battle (Continued)

ANTI-ARMOR (A^2) ATD: ***The Anti-Armor (A^2) ATD*** will develop and conduct experiments with a verified, validated, and accredited distributed interactive simulation (DIS) capability to assess and evaluate anti-armor weapon systems' effectiveness in a combined arms battalion-level task force or brigade-level synthetic battlefield environment. This real-time, warfighter-in-the-loop DIS capability will provide the potential to improve the effectiveness and efficiency of the materiel acquisition process by providing early insights in the areas of concept formulation and development; requirements definition; tactics, doctrine, and organizational development; human engineering; system and force effectiveness evaluation; and planning, training for, and augmenting operational tests. Measures of performance beyond the Battlefield Distributed Simulation-Developmental ATD baseline include the following: verified, validated, and accredited DIS standard capability to assess anti-armor systems' effectiveness; Janus-linked to DIS and used as a computer-generated force (CGF); definition of the scope of DIS applications to support weapon systems acquisition decisions. A^2 ATD technology will transition to BDS-D Version 1 program. The DIS synthetic environment capability will be used by the materiel and combat developers and operational testers for the early and ongoing anti-armor weapon systems analyses of science and technology concepts, tactics/doctrine, procedures, system upgrades, and next generation/future anti-armor weapon systems development.

TARGET ACQUISITION ATD: ***The Target Acquisition ATD*** will demonstrate aided target acquisition and prioritization at extended ranges to allow reduced crew work loads and targeting time lines. The program will combine a "Comanche-type" second generation thermal sight, aided target recognition processor, global positioning system, cooperative target identification, and other emerging technologies to reduce crew requirements and increase lethality and survivability. In addition, thermal driving technologies will provide increased on- and off-road mobility.



Conclusion

The goal of Army Research, Development and Acquisition is to provide our soldiers with world-class equipment, delivered on time at an affordable cost, so they can win quickly, decisively, and with minimum casualties whenever and wherever they are called upon to fight. To support this goal, the Army has adopted a program of continuous modernization. This strategy emphasizes the fielding of new technology through upgrades, synergistic improvements through integration of selective technologies horizontally across the force, and where required, selective initiation of new programs. Our modernization program is constructed around combat-proven capabilities, and we are pursuing only a few new programs of highest priority. Our program is austere but sound.

This Handbook overviews the Army's most important weapon systems and equipment, and is intended as an informational and visual aid for those involved in the Army's modernization efforts. We hope you find this information useful. Today's Army is superbly trained, highly motivated, and well equipped. Our challenge is to keep it that way, and with the implementation of our modernization plan, we can and will.

Glossary

Life Cycle System Management Model Terms:

Technology Base: Efforts focused on the identification and development of promising technologies (not directly tied to specific acquisition programs) are collectively called the technology base. It encompasses programs in basic research, exploratory development, and advanced technology development.

Concept Exploration and Definition: Alternative system design and support concepts are explored within the context of the mission need and program objectives. Emphasis is on generating innovation and conceptual competition from industry, both foreign and domestic, and U.S. Government research, development, and engineering centers and laboratories.

Demonstration and Validation: Focuses on defining critical design characteristics, addressing manufacturing technological deficiencies, and assessing production feasibility. Analysis, simulation models, or prototypes are used to optimize design and resolve problems.

Engineering and Manufacturing Development: The purpose of EMD is to design, fabricate, test, and evaluate a complete system. This includes the principal items necessary for its production, operation, and support, and serves to validate the production process. Reliability and maintenance design, testing, and evaluation of components should be integrated into the earliest part of this phase.

Production: After successful completion of technical and user tests, production begins at rates based on manufacturing efficiency, operational demand, and resource availability.

Fielded: During this phase, the materiel system is operated, supported, and maintained in accordance with its intended operational concept, and opportunities are explored for continued improvement in cost, performance, and reliability based on actual experience.

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