

Weapon Systems United States Army 1997

COLUMN 1







To the Reader:

Joint Vision 2010, the Chairman's of the Joint Chiefs of Staff vision of future joint warfighting concepts, will guide the services toward a more effective future joint force. America's Army is ready to move forward as the land component member of that joint warfighting force. The Army brings the ability to conduct prompt operations on land throughout the spectrum of crisis. The Army is modernizing its forces according to the concepts of Army Vision 2010 and the guidelines of the Army modernization objectives. Each modernization objective and each Army vision concept has a counterpart in the future operational concepts of *Joint Vision 2010*, ensuring that the Army remains synchronized with the Chairman's vision.

This handbook outlines the major programs that the Army is pursuing to realize that vision. These systems will provide the tools for America's trained and ready soldiers to be the most powerful force in the world. It is our hope that you will find this book a valuable and informative reference work.

forde Va

Ronald V. Hite Lieutenant General, GS Military Deputy to the ASA(RDA)

Flecher

Gilbert F. Decker Assistant Secretary of the Army (Research, Development and Acquisition)



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How to Use This Book

This book is divided into five **Modernization Objective** sections. The systems are listed only in the Modernization Objective section to which the system adds the most capability.



Project & Sustain



Protect the Force





Conduct Precision Strike



Dominate the Maneuver Battle

The Life Cycle Management Model shows the development stage that the system is in. The terms are explained on the facing page.



The **U.S. Outline** highlights the states in which system contractors with \geq 5% of total program value for FY97 are located.

The **Modernization Objective icons** are displayed for all Modernization Objectives to which the system adds capabilities. The **Prime Contractor(s)** for the system is displayed. The major sub-contractors can be found listed in the "Contractors by System" and "Contractors by State" Appendices.

Efforts focused on the identification and development of promising technologies (not directly tied to specific acquisi-SCIENCE AND TECHNOLOGY tion programs) are collectively called science and technology programs. S&T encompasses programs in basic research, (S&T): exploratory development, and advanced development. **CONCEPT EXPLORATION** The focus of this phase is on defining and evaluating the feasibility of alternative concepts and providing the basis for assessing the relative merits of the concepts. The objectives of this phase are to: **AND DEFINITION:** • Explore various material alternatives to satisfying the documented mission need, • Define the most promising system concept(s), • Develop supporting analysis and information to include identifying high risk areas and risk management approaches to support the Milestone I decision, and • Develop a proposed acquisition strategy and initial program objectives for cost, schedule, and performance for the most promising system concept(s). When warranted, multiple design approaches and parallel technologies are pursued within the system concept(s) dur-**DEMONSTRATION AND** ing this phase. The objectives of this phase are to: VALIDATION (DEM/VAL): • Better define the critical design characteristics and expected capabilities of the system concept(s), • Demonstrate that the technologies critical to the most promising concept(s) can be incorporated into system design(s) with confidence, • Prove that the processes critical to the most promising system concept(s) are understood and attainable, • Develop the analysis/information needed to support a Milestone II decision, and • Establish a proposed Development Baseline containing refined program cost, schedule, and performance objectives for the most promising design approach. **ENGINEERING AND** The objectives of this phase are to: • Translate the most promising design approach developed in the Demonstration and Validation phase into a stable, MANUFACTURING producible and cost effective system design, **DEVELOPMENT (EMD):** • Validate the manufacturing or production process, and • Demonstrate through testing that the system capabilities: Meet contract specification requirements, and • Satisfy the mission need and meet minimum acceptable operational performance requirements. System performance and quality will be monitored by follow-on test and evaluation during this phase. The objectives **PRODUCTION AND** of this phase are to: **DEPLOYMENT:** • Establish a stable, efficient production and support base, • Achieve an operational capability that satisfies the mission need, and • Conduct follow-on operational and production verification testing to confirm and monitor performance and quality and verify the correction of deficiencies. This phase overlaps with the Production and Deployment phase, and begins after initial systems have been fielded. The **OPERATIONS AND SUPPORT:** objectives of this phase are to: • Ensure the fielded system continues to provide capabilities required to meet the identified mission need, and • Identify shortcomings or deficiencies that must be corrected to improve performance.



Leading the Way to JV 2010 and Beyond

"...Tomorrow's Force must be as ready as today's and therein lies a very big challenge. While we have been able to maintain high readiness levels throughout the years of downsizing, we must now turn to replacing old equipment and sustaining a prudent modernization program in the future."

> GEN John M. Shalikashvili Chairman, Joint Chiefs of Staff April 10, 1996

The United States military is in transition, heading away from a large Cold War force to a smaller but more capable joint force that can meet all of America's defense needs. The rapid advance of information technology makes this transformation possible. Declining defense resources make this transformation essential to the continued dominance of the U.S. military. In *Joint Vision 2010*, the Chairman of the Joint Chiefs of Staff describes the operational concepts and capabilities of that future joint force.

While all the services are moving towards Joint Vision 2010 (JV 2010), the Army leads the way. Army Vision 2010 provides the directional azimuth for modernization through its six patterns of operations. The Army Modernization Plan, in turn, describes five modernization objectives that align with the operational concepts of JV 2010. The Modernization Plan and the Force XXI process will move us to Army XXI, which will be an integral part of JV 2010's vision.

Army Weapon Systems 1997 provides an in-depth look at the weapon systems that equip America's Army today and will equip Army XXI in the future. The programs in this book range from high to low profile, but each program has an important role to play in modernization. Army XXI will require the full package of systems and upgrades if it and JV 2010 are to become a reality. This book is not a catalog of mix-and-match systems, but a description of an integrated program that will bring the Army into the future.



JOINT VISION 2010 AND ARMY XXI

"The nature of modern warfare demands that we fight as a joint team.

This was important yesterday, it is essential today, and it will be even more imperative tomorrow. Joint Vision 2010 provides an operationally based template for the evolution of the Armed Forces for a challenging and uncertain future. It must become a benchmark for the Service and Unified Command visions."

> GEN John M. Shalikashvili Chairman, Joint Chiefs of Staff



JV 2010 aims to provide a conceptual template for how America's Armed Forces will achieve new levels of effectiveness in joint warfighting through the integration of its people with new technological opportunities. America's Armed Forces have the best people, but they must be given the best technology and the right kind of technology in order to retain their advantage over the rest of the world. The Armed Forces must modernize in such a way that they are prepared to fight a 21st Century conflict. The concepts in JV 2010 will help guide that modernization to ensure that our people receive the technology that will make the most difference.

The future vision of warfare in JV 2010 centers on Information Superiority, which is defined as the capability to collect, process, and disseminate an uninterrupted flow of information while exploiting or denying an adversary's ability to do the same. Information warfare involves both offensive operations against an adversary's ability to collect and use data and defensive operations to protect our own information systems from direct and indirect attack. Information superiority requires that we dominate in both kinds of operations.

Information superiority over an adversary makes it possible for U.S. forces to implement four operational concepts: Dominant Maneuver, Precision Engagement, Focused Logistics, and Full-Dimensional Protection. These four concepts focus on delivering massed effects (i.e. bringing the concentration of combat power against an adversary at the decisive time and place, without needing to physically mass forces as much as in the past). Information Superiority can produce massed effects, because it creates an information imbalance between friendly forces and the adversary. Figure 1 shows how these concepts fit together.

JV 2010 describes dominant maneuver as the multidimensional application of information, engagement, and mobility capabilities to position and employ widely dispersed joint air, land, sea, and space forces to accomplish the assigned operational tasks. It is the old Army approach of shoot, move, and communicate taken to a much more sophisticated level.

Precision engagement is a system of systems that will enable our forces to locate the objective or target, provide responsive command and control, generate the desired effect, assess our level of success, and retain the flexibility to reengage with precision when required. Precision engagement reinforces dominant maneuver by allowing U.S. forces to shape the battlespace from extended ranges.



Focused logistics is the fusion of information, logistics, and transportation technologies to provide rapid crisis response, to track and shift assets even while en route, and to deliver tailored logistics packages and sustainment directly at the strategic, operational, and tactical level of operations. It will allow U.S. forces to project their power more quickly and operate more efficiently.

Full dimensional protection will guarantee U.S. forces freedom of action in the battlespace by protecting them from many of the same technologies they will exploit. A multi-layer defense against ballistic missiles, cruise missiles, and nuclear, biological and chemical weapons will give the future joint force the freedom to deploy, maneuver and engage the adversary quickly and decisively.

These operational concepts add up to full spectrum dominance of an adversary across all categories of conflict. JV 2010 is about merging the best technology and the right technology with the best people to achieve full spectrum dominance. The Army is already on its way there.

ARMY SUPPORT OF JV 2010: OBJECTIVES AND SYSTEMS

The Army Modernization Plan lays out five modernization objectives that align with the operational concepts of JV 2010. The technology and concepts that are being tested in the Force XXI process will be the means to achieving those modernization objectives and moving toward Army XXI. It is through the Force XXI process, and the synchronization of Army capabilities and a modernization strategy, that the Army is leading the way to JV 2010 and beyond. Figure 2 shows the linkage between the JV 2010 operational concepts and the five Army modernization objectives.

Win the information war; dominate the maneuver battlefield; conduct precision strike; project and sustain; and protect the force are the Army's modernization objectives. Each modernization objective captures the same future capabilities as its JV 2010 counterpart. Army XXI will utilize the full package of operational concepts in JV 2010, putting Army systems and Army warfighters at the core of the future joint force.



"Modernization has had to make do with what we could salvage." The Hon. Gilbert E Decker Assistant Secretary of the Army for Research, Development, and Acquisition

The Army Modernization Plan (AMP) describes the what and why of the systems and capabilities that will go into Army XXI. Each objective is a statement of capabilities that the Army will need in the future to retain an overwhelming technological and doctrinal advantage over opposing forces. The plan also describes the systems needed to realize those capabilities. Getting the resources to modernize our forces towards each objective is critical to making Army XXI a success.

"Who the hell gets excited about a 2 1/2 ton truck? Well, I do. If you are in combat and can't move supplies you're in trouble." The Hon. Gilbert E Decker Assistant Secretary of the Army for Research, Development, and Acquisition

Project and Sustain



Project & sustain describes those systems and capabilities needed to rapidly deploy U.S. forces into a potentially hostile area and to sustain and augment them as necessary once

deployed. This objective covers the critical logistic systems needed to move a force to and within a theater and to keep that force supplied. It includes non-Army strategic lift programs like the USAF C-17 and the Navy's Large Medium Speed Roll-on/Roll-off Ship (LMSR). Army efforts to improve the self-deployability of systems like the Comanche and Apache Longbow also support this objective. Project & Sustain covers the workhorses of intratheater lift like the UH-60 Black Hawk, the High Mobility Multipurpose Wheeled Vehicle (HMMWV), the Family of Medium Tactical Vehicles, and the Palletized Load System. It also includes systems



like the Total Distribution Program which track the flow of supplies. Improved logistic efficiency will permit a move away from "supply push" to "just in time" logistics that will make optimal use of lift assets. Finally, it includes the systems like Force Provider, Family of Operational Rations and Deployable Medical Systems which improve the quality of life for soldiers in forward areas.

Protect the Force

Protect the Force describes the systems and capabilities needed to enhance the survivability of U.S. forces against the wide range of modern battlefield threats. Once a force has been projected into a region, it must be able to defend itself against deep strikes by the adversary. If the forward assembly areas cannot be defended, the U.S. cannot easily build up its forces. The Army requires systems for theater missile defense and chemical and biological weapon detection and defense. The Theater High Altitude Area Defense System (THAAD) and Medium Air Defense System (MEADS) are two systems in this category. The Army must also improve the survivability of its forces in combat, which means enhancing soldier survivability through the development of items like lightweight body armor and combat identification systems.

"There's a whole bunch of unglamorous things in the Army that are absolutely vital to the combat force."

The Hon. Gilbert F. Decker Assistant Secretary of the Army for Research, Development, and Acquisition

Win the Information War

Win the information war describes systems and capabilities needed to give U.S. forces an overwhelming information advantage in combat. Once the U.S. projects a force into a region and begins the build-up for the maneuver battle, the force

must know where the adversary is and what it is doing. The Comanche will serve as the commander's "eyes and ears" to provide tactical reconnaissance and battlefield situational awareness. As the ground maneuver element of the joint force, the Army needs improved Command, Control, Communications, Computers and Intelligence (C^4I) systems that will allow it to conduct deep simultaneous attacks against the enemy, while limiting the exposure of friendly forces. This includes systems that will provide all commanders and soldiers with total situational awareness, allowing them to know where both friendly and hostile units are. It includes the sensors that will detect and identify targets as well as the systems that will interpret and move the data to the appropriate users. It also includes the systems that will protect information about the locations and numbers of friendly forces.



Conduct Precision Strike



Conduct precision strike describes systems and capabilities needed to strike at hostile forces in their assembly areas and to shape the maneuver battlefield. As the projected force pre-

pares to move to the maneuver battle, the Army, as part of the joint team, must be able to destroy and disrupt the adversary as much as possible <u>before</u> Army maneuver units make contact. Both the Apache Longbow and the Comanche will allow the commander to plan and execute the close and deep battles rapidly, day or night and in any weather. Systems such as the Army Tactical Missile System (ATACMS) and the Multiple Launch Rocket System (MLRS) using precision munitions will allow U.S. forces to engage and destroy hostile forces before contact.

Dominate the Maneuver Battle



Dominate the maneuver battle describes the systems and capabilities needed to retain land force dominance over opposing forces. When

Army maneuver units move to engage the adversary, they must have an overwhelming technological advantage in order to produce massed effects. A smaller Army needs to hit harder, move faster and have better situational awareness, if it is to dominate the battlefield. This means providing upgrades to existing systems like Apache, Abrams and Bradley, as well as acquiring new systems like Line-of-Sight Anti-Tank (LOSAT) and the Crusader advanced field artillery system. These systems will ensure that as U.S. maneuver units close with the adversary, they will have an overwhelming technological advantage, achieving modernization overmatch.





ARMY MODERNIZATION: LEADING THE WAY TO JV 2010 AND BEYOND

The Army is well-situated to lead the way toward the Chairman's vision of the future force of full spectrum dominance. But it can only do so if its modernization plan is adequately resourced. Most of the systems in this book are not glamorous and for some their contribution to Army XXI may not be immediately clear. However, each system in the book is part of an integrated whole that will lead to Army XXI and JV 2010.

Each system in this book is listed according to the Army modernization objective that it primarily supports and the capabilities they enhance the most. On each system page are icons showing which other modernization objectives that system supports. As you, the reader, examine these systems, remember that each modernization icon represents a set of future capabilities that tomorrow's Army must realize for it to remain the dominant military force in the world.

"...we mortgaged the modernization account to take care of the people. Now it's time to rebalance that equation."



GEN Dennis J. Reimer Chief of Staff of the Army 23 April 1996

The systems in this book, like the capabilities in the Army Modernization Plan, are part of an integrated approach to make the Army of the future capable of meeting the increased demands of our nation with fewer resources. Each system and each capability has an important role to play in making modernization a reality. Each system and each capability will contribute towards the Army's ability to respond to our nation's needs. The systems in this book are today's investment to ensure the future readiness of our Army. The Army of tomorrow will rely on these systems to successfully perform all assigned missions.





The Army of tomorrow will be a smaller, continental U.S. (CONUS) based force that will require a greater ability to project and sustain its power anywhere in the world. To realize that objective, Army systems need to be light, lethal

and modular, so that it can project more capabilities with fewer resources. The Army also needs to have sufficient strategic and tactical lift assets to move its forces around the globe. Finally, the Army must project itself efficiently by taking advantage of new technologies to move only what is absolutely necessary. Improved logistical information systems and a new emphasis on split based operations will allow the Army to fully sustain its forces while projecting fewer support elements.

Major Regional Contingencies (MRCs) and crisis response operations are the most demanding scenarios for project and sustain, because they require rapid movement of large numbers of assets. Systems and approaches that support these intensive operations will also support other missions such as humanitarian relief and peacekeeping. In any crisis, the Army will need highly lethal early entry forces that can help secure entry points into a theater. Such forces need to be light, modular and rapidly transportable, but they also need improved defense and logistics assets that will permit them to hold the entry points. One example in this area is the Force Projection Tactical Operations Center (FP TOC), which will give the early entry commander an improved ability to manage the Theater Missile Defense (TMD) fight during the build-up phase.

Once the entry points are secure, the Army needs to be able to move heavier forces and supporting logistics forces into the theater quickly. This rapid build-up phase relies on the availability of large transport aircraft and large roll-on/roll-off ships to move the necessary equipment and supplies to the theater. The USAF C-17 and the USN Large Medium Speed Roll-On/Roll-Off (LMSR) ships are the critical programs for this capability. The build-up phase also depends on basic items like rail cars to get armored vehicles to their ships and the Family of Medium Tactical Vehicles (FMTV) to move the armored vehicles around the theater of war. There is also a role for advanced technology programs like the total distribution program, which will allow the Army to track items through every phase of transport, as commercial shippers can.

As Army forces build up in a theater, those forces require more than just a constant flow of supplies. The Army needs compact lightweight support systems that can move the supplies and meet other needs, be they medical, recreational or logistical. Systems like Force Provider and the Family of Operational Rations enhance the quality of life for soldiers in forward areas. Deployable Medical Systems (DEPMEDS) and Telemedicine will greatly improve the medical care available to soldiers in forward areas. The Improved Family of Test Equipment will improve the reliability and combat availability of systems in the theater. Project & Sustain means ensuring that the Army can get to where it has to fight with the equipment and supplies it needs to get the job done.





SCIENCE AND TECHNOLOGY	Concept	Dem/Val		Production and Deployment	OPERATIONS AND SUPPORT	
			EMD			An
MIS	tlefield	l circulation and E	nemy Prisoner of V	orts the Military Police (MP) missions of Var operations over the entire continuum o P Companies engaged in these missions.	law enforcement, area security, bat- of war and on operations other than	nunored Se
CHARACTERI	MP. It fully e mm ba age are 4 lb TI mines	s primary weapon nclosed turret incl all and protection eas. The ASV prov NT mines. In addi in the wheel well le launcher, crew/e	is the MK19 Grena udes a day/night sig from 12.7 mm arm vides overhead prot tion, the armor mu s. Other survivabi	I drive vehicle that provides increased ball de Machine Gun, and it can also mount the ght for target acquisition. The vehicle prov- or piercing for the crew compartment, we ection against 60 mm mortars at 10 meter st provide overhead blast protection from 1 lity enhancements include gas particulate, sion system, an intercom with radio interfa	ne M2 .50 caliber machine gun. The ides all around protection from 7.62 apons station and ammunition stor- rs and underbody protection against 155 mm at 15 meters and 12 lb TNT ventilated facepieces, a multi-salvo	Security Vehicle (ASV
FOREIGN COUNTE	RPART: Germa	Germany - Theissen -Henschel; Netherlands - DAF; France - Panhard				6
FOREIGN MILITARY	SALES: No for	No foreign military sales.				5
PROGRAM S	TATUS: ASV is	s in engineering ar	id manufacturing d	evelopment.		S
PROJECTED ACTI	VITIES: Opera	tional and develop	mental testing of p	rototypes at Fort Hood, TX with a product	ion award scheduled for June 1997.	5
PRIME CONTRA	CTOR: Textro	on (Marine and La	nd Systems Divisio	n) (New Orleans, LA)		
	* See a	appendix for list o	f subcontractors.			

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EMD

OPERATIONS AND SUPPORT

MISSION: The Black Hawk provides utility and assault helicopter capability.

CHARACTERISTICS:

The Black Hawk (UH-60) is a utility, tactical, transport helicopter that performs many missions in the Army. The Black Hawk is the primary helicopter for air assault, general support, and aeromedical evacuation units. Modified Black Hawks also fulfill command and control, electronic warfare, and special operations roles. The Black Hawk has enhanced the overall mobility of the Army because of its dramatic improvements in troop capacity and cargo lift capability compared to the UH-1 "Huey" it replaces. Now, an entire 11-man, fully equipped infantry squad can be lifted in one Black Hawk, and the troops can be transported faster and in most weather conditions. The Black Hawk also is the first utility and assault helicopter that adds to the Army's Division-level mobility; for example, it can reposition a 105 mm howitzer, its crew of six, and up to 30 rounds of ammunition in a single lift. The aircraft's critical components and systems are armored or redundant 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.

		UH-60A	UH-60L
	Max gross weight:	20,250 lbs	22,000 lbs
			23,500 lbs (External Cargo)
	Cruise speed:	139 kt	150 kt
	Endurance:	2.3 hr	2.1 hr
	Max range:	320 nm	306 nm
	Crew:	2 pilots, 2 crew chief	2 pilots, 2 crew chief
	Armament:	two 7.62 mm machine guns	two 7.62 mm machine guns
	Payload:	2,640 lb (or 11 combat equipped troops)	2,640 lb (or 11 combat-equipped troops)
	External load:	8,000 lb	9,000 lb
RPART:	France:	Puma; NH90	Russia: HIP series aircraft
	United Kingdom:	Lynx; EH-101	

FOREIGN COUNTERPART:

FOREIGN MILITARY SALES:

FMS: Bahrain, Colombia, Egypt, Saudi Arabia Commercial Sales: Australia, Brunei, China, Hong Kong, Japan, Jordan, Mexico, Morocco, Philippines, Turkey Co-Production: Korea

PROGRAM STATUS:The Army began fielding the UH-60 in 1978. Between 1978 and 1989 the Army procured UH-60A model aircraft. In
October 1989, the power train system was upgraded, resulting in a model designation change from UH-60A to UH-60L.
As of the end of FY96, the Army has procured 483 UH-60L models for a total UH-60 buy of 1463 aircraft. The Army cur-
rently is in the fifth year of a five-year, multi-year procurement contract calling for the delivery of 60 Aircraft per year.

PROJECTED ACTIVITIES: Delivery of 5 aircraft per month in accordance with the multi-year procurement contract. Continued refurbishment and standardization of pre-1989 UH-60A models to bring those airframes to the most up-to-date A model configuration. UH-60Q MEDEVAC type qualification is in progress and is to be completed in FY98. Contract for delivery of 34 additional aircraft and 4 UH-60Q kits from FY97 appropriation.

PRIME CONTRACTOR: United Technologies (Sikorsky Aircraft) (Stratford, CT); General Electric (Lynn, MA)

* See appendix for list of subcontractors.



CONCEPT

EMD

MISSION: The only U.S. Army cargo helicopter, the mission of the CH-47D Chinook/Improved Cargo Helicopter (ICH) will be to transport weapons, ammunition, equipment, troops and other cargo in general support of combat units and operations other than war.
CHARACTERISTICS: The CH-47D Chinook/ICH will be similar to the CH-47D Chinook with the following exceptions: The cockpit will be upgraded to a new electronic architecture which will allow seamless interface with other systems on the digital battlefield; the airframe will be modified with active and passive systems to reduce vibration, and in turn, reduce fleet O&S costs.

the airframe will be modified with active and passive systems to reduce vibration, and in turn, reduce fleet O&S costs. These aircraft will also have the advantage of a more powerful and reliable T55-GA-714A turboshaft engine as the result of a separate CH-47D Chinook engine upgrade program. Options to improve cargo handling and survivability may be possible based on availability of funding. The CH-47D Chinook/ICH will be a Corps asset.

Max Gross Weight:	50,000 lbs
Max Cruise Speed:	160 knots
Troop Capacity:	33
Litter Capacity:	24
Sling-load Capacity:	26,000 lbs center hook
	17,000 lbs forward/aft hook
	25,000 lbs tandem
Minimum Crew:	3

FOREIGN COUNTERPART: No known foreign counterpart.

FOREIGN MILITARY SALES: No foreign military sales.

PROGRAM STATUS: The CH-47D Chinook/ICH is fully funded in the FY98-03 Program Objective Memorandum. Additional RDT&E plusups in FY97 will allow for program continuity and an FY97 start to achieve first delivery in FY02 and a first unit equipped in FY04.

PROJECTED ACTIVITIES: Concept formulation studies will be completed in early FY97. Risk reduction flight tests with passive vibration reduction modifications are currently ongoing. Additional flight tests with active vibration reduction systems and upgraded power-plants will begin in mid-FY97.

PRIME CONTRACTOR: Allied Signal (Phoenix, AZ)

Boeing (Philadelphia, PA)

*See appendix for list of subcontractors.



EMD

- The Combat Service Support Control System (CSSCS) will provide timely situational awareness and force projection infor-MISSION: mation to determine capability to support current operations and sustain future operations. The CSSCS will rapidly collect, store, analyze, and disseminate critical logistics, medical, financial and personnel information.
- **CHARACTERISTICS:** The CSSCS is a computer software system designed to assist commanders and their staffs in the planning and execution of logistics operations. 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). 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 actions. The CSSCS is the combat service support component of the Army Battle Command System (ABCS). The 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 (EAC). The CSSCS will be comprised of computer units procured through the Project Manager [Common Hardware/Software (PM CHS)], [Common Operating Environment (COE)] Software and CSSCS-unique software. The CSSCS will be housed in the family of Standardized Integrated Command Post Systems provided by PM CHS.
- **FOREIGN COUNTERPART:** PM CSSCS participates actively with Germany, France and Great Britain in the Quadrilateral Army Communications Information Systems Interoperability Group. Additionally, Canada and Australia are monitoring the status of CSSCS development.

FOREIGN MILITARY SALES: No foreign military sales.

The CSSCS is currently in the Engineering and Manufacturing Development, with low-rate initial production authority. **PROGRAM STATUS:** Program development has been structured to evolve over five versions. Versions 1 and 2 served as proof of principle, and provided initial division level CSS functional capability on common hardware. Version 3 builds on the capabilities of the previous versions and provides an Initial Operational Capability at Division and Corps level, to include initial horizontal interoperability with ABCS systems. Version 4 will extend CSSCS to EAC, as well as provide added capabilities. Version 5, the objective CSSCS software, will extend CSSCS capabilities to joint, allied, and coalition forces.

PROJECTED ACTIVITIES: ASARC III (Full Production), 2QFY97. First Unit Equipped, June 1997.

LMC (Springfield, VA) Versions 4-5 1995-1999 **PRIME CONTRACTOR:** TRW (Carson, CA) Versions 1-3 1991-1997



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E AND TECHNOLOGY	CONCEPT	Dem/Val	EMD		OPERATIONS AND SUPPORT
				PRODUCTION AND DEPLOYMENT	
MISSI	ICS: The DI	EPMEDS family is	composed of m	DS) family provides deployable hospitals wit edical equipment packaged into standardiz ospitals under the Army's Medical Force 200	ed modules for use by all Services.
	differen The Dl equipn Tents, t tion. T serious receive	nt configurations of EPMEDS hospital ment, expendable so tactical shelters, he he hospital sets ca s shortages of field their DEPMEDS	of standard DEPN sets standardize upplies, major no eating, and air con an be deployed u medical equipmen equipment in on	Support Hospitals, Field Hospitals, and Ger MEDS modules, such as operating rooms, la the use throughout the Army and DoD of onmedical support equipment power units, nditioning. Standard modules improve medi nder all climatic conditions. Fielding the 88 ent and achieve major advances in equipping the package under the Total Package Fieldin y the Army Medical Department.	aboratories, x-ray units, and wards. The latest medical technology and Tent Extendible Modular Personnel ical operability and patient distribu- 8 Army hospital sets will eliminate g the Total Army. Gaining units will
				bital set. All provide adequate but austere car vice compatibility, and are transportable by s	
FOREIGN COUNTERPA	ART: No kno	own foreign counte	erpart.		
FOREIGN MILITARY SAI	LES: Six Mo	bile Army Surgica	l Hospitals (MAS	H) units were sold to Saudi Arabia during (Operation Desert Storm.
PROGRAM STAT				ensures compatibility among the Services. elded and 96 minimum essential equipment	
PROJECTED ACTIVIT	TIES: During	FY97, the system	s will be modern	ized in keeping with upgraded and changing	g medical technology.
PRIME CONTRACT	DEPM			lved in providing the 3,400-plus medical bled into modules and hospital sets by the	
	* See a	ppendix for list of	subcontractors.		



SCIENCE AND TECHNOLOGY	CONCEPT	Dem/Val	EMD		OPERATIONS AND SUP
				PRODUCTION AND DEPLOYMENT	

PPORT

MISSION:

The Family of Medium Tactical Vehicles (FMTV) will fill the Army's medium tactical wheeled vehicle requirements.

CHARACTERISTICS: The FMTV consists of a common truck chassis that is used for several vehicle configuration in two payload classes. The Light Medium Tactical Vehicle (LMTV) is available in van and cargo variants and has a 2 1/2-ton payload capacity. The Medium Tactical Vehicle (MTV) has a 5-ton payload capacity and consists of the following models: cargo with and without materiel-handling equipment, tractor, wrecker, and dump truck. Van and tanker variants of the MTV will be developed concurrent with the production of other models. The FMTV will perform line haul, local haul, unit mobility, unit resupply and other missions in combat, combat support, and combat service support units. Vehicles will operate worldwide on primary and secondary roads and trails. The FMTV will replace overaged and maintenance-intensive trucks currently in the fleet.

	Payload: Towed load: Engine: Transmission: Horsepower:	LMTV Cargo 5,000 lb 7,500 lb Diesel Automatic 225	MTV Cargo 10,000 lb 21,000 lb Diesel Automatic 290
FOREIGN COUNTERPARTS:	Drive: Austria: France: Germany: Italy: Russia: Spain:	4x4 LMTV. Steyr 630M3 RVI Saviem TRM-2000 Unimog U110OL Fiat 75PM ZIL-131; GAZ-66 Santana 2000	6x6 MTV Steyr 1291M RVI Saviem TRM-4000 Mercedes 1017A, MAN 5-ton Fiat 6602 URAL-375; 6A2 9301; KAW 4430 (same as 5-ton) Peguso 3050

Saudi Arabia and Thailand have FMS actions in progress. FOREIGN MILITARY SALES:

- First unit equipped was at Ft. Bragg, NC on 30 January 1996. Units at Ft. Campbell, KY have also received the FMTV. A **PROGRAM STATUS:** letter contract was awarded to Stewart and Stevenson Services on 23 August 1996 to complete the 5th program year of the original contract.
- **PROJECTED ACTIVITIES:** Fielding continues to the Army's highest priority "first-to-fight" units.
 - **PRIME CONTRACTOR:** Stewart and Stevenson Services (Houston, TX)

* See appendix for list of subcontractors.



SCIENCE AND TECHNOLOGY	CONCEPT	DEM/VAL .	EMD		OPERATIONS AND SUPPORT
				PRODUCTION AND DEPLOYMENT	

- **MISSION:** The Force Projection Tactical Operations Center (FP TOC) provides the Joint Force Land Component Commander with a digitized command and control capability to integrate and synchronize the four operational elements of Theater Missile Defense (TMD) (attack operations, active and passive defense, and Battle Management Command, Control, Communications, Computers and Intelligence) to defeat the Theater Missile threat.
- CHARACTERISTICS: The FP TOC is a command and control (C2) system of systems, functionally integrating existing and evolving Army Battle Command System (ABCS), Global Command and Control System (GCCS), and TMD BMC4I specific applications. Staffed by the Army Theater Missile Defense Element (ATMDE), the FP TOC integrates and synchronizes the Joint Force Land Component Commander's (JFLCC) TMD fight. The FP TOC is a mobile digitized information and C2 center, consisting of five High Mobility Multi-Purpose Wheeled Vehicles with Standard Integrated Command Post System shelters providing the ATMDE the capability to plan, coordinate, deconflict, monitor, and execute the JFLCC's TMD operations to counter the Theater Missile threat. The FP TOC receives, filters, processes, disseminates, accesses, correlates and displays TMD information through 13 fielded and/or developmental Army and Joint command, control, and communication systems. The FP TOC is the only C2 center that is compatible with Distributive Interactive Simulation (DIS) protocols allowing the ATMDE to conduct training in a Synthetic Battlefield Environment. The FP TOC's primary functions are: Intelligence, Preparation of the Battlefield, Situational Awareness and Battlefield Visualization, Vulnerability Assessments, Localized Missile Attack Warning, Early Entry C2 for TMD capability assets, Sensor Cross-Cueing, Defense Designs and Joint Theater Communications Interfaces.

FOREIGN COUNTERPART: No known foreign counterpart.

FOREIGN MILITARY SALES: No foreign military sales.

PROGRAM STATUS: The FP TOC was fielded to the Army in February 1995. The FP TOC has demonstrated its value-added to integrate and synchronize TMD during Roving Sands 95 and 96, the TMD Army Warfighting Experiment 95, Ulchi Focus Lens 95 and 96 and numerous other CINC exercises. The FP TOC set the standard for joint interoperability during the Joint Warfighting Interoperability Demonstration 95. The FP TOC established interfaces between its various BMC4I systems and with the Air Force's Combat Integration Center to receive and disseminate time sensitive TMD intelligence and operational products. During February 1996, the FP TOC was upgraded during Phase II. The Phase II upgrades added a new communication vehicle to consolidate voice communications; added new workstations and improved existing workstations; replaced CHS I equipment with CHS II; and upgrades provided a distributed computing environment and a standardized message formatting capability.

PROJECTED ACTIVITIES: FP TOC BMC4I systems upgrades and fielding additional FP TOC. The FP TOC will participate in Roving Sands 97 and Joint Project Optic Cobra 97, and Ulchi Focus Lens 97.

PRIME CONTRACTOR: TRW Inc. (Dominguez Hills, CA)


EMD

- **MISSION:** The Force Provider (FP) will provide high quality of life rest and refit facilities for combat soldiers in theater of operations with limited or no supporting infrastructure.
- **CHARACTERISTICS:** The FP is a high quality tent-based troop support system with selected containerized components which provides climate controlled billeting, feeding, hygiene services, and morale, welfare and recreation services. It was a non-developmental item engineering and integration effort. The components consist of existing DoD equipment to the maximum extent possible. Equipment for this system includes tent-based billeting, dining facilities, showers, and containerized latrines and laundries. FP also includes power generation and distribution equipment; morale, welfare, and recreation equipment; area lighting; water and fuel storage and distribution; and waste water storage. Additionally, FP supports bare base theater of operation reception, reconstitution, humanitarian aid, and disaster relief missions. It is packaged and containerized for ease of deployability by all modes of transportation.

FOREIGN COUNTERPART: Germany: Feld Lager System—Concept Phase

FOREIGN MILITARY SALES: No foreign military sales.

- **PROGRAM STATUS:**FP was type classified standard on 12 May 1996.
Delivery of first two modules December 1996.
Delivery of two modules December 1997.
Preplanned product improvements for containerized batch laundry and latrine systems completed September 1996.
Six interim support package modules (ISP#2) deployed to Operation Joint Endeavor and supported over 5000 troops with
high quality life support.
- **PROJECTED ACTIVITIES:** Major item contract and secondary item deliveries continuous and on schedule. System integration and assembly ongoing for FY97/98.
- **PRIME CONTRACTOR:** FY97/98 production assembly by Tobyhanna Army Depot with system integration by the Force Provider Program Management Office.



SCIENCE AND TECHNOLOGY	CONCEPT	DEM/VAL	EMD		OPERATIONS AND SUPPORT
				PRODUCTION AND DEPLOYMENT	
MIS		eavy Equipment Tr r other vehicles of		(HETS) deploys, transports, recovers, and ev	vacuates a combat-loaded M1 series
CHARACTERIS	acquisi highwa that sig tor has two HI	ition programs. Th ays, on CONUS hi gnificantly improve 5 front- and rear-az	he new HETS tran ighways with perm e the mobility and kle steering, a cent l four tank crewme	ctor and M1000 semitrailer (70 ton). They asports 70-ton payloads, primarily M1 seri- nits, secondary roads, and cross country. T overall performance of the system in a tacti- tral tire inflation system, and cab space for en. The M1000 semitrailer has automatical	es tanks. It operates on OCONUS The HETS has a number of features cal environment. The M1070 trac- six personnel to accommodate the
	Speed: Range: Transp Mobilit RAM:	300 miles ort: C-5 and C-1 ty: 95% on road	l7 aircraft d; 5% off road	0 mph with 70 ton payload) rdware mission failure for both tractor and	trailer
FOREIGN COUNTER	RPART: France	: TRH 350	Russia: TATH	RA-813 (tractor)/ChMZAP-5212 (trailer)	
FOREIGN MILITARY	SALES: Israel h	nas a letter of requ	irement for the tra	iler only, but no sale yet.	
PROGRAM ST	Corpoi	ration is producin ed on 3 June 1994	g the tractor. The 4 with the 27th M	velopmental item and is approved for full trailer is being produced by Systems & Ele ain Support Battalion (MSB), 1st Cavalry E rently funded and FY99 if contract options	ectronics, Inc. First unit equipped Division at Ft. Hood, Texas. HETS
PROJECTED ACTIV	TTIES: Fieldin	ng through FY97 (FY99 if contract op	ptions are exercised). Procurement of an ad	ditional 182 systems in FY97.
PRIME CONTRA	CTOR: Tractor Trailer:		uck (Oshkosh, WI Electronics, Inc. (S		







Project & Sustain

SCIENCE AND TECHNOLOGY	CONCEPT	Dem/Val	EMD

MISSION:

ION: The High Mobility Multipurpose Wheeled Vehicle (HMMWV) provides a common light tactical vehicle capability.

PRODUCTION AND DEPLOYMENT

CHARACTERISTICS: The HMMWV is a light, highly mobile, diesel-powered, four-wheel drive vehicle that uses a common 4,400 lbs payload chassis. The HMMWV can be configured through the use of common components and kits to become a troop carrier, armament carrier, S250 shelter carrier, ambulance, TOW missile carrier and a Scout vehicle. The 4,400 lbs variant was developed as the prime mover for the light howitzer, towed VULCAN system, and heavier shelter carriers. It is a Tri-Service program that also provides vehicles to satisfy Marine and Air Force requirements. The HMMWV program is complementary to the Commercial Utility Cargo Vehicle. The HMMWV replaced the 1/4 ton Jeep, the M718A1 Ambulance, 1/2 ton Mule, 1 1/4 Gamma Goat, and M792 Ambulance.

Since its inception the HMMWV has undergone numerous design and configuration updates and changes. These changes have included technological, environmental, operational and safety improvements such as higher payload capability, radial tires, 1994 EPA emissions update, commercial bucket seats, three-point seat belts, four speed transmissions and, in some cases, turbo charged engines, air conditioning and central tire inflation systems. In response to peace keeping missions, an Up-armored HMMWV was developed that provided increased ballistic and blast protection primarily for the Military Police (MP). In addition, the Project Manager (PM) developed a Scout HMMWV which is configured with a night vision device, a global positioning system, gun mounts and SINCGARS radios.

In 1995, the PM introduced the A2 configuration and the Expanded Capacity Vehicle (ECV) HMMWV. The A2 incorporates the four speed, electronic transmission, the 6.5 liter diesel engine and improvements in transportability. The A2 serves as a platform for other Army systems such as the Ground Based Common Sensor. The ECV vehicle also went into production in 1995. The payload of this vehicle will approach 5000 lbs. Its primary mission is that of an Up-armored vehicle for the Scouts and the MP. Also, this vehicle will serve as a platform for mission payloads and systems that exceed 4,400 lbs.

- **FOREIGN COUNTERPART:** Certain models of the HMMWV have counterparts such as the Swiss MOWAG, the French PANHARD and the German UNIMOG.
- FOREIGN MILITARY SALES: The HMMWV has been sold through FMS to 29 countries.
 - **PROGRAM STATUS:** Continued production on the requirements contract.
 - **PROJECTED ACTIVITIES:** Continued fielding as a platform in support of MP, Scouts and other Army systems.
 - PRIME CONTRACTOR: AM General (South Bend, IN)



OPERATIONS AND SUPPORT

MISSION: The Integrated Family of Test Equipment (IFTE) provides the capability to isolate electronic faults in weapon systems.

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

Two tactical systems, the AN/PSM-80 Contact Test Set (CTS), and the AN/TSM-191 Base Shop Test Facility (BSTF), provide on- and off-system support, respectively. The CTS is also the host for Electronic Technical Manuals (ETMs) and interactive ETMs. The CTS is man-portable and augments supported systems Built-in-Test/Built-in-Test-Equipment (BIT/BITE) to isolate weapon systems failures 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 (TPSs). TPSs are the weapon systems-specific software that the ATE uses to diagnose faults in major items or components. A 60 kW generator powers the BSTF Base Shops serve at both DS and GS levels. The Commercial Equivalent Equipment (CEE) is a nontactical, non-ruggedized equivalent of the BSTF, designed for completion TPS development and to support requirements at depots, contractor facilities, and Special Repair Activities. The Electro-Optic Test Facility (EOTF) is under development to provide an off-system electro-optic test capability at the DS and GS levels. The EOTF will be housed in an S-280 shelter mounted on a 5 ton truck and will be powered by a 60 kW generator.

FOREIGN COUNTERPART: No known foreign counterpart.

FOREIGN MILITARY SALES: Argentina, Denmark, Egypt, Greece, Israel, Korea, Kuwait, NAMSA, Norway, Organization of African Unity, Saudi Arabia, Taiwan, Thailand.

- **PROGRAM STATUS:** The IFTE BSTF full-scale production decision took place in March 1992. Improvements identified at initial operational test and evaluation are being retrofitted to all BSTFs. First Unit Equipped (FUE) for the BSTF occurred in December 1992. FUE for the CTS occurred in September 1994.
- **PROJECTED ACTIVITIES:** The BSTF and the CTS (SPORT) will be procured and fielded in FY97. Development of the EOTF will continue through FY97.
 - **PRIME CONTRACTOR:**BSTF/CEE/EOTF: Northrop-Grumman (Great River, NY)CTS:SAIC (San Diego, CA)CTS (SPORT):Miltope Corp. (Hope Hall, AL)



SCIENCE AND TECHNOLOGY	CONCEPT	Dem/Val	EMD		OPERATIONS AND SUPPORT	
				PRODUCTION AND DEPLOYMENT		Me
MISSI	other m ICS: After re provide require icant n 3116 d tem, re single n a new	nissions for combat emanufacture the ed for every two ne ed. New trucks are umber of new par liesel engine meeti worked Rockwell radial tires, power ergonomically des	, combat support at 2 1/2 ton ESP true ew ones produced e reassembled on a ts and component ng CY93 EPA emis axles and transfer assist steering, an i signed driver's sea	nded Service Program (ESP) vehicles perfor nd combat service units. Both of these progra ck receives a new serial number and regis . Old vehicles are completely disassembled a new production line using a combination is. Some of the features of the ESP vehicle sion standards, a new Allison 1545 automa case, new electronically controlled central t mproved independent circuit air/hydraulic t, electronic windshield wipers and washe lar system improvements on the 5 ton ESI	ams complement the FMTV program. tration number. Three vehicles are and reusable parts are reworked as of the reworked parts and a signif- es are as follows: a new Caterpillar atic transmission, a new cooling sys- tire inflation system, Michelin super brake system, three point seat belts, er and a new, improved heater and	dium Truck Remanufactur
FOREIGN COUNTERPA	RT: See th	e FMTV listing.				a
FOREIGN MILITARY SAI	LES: No for	eign military sales				A
PROGRAM STAT		1/2 ton truck is in ton ESP truck is in	*	ntly with the USMC's Medium Tactical Vehic	ele Remanufacture (MTVR) program.	R
PROJECTED ACTIVIT		1/2 ton ESP truck ton ESP truck wil		ing. Army and USMC prototypes.		
PRIME CONTRACT		1/2 ton ESP truck: ton ESP truck: TI		th Bend, IN)		



SCIENCE AND TECHNOLOGY

EMD

- **MISSION:** The Palletized Load System (PLS) is being deployed as the primary component of the maneuver-oriented ammunition distribution system (MOADS). It will perform line haul, local haul, unit resupply and other missions in the tactical environment to support modernized and highly mobile combat units.
- **CHARACTERISTICS:** The PLS consists of a 16 1/2-ton payload prime mover (10x10) with an integral load-handling system, which provides self-loading and unloading capability; a 16 1/2-ton payload trailer; and demountable cargo beds, referred to as flatracks. The PLS truck is equipped with the central tire inflation system, which significantly improves off-road mobility. PLS maintains interoperability with the comparable British, German, and French systems, through the use of a common flatrack, as specified in the current quadripartite agreement. On the basis of direction provided by Congress in the FY90 Defense Appropriation Bill, an intermodal flatrack (with features that enhance transportability and stacking) has completed design and is in production (5,000 M1 Flatracks). A container lift kit also will be fielded to PLS trucks assigned to transportation and ammunition units and to forward support battalions. This provides PLS the capability to pick up and transport 20 ft ISO containers without using a flatrack. The self-propelled field artillery units will receive PLS trucks equipped with a materiel-handling crane to deal with individual pallets of ammunition.

Truck payload:	16 1/2 ton
Trailer payload:	16 1/2 ton
Flatrack dimensions:	8x20 ft
Engine type:	Diesel
Transmission:	Automatic
Number of driven wheels:	10
Range, integral fuel at gross	
combined weight:	255 mi
Ŭ	

- FOREIGN COUNTERPART: United Kingdom: Demountable Rack Off-Loading and Pick-Up System
- **FOREIGN MILITARY SALES:** No foreign military sales.
 - **PROGRAM STATUS:** The PLS is a non-developmental item program which has been executed through a five-year multi-year production contract awarded to Oshkosh Truck Corporation in September 1990. It entered low rate production in 1991 and was approved to enter full production in April 1993. The PLS first unit equipped occurred in February 1994 with units from the 1st Cavalry Division at Ft. Hood, TX. PLS fielding will continue through FY97.
 - **PROJECTED ACTIVITIES:** TRADOC is currently performing an analysis of follow-on uses for the PLS. The study explores the benefits of using PLS for the following missions: Corps distribution of other classes of supply, DEPMEDS Hospital and Medical Supplies, Aviation Intermediate Maintenance Units in Division/Corps, and Engineer Bridging. The PMO is currently developing tanker flatracks to transport water and fuel per Congressional direction and will soon begin the development of engineering application flatracks. The PLS will be used as the launcher for the Theater High Altitude Area Defense (THAAD) and as the transporter for the Heavy Dry Support Bridge (HDSB).

PRIME CONTRACTOR: Oshkosh Truck (Oshkosh, WI)



SCIENCE AND TECHNOLOGY	Concept	Dem/Val	EMD		Operations and Support
				PRODUCTION AND DEPLOYMENT	
М	SSION: To plan	design develop	acquire install or	nd maintain highly complay management	information systems to support the

- **MISSION:** To plan, design, develop, acquire, install, and maintain highly complex management information systems to support the warfighter from the force projection base to the battlefield.
- CHARACTERISTICS: The Standard Army Management Information Systems (STAMIS) programs acquired by PEO STAMIS are diverse based on the size and variety of products (computer hardware and software systems) and the breadth of customers. Programs include: Standard Installation/Division Personnel System (SIDPERS); Joint Recruiting Information Support System (JRISS); Personnel Electronic Records Management Systems (PERMS); Joint Computer-aided Acquisition and Logistic Support (JCALS); Sustaining Base Information Services (SBIS); Acquisition Information Management (AIM); Department of the Army Movements Management System (DAMMS); Objective Supply Capability (OSC); Standard Army Ammunition System (SAAS); Standard Army Maintenance System (SAAS); Standard Army Maintenance System (SAAS); Standard Army Retail Supply System (SARSS); Standard Property Book System (SPBS); and Unit Level Logistics Systems (ULLS). The span of STAMIS programs is Defense-wide and world-wide to provide the warfighter a modern power projection platform to support peacetime operations, training, mobilization, force projection, split-based operations and redeployment. As an integral part of the Army enterprise Strategy, STAMIS programs acquire integrated systems using commercial technology that meets validated needs.
- FOREIGN COUNTERPART: No known foreign counterpart.
- **FOREIGN MILITARY SALES:** No foreign military sales.
 - **PROGRAM STATUS:** The STAMIS programs are at various states of life cycle management. JCALS competitively awarded an A-109 contract in December 1991; SBIS competitively awarded an A-109 contract in June 1993. Commercial off-the-shelf hardware and software, to the maximum extent possible, are used by STAMIS programs. Other STAMIS programs use various Indefinite Delivery/Indefinite Quantity contracts and/or government software development centers. PERMS has completed fielding of basic systems to the four Army records sites and enhance the systems.
 - **PROJECTED ACTIVITIES:**SBIS: Initial Operational Test & Evaluation and Milestone II/III in FY97 to commence fielding of the initial software incre-
ment. JCALS: Initial Operational Test & Evaluation and Milestone III in FY97 to fully deploy 269 DoD sites. SIDPERS:
JRISS and AIM institute prototyping and complete a Milestone I. The logistics programs will continue to develop, test and
field improved capabilities. SIDPERS-3: Testing of "fun" data at three sites. SIDPERS-3 will complete operational assess-
ments and seek Milestone III approval.
 - CONTRACTOR: JCALS: Computer Sciences Corporation (Moorestown, NJ) PERMS: PRC, Inc. (McLean, VA) SBIS: Lockheed Martin (Bethesda, MD)



and Technology Con	CEPT DEM/VAL	EMD		OPERATIONS AND SUPPORT
		Pi	RODUCTION AND DEPLOYMENT	
MISSION: CHARACTERISTICS:	equipment in a field environme The TQG are the new DoD star "single fuel" sets that are more r natures, are survivable in a nuc weapon systems, logistics and n	ent. ndard family of tact reliable, provide im clear environment, naintenance functio	tical electric power sources. The 5 k proved mobility (decreased weight), and provide quality electric power ons, and other battlefield support ec	W-60 kW TQG provide DoD with reduce noise and infrared (IR) sig- for command posts, C3I systems, fuipment. The new power genera-
	Aural signature: Fuel: Hertz: HAEMP: IR suppressed: Reliability (MTBOMF): Standard voltage connections: Slave receptacle:	Current Fleet Performance 79-85 dBA @25 GAS/DSL/JP4 DC 50/60/400 No No 140-180 hr Yes Ordnance	TQG Requirements m 70 dBA @7 m JP8/DSL DC 60, 50/60, 400 Yes Yes So0-600 hr Yes NATO	i thermal signatures.
FOREIGN COUNTERPART:	No known foreign counterpart.			
FOREIGN MILITARY SALES:			been adopted as standard equipmen ystems have also increased in recent	
PROGRAM STATUS:	Ft. Campbell, Ft. Benning, Ft. B	Bragg, and Aberdeer rdon, Ft. Lewis, Ft.	ragg in December 1993. 5-60kW ge n Proving Ground during FY94. Dur Hood, Ft. Bliss, and Ft. Knox. Dur	ing FY95, 5-60kW generators were
PROJECTED ACTIVITIES:	Fielding of generators will cont	inue through FY02		
PRIME CONTRACTORS:	5-60kW and 3 kW TQGs: Ferr 30 and 60 kW TQG-Re-Engine: 2 kW TQG: Dewey Electronics 10 kW APU: KECO Industries 5 kW APU and 3 kW TQG: Go 3 kW TQG: T and J Manufactu	:: MCII (Dallas, TX s (Oakton, NJ) s (Florence, KY) oodman Ball (Menl	() o Park, CA)	

Integrated High Performance The IHPTET initiative is a DoD, NASA, and industry turbine engine tech-Turbine Engine Technology nology program that embodies virtually all government-sponsored (IHPTET) research and development efforts devoted to advancing aircraft and missile (1989-2003) turbine engines. The goal of IHPTET is to double turbine engine propulsion capability by the turn of the century. It covers both military and commercial applications in three categories: (1) man-rated thrust (fixed wing), (2) man-rated shaft (rotorcraft), and (3) expendable engines (missiles). IHPTET advancements will result from the synergistic effect of combining advanced material developments, innovative structural designs, improved aerothermodynamics, and component integration. The Army's principal contribution is in a 6.3 technology demonstrator called the Joint Turbine Advanced Gas Generator (JTAGG). JTAGG II will reduce specific fuel consumption by 30% and improve power to weight ratio by 80% over the T700 engine baseline by FY97 with additional improvements projected



out to 2003. The IHPTET initiative will guide development of new aircraft and missile turbine engine technology from component development to demonstration. In this manner, advanced components and technologies should be ready for transition to weapons systems at lower technical risk and cost, provide greatly improved engine performance, and continue the civil and military excellence of the U.S. in aircraft and missile gas turbines. Supports: RAH-66 Comanche, AH-64 Apache Improvement, Joint Transport Rotorcraft.

Family of Operational Rations (FOR)



The FOR is a scenario-driven ration development program that supports highly mobile and forward deployed troops with innovative, highly acceptable components, suitable for use in arctic, jungle, desert, mountain and urban areas under all climatic conditions. The FOR represents technologically advanced food systems that consist of mobility enhancing, eat-out-of-hand components that represent an innovation to field feeding. These unique components such as sandwiches, dessert snacks and multi-functional performance enhancing components allow for eat-on-the-move capability, while providing high quality, familiar foods. Technology demonstrations have provided extremely positive feedback from soldiers and will serve as the basis for developing future rations to meet the requirements for Army Field Ration 2000. Supports: DoD Joint Food Program.

Battery Technology Improved lithium-ion rechargeable batteries have been designed, under a DARPA-TRP, by the CECOM-RDEC in conjunction with a contractor, and as a result there is now a domestic manufacturing capability for these batteries. In addition, the first rechargeable lithium-ion battery (BB-284/U) is now being fielded to support the Thermal Weapons Sight. These new rechargeable batteries have 2-3 times the energy density of nickel-cadmium batteries. In the field of primary batteries, prototype lithium-manganese dioxide 5590-size batteries have been designed and fabricated in conjunction with a contractor, and initial samples have 1.5-2 times the energy content of the current primary battery. Although it will take some time to work out safety and low-temperature performance issues, these have high potential for use in the future.

Intelligent Vehicles The Unmanned Ground Vehicle (UGV) technology development and demonstration program is an OSD/DARPA sponsored research and demonstration effort for which the Army Research Laboratory has been the technical manager. This program has been national in scope with the involvement of over 40 co-contractors drawn from academia, government laboratories and private industry. The continuing maturation of UGV technologies utilizing semi-autonomous vehicle navigation technologies; as well as advanced reconnaissance, surveillance, and target acquisition (RSTA); and new automated mission planning communication techniques; will provide novel tactical and support options to the future warfighter. Intelligent vehicles will give the commander the ability to multiply his force and conduct continuous combat operations. They will also generate a new capability for him to detect and target enemy forces throughout the entire battlefield. Multiple UGV-based observation platforms will provide commanders a better overview of the battlefield situation as part of the Army's Battlefield Digitization efforts. A Demo II phase of this effort was successfully concluded in June 1996 with an extensive series of field exercises coordinated with TRADOC at Fort Hood culminating in a Battle Lab Warfighting Experiment conducted by Fort Knox's Mounted Maneuver Battlespace Laboratory. Three intelligent UGVs were successfully integrated into field exercises at Fort Hood, were controlled by III Corps troops, and performed mission efforts in forward observer, maneuver on urban terrain (MOUT), reconnaissance, and security. Earlier in the program as a prelude to Demo II, a soldier controlled semi-autonomous UGV was integrated into actual Brigade-level Armored Cavalry field exercises at Fort Hood. These exercises demonstrated the potential of semi-autonomous UGVs to act as force multipliers for combat missions and their ability to extend stand-off ranges for soldiers in high risk missions. Key technologies developed during this program include: intelligent vehicle architecture, autonomous navigation, reconnaissance, surveillance, and target acquisition (RSTA), passive stereo for mobility and perception, and advanced planning tools to support tactical deployment of intelligent vehicles. The Next Generation UGV program, currently being formulated by OSD and the Army for 1997-2001, will focus on technologies providing higher speed maneuver for day/night and adverse weather operations, UGV survivability, and the effective interface of UGV derived data into the digital battlefield.

Joint Logistics ACTD (Phase I) The Joint Logistics Advanced Concept Technology

Demonstration (JL-ACTD) Phase I, also known as Logistic Anchor Desk (LAD) provides operational users such as CINCs and JTF Commanders with increased capability to rapidly plan and execute more responsive and efficient logistics support to military operations. A prototype network of workstations connect operational planners and logisticians across military services and command echelons, enabling a better understanding of the impact of information technology to increase the effectiveness and efficiency of military logistics for a twenty-first century force.



The focus of LAD is decision support tools with core functionalities that include advanced data distribution and visualization techniques to provide a common, relevant logistics picture. Integration of existing logistics analysis models with knowledge-based tools provide powerful decision support to leaders. This capability is a plus to the total asset visibility effort. In October 1995, senior logisticians in Europe requested LAD support for the Operation Joint Endeavor crisis action planning underway for deployment into Bosnia, Since then LAD sites have been providing increased operational capabilities to senior logisticians and their staffs over a variety of operational issues in EUCOM, USACOM, CENTCOM and supporting sites.



A CONTRACTOR OF CONTRACTOR OF

A rmy forces require improved protection against a wide variety of threats on the future battlefield. The threat posed by the growing proliferation of tactical ballistic missiles (TBMs) and nuclear, chemical and biological (NBC)

weapon technology has drawn the greatest attention. The Army is investing in a mix of active and passive defense systems to deal with the TBM/NBC threat. Patriot, THAAD and MEADS are the core of Army active defense systems, which will protect the force against TBMs and other airborne threats such as cruise missiles and aircraft. Passive defense centers around systems that can detect or offer passive protection against nuclear, chemical and biological agents. This includes detection systems like the NBC Reconnaissance System – Fox and the Biological Integrated Detection System (BIDS). It also includes items like the M40 series protective mask and the Advanced Integrated Collective Protection System that offer soldiers protection from dangerous airborne agents.

The Army is also concerned about the dangers posed by advanced conventional weapons and by fratricide. To counter the former, the Army is developing lighter and stronger ballistic protection for the individual soldier as part of the Soldier System program. The Army is also acquiring new vehicle mounted smoke generators to improve the capability to conceal moving forces and high value targets. To reduce fratricide the Army is pursuing two options. The Battlefield Combat Identification System (BCIS) will provide an interrogation/response system for Army weapons platforms that will allow them to accurately and instantly identify friendly forces; the digitization program for Army forces will provide pilots and vehicle commanders with total situational awareness that will allow them to locate friendly vehicles and distinguish them from hostile targets.



43



MISSION: The Aerostat mission is to provide Over-the-Horizon surveillance and precision macking data. The mission supports the air-dimeted surface-to-air missile concept and increases battlespace for land attack cruise missile defines (LACMD). CHARACTERISTICS: Aerostats are theater-based systems employing advanced deviated sensors with specific application to 1 ACMD. The aerostat system(s) will improve the battlefold commander shally to support wide-area defines against land attack cruise missiles by expanding bartlespace for weapon systems such as PATRIOT, Medum Extended Air Defense System, Aegis Standard Missile, Fighters, and Forward Area Air Defense Systems. Aerostats may also contribute to combat identification in desafication. Startellance: Startellance Combat ID TYPE Medica 10-15 Mr Additional Distribute to combat identification Modifier Starteging Modifier Distribute to combat identification Missile, Fighters, and Forward Area Air Defense Systems. Aerostats may also contribute to combat identification Missile, Fighters, and Forward Area Air Defense Systems. Aerostats may also contribute to combat identification Combat ID TYPE Mittande 10-15 Mr BMC(A) TIDSVCENC BMC(A) TIDSVCENC BMC(A) TIDSVCENC BMC(A) TIDSVCENC BMC(A) T	E AND TECHNOLOGY	Дем/V аг.	EMD	PRODUCTION AND DEPLOYMENT	O PERATIONS AND SUPPORT
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SmallLarge TacticalTacticalStrategicSurveillance225-280 Km225-280 Km320 KmPrecision Track Illuminator80-150 Km00-250 Km00-250 KmCombat IDTYPEAltinude10-15 K/ftAltinude10-15 K/ftBM/C41JTIDS/CECBasingLand/SeaMobilityLimited/MobileFOREIGN COUNTERPARINo known foreign counterpart.FOREIGN MILITARY SALE:No foreign military sales.PROGRAM STATUSOn January 11, 1996, the Under Sceretary of Defense (Acquisition and Technology) [USD(A&T)] and the Vice Chairman, Joint Chiefs of Staff (JCS) directed the Army to form a joint program office and initiate an Aerostat program. The Navy and Air Force plan to provide full-time deputy program managers and share in providing other required sup- port. On 22 May 96, USD(A&T) and the Vice Chairman, JCS directed the joint Aerostat program, with Army lead, tree bemonstration. The Aerostat Joint Project Management Office has been established and is assigned to the U.S. Army Space and Strategic Defense Command.PROJECTED ACTIVITIESAvavata Small/Tactical Aerostat System Development contracts - FY97. •Aerostat ADSAM Demonstration at Roving Sanded S 7O perational Exercise. • Risk Reduction effort with the Defense Advanced Research Projects Agency and other government agencies.PRIME CONTRACTORHughes Raytheon (Bedford, MA) Lockheed Martin (Akron, OH)		air-directed surface-to-air Aerostats are theater-base aerostat system(s) will im cruise missiles by expand Aegis Standard Missile, F	missile concept a d systems employ prove the battlef ing battlespace for ighters, and Forv	and increases battlespace for land attack cr ying advanced elevated sensors with speci ield commander's ability to support wide- or weapon systems such as PATRIOT, Med	ruise missile defense (LACMD). fic application to LACMD. The area defense against land attack lium Extended Air Defense System,
FOREIGN MILITARY SALES:No foreign military sales.PROGRAM STATUS:On January 11, 1996, the Under Secretary of Defense (Acquisition and Technology) [USD(A&T)] and the Vice Chairman, Joint Chiefs of Staff (JCS) directed the Army to form a joint program office and initiate an Aerostat program. The Navy and Air Force plan to provide full-time deputy program managers and share in providing other required sup- port. On 22 May 96, USD(A&T) and the Vice Chairman, JCS directed the joint Aerostat program, with Army lead, to proceed with concept studies and related risk reduction activities leading to an Advanced Concept Technology Demonstration. The Aerostat Joint Project Management Office has been established and is assigned to the U.S. Army Space and Strategic Defense Command.PROJECTED ACTIVITIES:•Award Small/Tactical Aerostat System Development contracts - FY97. •Aerostat ADSAM Demonstration at Roving Sands 97 Operational Exercise. •Risk Reduction effort with the Defense Advanced Research Projects Agency and other government agencies.PRIME CONTRACTOR:Hughes Raytheon (Bedford, MA) Lockheed Martin (Akron, OH)		Surveillance Precision Track Illuminat Combat ID Altitude BM/C4I Basing Mobility	or	TacticalStrat225-280 Km32080-150 Km100-TYPETYP10-15 K/ft20 KJTIDS/CECJTIDLand/SeaLand	egic Km 250 Km E Vft 9S/CEC 1/Sea
PROGRAM STATUS:On January 11, 1996, the Under Secretary of Defense (Acquisition and Technology) [USD(A&T)] and the Vice Chairman, Joint Chiefs of Staff (JCS) directed the Army to form a joint program office and initiate an Aerostat program. The Navy and Air Force plan to provide full-time deputy program managers and share in providing other required sup- port. On 22 May 96, USD(A&T) and the Vice Chairman, JCS directed the joint Aerostat program, with Army lead, to proceed with concept studies and related risk reduction activities leading to an Advanced Concept Technology Demonstration. The Aerostat Joint Project Management Office has been established and is assigned to the U.S. Army Space and Strategic Defense Command.PROJECTED ACTIVITIES:•Award Small/Tactical Aerostat System Development contracts - FY97. •Aerostat ADSAM Demonstration at Roving Sands 97 Operational Exercise. •Risk Reduction effort with the Defense Advanced Research Projects Agency and other government agencies.PRIME CONTRACTOR:Hughes Raytheon (Bedford, MA) Lockheed Martin (Akron, OH)		0	•		
 Aerostat ADSAM Demonstration at Roving Sands 97 Operational Exercise. Risk Reduction effort with the Defense Advanced Research Projects Agency and other government agencies. PRIME CONTRACTOR: Hughes Raytheon (Bedford, MA) Lockheed Martin (Akron, OH) 		On January 11, 1996, the Chairman, Joint Chiefs o The Navy and Air Force port. On 22 May 96, US proceed with concept stu Demonstration. The Aer	Under Secretary f Staff (JCS) direct plan to provide fu D(A&T) and the udies and related ostat Joint Projec	eted the Army to form a joint program offic all-time deputy program managers and sha Vice Chairman, JCS directed the joint Ac risk reduction activities leading to an Adv	ce and initiate an Aerostat program. are in providing other required sup- crostat program, with Army lead, to anced Concept Technology
Lockheed Martin (Akron, OH)	PROJECTED ACTIVITIES:	•Aerostat ADSAM Demo	nstration at Rovi	ng Sands 97 Operational Exercise.	ner government agencies.
	PRIME CONTRACTOR:	Lockheed Martin (Akron	, OH)		









Protect the Force

NCE AND TECHNOLOGY	Conci	EPT DEM/VAL	EMD		OPERATIONS AND SUPPORT
				PRODUCTION AND DEPLOYMENT	
MI		chemical agent alarm sys	stem capable of det	arm-Non Developmental Item (ACADA-N ecting both nerve and blister agents. It v nterest in the ACADA-NDI.	
CHARACTER		Chemical Agent (MICA tlefield data transfer and	D) Monitor as a su warning systems. I ating its warning the 24 lbs (complete w		mmunicate (using MICAD) to bat- ator and can be used in a fully auto-
FOREIGN COUNTE	ERPART:	M90-D1 Detector			
FOREIGN MILITARY	SALES:	No foreign military sales	\$.		
PROGRAM S	STATUS:	Force, the GID-3, produc ond phase of the PVT is	ced by Graseby Ioni ongoing to comple	T) which consisted of operational and tec cs, UK, was selected as the single NDI to p ete the remaining tests. At completion of a puirements of the Army and Air Force.	proceed to type classification. A sec-
PROJECTED ACTI	VITIES:	Full rate production deli First Unit Equipped is U	0 -		
PRIME CONTRA	ACTOR:	Graseby Dynamics LTD	(UK)		

1 Ober



SCIENCE AND TECHNOLOGY

EMD

MISSION: The Battlefield Combat Identification System (BCIS) will provide the materiel solution for minimizing battlefield fratricide incidents.

CHARACTERISTICS:

STICS: The BCIS is a point-of-engagement, millimeter-wave (MMW), question-and-answer type of system that will greatly reduce the risk of fratricide during military operations. The BCIS will provide positive identification of friendly ground platforms and dismounted soldiers from both ground and air weapons platforms and dismounted soldiers. The BCIS, via its digital data link capability, will provide local situational awareness of information with sufficient position resolution and timeliness to support the fire/no-fire decision at the platform level and improve combat effectiveness. Weapons platforms that have a direct fire capability and/or are instrumental in initiating indirect fire missions will transmit an interrogating MMW signal toward the suspect target. Friendly platforms will respond automatically through their transponding component with its identification as a friend. The BCIS is an integral part of the Army's digitized effort for combat identification and is one of several Horizontal Technology Initiatives. It will be used by Combat, Combat Support, and Combat Services Support units within the CONUS contingency forces.

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:	< l sec

FOREIGN COUNTERPART: No known foreign counterpart.

FOREIGN MILITARY SALES: No foreign military sales.

- **PROGRAM STATUS:**The BCIS is currently in the Engineering and Manufacturing Development phase with 92 of 111 units delivered as of
3Q96. BCIS has been tested on the Abrams M1A1 and M1A2, HMMWV, FISTV, and Bradley Fighting Vehicle with demon-
strated system performance which met/exceeded critical requirements. The Production Qualification Test and the Limited
User Test were completed in 4Q95 and 1Q96, respectively. Sixty-two systems plus spares were installed on platforms at
Ft. Hood in 3Q96 to participate in TFXXI AWE. Producibility enhancements and low cost design efforts were initiated in
4Q96.
- **PROJECTED ACTIVITIES:**Continue Producibility Enhancement and Low-Cost Design Efforts in FY97/98.Participate in TF XXI Advanced Warfighting Experiment 2Q97.
Participate in International Demo 3Q97.
Produce systems for Initial Operational Test and Evaluation FY98.

PRIME CONTRACTOR:Hughes (Ft. Wayne, IN)TRW (Redondo Beach, CA)



EMD

- **MISSION:** As a corps level asset the Biological Integrated Detection System (BIDS) will mitigate the effects of large area biological warfare attacks during all phases of a campaign. The BIDS network will be used to provide the basis for warning and confirming that a biological attack has occurred. The system will provide presumptive identification and produce a safety configured sample for later laboratory analysis.
- **CHARACTERISTICS:** The BIDS is a shelter (S-788 Lightweight Multipurpose Shelter) mounted on a dedicated vehicle (M1097 Heavy HMMWV) and equipped with a biological detection suite employing complementary technologies to detect large area biological attacks. The system is designed to allow removal of the shelter from the vehicle for fixed site applications. The system includes a trailer-mounted 15-kW generator (PU-801) to provide electrical power. The shelter includes the follow-ing equipment: (1) Collective Protection; (2) Environmental Control; (3) Sample Refrigeration; (4) HF and VHF Communication; (5) Meteorology Instrumentation and (6) Biological Detection Suite.

The BIDS biological detection suite contains multiple technologies selected to detect various characteristics of a biological aerosol attack. The BIDS integrates aerodynamic particle sizing, bioluminescence, flow cytometry, mass spectrometry and immunoassay technologies in a complementary, layered manner to increase detection confidence. The BIDS will detect and identify specific biological agents, at the following sensitivity levels and have the capability of being upgraded/modified to detect and identify other biological agents: Non Developmental Item (NDI) (Interim) BIDS - Detect 25 Agent Containing Particles per Liter of Air (ACPLA) within 15 minutes, identify 25 ACPLA within 30 minutes (45 minutes total); P3I BIDS - Detect 15 ACPLA within 10 minutes and identify 15 ACPLA within 20 minutes (30 minutes total).

FOREIGN COUNTERPART: No know foreign counterpart.

FOREIGN MILITARY SALES: No foreign military sales.

PROGRAM STATUS: BIDS NDI has been fielded. BIDS P3I is in production.

- **PROJECTED ACTIVITIES:** Near Term activities include: (1) Complete Production Prove-Out Test (PPT) for long lead time (LLT) P3I components (Biological Detector and Chemical Biological Mass Spectrometer); (2) Conduct a special IPR for production approval of LLT components and (3) Fabricate three P3I prototypes.
 - **PRIME CONTRACTOR:**Bruker Analytical Systems (Billerica, MA)
Environmental Technologies Group (Baltimore, MD)
Kaman Sciences Corporation (Alexandria, VA)



Science and Technology	Concei	PT DEM/VAL	EMD		OPERATIONS AND SUPPORT
				PRODUCTION AND DEPLOYMENT	
MI		U		the Improved CAM (ICAM) provide a meantamination on personnel and equipment.	ns of quickly locating the presence
CHADACTED		The CAN is a hand hold	dovice used to gu	ickly find norve and mysterd egent conten	nination on people and equipment

The CAM is a hand-held device used to quickly find nerve and mustard agent contamination on people and equipment. CHARACTERISTICS: It is used by troops in full protective clothing, after an attack or after going through a contaminated area. It provides fast low level detection of both nerve and mustard vapors, differentiates between nerve and mustard agents, provides an indication of the relative magnitude of the hazard present, and is not affected by most common battlefield interferences. The CAM provides information not previously available about the chemical hazard and provides it in seconds for both nerve and mustard. Use of the CAM on a chemical battlefield reduces the risk a commander may have to take in reducing the level of mission oriented protective posture in a combat situation. The CAM gives a commander the ability to quickly monitor for contamination, allowing soldiers and equipment to remain engaged in their combat missions and reduces the need for decontamination. The CAM is also used to check the effectiveness of decontamination operations on people and equipment. The ICAM differs from the CAM in that it is more reliable and much less costly to operate and repair.

France: AP2C **FOREIGN COUNTERPART:**

- CAM is a foreign-developed item (U.K.), therefore foreign military sales are restricted by a license agreement. Sales are **FOREIGN MILITARY SALES:** allowed under Foreign Military Credits. Egypt has procured 6 CAMs for their Wadimobile and is considering a significantly larger purchase.
 - **PROGRAM STATUS:** Production of 9,634 CAMs for the Army is complete and more than 9,300 fielded. A multi-year contract was awarded to Intellitec in December 1995 for a quantity of 3,135 ICAMs and associated spares. Delivery is scheduled to begin September 1998, following an extensive production acceptance test.
 - Conduct a pre-production evaluation of the technical data package followed by production acceptance testing from May **PROJECTED ACTIVITIES:** through September 1997.

Intellitec Division (Technical Products Group) (DeLand Florida) **PRIME CONTRACTOR**:



		The second second
SCIENCE	AND	TECHNOLOGY

EMD

DEM/VAL

- **MISSION:** The Joint Service Lightweight Integrated Suit Technology (JSLIST) program provides a Joint Service Chemical Biological (CB) protective clothing ensemble that can be tailored to the diverse operational needs of the individual soldier, marine, airman, and sailor and is compatible with existing and emerging individual protective equipment.
- **CHARACTERISTICS:** The JSLIST system will consist of three major components: lightweight CB protective garments (overgarment, undergarment, duty uniform, and aviation overgarment), improved CB protective gloves, and multipurpose overboots. Each component is based on state-of-the-art material technologies that have undergone extensive user evaluation and field and laboratory testing. Through unique system and component design features, individual users can select any combination of JSLIST components to form a mission-tailored protective system. This system will provide the highest level of protection against current CB threats while reducing heat strain, weight, and bulk to an absolute minimum. User performance is optimized by balancing CB protection and heat strain management with service-defined mission requirements. Although the main thrust of JSLIST is to develop the next generation CB protective system, considerable focus also continues on ensuring full compatibility and integration with equipment such as developmental masks and body armor and developmental systems such as Land Warrior, Air Warrior, and Mounted Warrior. Under management, system planning, system and component design, material selection, test execution, and data assessment. The program structure and approval process have been configured to assure full user participation so that common and service unique requirements are met.

FOREIGN COUNTERPART: Multiple countries have similar products.

FOREIGN MILITARY SALES: No foreign military sales.

CONCEPT

- **PROGRAM STATUS:** Phase I preliminary wear tests, material tests (chemical, physical properties, and heat stress) and design of suits resulted in down selection of materials and garment designs to continue into Phase II. Phase II included extensive field DT/OT testing at diverse environmental sites and various user facilities as well as uniquely developed standardized chemical agent swatch, heat stress, aerosol, man-in stimulant system, and FR tests. A critical design review has been conducted to determine any modifications that may need to be made to ensure JSLIST system provides the best ensemble for CB protection.
- **PROJECTED ACTIVITIES:** Based on extensive testing and preliminary evaluations, minor modification are being made to JSLIST components and additional testing is being scheduled to ensure that modifications provide desired results. An MSIII-type classification is scheduled for 2QFY97 with initial production of garments in FY97. The JSLIST P³I program will structure an iterative process that will allow for periodic technology insertion of tested approved materials into the JSLIST production cycle.

PRIME CONTRACTOR: Battelle (Stafford, VA)



SCIENCE AND TECHNOLOGY

EMD

- MISSION: The Joint Tactical Ground Station (JTAGS) will receive and process data in-theater from space-based infrared sensors and disseminate warning, alerting and cueing information on TBMs and other tactical events of interest.
- **CHARACTERISTICS:** JTAGS is a theater tactical ground station contained in an 8 ft by 8 ft by 20 ft ISO shelter. The system is transportable by C-141 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.
- FOREIGN MILITARY SALES: No foreign military sales.
 - **PROGRAM STATUS:** JTAGS is a Program Executive Office Missile Defense, ACAT III managed program, and is a joint interest effort with the Navy. The Program has transitioned from a Ballistic Missile Defense Organization/U.S. Army Space and Strategic Defense Command Advanced Technology Demonstration to an Army funded 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 prototype was delivered during FY93 and underwent developmental and operational testing during 4QFY93 and 1QFY94. Both prototypes are currently deployed supporting EUCOM and PACOM respectively. A successful MS II IPR decision was held on 6 May 1994 which approved entry into Engineering and Manufacturing Development (EMD). The EMD contract with production options was awarded on 8 July 1994. The two EMD units were delivered 3QFY95 and underwent extensive technical and operational testing. The program was approved to enter production following a successful 26 February 1996 MS III decision review.
 - **PROJECTED ACTIVITIES:** Production units to be fielded in FY97. Phase I of a two-phased product improvement program will also begin in FY97, ending in FY99. Phase I will enhance joint communications and the system's ability to predict both the launch and impact points of tactical ballistic missiles. Phase II, scheduled from FY99-FY04, will enable JTAGS to be compatible with the next generation of space-based infrared satellites. This will enable JTAGS' early warning capability to remain viable well into the 21st century.

PRIME CONTRACTOR: GENCORP Inc. (Aerojet Electronic Systems) (Azusa, CA; Colorado Springs, CO)







AL EMD

CONCEPT

- **MISSION:** Medium Extended Air Defense System (MEADS) will provide low-to-medium air and theater missile defense to the maneuver forces and other critical forward deployed assets throughout all phase of tactical operations. It will operate both in an enclave with upper tier systems in areas of debarkation and assembly and alone or with Forward Area Air Defense System in the division area of the battlefield during movement to contact and decisive operations.
- **CHARACTERISTICS:** MEADS will provide air and missile defense of vital corps and division assets associated with the Army and Marine Corps maneuver forces. MEADS will utilize a combination of a netted and distributed architecture, modularly configurable battle elements, interoperability with other airborne and ground based sensors, and improved seeker/sensor components to provide a robust defense against the full spectrum of TBM, cruise missile, unmanned aerial vehicle, TASM, rotary wing, and forward wing threats. MEADS will be designed to provide: 1) defense against multiple and simultaneous attacks by SRBMs, low cross-section cruise missiles, and other air-breathing threats to the force; 2) immediate deployment for early entry operations with as few as six C-141 sorties; 3) mobility to move rapidly and protect maneuver force assets during offensive operations; 4) a distributed architecture and modular components to increase survivability and flexibility of employment in a number of operational configurations; and 5) a significant increase in firepower while greatly reducing manpower and logistics requirements. Given these characteristics, MEADS can rapidly respond to a variety of crisis situations and satisfy the needs of the joint operational and tactical commanders.

FOREIGN COUNTERPART: Germany: Taktisches Luftverteidigungs System (TLVS)

FOREIGN MILITARY SALES: No foreign military sales.

PROGRAM STATUS: Concurrent with the U. S. MEADS requirements and concepts, discussions with German (GE) government and industry confirmed similar operational/technical requirements which provided an opportunity for cooperation. Discussions were later expanded to include France (FR) and Italy (IT). On 20 Feb 95 representatives of U.S., GE, FR, and IT signed a Statement of Intent (SOI) to cooperate on the development and production of the MEADS. This cooperation was based on the U.S. providing 50% of funding and receiving 50% of the workshare. However, France later decided not to participate in the program. Thus, the U. S., GE, and IT signed a 1 May 96 Memorandum of Understanding formally initiating the program's first phase, known as Project Definition and Validation (PD-V). New cost/work share ratios are 60%/25%/15% for the U. S/GE/IT respectively. MEADS will be managed by the NATO MEADS Management Agency, a NATO-chartered agency located in Huntsville, Alabama. During PD-V, two competing international teams will define total system concepts, establish system and prime item specifications, demonstrate critical functions, develop digital end-to-end simulations, and establish integrated program plans and cost estimate for the Design and Development and Production Phases.

PROJECTED ACTIVITIES: Downselect to one international team in the late FY98-early FY99 timeframe for the Design and Development phase, currently scheduled to begin 2QFY99.

PRIME CONTRACTOR:MEADS will have two international contractor teams competing during the PD-V Phase: 1)MEADS Inc. (consortium
consisting of U.S. contractor Hughes and Raytheon Co (joint venture), and European contractors Deutsch Aerospace
(Germany), Siemens (Germany), and Alenia (Italy), and 2)MEADS International Inc. (consortium consisting of U.S. con-
tractor Lockheed Martin Integrated Systems and the same three international contractors).

* See appendix for list of concept studies contractors.






SCIENCE AND TECHNOLOGY	CONCEPT		EMD	PRODUCTION AND DEPLOYMENT	OPERATIONS AND SUPPORT	
		Dem/Val				Natio
MI	SSION: To prot	tect the United Sta	tes against limited	d long range ballistic missile (ICBM/SLBM) attacks.	3
CHARACTERI	EW Ra Manag based e object making	adars) and the Uni ement Command (exoatmospheric hit classification and l	ited States Space Control and Com -to-kill intercepto kill assessment) a munications). Fo	em will interoperate with external Early Wa Command (USSPACECOM) Command a munications (BMC3). The Army elements ors, a ground-based, phased array, national o and site BMC3 (for human-in-control, enga or an effective early capability to protect al s may be required.	and Control Center via CINC Battle of the NMD System include ground- defense radar (for surveillance, track, agement planning, top level decision	Missile D
	es tow veillan tile ree reposit tional Once u The ta sor dat game"	ard the U.S. and tr ce and tracking sys- entry vehicles and p tions itself pointing target updates from uncapped, the on-b rget is designated u ta, and on-board tar	ansmitting the tr stems including the planning the enga g the seeker field- n the site BMC3 b oard passive seek using a combination rget selection capa ieve a direct impa	early warning sensors detecting and design racking data through the CINC BMC3 to the ground-based radar, the site BMC3 aids agement. After launch and burning of the of-view to the predicted target position. The based on surveillance data and executes int the searches and acquires the target and any on of target object map, provided by the site abilities. After target designation, the kill ve act kill. The intercept is monitored by the re- t, if required.	the site BMC3. Using data from sur- the operators in identifying the hos- booster, a kill vehicle separates and ne on-board computer receives addi- ercept course correction maneuvers. associated objects in its field-of-view. e BMC3 based on radar and EW sen- hicle tracks the target executing "end	National Missile Defense (NMD)
FOREIGN COUNTER	PARTS: Russia	: Moscow ABM Sy	vstem			
FOREIGN MILITARY	SALES: No for	eign military sales.				
PROGRAM S	design execut NMD The A and th	ated as a Major De tion of the NMD Pr system within the r rmy's efforts are foo	fense Acquisition rogram. The goa next three years the cused on develop	n a technology effort to a Deployment Read Program. The Army is supporting Ballistic I of the program is to develop and test the hat could be deployed within an additional ing and demonstrating the Ground Based I m will demonstrate the integrated perform	e Missile Defense Organization in the elements of the initial ground-based three years, if dictated by the threat. interceptor, the Ground Based Radar,	
PROJECTED ACTI	EKV i		in FY98 and one	ensor flight tests in FY97 (one per contract e in FY99. One system flight test in FY99		
PRIME CONTRA	vehicle		is Lockheed Mar	p. (Hughes Aircraft Company) and Rockwe tin (Lockheed Missiles and Space Compan	- ·	
	* See a	appendix for list of	subcontractors.			



SENCE AND TECHNOLOG	Y CONCE	PT DEM/VAL	EMD		Operations and Support		
				PRODUCTION AND DEPLOYMENT			Z
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	;		nation, and report acc	connaissance System (NBCRS) will detect, curate information to supported commande l contamination.			Nuclear, Biological,
CHARA		ed nuclear and chemi biological and chemic for later analysis; mar commanders in the an	cal detection, warnin al contamination for c areas of nuclear and rea of operation. The	e fielded, M93A1 are wheeled armored vehing, and communications capability, and the future analysis. These systems can collect a chemical contamination; and transmit, in the hazards to the NBCRS crew are minimized we overpressure with heating and cooling for the systems and cooling for the systems are minimized by the systems and cooling for the systems are minimized by the systems and cooling for the systems are minimized by the systems are minim	e added capacity to sample nuclear, soil, water, and vegetation samples real time, NBC information to unit ed through the inclusion of vehicle		ogical, and
		Engine:V8 DieseWeight:XM93: 1Speed:65 mphRange:500 mi	armored-collective p el—320 hp 8.7 ton; XM93E1: 20 soldiers; XM93E1:).2 ton			Chemical
FOREIGN CO	UNTERPART:	China has an NBC rec	connaissance vehicle.	Russia: BRDM-ZRKH, MTLB, RKHM, UA	Z-469RKH.		Re
FOREIGN MILI	TARY SALES:	No foreign military sa	les.				8
PROGE		phase, during which p Systems was selected vided 48 contractor-s XM93 NBCRS to the redeployed worldwide the XM93E1 NBCRS	proposals were evalu to complete all addit upported systems for U.S. Government in to U.S. Army and Ma which satisfies all Rec	a program consisting of four phases: (1) I ated, competition conducted, and a winner ional phases; (2) Interim System Productio curgent fielding. Additionally, the German support of Operation Desert Storm (ODS) arine Corps forces; (3) System Improvement quired Operational Capabilities (ROC) requ CRSs to the M93A1 configuration.	r selected. General Dynamics Land on phase for the XM93, which pro- d Government donated 60 German . Following ODS, all systems were t phase to design, fabricate, and test		Reconnaissance Sy
PROJECTED		Production Qualificat First Unit Equipped v	0	led for September 1997. in March 1998.			sten
PRIME CC		General Dynamics (D Thyssen Henschel (G					n (NBCRS) - F
						63	Fox



SCIENCE	AND	TECHNOLOGY
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- **MISSION:** The PATRIOT Missile System provides high- and medium-altitude defense against aircraft and tactical ballistic missiles to critical assets and maneuver forces belonging to the corps and to echelons above corps. The PATRIOT Advanced Capability-3 (PAC-3) system upgrade, along with the PAC-3 missile, will provide an advanced anti-tactical missile capability to the current fielded system.
- **CHARACTERISTICS:** The combat element of the PATRIOT Missile System is the fire unit, which consists of a Radar Set (RS), an Engagement Control Station (ECS), an Electric Power Plant (EPP), an Antenna Mast Group (AMG), and eight remotely located Launching Stations (LS). The RS provides all tactical functions of airspace surveillance, target detection and tracking, and missile guidance. The ECS provides the human interface for command and control of operations. Currently, each launcher contains four ready-to-fire missiles, sealed in canisters which serve a dual purpose as shipping containers and launch tubes. PATRIOT's fast reaction capability, high firepower, ability to track 50 targets simultaneously, and the ability to operate in a severe electronic countermeasures environment are features not available in previous air defense systems. The PAC-3 upgrade program will incorporate significant upgrades to the RS, ECS, and will include up to 16 advanced hit-to-kill missiles into three to four of the eight launchers per firing battery, thus increasing fire power and ballistic missile defense capabilities. The primary mission of the PAC-3 missile is to kill both maneuvering and non-maneuvering tactical ballistic missiles. The PAC-3 missile will also have a capability to counter cruise missiles and aircraft.

FOREIGN COUNTERPART: Russia: SA-10 and SA-12

- **FOREIGN MILITARY SALES:** Germany, Israel, Japan, Kuwait, the Netherlands, and Saudi Arabia are currently participating in PATRIOT acquisition programs. Discussions with several other interested allies for PATRIOT acquisition are ongoing.
 - **PROGRAM STATUS:** PATRIOT has completed fielding to U.S. forces and is deployed in CONUS, Europe, Korea, and Southwest Asia. U.S. missile production deliveries include PATRIOT Anti-Tactical Missile Capability-Level 2 (PAC-2), and Guidance Enhancement Missiles. The PAC-3 capability 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.
 - **PROJECTED ACTIVITIES:** The PAC-3 missile, a key component of overall system improvements, has entered the test flight phase of Engineering and Manufacturing Development (EMD). The Low-rate Initial Procurement (LRIP) decision for the PAC-3 missile is scheduled to occur in 3rd Quarter 1997.
 - **PRIME CONTRACTOR:**Lockheed Martin Vought Systems (Grand Prairie, TX)
Raytheon (Bedford, MA)

* See appendix for list of subcontractors.



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DEM/VAL CONCEPT

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EMD

OPERATIONS AND SUPPORT

- **MISSION:** The family of chemical, biological and radiological protective masks (M40 Series) provides respiratory, eye, and face protection against chemical and biological agents, toxins, radioactive particles and battlefield contaminants. These masks are issued to every soldier, the M42A2 to armored crews, M45 to rotary wing crew, and the M40A1 to the balance of the force and AMC Surety Sites. The M41 Protection Assessment Test System (PATS) checks out the readiness of a protective mask while worn by an individual. It also can be used to screen for unserviceable masks and assists in training personnel on the proper wearing and fitting of the mask.
- **CHARACTERISTICS:** The M40A1, M42A2 and M45 masks have a silicone rubber facepiece with an in-turned peripheral faceseal and binocular rigid lens system. The basic mask, the M40A1, replaces all previously fielded masks. It includes a face-mounted canister with NATO standard threads (gas and aerosol filter) which can be worn on either the right or left cheek and includes a drink tube, and clear and tinted lens outserts. When the canister is attached to a connection hose and equipped with a canister harness, larger mask carrier, and a microphone, the mask becomes the M42A2 which is used by all combat vehicle crew personnel. The interchangeability has also permitted the repair of masks using a facepiece assembly, while retaining other existing, undamaged parts instead of a total replacement a significant cost and time savings. The M45 is designed with close-fitting eye lenses, and interchangeable nose cups, to permit fitting an increased range of soldiers. This unique design permits operation of aircraft sighting systems and night vision devices without the aid of forced ventilation air. The PATS now permits verification that the fit of the mask to the soldier's face is acceptable and that there are no critical leaks in the mask system.

FOREIGN COUNTERPART: Britain: S10

No foreign military sales. **FOREIGN MILITARY SALES:**

- **PROGRAM STATUS:** Army is currently conducting negotiations for the award of a multi-year contract for the production of M40 and M42 masks. Award is scheduled for October 1996. More than one million M40 Family masks have already been fielded. Replacement of all combat vehicle crew masks with the M42A2 model has been requested but is awaiting additional funding for their procurement, previously unplanned. The M45 initial production contract is planned for award in 2QFY97. Contract awarded in November 1996.
- **PROJECTED ACTIVITIES:** Continued production of M40 Series.

ILC Dover (Dover, DE) **PRIME CONTRACTOR:** Mine Safety Appliances (Pittsburgh, PA) TSI, Inc (St. Paul, MN)



CE AND TECHNOLOGY	CONCEPT	DEM/VAL	EMD		OPERATIONS AND SUPPORT
				Production and Deployment	
MISS	effectiv mission	ely and survive or ns including peace	the nuclear battle ekeeping, nuclear	nmanders with nuclear radiation detecti efield and to minimize nuclear radiation accident response, recovery of vehicles ipment containing radioactive material.	exposure of troops during peacetime
CHARACTERIS	equipn Radiac hand-h tron cu detects stored	nent has been deve equipment that in held, pocket-sized in humulative dose in a hand displays beta	corporates advance tactical radiation n a battlefield enviro radiation. The Al lividual Dosimeter	nd fielding nuclear detection and monitor g fielded to U.S. forces to upgrade thirty y res made in modern electronics. The AN neter. It measures and displays both gam nment. The AN/VDR-2 detects, measure N/PDR-75 measures the prompt and resid from 1-1000 cGy. The AN/PDR-77 dete	vear old technology with digital /UDR-13 Radiac Set, is a compact, ma dose rate, and total gamma/neu- s and displays gamma dose rate and hual gamma doses and neutron doses
FOREIGN COUNTERI	PART: Many	nations have nucle	ear radiation detec	tors.	
FOREIGN MILITARY SA	ALES: No for	eign military sales			
PROGRAM STA	compl			rd and began production in May 1996. T tages of fielding, and the AN/PDR-75 is ir	
PROJECTED ACTIVI				dings of the Radiac equipment that are and initiate fielding of the AN/UDR-13 I	
			1	and mittate neuting of the AWODK-13 h	raulae sets.



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ATIONS AND SUPPORT

SCIENCE AND TECHNOLOGY	Concept	Dem/Val		PRODUCTION AND DEPLOYMENT	OPER
			EMD		

- **MISSION:** The Remote Sensing Chemical Agent Detection (M21) permits early warning of chemical agent hazards through the use of remote sensing alarms.
- CHARACTERISTICS: The Army and Marine Corps are currently fielding the first generation of chemical agent vapor detectors capable of sensing and warning of clouds of mustard and nerve agents up to 5 kilometers away from the detector. The M21 Remote Sensing Chemical Agent Alarm is an automatic scanning, passive infrared sensor which detects agent vapor clouds based upon changes in the background infrared spectra caused by the presence of agent vapor. The M21 is currently being fielded and mounts on a tripod. When the M93A1 FOX Nuclear, Biological, and Chemical Reconnaissance System is available, the M21 will mount on a mast on the vehicle, and its alarm system interconnected into the M93A1. It operates only in a fixed, stationary position. The Joint Service Lightweight Standoff Chemical Agent Detector (JSLSCAD) also uses infrared technology for the sensor system. However, JSLSCAD expands on this by combining emerging technologies in miniaturization and computer power to decrease the size and weight by 60%, permit 360 degree detection on the move, and operation from ground vehicle, sea and aerial platforms.
- FOREIGN COUNTERPART: No known foreign counterpart.

FOREIGN MILITARY SALES: No foreign military sales.

PROGRAM STATUS: Army is currently fielding the M21. The JSLSCAD is in the first year of Engineering and Manufacturing Development. It has successfully demonstrated detection of simulants from both unmanned aerial vehicles, ground vehicles and shipboard sites. Type classification is planned for FY00 with the first units to get JSLSCAD being the Marine Corps.

PROJECTED ACTIVITIES: JSLSCAD Engineering and Manufacturing Development contract award - June 1997.

PRIME CONTRACTOR: M21 production: Intellitec (FL)



- **MISSION:** The Sentinel is used with the Army's Forward Area Air Defense (FAAD) C2 system to provide critical air surveillance of the forward areas. It automatically detects, tracks, classifies, identifies, and reports targets (cruise missiles, unmanned aerial vehicles, rotary wing and fixed wing aircraft) to Air Defense Weapons Systems located in the Forward Area.
- **CHARACTERISTICS:** The Sentinel consists of a radar-based sensor system with its prime mover/power, Identification Friend or Foe (IFF), and FAAD Command and Control Intelligence (C21) interfaces. The sensor is an advanced three dimensional battlefield Xband air defense phased-array radar with an instrumented range of 40 km. The Sentinel is capable of operating day or night, in adverse weather conditions, in the battlefield environments of dust, smoke, aerosols, and enemy countermeasures. It provides 360 degree azimuth coverage for acquisition and tracking. The Sentinel contributes to the digital battlefield by automatically detecting, tracking, classifying, identifying, and reporting targets (cruise missiles, unmanned aerial vehicles, rotary wing, and fixed wing aircraft). Targets can be hovering to fast moving, as well as, from nap of the earth to the maximum engagement altitude of FAAD weapons. Very accurate and quick reacting, Sentinel acquires targets sufficiently forward of the Forward Line of Own Troops (FLOT) to improve FAAD weapon reaction time and allow engagement at optimum ranges. The Sentinel integrated IFF reduces the potential for fratricide of Army Aviation and Air Force aircraft. Highly mobile and reliable, the Sentinel Anti-Radiation Missile and Electronic Counter-Measures resistant performance support Army Corps and Divisional Air Defense operations across the full spectrum of conflict. Sentinel uses a HMMWV as its prime mover. It is transportable without disassembly in USAF C-130, C-141, C-17 and C-5 aircraft and U.S. Army CH-47 helicopters. It is designed to be transported as external cargo (sling load) by U.S. Army UH-60 aircraft. The Sentinel is capable of being march-ordered and emplaced by two soldiers. The system is capable of normal operation while attended by one soldier and will not require continuous operator attention to perform normal operations.
- **FOREIGN COUNTERPART:** Seven other foreign air defense radars which specialize in search and track of low and slow airborne targets are: Contraves LPD-20 (Italy); Skyguard-Improved (Switzerland); Hot Shot 2S6 (Russia); El Dorado (France); Siemens DR-641 (Germany); Rodeo (France) and RA-20S (France).

FOREIGN MILITARY SALES: Turkey

- **PROGRAM STATUS:** Sentinel is in the Production and Deployment phase. The contract was awarded in 2QFY92. First production delivery was received on 2 July 1996.
- **PROJECTED ACTIVITIES**Second Production Option Award FY97.
Production Verification Test (PVT) FY97.
Production Fielding to 4ID (1-44) FY97.
- PRIME CONTRACTOR: General Motors (Hughes Aircraft Company) (El Segundo, California and Forest, Mississippi)



SHICKE	
Generator	

CIENCE AND TECHNOLOGY CONCEPT DEM/VAL EMD **OPERATIONS AND SUPPORT** PRODUCTION AND DEPLOYMENT The mechanical smoke generator (M56) provides large-area obscuration in the visual and infrared spectra. **MISSION: CHARACTERISTICS:** The M56 is a large-area smoke generator system that is mounted on the High Mobility Multipurpose Wheeled Vehicle. The M56 will 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 screening modules is capable of disseminating a particulate material to provide 30 minutes of screening. Gas turbine engine-powered visual screening (fog oil): 1.33 gal/min 1 hr continuous Infrared screening (graphite): 10 lb/min 30 min continuous Countries using Soviet doctrine emphasize extensive use of smoke during tactical exercises. Many nations, especially FOREIGN COUNTERPART: those in the Middle East, are beginning to realize the benefits of smoke and have developed programs in this area. FOREIGN MILITARY SALES: No foreign military sales. The M56 Smoke Generator was type classified standard in September 1994. A production contract was awarded in March **PROGRAM STATUS:** 1995. Fielding will begin in FY97. **PROJECTED ACTIVITIES:** The First Unit Equipped (FUE) will be in March 1997. **PRIME CONTRACTOR:** Robotic Systems Technology (Westminster, MD)



- **MISSION:** The mechanical smoke generator (M58) system enhances the maneuver commander's ability to deploy his forces. Six vehicles are organized into two squads, led by the platoon leader in one of the six vehicles. The M58 smoke platoon is task organized to the brigade or divisional commander, who will use them to conceal ground maneuver forces, breaching, river crossing, and recovery operations. Three platoons are assigned to the Mechanized Smoke Company and one platoon to the Divisional Chemical Company.
- **CHARACTERISTICS:** The M58 consists of a mechanized smoke generator system mounted in a modified M113A3 Armored Personnel Carrier. The carrier incorporates the Reliability Improvement of Selected Equipment configuration that includes an upgraded engine and transmission, external fuel tanks, and new driver's station. The 250 hp Detroit Diesel powerpack provides a 20.3 hp/ton ratio at a combat loaded weight of 27,000 pounds. This is sufficient to maintain mobility with the M1 and M2/M3 vehicles the M58 supports. The smoke generator system provides up to 90 minutes of visual and 30 minutes of infrared obscuring screens. A 30-minute millimeter wave obscuring capability will be added as a product improvement. The system includes the Driver's Thermal Viewer that allows it to see through its own smoke clouds and a Gas Particle Filter Unit for operating in an NBC-contaminated environment. A crew of three will operate the M58 system.
- **FOREIGN COUNTERPART:** Countries using Soviet doctrine emphasize extensive use of smoke during tactical exercises. Many nations, especially those in the Middle East, are beginning to realize the benefits of smoke and have developed programs in this area.
- FOREIGN MILITARY SALES: No foreign military sales.
 - **PROGRAM STATUS:** The M58 program entered the production deployment in FY96.
- **PROJECTED ACTIVITIES:** Production is scheduled for FY96-99, with production verification testing scheduled 2QFY97 and fielding through FY97-00.
- **PRIME CONTRACTOR:** Anniston Army Depot (Anniston, AL)

 Robotic Systems Technology (Westminster, MD)



PRODUCTION AND DEPLOYMENT

MISSION:

CONCEPT

ION: The soldier system's mission is to provide the soldier with everything he wears, carries, and consumes in combat.

CHARACTERISTICS: The soldier system includes improved individual equipment, weapons, clothing, C4I, and subsistence items, 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.

Soldier Modernization provides a cohesive plan for the coordinated development of soldier system items and is the roadmap 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 Shin/Knee Guards for Riot Control; Pistol Belt Extender; Extreme Cold Weather Boot; Ballistic/non-Ballistic Face and Body Shield; Fuel Bar; improved Physical Fitness Uniform; Small Unit Showers; Lightweight Video Reconnaissance System; Individual Soldier Radio; Heavy Sniper Weapon System; M4 Improved Butt Stock; Non-lethal 40 mm, 5.56 mm, and 12 Gauge Munitions; selectable Lightweight Attack Munitions and Armor Crew/infantry Protective Mask XM45 to name a few. 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 (JSLIST), and improved laser eye protection. 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 radio/computer, with embedded 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, infrared laser aiming light, and laser rangefinder/digital compass. Far- term efforts include the Force XXI Land Warrior, Objective Individual Combat Weapon (OICW) and other programs which pursue advance technology at the component level for insertion into Land Warrior. Emphasis will be on those areas that provide substantial operational benefits such as OICW or enhanced radio/GPS or integration of components to achieve weight savings for the soldier. Similar efforts have been started for mounted and air crew personnel. AW and MW efforts are being defined.

PROGRAM STATUS:There are approximately 100-125 projects per year in various stages of R&D for the Soldier System (CIE/SEP/Land
Warrior). Land Warrior (LW), an Army Acquisition Category III program, awarded an R&D contract to Hughes Aircraft
Co. on 11 July 1995. Mounted Warrior MNS was approved 10 April 1995. Air Warrior MNS was approved 17 July 1995.

PROJECTED ACTIVITIES: It is projected CIE/SEP, will have over twenty new starts in FY 97 and as many as 24 new items will be proposed for adoption in FY 97. Land Warrior is scheduled for Early Operational Evaluation in the first quarter of FY 97. Mounted Warrior is currently funded in the POM starting in FY 98.

PRIME CONTRACTOR: Aimpoint Inc. (Herndon, VA) Hughes (El Segundo, CA) SARCO (Sterling, NJ) Alliant Tech Systems (Hopkins, MN) Motorola (Scottsdale, AZ) Texas Instruments (San Antonio, TX) DECILOG (Melville, NY) Olin (East Alton, IL)



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IENCE AND TECHNOLOGY CONC.	EPT DEM/VAL	EMD		OPERATIONS AND SUPPORT
			PRODUCTION AND DEPLOYMENT	
MISSION:	0		e for combat units (Brigade, Division, and ng fixed wing aircraft and helicopters.	Corps Area) against cruise missiles,
CHARACTERISTICS:	platforms. This missile he The Stinger system emploi the missile has traveled a program has evolved from Microprocessor (Stinger F been provided in FY95-97 strated and is capable of a	omes in on the he bys a proportional safe distance from n the redeye, to Sti RMP), and finally a 7 to develop the St acquiring and tracl	system which can be fired from a number of cat emitted by either jet or propeller-driven navigation system that allows it to fly an i in the gunner, its main engine ignites and p inger Basic, followed by Stinger Post, then an upgrade to Stinger Block I. To overcom tinger Block II. The Stinger Block II focal king targets in clutter at 2.5 times or greate in MANPADS, Avenger, Kiowa Warrior, B	a, fixed wing aircraft or helicopters. ntercept course to the target. Once ropels it to the target. The Stinger Stinger Reprogrammable he targets in clutter, funds have plane array lens has been demon- er than the acquisition range of the
	Guidance:Passive infraSpeed:SupersonicNavigation:ProportionalWeight:34.5 lbDiameter:2.75 inLength:60 in	ared and ultraviole l with lead bias	t homing	
FOREIGN COUNTERPART:	Britain: Blowpipe, Javelir Sweden: RBS-70	1 Russia: S	5A-7, SA-14, and SA-16	
FOREIGN MILITARY SALES:	Germany, Denmark, Kore	ea, Netherlands, Sv	witzerland and Taiwan.	
PROGRAM STATUS:	Stinger-RMP was fielded Further improvements to which started in FY94 with the service life and developmear-term, low-observable for super-elevation (a safe Stinger Block II with the	l in FY90. Stinger Stinger-RMP perfo th fielding in FY96 op improvements e targets (UAVs and ety hazard when St focal plane array s	to Stinger Block I. The first Stinger Block -RMP production was accelerated to meet ormance have been developed under a Bloc 5. The Army has initiated the Block I Sting to increase accuracy and resistance to cou d cruise missiles) and standoff helicopters tinger is fired from a hovering helicopter). seeker for acquiring, tracking and hitting a pproximately 11,500 Stinger Block I retrofi	Desert Shield/Storm requirements. ck 1 product improvement program ger improvement program to extend intermeasures, effectiveness against in clutter, and to eliminate the need The objective Stinger missile is the aerial targets at the kinematic range
PROJECTED ACTIVITIES:	Block 2 focal plane array s	seeker Demonstrat	6 tech base effort, the Army plans to continution/Validation (DEM/VAL) phase prior to lock II DEM/VAL phase reduces the risk on	the Engineering and Manufacturing
PRIME CONTRACTOR:	General Motors (Hughes	Aircraft Company	v) (Tucson, AZ; Pomona, CA; Farmington,	NM)
	* See appendix for list of			



CONCEPT DEM

Dem/Val

EMD

CHENCE AND TECHNOLOGY

- **MISSION:** The overarching objective of the Tactical High Energy Laser (THEL) Advanced Concept Technology Demonstration (ACTD) is to evaluate the effectiveness of a THEL in negating the threat posed by Katyusha and other short-range artillery rockets. The THEL ACTD Demonstrator mission provides for early operational assessment of the acquisition and close-in engagement problems associated with the evolving air threat of short to medium range targets within the Air Defense Architectures, which will significantly enhance the defensive coverage to combat forces and theater level assets.
- **CHARACTERISTICS:** The THEL ACTD demonstrator will be a deuterium fluoride chemical laser with a minimum of 60 seconds of continuous total run time. The Pointer Tracker/Beam Control system will be capable of providing + 200 degree coverage in azimuth and -5 to 95 degrees coverage in elevation, and have the ability to accept cueing from external sensors in existing air defense architectures. The demonstrator, including the laser device, pointer tracker, support equipment, and command, control, communication, and intelligence subsystems, will consist of modules enclosed in standard shipping containers that are road transportable and air transportable. The THEL demonstrator will also be configured for field setup and testing at the High Energy Laser Systems Test Facility and remote locations in Israel, and demonstrate equivalent system performance to ACTD phase one criteria at Capistrano Test Site (CTS), Capistrano, CA.

FOREIGN COUNTERPART: No known foreign counterpart.

FOREIGN MILITARY SALES: No foreign military sales.

PROGRAM STATUS: On 29 April 1996, then Prime Minister of Israel, Shimon Peres, met with President Clinton and Secretary of Defense Perry. During the meeting, the U.S. made a commitment to assist Israel in the development of a THEL demonstrator for the ultimate purpose of defeating the threat posed by Katyusha and other short range rockets against the cities in northern Israel. By memorandum dated 11 May 1996, Secretary of Defense Perry established the THEL ACTD program. The Secretary of Defense established the end of 1997 as the completion date for the THEL ACTD. The Department of Defense and the Israeli Ministry of Defense executed a Memorandum of Agreement on 18 July 1996 which delineates the THEL program. The MOA provides for performance of the ACTD, in principle, during calendar years 1996-1997. On 12 Sept 1996 a memorandum was generated by Assistant Secretary of the Army, Gilbert F. Decker to the Deputy Under Secretary of Defense recommending the completion date of 31 Mar 1998 for the THEL ACTD Program. On 22-24 July 1996 the Concept Design Review was held establishing requirements for the follow on Detailed Engineering Design Review. The THEL Project Management Office has been established and is assigned to the Space and Strategic Defense Command.

PROJECTED ACTIVITIES:

- Manufacturing Readiness Reviews, 1QFY97-2QFY97.
- THEL ACTD Systems Integration Testing at CTS, Jan 1998 Mar 1998.

PRIME CONTRACTOR: TRW currently under letter contract.



CIENCE AND TECHNOLOGY	
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CONCEPT

EMD

DEM/VAL

itary forces and strategic geopolitical assets.

CHARACTERISTICS:

MISSION:

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

The Theater High Altitude Area Defense (THAAD) system will fill the void of a large area defense of tactical ballistic missile threats, including weapons of mass destruction, operating in the endo- and exo-atmosphere and directed against mil-

The THAAD system consists of missiles, launchers, Battle Management/Command, Control, Communication, Computers, and Intelligence (BM/C4I) elements, radars, and support equipment. The missile is a hypervelocity, single stage, solid propellant booster and a unique endo-/exo-atmospheric kill vehicle (KV). The hit-to-kill technology KV, designed to destroy threat warheads, guides to target using an infrared homing seeker. The launcher utilizes the Army standard Palletized Loading System (PLS) 16-ton truck with a capacity of at least 8 missile rounds on a missile pack. The HMMWV based BM/C4I centers are a set of highly robust and configurable shelters to ensure maximum flexibility on the modern battlefield. These units interface and coordinate with the Theater Air Defense C2 system and will control both the Engagement and Force Operations for the THAAD system. The BM/C4I will provide automated acquisition and identification of TBM threats, process and disseminate track data, assign weapons, monitor engagements, and guide sensor operations. The THAAD X-band phased array radar acquires the target at long ranges, tracks the target and provides in-flight updates to the THAAD interceptor prior to intercept. The radar also performs kill assessment to support the decision to commit additional interceptors or to cue lower tier systems such as the Patriot System. The THAAD System will support passive defense and attack operations by providing impact point predictions and launch point estimations. The THAAD system will be fully transportable by C141/C5/C17 military aircraft. Once in theater, the system will utilize Army standard movers to be highly mobile on highways and unimproved roads. These system capabilities will allow THAAD to be rapidly deployed to any theater on short notice. Current plans call for a User Operational Evaluation System to be available in 1998 to gain user input into the final system design and to provide a Commander In Chief with a prototype system to use in the case of an emergency.

FOREIGN COUNTERPART:		THAAD System	THAAD Radar
	France and Italy:	SAAM; SAMP/N; SAMP/T	Russia: Hen House; Dog House; and Try Adds radars
	Germany:	MSAM	
FOREIGN MILITARY SALES:	No foreign military sale	·S.	
PROGRAM STATUS:	: The THAAD program is currently in the Demonstration and Validation (DEM/VAL) phase. The contract for DEM/ was awarded on 4 September 1992. Flight testing began in April 1995. Completion and delivery of a User Operation Evaluation System (UOES) prototype is scheduled for availability in FY98 and final delivery in FY99.		il 1995. Completion and delivery of a User Operational
PROJECTED ACTIVITIES:	: DEM/VAL flight tests will provide interceptor and system data to support the exercise of the UOES option and Milestone II decision in FY98.		a to support the exercise of the UOES option and the
PRIME CONTRACTOR:	2	eed Martin (Lockheed Martin Missiles ar on (Bedford, MA) (as of FY97 Raytheon v	· · · · ·

Future Missile FMTI will demonstrate lightweight, multirole missile technol-Technology Integration ogy in support of ground-to-ground, ground-to-air, air-to-air, (FMTI) (1994-1998) and air-to-ground missions with an emphasis on ground-toground technology with a multimission growth potential. The missile system demonstration includes the integration of guidance, control, propulsion, airframe and warhead technologies capable of performing in high clutter/obscurants, and adverse weather and 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 radio frequency data links.

> FMTI has five primary goals: superior antiarmor fire-andforget lethality in clutter up to five kilometers; the ability to engage armored vehicles and suppressed helicopters in clutter at extended ranges; multirole capability including ground-to-



ground, ground-to-air, air-to-air, and air-to-ground; multiplatform launch capability from the HMMWV, Bradley fighting vehicle, Avenger, RAH-66 Comanche, AH-64 Apache, OH-58D Kiowa Warrior, light armored vehicle and AH-1W Cobra; and TOW and Hellfire launcher compatible. The program is structured in three phases: Phase I, concept evaluation, fiscal 1992-1993 (that is, design, simulation); Phase II, technology demonstration, fiscal 1994-1997 (that is, five missiles fabrication, tower and captive flight test); and Phase III, proposed advanced technology demonstration (ATD), fiscal 1999-2002 (that is, platform integration, flight and ground testing). Supports: TOW follow-on

Integrated Biodetection Advanced Technology **Demonstration (ATD)** (1996-1999)

BAWS **Biological Aerosol Warning System**

This ATD will demonstrate point detection and remote early warning of biological agents. The ATD will focus on point biosensors that will incorporate automated DNA technology to increase reliability, stability, sensitivity and response time. This ATD will also demonstrate a remote biological aerosol warning capability using small, microultraviolet laser-based, fluorescent particle counters. The key to the ATD is to demonstrate the technologies in a unified effort in a battlefield exercise providing detection and warning of biological agents before forces are affected, thus reducing casualties.

Joint Combat Identification This ACTD is aimed at solving the combat identification problem underscored by the lessons learned from Operation Desert Advanced Concept Storm. The effort will build upon the Battlefield Combat Identification System (BCIS), which is a millimeter wave question Technology Demonstration and answer, target ID system developed for ground vehicle platforms. The ACTD will validate the architecture for, and (ACTD) demonstrate an affordable, integrated ground-to-ground and air-to-ground combat ID capability. An enhanced version of (1996-1999) BCIS with digital data link for improved situation awareness and various air-to-ground concepts including direct sensing target ID, "don't shoot me" communications nets and situation awareness through the commander's and gunner's sight will be demonstrated in the Force XXI exercise and the All Service Combat Identification Evaluation Test field exercise in FY 97. Concepts will be evaluated for lightweight combat identification for the dismounted soldier within battlelab warfighting experiments in FY 97.

Joint Countermine **Advanced Concept Technology Demonstration** (ACTD)

Joint Countermine AC Seamless Transition of Countermine Capabilities

From Sea to Land Operations



The Joint Countermine (JCM) ACTD will demonstrate seamless MCM operations by integrating Army, Navy, and Marine Corps technology developments and fielded military equipment. This ACTD will employ eleven (11) prototypes from Advanced Technology Demonstrations and preproduction phases of the development cycle along with fielded equipment in live demonstrations. In addition, a robust modeling and simulation effort, Joint Countermine Operational Simulation (JCOS), will expand the information the information base obtained from the live demonstrations through constructive modeling and distributed interactive simulation. C4I connectivity and notional architectures for MCM operations will also be an integral part of the JCM ACTD. The ACTD will be completed in two live demonstrations. Demonstration 1 is focused on land combat countermine and is scheduled to be conducted in 4QFY97. Demonstration II focus-

es on deep and shallow water countermine and will be completed in 2QFY98.

Force XXI Land Warrior The Force XXI Land Warrior program is the Land Warrior (LW) Science and (1996-FYOO) Technology (S&T) program which addresses the critical Army need to enhance the performance, lethality, survivability, and sustainment of the individual soldier. Force XXI Land Warrior efforts focus on technology insertions to the LW backbone which will enhance the LW system or provide improved capabilities. This program will be utilized to further reduce the LW fielding risks and to insure that future LW procurements are upgraded with current technological advancements. This program leverages the commercial microelectronics and telecommunications industries to achieve lightweight, miniaturized components. Supports: Land Warrior and U.S. Marine Corps.



Medical Research and 1. Advanced Technology. The Commander, U.S. Army Medical Research and Materiel Command (USAMRMC), is the Army Medical Commands chief technology officer. He is responsible for enhancing battlefield medical care by adapting new Development technologies that will significantly reduce deaths on the battlefield through the projection of life-saving medical expertise to the front lines. These technologies will enhance the delivery of care at each echelon of the field medical care system



by providing vastly enhanced communication links for diagnostic consultation between deployed physicians and specialty experts in the United States.

The USAMRMC's Medical Advanced Technology Management Office (MATMO) has coordinated deployments of telemedicine technology in support of US forces in Macedonia, Croatia and Haiti. This technology has been incorporated into Advanced Warfighter Experiment (AWE) Demonstrations of the Army's digitized battlefield for the 21st century. Advances in Army medicine have thus been fully integrated into the broader Army vision of a digital future.

2. Infectious Diseases. The first vaccine for hepatitis A was recently licensed by the U.S. Food and Drug Administration. Medical researchers assigned to the U.S. Army Medical Research and Materiel Command s Walter Reed Army Institute of Research conducted the large-scale clinical trials that made licensure possible. Army participation in the lengthy process of approving the new vaccine helps to insure the availability of the promising new product for future soldiers deploying to areas of the world in which hepatitis A is an endemic disease threat.

Researchers at the U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID) at Fort Detrick, MD, while continuing to develop improved medical countermeasures to classical biological warfare agents, have increased their efforts in global surveillance of new_and emerging infectious diseases. Recent outbreaks of Hanta virus in the United States and Ebola virus in Zaire have served to remind military and civilian medical communities of the importance of disease surveillance. USAMRIID scientists collaborate on a continuing basis with colleagues at the World Health Organization, the U.S. Centers for Disease Control and Prevention, and other agencies in monitoring emerging threats. USAMRIID is also involved in basic research efforts to develop preventative products to protect military personnel from these new threats.

3. Combat Casualty Care. Pilot lot production of purified hemoglobin for blood substitute research has resumed at the Walter Reed Army Institute of Research. The production facility was temporarily mothballed during the relocation of the blood research program from the Letterman Army Institute of Research. Research also continues on cell cultures in microgravity, using the Space Shuttle as a platform. These studies hold promise for future advances in wound healing.

Both the Combat Casualty Care Research Program and the Operational Medicine Research Programs have established closer ties to the Soldier Systems Command, outlining medical interfaces with and medical components of the 21st Century Land Warrior.

4. Persian Gulf Illness. The USAMRMC is investigating possible causes of Persian Gulf-related illnesses on several fronts. The USAMRMC supported a toxicological study of three chemicals used in protective products during the Gulf War. Deet, the active ingredient in the Army's insect repellent; permethrin, a pesticide applied to military uniforms which supplements the repellent formulation applied to the skin; and pyridostigmine bromide, a drug used as a pretreatment for protection from chemical warfare agents, were studied in the test. The purpose of the toxicological study was to assess the toxicity of the three chemicals individually, and in combination. The study establishes that there is some synergy, or enhanced toxicity of the products when combined, but at exposure levels far above those resulting from normal, recommended use.

The USAMRMC has published requests for proposals for research on Persian Gulf Illnesses, as a result of a Congressional appropriation of \$5 million for research on these illnesses. The USAMRMC is managing the research, which will be conducted by non-federal agencies. Proposals will be peer-reviewed by expert panels, and research grants will be awarded based on the merits of the proposals.

5. Special Interest Programs. The USAMRMC continues to manage Congressionally-mandated research programs in breast cancer and women s health. The Breast Cancer Research Program awarded approximately 750 grants and contracts with FY 1993, FY 1994, and FY 1995 funds. Proposals are now being evaluated for additional research to be supported by a fourth appropriation for breast cancer research from the 1996 budget.

The Defense Women s Health Research Program investigates health problems commonly encountered by military women. Appropriations of \$40 million from the FY 94 and 95 budgets are supporting a variety of in-house military and contractor research efforts. This program is consistent with a trend in civilian medical research to balance the traditional focus of medical research on male subjects by directing more research at women and women's health issues.

Mine Hunter/Killer The Mine Hunter/Killer will demonstrate a conceptual vehicular mounted system to autonomously detect, locate, and neu-Advanced Technology tralize land mines at tactical maneuver speeds. The technologies will be adaptable to light vehicle platforms (HMMWV) Demonstration (ATD) and medium or heavy armored vehicles to support combat maneuver and rear area logistics/operations other than war mis-(98-01) sions. The system will automatically detect, classify, and geolocate metallic and non-metallic mines. The position/location information will be used to direct a neutralizer to the individual mine. This classification and location data will also be communicated to other tactical units. Standoff detection sensors that will be demonstrated include infrared (IR) and forward looking radar. Standoff neutralization devices to be evaluated are kinetic energy projectiles, shaped charge explosives, and emerging directed energy beams. Supports: Joint Countermine ACTD, Ground Stand-off Mine Detection System, Breacher P31

Multispectral Countermeasures The Multispectral Countermeasures ATD will demon-

Advanced Technology strate advancements in laser technology, energy trans-**Demonstration (ATD)** mission, and jamming techniques for an all laser solu-(97-00) tion to infrared countermeasures and provide the technology baseline for product improvements to the Advanced Threat Infrared Countermeasure/Common Missile Warning System (ATIRCM/CMWS). These technologies will provide the capability to counter both present and future imaging focal plane array and non-imaging missile seekers. A tunable multiline laser with a fiber optic transmission line, advanced jamming algorithms will be live fire tested using the ATIRCM as a testbed. The goal is a 3X reduction in laser jam head volume, a 35 pound weight reduction, a 2X reduction in ATIRCM/CMWS power consumption, and a 4X increase in jammer power. Supports: Tri-Service ATIRCM/CMWS



Nuclear, Biological, Chemical The NBC defense science and technology program includes technologies for individual physical and medical protection, col-(NBC) lective protection, decontamination and contamination avoidance. Individual protective technologies will offer increased Defense Science and respiratory protection against current and emerging NBC threats while providing improved weapons systems and minimiz-Technology Program ing the physiological burden imposed by NBC protective equipment. Individual protective equipment also includes advanced materials for clothing which will provide enhanced protection and reduced heat stress. Medical chemical-biological defenses will provide new pretreatments for nerve agents, topical skin protectants for vesicants, new vaccines for biological threats, and novel therapies for chemical and biological threats.

> Improved casualty care practices doctrine will increase the return-to-duty rate, thus adding to force sustainment. Collective protection technologies will investigate continuous, regenerable filtration requiring minimal logistics. New decontamination technologies will minimize logistics burden, reduce contamination impact on mission effectiveness and have low environmental impact. The emphasis on the contamination avoidance component of NBC defense includes technologies for multiagent sensor, point detection and remote early warning for real-time detection and identification of chemical and biological agents. In addition, detectors will be more compact, so they may be placed on a variety of platforms and will not have large space and power requirements.





Information is power. On the battlefield, information is deadly power. The Army approach to information warfare emphasizes both offense and defense. The Army of tomorrow will deny information to the enemy through secure

communications and direct attack against enemy Command, Control, Communications, Computers and Intelligence (C4I) assets. The Army in conjunction with the other services will also expand its own C4I assets. This will give all U.S. forces a complete picture of the battlefield and securely transmit that picture to all units. As part of this effort, the Army is building the Army Battle Command System (ABCS), a seamless, secure and adaptable information architecture that will link battle commanders at all echelons. Most of the systems listed in this section are components of ABCS. Winning the Information War is about gathering as much information as possible on the enemy (e.g. numbers and types of vehicles, units and command centers) and on your own forces and then moving that information to the soldiers that can act on it, be they a transportation company or an armored battalion.

In order to build that complete picture of the theater, the Army must acquire a new range of information systems. The first elements to acquire are the intelligence and sensor systems that will gather all the information about the enemy and about friendly forces as well. The Guardrail/Common Sensor (GR/CS), the Ground Based Common Sensor (GBCS), the Tactical Unmanned Aerial Vehicle (UAV), and Trackwolf are a few of the systems that will gather the information. Other platforms like the Comanche helicopter will figure prominently in intelligence gathering through an armed reconnaissance role. A subset of this category includes the systems that highlight information about friendly forces. As an example, the NAVSTAR Global Positioning System (GPS) receivers provide precise location data to soldiers for targeting and navigation.

The second element of a new information architecture are the communications systems needed to move data securely and rapidly from point to point. In this category are systems like the Single Channel Ground Air Radio System (SINCGARS), Digital Transmission Assemblages, Circuit Switches/Message Switches, Mobile Subscriber Equipment (MSE) and Satellite Communications (SATCOM). These systems create a powerful network that will permit the movement of large amounts of data from any source to any soldier.

The final element is the computer hardware and software that will process the raw data into usable products. The systems in the first two categories will greatly increase the amount of information available to every soldier in the field. New computer systems are needed to manage the increased flow of information. Common Hardware and Software (CHS) and the Standard Army Management Information System (STAMIS) will ensure that the Army Information architecture remains compatible and interchangeable. Advanced software systems, like the Army Data Distribution System (ADDS), the Advanced Field Artillery Tactical Data System (AFATDS) and the All Source Analysis System (ASAS) will provide the means for analyzing and using the data. These are the systems that the soldiers will use to determine their next priority per the commander's intent.

The entire package of systems will create an Army that will be able to gain Information Dominance over any enemy. Tomorrow's Army will have unprecedented awareness of its own situation and needs and be able to acquire much more information about the enemy in terms of strength, location and intent. Commanders will be able to move resources (be they supplies or combat units) to where they can have the greatest impact on the battle. The Army seeks to provide its commanders and soldiers with total situational awareness, such that they will dominate the battlefield.



Operation Center (TOC)



CIENCE AND TECHNOLOGY

CONCEPT DEM/VAL

PRODUCTION AND DEPLOYMENT

OPERATIONS AND SUPPORT

EMD

- **MISSION:** The Advanced Field Artillery Tactical Data System (AFATDS) is the automated command and control system for the fire support of the future. It provides the maneuver commander the capability to plan for and execute the attack on the right target, at the right time with the right munitions, and the right weapons system. It provides the maximum utilization of the fire support assets available on an expanding battlefield. The AFATDS will provide the multiservice (Army and Marine Corps) automated Fire Support Command, Control and Communications portion of the Army Battle Command System (ABCS) and support the close, deep and rear battle fire support requirements of Army doctrine. Additionally, AFATDS will interface with Contingency Theater Automated Planning System (CTAPS) to pass air support requests to the Air Force and Navy.
- **CHARACTERISTICS:** AFATDS will provide integrated, automated support for planning, coordinating and controlling all fire support assets (field artillery, mortars, close air support, naval gunfire, attack helicopter, and offensive electronic warfare) and for executing counterfire, interdiction, and suppression of enemy targets for close and deep operations. AFATDS uses non-developmental, ruggedized, Common Hardware/Software used by the other ABCS Battlefield Functional Areas (BFAs). AFATDS uses the results of its target value analysis to establish target priorities and select the best weapon system from field artillery (cannons and rockets), mortars, naval gunfire, Air Force, Navy and Army attack helicopters and offensive electronic warfare. The AFATDS will receive the Air Tasking Order from CTAPS and automatically process it for use in fire support operations. It also coordinates target acquisition and sensor assets to provide targeting information and target damage assessment data. The software for AFATDS is being developed in incremental fieldable versions such that each version provides additional capability/functionality with AFATDS 00 (formerly Version 3) providing the objective system. AFATDS is designed to be fully interoperable with the other ABCS BFAs as well as with the Fire Support capabilities of the Marine Corps, Navy and Air Force. AFATDS assets will be utilized at Echelon Above Corps levels.
- **FOREIGN COUNTERPART:** AFATDS is designed to interoperate with the fire support command and control systems of the United Kingdom (BATES), Germany (ADLER) and France (ATLAS). Norway is planning an upgrade to its ODIN Fire Support System to interoperate with the AFATDS, Bates, ADLER, and Atlas. 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.

FOREIGN MILITARY SALES: Discussions are ongoing with Kuwait, Thailand, and the United Arab Emirates regarding their acquisition/purchase of AFATDS.

- **PROGRAM STATUS:**Joint Warrior Interoperability Demonstration (JWID 96) with Air Force, Marine Corps, Navy, & NATO nations in August 1996.Began fielding AFATDS 96 in Sep 96 with First Cavalry Division as the First Unit Equipped (FUE). Conducted AFATDS 98System Design Review, 1QFY97. Technical Test 2A of the interface to the BATES, ADLER, and ATLAS, 1QFY97.
- **PROJECTED ACTIVITIES:** Continue development of AFATDS 97 and 98. Continue fielding of AFATDS 96 software. Conduct AFATDS 96 Initial Operational Capability. Conduct AFATDS 97 Test Readiness Review. Conduct Multi Service Operational Test.
- **PRIME CONTRACTOR:**GTE, Taunton, MA-Hardware (CHS 2) Hughes Defense Communications, Fort Wayne, IN-Software
MILTOPE, Montgomery, AL-Hardware (CHS 1) SAIC Corp, San Diego, CA-Hardware (LCU)

*See appendix for list of subcontractors.



Advanced
Quick Fix
(AQF)

- **MISSION:** The Advanced Quickfix (AQF) is a signal-intercept and precision emitter-location system that intercepts, identifies, and jams enemy C31 emitters. Leap-ahead technology exploits Communications Intelligence (COMINT) and Electronic Intelligence (ELINT) against enemy Low Probability of Intercept (LPI) and conventional signals.
- **CHARACTERISTICS:** AQF, an intercept and emitter location system, interoperates with the Ground-Based Common Sensor-Light (GBCS-L) and Ground-Based Common Sensor-Heavy (GBCS-H) to provide Division commanders with the capability to intercept, precisely locate, and identify enemy conventional and Low Probability of Intercept (LPI) communications and noncommunications emitters and jam enemy conventional and LPI communications emitters. The AQF is an evolutionary, open architecture system which satisfies the Army's requirement to conduct tactical ground COMINT, ELINT, Electronic Support against enemy communications and radars and Electronic Attack against threat communications; and enhance the commander's ability to outmaneuver and destroy the enemy by locating or jamming threat command and control, fire control, and air defense centers. The AQF uses the EH-60L Blackhawk helicopter.

FOREIGN COUNTERPART: No known foreign counterpart.

FOREIGN MILITARY SALES: No foreign military sales. Sales to Taiwan of the older technology Quickfix systems are being discussed.

- **PROGRAM STATUS:** AQF is in Low Rate Initial Production. An integrated Customer Test with the GBCS-L, GBCS-H and AQF was conducted in 4QFY95 in support of a Nov 95 Milestone IIIA decision for AQF Low Rate Initial Production.
- **PROJECTED ACTIVITIES:** AQF will participate in the GBCS-L IOT&E in 4QFY97.

PRIME CONTRACTOR: Lockheed Martin (Owego, NY)

*See appendix for list of subcontractors.


E AND TECHNOLOGY CONC	EPT DEM/VAL	EMD		OPERATIONS AND SUPPORT
			PRODUCTION AND DEPLOYMENT	
MISSION: CHARACTERISTICS:	automated operations ce ing both Forward Area A The TOC consists of six Post System (SICPS) sho	nter through whic Air Defense (FAAD High Mobility Mul elters, connected b	lti-Purpose Wheeled Vehicles (HMMWV) w by tents, to form a self-contained command	l and attached ADA forces, includ- ith Standard Integrated Command element. The TOC provides the
	a single-vehicle Jump TC age with FAAD elements Defense; real-time air thu and Control (C2) system	OC capable of deplo s; automated suppo reat data from the A ns of their parent C	real-time Tactical Ballistic Missile threat into oying rapidly and providing initial control of ort for the entire spectrum of defense planni Airborne Warning and Control System; auto Corps or Army; and automated roll-up of sub laces older, larger single-purpose systems that	the entire brigade; automated link- ng, from FAAD to Theater Missile mated linkage with the Command pordinate unit logistic and person-
FOREIGN COUNTERPART:	No known foreign coun	terpart.		*
FOREIGN MILITARY SALES:	No foreign military sales			
PROGRAM STATUS:	The first ADA Brigade T following exercises and		to the 31st ADA Brigade in March 1995. It h	nas successfully participated in the
	— The Fire Directio	n Control Van and	MD Army Warfighting Experiment 95. Communications Van were used as the Air ic Cobra 96 and TMD Army Warfighting Ex	
			d to the 11th ADA Brigade in February 199 rmy Warfighting Experiment 96 and Interna	
PROJECTED ACTIVITIES:	 Commence asser Exercise Roving S 	nbly of an ADA Bri	gade TOCs for 108th, 35th and 69th ADA B igade TOC for 94th ADA Brigade to be comp ion by 3 or 4 Brigade TOCs. DA Brigade.	
PRIME CONTRACTOR:	TRW Inc. (Huntsville, A	L)		

1

Artillerv (ADA) Bricade 2 2 erations Centers (TOCs)



CIENCE AND TECHNOLOGY	CONCEPT	Dem/Val	EMD		OPERATIONS AND SUPPORT
				PRODUCTION AND DEPLOYMENT	
MIS				s a multifunction, day/night, all-weather rea lligence collection, exploitation and reporti	
CHARACTERIS	imager workst	y intelligence (IMI ations. The SIGIN	INT) mission pay T subsystem has	-7 (RC-7B) fixed wing aircraft with a core pload controlled and operated via onboard an HF/VHF/UHF intercept and direction-f equipped with an infrared line scanner, for	d open architecture, multifunction finding-capable Electronic Support

- CHARACTERISTICS: The ARL is a modified DeHavilland DHC-7 (RC-7B) fixed wing aircraft with a core Signal Intelligence (SIGINT) and imagery intelligence (IMINT) mission payload controlled and operated via onboard open architecture, multifunction workstations. The SIGINT subsystem has an HF/VHF/UHF intercept and direction-finding-capable Electronic Support Measures system. The IMINT subsystem is equipped with an infrared line scanner, forward looking infrared, and daylight imaging system. The ARL system has been developed to accommodate diverse mission requirements through the implementation of an open architecture, modular, reconfigurable mission sensor. The core set of sensors has been complemented with a Moving Target Indicator/Synthetic Aperture Radar and could also include low-light level TV, multi-spectral camera, acoustic range extension system, precision targeting subsystem, and remote configuration using a direct air-to-satellite datalink. Currently, there are three interim-capable ARL systems fielded to support U.S. SOUTHCOM requirements. These fielded systems are in two different configurations; two for performing SIGINT missions (ARL-C) and one for performing IMINT missions (ARL-1). Two additional ARL systems equipped with MTI/SAR were fielded in FY96 to support U.S. PACOM requirements in Korea.
- **FOREIGN COUNTERPART:** Numerous countries possess airborne SIGINT and/or IMINT systems, but none provide the robust multi-intelligence capability of ARL.
- FOREIGN MILITARY SALES: No foreign military sales.
 - **PROGRAM STATUS:** ARL is in MSIII Production and Deployment. ARL-M units #4 and #5 were fielded in September 1996. ARL-M unit #6 is scheduled to be fielded in September 1997. Retrofit of the ARL-I and ARL-C systems (units #1-3) is scheduled for FY97-98.
- **PROJECTED ACTIVITIES:**Incorporate Joint Tactical Terminals (JTTs) into all six systems in FY98 to improve intelliegence dissemination capabilities.
Incorporate precision SIGINT targeting capabilities into all six systems in FY99.
Upgrade all six systems with Joint SIGINT Avionics Family (JSAF) subsystems in FY00-02.

PRIME CONTRACTOR: California Microwave, Inc. (Belcamp, MD)



- **MISSION:** The All Source Analysis System (ASAS) is the Intelligence Electronic Warfare (IEW) sub-element of the Army Battle Command System (ABCS). ASAS provides combat leaders the asset management capability and the all-source intelligence needed to visualize the battlespace and more effectively conduct the land battle.
- **CHARACTERISTICS:** ASAS is a tactically deployable capability which receives and correlates data from strategic and tactical intelligence sensors and sources; produces ground battle situation analysis through threat integration; rapidly disseminates intelligence information; provides target nominations; helps manage organic IEW assets; and assists in providing operational security support. ASAS provides all source intelligence fusion, to give the warfighter timely and comprehensive understanding of enemy deployments, capabilities, and potential courses of action. ASAS is theater independent and operates during peace-time supporting contingency and crisis operations; stability and support operations; during low, mid and high intensity conflicts, and during restoration and return to peace time stabilization periods.
- FOREIGN COUNTERPART: No known foreign counterpart.
- FOREIGN MILITARY SALES: No foreign military sales.
 - **PROGRAM STATUS:** All Source Analysis System (ASAS) is an ACAT 1 evolutionary acquisition project with five distinct blocks. Block I, which provided initial software functionality, was fielded to 11 units and the training base during the FY93-95 timeframe. ASAS-Extended, an NDI hardware variant of fielded ASAS using the Block I software, has been fielded to the remainder of the active force and will be fielded to the Reserve Component Enhanced Brigades during FY97 through FY99. ASAS Block II, a streamlined acquisition initiative, builds upon the success of Block I, upgrading capabilities, transitioning to the Defense Information Infrastructure (DII) Common Operating Environment (COE) and moves to an open architecture capable of running on common hardware. ASAS Block III will be principally a software enhancement and communications upgrade that provides the Army with the objective ASAS capability. The ASAS Block III development begins in FY99. Blocks IV and V will be developed under PDSS.

PROJECTED ACTIVITIES: Continue fielding ASAS - Extended to Reserve Components. Continue ASAS Block II Engineering and Manufacturing Development (EMD) effort. Provide Block II Capability Package-Remote Workstation (RWS) to Task Force XXI. Complete testing of Block II Capability Package-Single Source upgrade. Procure and field CHS-2 hardware as part of Block II Capability Package upgrades. Provide units with sustainment training assistance. Participate in JWID 97 and Task Force XXI.

PRIME CONTRACTOR: ASAS Block II: Lockheed Martin (Littleton, CO)



CONCEPT

EMD

PRODUCTION AND DEPLOYMENT

MISSION: The Army Data Distribution System (ADDS) functions to provide a tactical data distribution radio system in support of the needs of the multitude of computers being fielded as part of the Army Tactical Command and Control System (ATCCS), which is transitioning to the Army Battle Command System (ABCS), and other battlefield automated systems to include those requirements associated with Force XXI programs.

CHARACTERISTICS:

The ADDS consists of three major products: the Enhanced Position Location Reporting System (EPLRS) for mediumspeed data distribution, the Joint Tactical Information Distribution System (JTIDS) for high-speed data distribution, and the Near-Term Digital Radio (NTDR) which is planned to replace EPLRS. The NTDR is a Non-Developmental Item R&D program that will meet Army data communication needs at Brigade and below. The program will create the Army communications data backbone from platoon to brigade for Task Force XXI. The ADDS uses Time Division Multiple Access communications architecture to avoid transmission contention. Frequency hopping, error detection and correction with interleaving, and spread spectrum technology provide jamming resistance. The EPLRS portion of ADDS provides data distribution and position/navigation services in near real time. EPLRS consists of a Network Control Station (NCS) and EPLRS User Units (EPUUs). Up to 460 EPUUs can be controlled by a single NCS. The EPUU is a radio that can be configured as a Manpack Unit, a Surface Vehicle Unit, and an Airborne Vehicle Unit. The JTIDS portion of the ADDS program is a joint program representing all services and allied force requirements with the purpose of acquiring a digital information system for tactical interoperability and awareness which complies with the ASD (C3I) policy establishing Link-16 as the DOD primary tactical data link for C21. The primary use of the Class 2M terminals is to distribute air tracks to net Air Defense Control Centers, and to control air and missile defense weapon engagement operations. The Class 2M will be integrated into six Army platforms. The NTDR program will have an open system architecture and have five times the data throughput of EPLRS, and support both tactical Internet protocol (IP) host systems such as Applique as well as Battlefield Functional Area host systems.

EPLRS has no known foreign counterpart. JTIDS is a joint and multinational system that will be interoperable with NATO units.

FOREIGN COUNTERPART: FOREIGN MILITARY SALES: **PROGRAM STATUS:**

JTIDS (2M) is currently being acquired by France and the Netherlands. A total of 1816 EPLRS were built during Low-Rate Initial Production (LRIP). The LRIP IOTE was completed in August 1994. Fielding commenced in January 1995. The JTIDS has completed engineering development and system technical testing for the Class 2M Terminal. The Development Tests on the Class 2M Terminals are being conducted from April through September 1996. Operational Test/Multi-Service Tests will be conducted from October through November 1997. JTIDS LRIP was awarded 26 March 1996. NTDR basic contract was awarded competitively on 19 Jan 96 for 200 NTDRs with an option for up to 950 units. Technology insertion efforts began in FY97.

PROJECTED ACTIVITIES:

JTIDS Full Rate Production Decision is scheduled for March 1997.

EPLRS Very High Speed Integrated (VHSIC) developed under EPLRS LRIP are scheduled for retrofit starting 2QFY98. VHSIC and on-going Engineering Change Proposal (ECP)/System Improvement Program (SIP) efforts will provide EPLRS with a three-fold increase in data rate. Full Rate Production Decision is scheduled for 2QFY97.

NTDR Operational Assessment is scheduled for 3QFY98. Initial Production Award is anticipated 3QFY99.

General Motors (Hughes Aircraft Company) (HAC) (El Segundo, CA and Forest, MS) HAC/Magnavox (Ft Wayne, IN) **PRIME CONTRACTOR:** EPLRS, GEC Marconi (Totowa, NJ) JTIDS, ITT (Ft Wayne, IN) NTDR











Army
Global
I Command a
nand and Control Syste
rol System
(AGCCS

SIENCE AND TECHNOLOGY	
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- MISSION: As the Echelon Above Corps segment of the Army Battle Command System (ABCS), the Army Global Command and Control System (AGCCS) will provide functional applications and decision support software for Commanders and Staffs at Strategic Command Centers, Theater Army Headquarters, and Major Subordinate Commands.
- **CHARACTERISTICS:** The AGCCS is the Army implementation of the Joint Staff sponsored Global Command and Control System (GCCS). The AGCCS will be interoperable with the GCCS and the tactical implementations of the ABCS such as the Army Tactical Command and Control System to provide significant improvement in information exchanges between all levels of joint and service operations.

The AGCCS is developed by reusing the "best of breed" functional C2 software currently resident in other Army systems, such as the Army WWMCCS Information System (AWIS) and the Standard Theater Army Command and Control System. Application code from these systems is integrated into the GCCS Common Operating Environment (COE). The COE incorporates standardized rigidly controlled non-developmental software modules as promoted by all military components and provides a full range of systems services for database functions, network operations, message handling, mapping, security controls and more. The system's hardware platform is based on the Common Hardware Software II (CHS II) contract. The system architecture links users via Local Area Networks (LANs) in Client/Server configurations with interface to the Secret Internet Protocol Router Network (SIPRNET) for worldwide communication.

FOREIGN COUNTERPART: No known foreign counterpart.

FOREIGN MILITARY SALES: No foreign military sales.

PROGRAM STATUS: Award of the AGCCS systems integration and development contract, December 1994. The Initial Operating Capability (IOC) occurred in August 1996. Currently validating requirements for continuing C2 functional enhancement.

PROJECTED ACTIVITIES: Fielding of functional capabilities began in January 1996 and will continue in FY97.

PRIME CONTRACTOR: Lockheed Martin (Springfield, VA)



OPERATIONS AND SUPPORT

MISSION: The mission of Circuit Switch and Message Switch is to provide automatic switching service - interconnecting analog and digital users - between tactical and Defense Communication System switches and between U.S. and NATO national switches.

CHARACTERISTICS: 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 secure and nonsecure modes 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). 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 identical to that in MSE. Most "A" features are still available in the "D" model. The AN/TYC-39 message switch family consists of two fielded versions. All are in S-280 shelters. There are a dual-shelter, 50-line switch and single-shelter, 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 equipment with precedence, security, and other subscriber features. The Fly-Away Message Switch System (FMSS) is a portable 8-line Message Switch.

FOREIGN COUNTERPART: No known foreign counterpart.

FOREIGN MILITARY SALES: No foreign military sales.

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 will complete fielding in FY96. A Circuit Switch Routing Improvement Program (CSRTEP) has been completed and tested and will provide for a common software baseline in most TTC-39 A/39D and MSE switches. Fielding of this upgrade is on-going. The fielding of the AN/TYC-39A is also ongoing. An award for the Fly-Away Message Switch occurred in March 1996.

PROJECTED ACTIVITIES:Approve ECP which will begin a Single Shelter Switch Program.
Continue Fielding of Routing Improvement Program (CSR TEP) to all Area Common User System (ACUS) switch users
(except AN/TTC-39-A(V)1).
Incorporate Enhanced Switch Operation Program into ACUS switches.
Incorporate video and Asynchronous Transfer Mode capabilities into ACUS switches.
Transition AN/TTC-39A and AN/TYC-39 to CECOM.
Procure and Field Network Encryption System.

PRIME CONTRACTOR:California Microwave (Woodland Hills, CA) FMSS
GTE (Taunton, MA) except FMSS



MENCE AND TECHNOLOGY

CONCEPT

EMD

DEM/VAL

MISSION:

ON: The Comanche will perform the armed reconnaissance mission for attack helicopter and air cavalry units.

CHARACTERISTICS:

The Comanche (RAH-66) is the Army's next generation helicopter designed to perform the armed and light attack reconnaissance mission. The Comanche will significantly expand the Army's capability to conduct reconnaissance operations in all battlefield environments, adverse weather, and during the day or night. The Comanche will "protect the force" with its advanced electro-optical sensors, aided target recognition and sensor/weapons integration. Comanche's digital communications capacity will enhance the Army's capability to win the "battlefield information war" and allow interface with Joint Surveillance and Target Attack Radar System (JSTARS) and other joint sensors and weapons platforms. Comanche's design for rapid rearm, refuel and repair will provide increased operation tempo. Low observability, target recognition and digitized communications provide the capability to conduct deep "precision strike" missions against time sensitive targets. The Comanche will replace three types of helicopters (AH-1, OH-58, and OH-6) that currently perform the armed reconnaissance mission.

Crew:2 pilots (single-pilot operable)Speed:175 kt (Dash)Endurance:2.5 hr (plus 20-minute reserve)Armaments:20 mm Turreted Gatling Gun, Air-to-ground and air-to-air missiles

Mission Equipment Package: Advanced electro-optical target acquisition and designation system, aided target recognition and helmet-mounted display. Each aircraft will have Longbow Millimeter Wave Radar capability and provisions for additional weapon stores.

FOREIGN COUNTERPART: French/German: Tigre

FOREIGN MILITARY SALES: No foreign military sales.

PROGRAM STATUS: The program is currently in the development phase of the acquisition life-cycle, with two prototype aircraft being built and flight tested. The program also includes six Early Operational Capability (EOC) aircraft that will be evaluated in a field environment prior to initiation of low-rate initial production (LRIP). The first flight of prototype 1 occurred on 4 January, 1996.

PROJECTED ACTIVITIES: DAB MSII October 2001. IOC July 2006.

PRIME CONTRACTOR: Allied Signal/Rolls-Royce (Allison Engines) Team (Indianapolis, IN) Boeing and Sikorsky Team (Stratford, CT)







Win the Information Wa

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PRODUCTION AND DEPLOYMENT

- MISSION: The Common Hardware/Software (CHS) program equips the Army Battle Command Systems from Echelons Above Corps to foxhole with common computer hardware/software.
- **CHARACTERISTICS:** CHS improves interoperability and lowers life-cycle costs by standardizing battlefield command and control (C2) automation through centralized buys of Non-Developmental Items, standardized protocols, and the development of reusable common software (CS). The program provides CHS to over 80 Army and DoD customers; three primary contracts are available with the following hardware—the CHS-1 Transportable Computer Unit (TCU)/Handheld Terminal Unit (HTU), CHS-2 High Capacity Computer Unit (HCU)/TCU/HTU), and the Lightweight Computer Unit (LCU). These contracts have commercial, rugged and highly rugged hardware versions and provide for commercial industry based logistics support that meets the unique requirements of the tactical military units.

	CHS-1 (TCU)	CHS-2 (HTU)	CHS-2 (HCU(2))	LCU				
Processor:	RISC	80486DX2	RISC	Pentium				
MHz clock:	125	50	50,61,75	90				
MIPS:	147	>10	123,164,205	14/20				
RAM:	80-400 MB	16 or 32 MB	32-512 MB	8-32/8-128 MB				
CHS/LCU software:	UNIX-POSIX; RDBM	IS; GKS, PHIGS, PEX; I	DoD Protocols; GOSIP; E-M	IAIL; NIX, NFX, DCE;				
	MPN/DDN X.25; ADA; DOS; PURGING SW; CASE TOOLS							

A key component to the overall CHS program is CS. The CS program builds upon Army, Navy and Air Force software to produce common standard products for the Defense Information Infrastructure Common Operating Environment (DII COE) for use by all DoD services and agencies. The CS program provides Army products and input to the DII COE developments being managed by other DoD organizations and is also responsible for developing common C2 Army applications for use by many systems. These CS activities have resulted in improved interoperability, reduced development and maintenance costs and shortened development schedules through a robust systematic software reuse program.

FOREIGN COUNTERPART: No known foreign counterpart.

FOREIGN MILITARY SALES: No foreign military sales.

- **PROGRAM STATUS:** The CHS-1 contract was extended to August 1997. CHS-2, which is a follow-on to the CHS-1 contract, was awarded to GTE April 10, 1995. CH-2 ruggedized HCU and TCU equipment began delivery February 1996, and First Article Testing was completed in Oct 1996.
- **PROJECTED ACTIVITIES:** Complete the CHS-2 HTU First Article and Reliability Qualification Test.
 - Continue execution of common HW/SW upgrades.
 - Continue Technology Insertion.
 - Development of DII COE products for DoD systems.
 - Development of common Army C2 applications.

PRIME CONTRACTOR: CHS-1: MILTOPE Inc. (Hope Hull, AL) CHS-2: GTE (Taunton, MA) LCU: SAIC (San Diego, CA)



SCIENCE AND TECHNOLOGY	CONCEPT	Dem/V	AL	EMD	PRODUCTION AND DEPLOYMENT	
						OPERATIONS AND SUPPORT
MIS	switch provid STICS: The D	nes into com le the transn Digital Transi	munications nission path f mission Asser	networks suppo for linking exten mblages provide	orting telephone and message traffic a usion switches at subscriber locations	ninal equipment in a variety of sizes,
	AN/TI AN/TI AN/TI AN/TI AN/TI AN/TI AN/TI AN/TI AN/TI AN/TI	RC-173B RC-174 RC-174A RC-174B RC-175 RC-175A RC-175B RC-138A RC-138B RC-138C	(downsize) (HMDA) (fullsize) (downsize) (HMDA) (fullsize) (downsize) (HMDA) (fullsize) (downsize) (HMDA)	Radio Termina Radio Termina Radio Termina Radio Repeate Radio Repeate Radio Repeate Radio Termina Radio Termina Radio Termina Radio Repeate Radio Repeate Radio Repeate 280C shelter red	al Set:Single Shelter (S-749)*al Set:Single Shelter (S-805G)r Set:Single Shelter (S-280C)r Set:Single Shelter (S-749)*r Set:Single Shelter (S-805G)al Set:Single Shelter (S-280C)al Set:Single Shelter (S-749)*al Set:Single Shelter (S-749)*al Set:Single Shelter (S-749)*al Set:Single Shelter (S-280C)r Set:Single Shelter (S-280C)r Set:Single Shelter (S-280C)r Set:Single Shelter (S-280C)r Set:Single Shelter (S-749)*	
FOREIGN COUNTER	RPART: No kr	nown foreign	n counterpart			
FOREIGN MILITARY	SALES: No fo	oreign militai	ry sales.			

PROGRAM STATUS: A new generation of assemblages is currently being produced by Laguna Industries. These are known as the High Mobility DGM Assemblage (HMDA) and are transported on two heavy HMMWVs. One vehicle transports the shelter while the second vehicle transports the AB-1373/TRC antenna masts. These systems will replace the active Army assemblages in EAC Signal units in FY98 and FY99. The First Article Test was completed and an Option Year I was awarded during 2QFY95. Production deliveries began 1QFY96.

PROJECTED ACTIVITIES: HMDA retrofits begin in 1QFY98.

PRIME CONTRACTOR: Laguna Industries (Laguna Pueblo, NM)

Enhanced Trackwolf Station AN/TSQ-205











Win the Information War

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HENCE AND TECHNOLOGY	Concept	Dem/Val	EMD		OPERATIONS AND SUPPORT
				PRODUCTION AND DEPLOYMENT	
MI		e Enhanced Trackwolf quency direction findir		n Echelon Above Corps, ground-based, m system.	an-transportable, transit cased, high
CHARACTER	op du po ce Mi thi	erational flexibility. Th ring which the current rtability advantages fro pt of modern modulati anagement/Analysis, an	e program was d Trackwolf system m the current Tra ons. The system d 6 Collection fu c. The architectur	y step from the Trackwolf Program, with gr irected by Congress in FY93 as a result of a proved too large and cumbersome for rap ackwolf system, ET will incorporate advance consists of three stations, each with nine p nctions. Set-up/tear-down times are less that e is designed to be an integration of prover e.	DESERT SHIELD/DESERT STORM, bid deployment. In addition to trans- ced capabilities that will allow inter- positions, each configured as 1 DF, 2 in four hours and each suite uses less
FOREIGN COUNTE	RPART: No	o known foreign counte	erpart.		
FOREIGN MILITARY	SALES: No	o foreign military sales.			
PROGRAM S		competitive solicitation 2FY95. Software and ha		award for the ET effort on 31 March 1994 ompleted 4QFY95.	. Critical Design Review conducted
PROJECTED ACTI		ompleting fielding proc ograde 2QFY97. Fieldin		Battalion 2QFY97. Completing new equip ttalion in 4QFY97.	ment training and working Block 1
PRIME CONTRA	ACTOR: E	ngineering Research As	sociates (Vienna,	VA)	

Enhanced Trackwolf (ET)









Protect the Force

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- **MISSION:** The Forward Area Air Defense Command and Control (FAADC²) provides an automated means of providing timely target data to FAAD weapons, to protect friendly aircraft, and to facilitate management of the air battle.
- **CHARACTERISTICS:** FAADC² consists of non-developmental computers, displays, printers, communication systems that are common to the Army Battle Command System (ABCS), non-developmental ground sensors and the requisite software that enhance the execution of air defense engagement operations (EO) and force operations (FO). FAADC² integrates air defense fire units, sensors, liaison elements, and command posts into a synergistic system capable of defeating and denying the serial threat. It provides the automated interface (Division and below) for the Air Defense component to the ABCS and allows the commanders and staffs to communicate, plan, coordinate, and control the counter-air fight. FAADC² is capable of collecting, storing, processing, displaying and disseminating situational awareness (air and ground), targeting data, and battle command information throughout FAAD units and from other ADA, Army, Joint and Combined elements. FAADC² enhances the ability of commanders, staff and weapon system operators to visualize battlespace, realize situational awareness, defeat the enemy, and synchronize operations with the supported unit.

FOREIGN COUNTERPART: No known foreign counterpart.

FOREIGN MILITARY SALES: No foreign military sales.

PROGRAM STATUS: The FAADC² system is currently in the Engineering and Manufacturing Development and Production phases. The basic effort consists primarily of software development, which is being developed incrementally. Block I was successfully tested and fielded. Block II builds on the basic capabilities of Block I by incorporating an improved ground based sensor, sensor netting, as well as establishing additional internal and external EO interfaces. Block II has completed all government testing and is being fielded to Heavy/Mechanized Army Divisions. Block III (Objective, 3QFY99) incorporates the field-ing of the FAAD Battalion TOC, two way TADIL J connectivity, and improved force operations functionality. Block IV (FY00-04) provides for EO and FO preplanned product improvements (P3I). It is currently envisioned that the FAADC² system will be fielded to all active component FAAD units, selected ARNG FAAD units, and the training base.

PROJECTED ACTIVITIES: ATCCS VI - 1QFY97. TFXXI Brigade Exercise - 2QFY97. ABCS 1 - 1QFY98. TFXXI Division Exercise - 1QFY98.

PRIME CONTRACTOR: TRW (Redondo Beach, CA)



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Protect the Force

Win the Information War

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DEM/VAL

- **MISSION:** The Ground Based Common Sensor-Light (GBCS-L) and the Ground Based Common Sensor-Heavy (GBCS-H) are vehicle mounted signals-intercept and precision emitter-location systems that intercept and identify enemy C3I emitters and *a*' radars and provide electronic countermeasures against enemy communications.
- **CHARACTERISTICS:** GBCS, an intercept and precision emitter location system, provides Division commanders with the capability to intercept, precisely locate, and identify enemy conventional and Low Probability of Intercept (LPI) communications and noncommunications emitters and jam enemy conventional and LPI communications emitters. GBCS is an evolutionary, open architecture system which satisfies the Army's requirement to conduct tactical ground Communications Intelligence, Electronic Intelligence, Electronic Support against enemy communications and noncommunications emitters and Electronic Attack against threat communications; and enhances the commander's ability to outmaneuver and destroy the enemy by locating or jamming threat command and control, fire control, and air defense centers. The GBCS will be used in two platform configurations that can perform on all terrain. The GBCS-L can be transported by a C-130 or C-141. The GBCS-H will be deployed on a tracked vehicle (Bradley variant) in support of Armored and Mechanized Infantry Divisions. The GBCS-H can be transported by a C-17 and C-5.
- FOREIGN COUNTERPART: No known foreign counterpart.

CONCEPT

FOREIGN MILITARY SALES: No foreign military sales.

SCIENCE AND TECHNOLOGY

- **PROGRAM STATUS:** Both light and heavy variants are in the Engineering and Manufacturing Development phase. A Customer Test for GBCS-L was conducted 3QFY94 and a Special In-Process Review for the GBCS-L occurred in 4QFY94 to support a Limited Procurement production decision.
- **PROJECTED ACTIVITIES:** GBCS-L IOT&E will be conducted in 4QFY97.
- **PRIME CONTRACTOR:** Lockheed Martin (Owego, NY)





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CIENCE AND TECHNOLOGY

DEM/VAL

CONCEPT

EMD

OPERATIONS AND SUPPORT

PRODUCTION AND DEPLOYMENT

- MISSION: The Guardrail/Common Sensor's (GR/CS) mission is to provide a fixed-wing communication and electronic emitter intercept and direction-finding system with precision geolocation. GR/CS 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 Joint Tactical Terminal and other means.
- CHARACTERISTICS: The GR/CS is a Corps level airborne Signals Intelligence collection/location system. The GR/CS integrates the Improved Guardrail V Communication High Accuracy Airborne Location System, and the Advanced Quicklook into the same SIGINT platform. One GR/CS system is authorized per Aerial Exploitation Battalion in the MI Brigade at each Corps. A standard system consists of twelve aircraft which fly operational missions in sets of three. GR/CS provides near real-time SIGINT and targeting information to tactical commanders throughout the Corps area with emphasis on Deep Battle and Follow-on Forces Attack support. Ground processing is conducted in the Integrated Processing Facility (IPF). Interoperable Data Links provide microwave connectivity between the aircraft and the IPF. Primary reporting is accomplished via Commander's Tactical Terminals. Key features include integrated COMINT and ELINT reporting, enhanced signal classification and recognition, near real-time direction finding, precision emitter location, and an advanced integrated aircraft cockpit. Preplanned product improvements include frequency extension, computer assisted on-line sensor management, upgraded data links, and the capability to exploit a wider range of signals. GR/CS shares technology with the Ground Based Common Sensor, Airborne Reconnaissance Low, and other Joint systems.
- **FOREIGN COUNTERPART:** Numerous countries possess airborne electronic warfare systems, but none achieves the direction-finding accuracy of the Guardrail system.

FOREIGN MILITARY SALES: No foreign military sales.

- **PROGRAM STATUS:** The Guardrail systems currently in service include the Improved Guardrail V (RC-12D aircraft) and the Guardrail Common Sensor (RC-12H/K/N/P aircraft). GR/CS was fielded to Korea in 1988, Europe in 1991, and the XVIII Corps in 1994. A remote relay capability that allows forward deployment of aircraft while the ground processing facility remains in CONUS was a component part of the XVIII Corps system. The last GR/CS system is in the production and deployment phase and will be fielded in FY99.
- **PROJECTED ACTIVITIES:** Incorporate TIB/TRIXS capability into all four systems (FY97-99). Incorporate joint interoperability upgrades to all four systems (FY97-98).
- **PRIME CONTRACTOR:**Raytheon (Raytheon Aircraft) (Wichita, KS)TRW (Sunnyvale, CA)







Win the Information Wa

SCIENCE AND TECHNOLOGY	CONCEPT	DEM/VAL	EMD		Operations and Support
				PRODUCTION AND DEPLOYMENT	
MIS	sub-ele mated	ment of the Army weather system to	Battle Command receive, process	ETS) is the weather component of the Inte l System (ABCS). IMETS provides comman , and disseminate weather observations, fo d Operating Systems (BOS).	nders at all echelons with an auto-
CHARACTERI	ed tacti echelor weathe artillery vations needs. produc	ical system which p is from brigade thr r information from y meteorological an , and climatologica The most significa red by the IMETS.	orovides automat rough Echelons A polar-orbiting ci ad remote sensor al data to produ- ant weather and These graphics g	is a Heavy High Mobility Multi-Purpose W ion and communications support to Air Fo Above Corps (EAC) and to Army Special C vilian and defense meteorological satellites, s, and civilian forecast centers. IMETS proc ce timely and accurate weather products ta environmental support to Warfighters are th o beyond briefing the weather by displaying litions on both friendly and enemy capabili	rce staff weather teams assigned to Operations Forces. IMETS receives Air Force Global Weather Central, cesses and collates forecasts, obser- ailored to the specific Warfighter's he automated tactical decision aids g the impact of the weather on cur-
FOREIGN COUNTE	RPART: No kno	ather, the Warfighte own foreign counte eign military sales.		itage of the enhanced weather knowledge ir	n his planning cycle.

- **PROGRAM STATUS:** IMETS has a streamlined evolutionary acquisition strategy, relying heavily on commercial off-the-shelf/Government off-the-shelf (COTS/GOTS) and Non-Developmental Items (NDI) products. These products are then packaged into upgrades and enhancements to the fielded IMETS. IMETS was fielded to 15 high priority units through FY96. The IMETS Block II fielding effort will be initiated in FY97 after the successful conclusion of the Developmental Test and Operational Assessment in February 1997. Block II will be fielded to 17 units first, then the Block I systems will be upgraded to the latest configuration.
- **PROJECTED ACTIVITIES:**Complete fielding of IMETS Block I to priority units.
Conduct Technical and Operational Test on IMETS Block II.
Obtain a Milestone III Production and Fielding decision on IMETS Block II.
Initiate Fielding of IMETS Block II systems.
Participate in Task Force XXI and JWID 97 warfighter exercises.
 - **PRIME CONTRACTOR:** Logicon (Arlington, VA; Tacoma, WA) Sytex (McLean, VA)

Integrated Meteorological System (IMETS)



IENCE AND TECHNOLOGY	CONCEPT	Dem/Val		PRODUCTION AND DEPLOYMENT	OPERATIONS AND SUPPORT	
			EMD			
MI				provides an automated, theater-wide system ms in support of battlefield operations.	m that Signal units can use to man-	
CHARACTERI	Operat method the Arr and ma of satel force u ISYSCO station officers	tion Desert Storm of for managing the my Tactical Comm anagement of a dyn ellite resources as a use. The spectrum ON node consists o as, and peripherals. rs. (Each ISYSCON	and other recent e tactical communi mand and Control S mamic battlefield. A requirement. The h management soft of an S-250 shelter of An ISYSCON node	ajor thrust to overcome network manage deployments. The ISYSCON facility will ications network, establish an interface with System (ATCCS) architecture, and enable A change to the requirements document ha ISYSCON has been selected as the network tware has been designated as part of the n for a heavy HMMWV and two extension ten e can support up to 20 remote terminals dis ided with 10 remote terminals.) Signal S-3 on systems for both deployed and split-base	provide an automated, integrated ith each technical control facility in a automation-assisted configuration as added planning and management k management system for joint task migration system for DoD use. An nts, two server and four client work- stributed by the S3 to various Signal staffs will use ISYSCON to manage	
FOREIGN COUNTE	RPART: No kn	own foreign counte	erpart.			
FOREIGN MILITARY	SALES: No for	reign military sales.				
PROGRAM S	Rate Ir	nitial Production (L	LRIP) in 3QFY95, a	E Government Systems in 4QFY92. The pa and had a successful Development Progres pated to be fielded to select units in 4QFY9	ss Review (DPR) in 4QFY97 for the	
PROJECTED ACTI				in preparation for ISYSCON Initial Operati v is planned for 1QFY98. Production contr		
PRIME CONTRA	ACTOR: GTE (Taunton, MA; Rale	igh, NC)			
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Protect the Force

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MENCE AND TECHNOLOGY	Concept	DEM/VAL		PRODUCTION AND DEPLOYMENT	OPERATIONS AND SUPPORT
			EMD		

MISSION: The Joint Surveillance Target Attack Radar System (Joint STARS) Ground Station Module (GSM) provides long-range radar and other sensor surveillance battle management and targeting data to tactical commanders.

CHARACTERISTICS: Joint STARS is a joint Air Force/Army program. The airborne platform is a USAF E-8 (a militarized Boeing 707) with a multimode radar (capable of wide area surveillance and synthetic aperture modes), 18 operation and control consoles, a Surveillance and Control Data Link (SCDL), and secure communications. Orbiting a safe distance from the Forward Line of Troops, Joint STARS radar scans a wide area of the battlefield at long ranges. The radar data are received by Air Force and Army operators aboard the aircraft and then downlinked to multiple GSMs via the SCDL. The information provides tactical air and ground commanders with near-real-time wide area surveillance and deep targeting data. The Joint STARS system can detect, locate, track, classify, and assist in attacking both fixed and moving targets beyond the FLOT during daylight and darkness in nearly all weather conditions.

The GSM is a mobile, tactical, multisensor ground station that receives, displays, processes, and disseminates targeting battle management and intelligence information to all echelons. In addition to Joint STARS radar data, the GSM is now capable of receiving and displaying Unmanned Aerial Vehicle imagery as well as signals intelligence data via an integrated Joint Tactical Terminal. The GSM is being produced in two variants: a medium version (MGSM) mounted on a 5-ton truck and a light version (LGSM) mounted on a High Mobility Multipurpose Wheeled Vehicle (HMMWV). The Common Ground Station (CGS) will be a light version mounted on a HMMWV. Beginning in FY96, the GSM will transition into the CGS which will also be HMMWV mounted. The CGS will be a key node on the digitized battlefield, receiving multiple national, theater, and tactical sensor input.

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

FOREIGN MILITARY SALES: No foreign military sales.

PROGRAM STATUS: The Joint STARS MGSMs have completed the Low Rate Initial Production (LRIP) phase. Fielding of MGSMs started in 2QFY96, and will continue through 2QFY97. LGSM fielding will begin 4QFY97 and continue through 2QFY98. Six Interim GSMs (IGSM) have been fielded to contingency forces and will be cascaded from original units to 3 gaining units 1QFY97 through 2QFY97. The CGS Production Contract was awarded 1QFY96 and initial fielding begins 2QFY98. Fielding of MGSMs will be completed 1QFY97.

PROJECTED ACTIVITIES: Initial Operational Test of the initial CGS units is planned for 4QFY97. The CGS Full Production (Milestone III) Decision is scheduled for FY98.

PRIME CONTRACTOR: CGS: Motorola (Scottsdale, AZ)











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E AND TECHNOLOGY	CONCEPT	DEM/VAL	EMD		OPERATIONS AND SUPPORT	
				PRODUCTION AND DEPLOYMENT		
MISSION:		The Joint Tactical Terminal (JTT) and Commanders Tactical Terminal (CTT) provide the joint warfighter with seamless, near-real-time tactical intelligence and targeting information.				
CHARACTERI	tion r netwo Tactio	The JTT and CTT provide the critical data link to battle managers, intelligence centers, air defense, fire support and avia- tion nodes across all services. JTT allows Army, Air Force, Navy and Marine Corps users to exploit intelligence broadcast networks, including: Tactical Reconnaissance Intelligence Exchange Service, Tactical Information Broadcast Service, Tactical Related Applications, Tactical Data Information Exchange System-B and Secondary Imagery Dissemination via a General Purpose Link. In addition to receiving intelligence data, data provider or relay functions are provided.				
		The JTT and CTT are provided for integration into systems on vehicles, aircraft, ships, and fixed sites.				
FOREIGN COUNTE	RPART: No ki	No known foreign counterpart.				
FOREIGN MILITARY	SALES: No fo	No foreign military sales.				
PROGRAM S	was a One (withi	A contract was awarded 2QFY96 for 79 CTT3s for the Army, Navy, and Marine Corps urgent requirements. A contract was also awarded 4QFY96 for 85 JTT/Common Integrated Broadcast Service-Modules (JTT/CIBS-M). Fielding of the CTT One Channel is complete. One hundred and eighty CTT Two Channel receivers have been delivered to various elements within the Army, Air Force, Navy, Marine Corps and Special Operating Forces, and fielding continues. Seven CTT3s have been delivered.				
PROJECTED ACTIV	PROJECTED ACTIVITIES: Delivery of 79 urgent CTT3s in 3QFY97. The Integrated Broadcast Service Operational Requirments Document w approved FY97.					
PRIME CONTRA		CTT: E-Systems (ECI Division) (St. Petersburg, FL) JTT: Hughes (Fort Wayne, IN)				
	*See	*See appendix for list of subcontractors.				

SELEN



- **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. It automates the creation and distribution of the relevant common picture of the battlefield for the Army Battle Command System (ABCS).
- **CHARACTERISTICS:** MCS is the primary battle command source, providing the common picture, decision aids, and overlay capabilities to support the tactical commander and his staff. It integrates information from other ABCS Battlefield Automated Systems to provide timely accurate status of battle information. V 12 of MCS will provide the initial implementation of the Defense Information Infrastructure (DII) Common Operating Environment (COE) and evolution to the Army Battle Command System. MCS will be fielded on CHS-2 hardware and will implement a client/server architecture.

FOREIGN COUNTERPART: No known foreign counterpart.

FOREIGN MILITARY SALES: No foreign military sales.

- **PROGRAM STATUS:** Currently, MCS Version 10.03.1G software is fielded to all heavy Army units with non-developmental item equipment. Block IV Development Contract awarded to Lockheed Martin in September 1996.
- **PROJECTED ACTIVITIES:**Participate in Task Force XXI 2QFY97.Fielding MCS 12.1 with CHS-2 scheduled to begin in FY98.Beta version issued to selected units.
 - PRIME CONTRACTOR
 Block IV contractor:
 Lockheed Martin

 Block III contractors:
 CSC (Eatontown, NJ)

 Mitre (Eatontown, NJ)
 Telos (Shrewsbury, NJ)


PRODUCTION AND DEPLOYMENT

OPERATIONS AND SUPPORT

EMD

MISSION:

ION: The Army is DoD's lead service for development and acquisition of a family of ground terminals for all services and special users, as part of the Extremely High Frequency (EHF) joint Milstar satellite communications program. Milstar satisfies the requirement for worldwide, two way, anti-jam, low probability of intercept, secure voice, and data communications to enable the National Command Authority and Commanders-in-Chief to command and control strategic, operational, and tactical forces through all levels of conflict and crisis. Milstar greatly enhances the fighting effectiveness of US Forces through interservice, interoperable, synergistic command and control communications for all force elements, from special operations to battlefield maneuvers.

CHARACTERISTICS:

Milstar provides a seamless, interoperable communications capability that satisfies the Force Projection Army critical operational communications requirement. It provides a range-extension capability that is interoperable with all services and other satellite and ground systems, that keeps up on the battlefield and provides the warfighting commander assured communications. The terminals are capable of rapid set-up and tear-down and provide uninterrupted, secure, anti-jam communications for tactical forces, even under harsh electromagnetic conditions. The SMART-T, mounted on a standard HMMWV, provides range extension for the Army's Mobile Subscriber Equipment system at Echelons Corps and Below. It processes data and voice communications at both Low Data Rate (LDR) and Medium Data Rate (MDR) (75 bps - 1.544 mbps). SCAMP is a manportable, battery-powered terminal that provides LDR secure voice at 2400 bps and secure data at 75-2400 bps. The user owned and operated SCAMP has embedded COMSEC and TRANSEC and includes an accessory AC/DC converter to enable the terminal to function on external power. In addition, the terminal provides a capability to operate in four simultaneous, half duplex, communications channels. Efforts are underway for the development of technologies leading to an objective SCAMP Block II 12-15 pound manpackable terminal. The Army is also integrating eight Air Force procured Ground Command Post (GNDCP) Terminals into the Army force structure. The GNDCP is a network control terminal, in fixed and transportable configurations, which operates and manages assigned service/CINC Milstar communications and user priorities.

FOREIGN COUNTERPART: No known foreign counterpart.

FOREIGN MILITARY SALES: No foreign military sales.

- **PROGRAM STATUS:** SMART-T: PEO C3S Low Rate Initial Production (LRIP) In-Process Review Jan 96. Down select and award of LRIP/Full Rate Production (FRP) contract to Raytheon 7 Feb 96.
 - SCAMP: Competitive, best value, source selection, including equipment demonstrations 1-2QFY96. Production Contract awarded to Rockwell International 2QFY96.
- PROJECTED ACTIVITIES:
 SMART-T: Initial Operational Test & Evaluation (IOT&E) FY98.

 First Unit Equipped (FUE) FY98.
 Milestone III Decision to enter FRP FY99.
 - SCAMP: Follow-on test & evaluation (FOT&E) 4QFY97.
 FUE 1QFY98.
 Award contract(s) for Engineering Feasibility Efforts (EFE) to support the Block II program FY97
 - **PRIME CONTRACTOR:**SMART-T: Raytheon Electronics Systems Division (Marlboro, MA)
SCAMP: Rockwell International (Richardson, TX)
SCAMP Block II: TBD
*See appendix for list of subcontractors.

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JENCE A	ND TE	CHNOLOGY	
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EMD

OPERATIONS AND SUPPORT

- **MISSION:** The 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 nonradio 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 rate in the same telephone number regard.
 - ic switching, continuous coverage, and the ability of commanders and staff to retain the same telephone number regardless of 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.

FOREIGN MILITARY SALES: No foreign military sales.

PROGRAM STATUS: All Signal Battalions scheduled to receive MSE have been successfully fielded. Final unit fielding was completed in November 1993. An approved System Modernization Plan (SIP) is in place to provide technological upgrades that will improve system performance and extend the life of the equipment. A routing improvement program (CSRIP) is currently being fielded and will provide a common software baseline for MSE and AN/TTC-39 A/D switches.

PROJECTED ACTIVITIES: Enhanced Switch Operation Program. Packet Network Management Center Improvements.

Training Device Upgrade.

Network Management Tool Implementation.

Internet Protocol Router (BGP-4) Upgrade.

Continue Routing Improvement Program (CSRIP).

Incorporate Asynchronous Transfer Mode (ATM) technologies.

PRIME CONTRACTOR: GTE (Taunton, MA)



Protect the Force

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Win the Information War

Conduct Precision Strike

Dominate the Maneuver

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ENCE AND TECHNOLOGY

DEM/VAL

CONCEPT

EMD

OPERATIONS AND SUPPORT

PRODUCTION AND DEPLOYMENT

- **MISSION:** The mission of NAVSTAR Global Positioning System (GPS) is to provide accurate, continuous, all-weather, common grid, worldwide navigation, positioning, and timing information to land, sea, air, and space-based users.
- **CHARACTERISTICS:** The NAVSTAR GPS is a joint Army, Navy, and Air Force program, with the Air Force as the lead service. GPS is a spacebased navigation, three-dimensional positioning, and time-distribution system. The 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 for the Ground User Segment with approximately 80% of total DoD requirements. The user segment consists of receiver configurations for ground, 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. Financed through European firms, GLONASS has matured to 21 spacecraft. GLONASS operates in a different portion of the same frequency band as NAVSTAR GPS, with slightly less accuracy.
- **FOREIGN MILITARY SALES:** Coded FMS GPS Receivers are handled by the Air Force GPS Office through Joint coordination. Standard commercial GPS receivers are a world open market resource.
 - **PROGRAM STATUS:** The last Precision Lightweight GPS Receiver (PLGR) production option will be awarded in 2QFY97. The Army has acquired 100,000 hand held units to date and worldwide fielding has been ongoing since October 1993 on an accelerated basis. The PLGR enhancement was awarded May 1995 and provides Army users with the following: 50% lower power consumption, improved ease of use, automatic leg advance, updated datums, enhanced satellite vehicle selection for reduced re-acquisition time, magnetic variation entry/display improvements, larger user defined screens, more routes and legs, auto zeroized warning, and present position naming. As SLGRs are rapidly displaced by PLGRs, 1000 SLGRs will be upgraded to Precise Positioning Service (PPS) accuracy and reallocated as inexpensive receivers for the non-modernized rotary wing fleet. These receivers will be designated as Stand Alone GPS Receivers (SAGRs). The Miniaturized Airborne GPS Receivers (MAGR), the AN/ASN-149 and GPS embedded in AN/ASN-128/G and INS are for modernized aircraft fleet. The Cargo Utility GPS Receiver (CUGR) will be the objective solution for UH-1 aircraft. A contract award for CUGR was awarded in September 1996. The Army has completed a new operational requirement for PLGR replacements. The Direct Access GPS Receiver (DAGR) requirement consists of 114,000 units with initial production in FY99.
 - **PROJECTED ACTIVITIES**: PM GPS will complete fielding of PLGR to all major Active Army elements during 1QFY97. Total PLGR fielding for FY97 is approximately 12,000. Option 5 award for MAGR is planned for March 1997. Aside from the DAGR initiative, the Army is conducting extensive research in GPS navigation
 - **PRIME CONTRACTOR:**Rockwell International (Cedar Rapids, IA)Trumble Navigation (Sunnyvale, CA)



CONCEPT

EMD

OPERATIONS AND SUPPORT

PRODUCTION AND DEPLOYMENT

- **MISSION:** The mission of Satellite Communications (SATCOM) is to satisfy Joint Chiefs of Staff validated Command, Control, Communications, Computers, and Intelligence (C4I) requirements supporting the President, National Command Authority, Commanders in Chief (CINC), Military Departments, Intelligence community, and NATO. Satellite communications provide the CINC the reach-back capability between the forward deployed force and the CONUS sustaining base required to support Army power projection.
- **CHARACTERISTICS:** Fixed strategic, theater, and mobile tactical satellite (TACSAT) communications terminals characterize SATCOM. The satellite equipment uses all DoD SATCOM systems, including the Fleet Satellite/Air Force Satellite (FLTSAT/AFSAT) Ultra High Frequency (UHF) system, UHF follow-on (UFO) system, and the Defense Satellite Communications System (DSCS) Super High Frequency (SHF) X-Band.
- **PROGRAM STATUS:** The Army is procuring the AN/PSC-5 Spitfire UHF Manpack Terminal a/k/a EMUT and related equipment in support of the Army, Air Force, Marine Corps, and Special Operations Forces unit requirements for use on FLTSAT/AFSAT/UFO. The Spitfire has embedded Communications Security and demand assigned multiple access capability. For SHF TACSAT Terminals, the Army acquired, tested, and fielded the AN/TSC-143 PrototypeTri-Band Terminal (PT3) to the 11th Signal Brigade, Power Pac 3 Company. Additionally, Army is procuring the SHF TRI-BAND Advanced Range Extension Terminal (STAR-T) which will be an SHF terminal mounted in a HMMWV and will eventually replace the AN/TSC-85B/93B Tactical Satellite Terminals for the Army. These terminals will expand TACSAT capabilities because they are capable of using commercial C or Ku bands, or the existing DSCS X Band. For the strategic DSCS, the Army will continue to modernize its heavy and medium fixed terminal facilities and transportable terminals, and modernize the light contingency terminals, provide digital equipment upgrades, and expand the control subsystem to enhance satellite and communications payload control operations. Contract awarded for four SOFTACS LRIP terminals in August 1996. STAR-T will be an option to this contract Milestone I-IIIa planned for 1QFY97 and contract option award planned for 2QFY97.

PROJECTED ACTIVITIES:Continue the modernization of all the fixed site AN/FSC-78/79 SATCOM terminals through FY99.Initiate the modernization of the AN/GSC-52 SATCOM terminals (fixed and transportable) in FY97.Initiate Universal Modem System (UMS) production and award contract in FY97.Continue on-going DSCS ground segment Control System upgrade in accordance with the Objective DSCS Operations
Center Operational Requirements Document.

PRIME CONTRACTOR:Cincinnati Electronics (Cincinnati, OH)
Harris (Melbourne, FL)
Magnavox (Ft. Wayne, IN; Torrence, CA)
Raytheon (Marlborough, MA)
Titan (San Diego, CA)

GTE (Taunton, MA) Lockheed Martin (Bethesda, MD) Motorola (Scottsdale, AZ) Stanford Telecommunications (Colorado Springs, CO)



EMD

OPERATIONS AND SUPPORT

- **MISSION:** The Single Channel Ground and Airborne Radio System (SINCGARS) provides commanders with a highly reliable, secure, easily maintained Combat Net Radio (CNR) that has both voice and data handling capability in support of command and control operations. The radio, along with the ADDS, forms the communications backbone for Force XXI.
- **CHARACTERISTICS:** SINCGARS configurations include manpack, vehicular (both low and high power), and airborne models. Communications Security (COMSEC) is integrated in currently produced versions of the ground and the airborne radios, and the System Improvement Program (SIP) models providing upgrades to enhance operational capability in the tactical internet environment.
- FOREIGN COUNTERPART: Racal (UK), Thomson CSF(FR), Marconi (Belgium), Erichssen (Norway)
- FOREIGN MILITARY SALES:Bahrain, Finland, Greece, Italy, Kuwait, Morocco, Saudi Arabia National Guard, SHAPE Tech Ctr (NATO), Spain, Special
Def Acq Fund (pre-purchased export model assets for FMS Sales)
 - First source, International Telephone and Telegraph (ITT), SINCGARS ground radios passed First Article Tests in January **PROGRAM STATUS:** 1988, and production deliveries began immediately. A Follow-On Test and Evaluation (FOTE) was successfully completed in May 1988 on the non-integrated COMSEC (non-ICOM) version of the radio. Initial and Follow-on 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 16,000 radios was awarded in 1QFY91, completing the firstsource 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 6,361 units. A second-source of ground radios, General Dynamics Land Systems (GDLS), 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. Annual dual source limited competition began in FY94, with award in April 1994 of 17,053 units to ITT and 11,369 units to GDLS. FY95 limited competition awards were made in March 1995 for System Improvement Program (SIP) radios, 18,601 to ITT and 15,219 to GDLS. FY96 limited competition awards were made in March 1996 for an additional 23,716 SIP radios. These radios will provide improved data capability, improved forward error correction for low speed data modes, automated interface into the Automated Common User System and a Global Position System interface and Internet Controller which allows SINC-GARS to interface with EPLRS and Battlefield Functional Area and other host computers. Annual dual source limited competition for the SIP system components will continue in FY97. The program office has fielded more than 85,000 radios to the training base and Army units worldwide. Dual source limited competition awards were made for SIP radios in March 1996.

PROJECTED ACTIVITIES:

Dual source limited competitive award is scheduled for 2QFY97.

PRIME CONTRACTOR: General Dynamics (Tallahassee, FL)

International Telephone and Telegraph (Ft. Wayne, IN)



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NCE AND TECHNOLOGY	CONCEPT	Dem/Val	EMD		OPERATIONS AND SUPPORT
				PRODUCTION AND DEPLOYMENT	
MI	to hous	se the Army Battle C	Command System	: System (SICPS) is a family of standard con across all Battlefield Functional Areas (BFA) CP (M1068), a 5-Ton Expansible Van CP, a). Variants of SICPS consist of a Tent
CHARACTERI	can be set. Th sidewa Rigid V ator. wiring, tromag Comm Track erator, com sy 5-Ton equipr and wo Soft T lightin	removed for attachi e Tent CP can be att ll with an interface Wall Shelter CP: M Provides equipmer (cabling, vehicular i gnetic interference sl unications, Compu Vehicle CP: Modifi equipment racks, in stem, QEAM, and v Expansible Van CI nent racks, internal orkspace for four ea op HMMWV CP:	ing two or more t tached to any of t boot wall. Mounts on the HI nt racks, interna intercom system, hielding, Quick H iters and Intellige ication of existing nternal lighting, p workspace for tw P: An installation lighting and blac ach moveable C41 An installation k ver and signal imp	ee-piece aluminum frame, with interchang ents together. Fielded with two tables, two he other SICPS variants, except the 5-Ton I MWWV shelter carrier (M1097) and is pow l lighting and blackout, power and sig 18000 BTU environmental control unit, of frect Antenna Mast (QEAM), and workspace nce (C4I) workstations and operators. g M577 track vehicle to M1068 CP vehicle lower and signal import/export panels, inter o each C4I workstations and operators. h kit, M-2780/G, for existing 5-Ton Expans shout, power and signal import/export pan workstations and operators. it, M-2727/G, for existing HMMWV that port/export modules, internal wiring/cabling rs.	o mapboards, and a fluorescent light Expansible Van CP, by replacing one wered by an on-board 10 kW gener- nal import/export panels, internal chemical/biological protection, elec- ce for two each Command, Control, by addition of on-board 5 kW gen- ernal wiring/cabling, vehicular inter- sible Van (M934A2) which provides els, internal wiring/cabling, QEAM, provides equipment racks, internal
FOREIGN COUNTE	RPART: No kn	own foreign counter	rpart.		
FOREIGN MILITARY	SALES: No for	eign military sales.			
PROGRAM S	RWS Track 5-Ton	C P :	Version 1, TO fielding. Ver Production of Milestone III	ed (TC) Standard, Feb 90; production cor Climited Procurement Urgent, Aug 91. Pro- sion 4, Milestone III, Aug 96. Start produc contract awarded, Jun 92. TC Standard, Se , Aug 96. Start production; TBD. contract, Jun 95; TC Standard, Oct 95. Fin	duction contract, Sep 91. On-going tion, Oct 96. p 95. On-going fielding.
PROJECTED ACTT	VITIES: Provid	e SICPS Tent, RWS,	, M1068, 5-Ton, a	and Soft Top platforms to support BFA requ	airements.
PRIME CONTRA	Track RWS	CP: Camel (Knoxvil CP: FMC (United I C P: TBD and Soft Top CP:	Defense, LP) (Sar	n Jose, CA) y Depot (Tobyhanna, PA)	



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CONCEPT DEM/VAL

EMD

PRODUCTION AND DEPLOYMENT

OPERATIONS AND SUPPORT

MENCE AND TECHNOLOGY

MISSION: The Outrider Tactical Unmanned Aerial Vehicle (TUAV) will provide Reconnaissance, Surveillance, and Target Acquisition (RSTA) to U.S. Army Divisions and Brigades and to U.S. Marine Corps expeditionary brigades, and Navy ships at a range up to 200 km, day or night, and in limited adverse weather conditions.

CHARACTERISTICS:

ICS: The Outrider TUAV is intended for use 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. The Outrider TUAV system consists of one Ground Control Stations (GCSs); one Remote Video Terminals (RVTs); four Air Vehicles (AVs), Modular Mission Payloads (MMPs), and launch and recovery equipment. The Ground Control Station collects, processes, analyzes, and distributes digitized battlefield information by interfacing with present and planned Service Command, Control, Communications, and Intelligence (C3I) systems. Flight and mission commands are sent to the AV(s) from the GCS. RSTA imagery and AV position data are sent by downlink directly to the GCS or RVTs located in tactical operations centers. The Outrider TUAV is transportable by one C-130, with a roll-on, roll-off capability. Mission capability will be enhanced as advanced mission payloads become available, maximizing battlefield digitization to increase the effectiveness of other weapon systems.

Air Vehicle Characteristics: Size and Weight Wing Span - 11.1 ft Overall Length - 9.9 ft Wing Area - 28.2 ft Dry Weight - 300 lbs

Performance Dash Speed - 110 kts Minimum Flying Speed - 35 kts On Station Endurance - 7.2 hours @ 50 km - 4.9 hours @ 200 km

- FOREIGN COUNTERPART: Israel has considerable experience with UAVs; however, requirements and specifications of the Tactical UAV make it unique.
- **FOREIGN MILITARY SALES:** No foreign military sales.

PROGRAM STATUS: Contract for the TUAV Advanced Concept Technology Demonstration was awarded on 2 May 1996.

PROJECTED ACTIVITIES: The first system is expected to be delivered to the Army in May 1997.

Available fuel and oil - 85 lbs

PRIME CONTRACTOR(S): Alliant Techsystems (Hopkins,MN)



NCE AND TE	ECHNOLOGY		DEM/VAL	EMD	PRODUCTION AND DEPLOYMENT	OPERATIONS AND SUPPORT
		Concept	r			
	MIS	(R STICS: Th re: m ca fo	STA) capability as a fo ne TUV consists of a M motely operated MBU. it RSTA information to pability will be able to r Army and Marine Con	te multiplier to ex obile Base Unit (M A data link betwe the operator. The detect vehicles 2 h ps Infantry and Ma	vill use its unmanned Reconnaissance, Su expand the maneuver commanders' area of i 1BU) with a payload and an Operator Cont een the MBU and the OCU will allow vehic MBU will be able to operate at ranges 4-10 km from the MBU. The TUV is planned to arine Corps Artillery units and will be comp Command, Control, Communications, and	nterest and influence. rol Unit (OCU) which controls the cle control and feedback and trans- km from the operator and its RSTA be an organic Battalion level asset patible with the Common Operating
FORE	EIGN COUNTEI	RPART: N	o known foreign count	erpart.		
FOREIG	GN MILITARY :	SALES: N	o foreign military sales			
	PROGRAM ST		ne TUV is currently in ent effort using existin	0	nition and Risk Reduction phase of develop ns.	oment. This is an in-house govern-
PRO	JECTED ACTIV	VITIES: U	ser Appraisals with the	3rd Brigade, 3rd I	nfantry Division will begin in FY97. Miles	tone II is scheduled for 4QFY98.
PI	RIME CONTRA	CTOR: T	3D.			

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CONCEPT

PRODUCTION AND DEPLOYMENT

MISSION: The Task Force (TF) XXI Tactical Operations Centers (TOCs) provide effective, interoperable and digitized C3I facilities to the Experimental Force (EXFOR) for TF XXI Army Warfighting Experiment (AWE) in March 1997. The focus is on providing warfighters with automated TOCs that are flexible, modular, robust, reconfigurable and interoperable.

CHARACTERISTICS:

: The TOCs consist of Army Battle Command Systems (ABCS); FAAD C²I, ASAS, CSSCS, MCS, and AFATDS. The TOCs incorporate standard army communications, e.g., SINCGARS, and commercial products to form the Tactical Internet. The TOCs also have Applique that provide an interface between individual vehicles and the ABCS systems. The TOCs were designed using an Integrated Product Team consisting of PEO C3S, various TRADOC agencies and the 4th Infantry Division. Through an iterative process the designs were refined and approved by a General Officer Steering Committee headed by the Deputy Commander, TRADOC. For TF XXI Brigade, the following TOCs were built and delivered in May - Jun 96:

- 4 ID Tactical CP 1
- 1st BDE TOC
- 1st BDE Tactical Alternate Command Post (TAC)
- 1st Brigade Support Area (BSA) TOC
- 1st BN 22nd Inf TOC
- 3rd BN 66th Armor TOC
- 1st BN 5th Inf TOC
- 4th BN 42nd FA TOC
- Aviation Task Force TOC
- 299th Engineer BN TOC
- Military Intelligence CO Analysis and Control Team (MI CO ACT)
- FOREIGN COUNTERPART: No known foreign counterpart.

FOREIGN MILITARY SALES: No foreign military sales.

- **PROGRAM STATUS:** As of August 1996, all TOCs were delivered to 4th Infantry Division, Fort Hood, Texas. The units have received individual training and conducted collective training in preparation for TF XXI Brigade exercise at the National Test Center in March 1997.
- **PROJECTED ACTIVITIES:**Task Force XXI Brigade exercise March 1997.Task Force XXI Division exercise Nov 1997.
 - PRIME CONTRACTOR: TRW Inc. (Huntsville, AL)

Digital Battlefield This ATD will exploit emerging commercial communica-**Communications** tions technologies to support multimedia communications Advanced Technology in a highly mobile dynamic battlefield environment. It will **Demonstration (ATD)** demonstrate capabilities that can supplement and in some (96-00): cases replace, "legacy" military communications systems which are unable to keep pace with the rapidly increasing demand for communications bandwidth and global coverage in support of Digitized Battlefield and split-based operations. It will evolve an integrated communication infrastructure which utilizes commercial protocols and standards to achieve global interoperability. Extensive use of modeling and simulation will be employed. High throughput radio applications will be developed to solve data congestion problems. The architecture will include a Radio Access Point (RAP) to provide high bandwidth data distribution to lower echelon units-on-the-move. Network plan-



ning and communications simulation technologies that provide bandwidth control based assets, priority, environment, and reliability will be included. A mobile RAP, consisting of a high capacity trunk radio, an airborne relay, portable switch (ATM or other), and a wideband phased array antenna suited to connect forward mobile elements in split-base deployments will be prototyped and exercised by troops in the field. By FY99, this program will demonstrate adaptive internetwork control applications, and provide insertion of high throughput radio capabilities into the digital brigade, division and corps. Supports: Battlefield Digitization.



The objective of the Battlespace Command and Control (BC2) Advanced Technology Demonstration (ATD) is to demonstrate through modeling, simulation, and experimentation with the user, the critical solutions leading to a Command and Control and Battlefield Visualization (C2/BV) prototype providing software tools and architecture supporting consistent battlespace understanding; forecasting, planning and resource allocation; and integrated force management for commander and staff. These capabilities will be integrated into the C4I systems architecture at Battalion through Division. Interoperability with Corps/Joint/Allied assets is a goal. The ATD will also explore the insertion of developed C2/BV software into Corps and Echelons above Corps. BC2 ATD will provide technology options for upgrades to applications on the Army Battle Command System,

including Maneuver Control System and Force XXI Battle Command Brigade and Below, as well as provide system and operational architectures that will reduce reaction and decision times. Support: Battlefield Digitization

Battlespace Command and Control (BC2) **Advanced Technology Demonstration** (ATD): **Rapid Battlefield Visualization Advanced Concept Technology Demonstration (ACTD):**

Appld Battlefield Visualizatio

Socital Terrain Elevation Gata (DTED

The Rapid Battlefield Visualization ACTD (RBV ACTD) will address the current inability of the Army to provide high resolution terrain databases and to integrate and demonstrate capabilities to generate, disseminate, and exploit high resolution digital terrain databases rapidly. The program will provide comprehensive visualization of the battlefield to support crisis response and force projection operations over unmapped areas. A test bed will be established with the XVIII Airborne Corps at Fort Bragg, North Carolina and will be incrementally upgraded and improved by integrating key enabling technologies in a series of Army Warfighter Exercises. An objective capability will be delivered as a leave behind in the year 2000. The ACTD will address three principle types of terrain data: digital terrain elevation data (DTED); (2) digital fea-

ture data; and (3) orthorectified imagery. The objective timelines identified by the user to collect all three terrain data types are: a 20 x 20 km area in 18 hours: 90 x 90 Km area in 72 hours; and a 300 x 300 Km area in 12 days. The approach to the ACTD is to investigate six elements which will be integrated, evaluated and demonstrated: (1) rapid access to archived data: (2) rapid collection of high resolution terrain elevation data and multi-spectral imagery using a tactically viable platform; (3) semi-automated extraction of terrain features; (4) rapid dissemination of databases over global broadcast; (5) a hierarchical spatial database management system that will accommodate multiple scales, resolutions, and dynamic updates; and (6) visualization workstations that will allow mission planning, rehearsal, course of action analysis, and embedded wargaming. The RBV ACTD is leveraging key enabling technologies from government and industry for the above six elements.

Owning the Weather (OTW): The atmosphere affects nearly all Army systems, including the newer and more technologically advanced imagers, seekers, and munitions. Haze and fog can severely degrade target recognition and acquisition devices, and dense fog can render them useless. Precipitation is a concern for trafficability, but it also degrades optical and infrared devices and may incapacitate many radar systems. Chemical agents and obscurants disperse according to wind direction and speed, turbulence and temperature. Wind is a major factor affecting artillery accuracy, and as the range of artillery weapons increase, so do the atmospheric effects. Commanders must plan for the impact on weapon systems and optical/infrared devices in periods of adverse weather or limited visibility.



Atmospheric Effects

OTW is the use of advance knowledge of the environment, and its effects on friendly and enemy soldiers, equipment and weapon systems, operations, and tactics, to gain decisive advantage over opponents. It involves a four step process for knowing, predicting, and applying the weather: a) battlespace sensing and data collection; b) processing, forecasting, analysis and dissemination; c) battlefield visualization and decision aids; and d) combat weather exploitation and information operations. OTW will provide Force XXI an effective all-weather mission capability by giving the warfighter the information he needs to fight and operate smart weapons and munitions under all weather conditions. A near-all-weather operational capability can be achieved through the selection of the appropriate mix of battle sensors, weapon systems, and tactics that give friendly forces the ability to see, maneuver, fight and win in all types of weather.

OTW provides the capability to anticipate the differential impacts of weather on friendly and threat capabilities allowing commanders to exploit windows of opportunity influenced by the weather. OTW technology and information systems (e.g., Integrated Meteorological System, IMETS) can serve as a combat multiplier by providing commanders and their staffs with known and forecasted conditions and effects in the air and on the ground. These enable them to plan for conditions before a battle, helping the commander to choose the time, manner, and place of engagement. For example, in adverse weather the effectiveness of long-range precision-strike weapons with electro-optical sensors and laser-guided systems becomes severely limited. In such cases, employment of conventional systems and munitions would be more effective.



T he Army must be able to shape the battlefield of the future, in order to give its numerically smaller forces the maximum possible advantage. One method for accomplishing this goal is to Conduct Precision Strike to disrupt and

destroy enemy forces in rear areas before they reach the maneuver battlefield. The Army must be able to conduct deep attacks against enemy maneuver formations, logistical centers and command and control nodes. These deep attacks will allow the Army to extend the battlefield. To achieve this objective, the Army requires several types of systems that will create an all-weather, extended-range precision strike capability.

The Army's precision strike capability will be composed of three categories of systems. In the first category are systems that provide extremely accurate, near real-time intelligence to allow precision targeting of enemy forces under all conditions. Most of the systems in this category are C4I systems that primarily support efforts to Win the Information War. These systems gather and move the data that the strike systems need to execute their mission. In the second category are the platforms and extended range weapons that deliver the munitions to their deep targets. Systems like Extended Range Multiple Launch Rocket System (ER – MLRS) and the Army Tactical Missile System (ATACMS) will greatly extend the range of artillery assets in a deep strike role.

In the final category are the smart and brilliant submunitions that will sense, track and destroy enemy targets under all conditions. The Brilliant Anti-Armor Submunition (BAT) and the Sense and Destroy Armor (SADARM) projectile are two all-weather submunitions capable of detecting, tracking and destroying armored vehicles in deep areas. These submunitions can devastate enemy armored formations as they move toward the maneuver battle and cripple enemy deep strike artillery. Together the systems in these three categories create a capability to shape the maneuver battle by severely disrupting enemy operations in the rear area. Precision deep strike systems can cut off forward enemy forces from supplies, reinforcements and retreat, allowing Army ground forces to control the maneuver battlefield.



Counter Multiple Rocket Launcher ACTD

Guided Multiple Launch Rocket System (MLRS)

High Mobility Amillery Rocket System (HIMARS)

Indirect Precision Fire Joint Precision Strike (JPSD) Program

ATD



Conduct Precision Strike











Protect the Force

Conduct Precision Strike

Dominate the Maneuver Ba

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	NCEPT	DEM/VAL	EMD		OPERATIONS AND SUPPORT
				PRODUCTION AND DEPLOYMENT	
MISSION			-	b) provide long-range, surface-to-surface fin	* *
CHARACTERISTICS	with a extend contro ble of with e	n anti-personnel/ar led ranges. Its targe l, and communicati engaging targets at nhanced Global Po	nti-materiel (APAN ets include surface- ions complexes. An ranges well beyond sitioning System (4	nd-launched missile systems consisting of (1) warhead. The Army TACMS with APA to-surface missile sites, air defense systems rmy TACMS missiles are fired from the mod the capability of existing cannons and roc GPS) accuracy, has approximately twice th	M is used to attack soft targets at , logistics elements, and command, dified M270 launcher and are capa- ckets. The Army TACMS Block IA, e range of the Army TACMS.
	Set, G		m: M165; Trainer,	and Launching Assembly: M39; Trainer, Lau Test Device, Guided Missile: M78; Modifi	
	ily. Th submu destro	ne Block II will deliv anitions deep into e y numerous high-p	ver 13 Brilliant Ant enemy territory at a ayoff targets. The	of the currently fielded and combat-proven i-Armor Submunitions (BAT) or BAT Prepl supersonic velocity, where these submunit Army TACMS Block IIA is an extended ra gnificantly extended ranges.	lanned Product Improvement (P ³ I) ions will autonomously attack and
FOREIGN COUNTERPART		Blocks I/IA: Iran, Iraq, Libya, North Korea, Russia, Syria: Scud variants and SS-21; China: M-9 and M-11; France: HADES. Blocks II/IIA: No known foreign counterpart.			
OREIGN MILITARY SALES		5 I/IA: Turkey - Let 5 II/IIA: No foreign	0	or 72 missiles, 2 May 1996.	
PROGRAM STATUS	optior The cu in the	n for 70 Block IA Lo arrent Procurement	w Rate Initial Prod Objective for Bloc gram for a "system	for 50 Block I missiles; this is the final buy uction (LRIP) missiles and 72 export version ks I and IA is 2,447. Army TACMS was the of systems" deep fires suite, and it saw con- priority targets.	on missiles (Turkey) was exercised. he first weapon system to be fielded
	Engin Desigi	eering and Manufa n Review and sled te	cturing Developm est were conducted	II was designated as the carrier for the ent (EMD) Program was approved in Ma in October, 1996. Numerous Block II/BAT Block IIA is scheduled to begin EMD in fis	y 1995. A successful Preliminary integration activities are on-going,
PROJECTED ACTIVITIES	: Army launcl has be tem d	TACMS Block I del ners to Army TACM een authorized for B	liveries will be con 15 Block IA capabil Block IA in FY97; c	npleted in FY97. Block IA will begin fieldi ity will occur simultaneously with missile f ontract award is expected in 3QFY97. The ith the Navy for Counter Proliferation (CI	ng in FY98, and retrofit of existing ielding. A multi-year procurement Army will initiate preliminary sys-
	the co		nser tests. First flig	o include the conducting of the hardware/so ght test for an Army TACMS Block II missi FY99.	
PRIME CONTRACTOR	: Lockh		Systems (Dallas, T	TX; Horizon City, TX; Camden, AR)	



EMD

MISSION: The Brilliant Anti-Armor Submunition (BAT) and the BAT Preplanned Product Improvement (P³I) will provide an autonomous anti-armor capability for the Army Tactical Missile System (Army TACMS) missile.

CHARACTERISTICS: The BAT submunition uses acoustic and infrared sensors to autonomously locate, attack, and destroy moving tanks and other armored vehicles. These sensors provide the autonomous capability that makes this submunition "brilliant." The BAT P³I adds cold, stationary targets, to include heavy multiple launch rocket systems, and surface-to-surface missile transporter erector launchers to the Basic BAT target set through seeker and warhead improvements. The BAT/BAT P³I submunitions are carried deep into enemy territory by variants of the Army TACMS missile, then dispensed to attack and destroy targets.

Length:	36 in
Diameter:	5.5 in
Weight:	44 lb
Seekers:	BAT - Acoustic and infrared (IR)
	BAT P ³ I - Acoustic, millimeter wave radar and imaging IR
Payload:	Tandem-shaped warhead
Guidance:	Autonomous
Delivery vehicles	: Army TACMS Block II and Block IIA

FOREIGN COUNTERPART: No known foreign counterpart.

FOREIGN MILITARY SALES: No foreign military sales.

PROGRAM STATUS:BAT entered the Engineering and Manufacturing Development (EMD) phase after receiving Defense Acquisition
Executive approval in June 1991. Design Verification Testing (DVT) was completed in April 1996, and Contractor
Development Testing (CDT) began in July 1996. BAT P³I Program Definition and Risk Reduction (PDRR) phase began
in November 1993 and is on-going. A low rate initial production decision is scheduled for 1QFY98. BAT P³I is planned
to transition into EMD in fiscal year 1998.

PROJECTED ACTIVITIES: BAT - Continue EMD Program; conduct carrier integration activities and other studies; and conduct test range and target operations, maintenance, and improvement. BAT P³I - Continue PDRR, conduct first captive flight test in 2QFY97.

PRIME CONTRACTOR: Northrop Grumman (Hawthorne, CA; Huntsville, AL)







Conduct Precision Strike

Dominate the Maneuver I

PRODUCTION AND DEPLOYMENT

- **MISSION:** The Extended Range Multiple Launch Rocket System (ER-MLRS) will provide longer range rockets with lower submunition hazardous dud rates for the MLRS.
- **CHARACTERISTICS:** The ER-MLRS is the logical step in the evolution of the MLRS rocket design. It resulted from operations in Desert Storm, in which senior level commanders, while applauding the effectiveness of the basic rocket, stated a requirement for greater range. The ER-MLRS is a free-flight, area-fire, artillery rocket designed to enhance the capabilities of the MLRS. It is designed to engage targets out to 50 km. The ER-MLRS has the same diameter and length as the basic rocket but has been modified to include a lengthened motor and a smaller warhead section with fewer grenades, a new warhead section fuze and a modified center core burster. The XM85 grenade is equipped with a new self-destruct fuze designed to reduce the danger of residual duds to friendly troops. The launch pod for the ER-MLRS incorporates a new no-load detent system, which coupled with the new low-level wind measuring device on the M270 launcher, increases accuracy and effectiveness at longer ranges.

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

EMD

The Guided Multiple Launch Rocket System (G-MLRS) will be the follow-on to ER-MLRS. While retaining the majority of the ER-MLRS components, the G-MLRS will incorporate a low cost guidance and control section to increase accuracy out to a range of 60 km. The decrease in the number of grenades in the warhead will be offset by the improvement in range accuracy. G-MLRS will ensure that planned future smart munitions will be precisely delivered at extended ranges.

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

FOREIGN MILITARY SALES: Norway is committed to procure the ER-MLRS beginning in FY98. There are several other potential FMS cases, including Bahrain, Denmark, and Israel.

- **PROGRAM STATUS:** The program entered the Engineering and Manufacturing Development (EMD) phase in November 1992. The ballistic algorithm flight test program began in August 1994 and is on schedule with no technical difficulties. Pre-Production Qualification Testing (PPQT) was completed in 2QFY96. The program received approval to enter Low Rate Initial Production (LRIP) in 3QFY96.
- **PROJECTED ACTIVITIES:** First LRIP rockets will be delivered in 2QFY98. Production qualification testing is also scheduled for 2QFY98. The first ER-MLRS rockets will be available for fielding in 1QFY99. G-MLRS EMD will commence in FY98.

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



CONCEPT

DEM/VAL

EMD

SCIENCE AND TECHNOLOGY

- **MISSION:** The High Mobility Artillery Rocket System (HIMARS) provides early entry forces with a C-130 transportable launch vehicle capable of employing the entire MLRS Family of Munitions to conduct counterfire, suppression of enemy air defenses, and destruction of materiel and personnel targets across a 10 to 300 km range of engagement.
- **CHARACTERISTICS:** HIMARS integrates MLRS launcher capabilities with the new Medium Tactical Vehicles (MTV) 5-ton tactical truck chassis to provide a rapid response wheeled MLRS launcher. The resulting launcher requires 70% fewer airlift resources to transport a battery, when compared to the M270 MLRS tracked launcher. HIMARS fires the entire suite of MLRS rockets and Army TACMS missiles and is designed to be forward compatible with future MLRS munitions. The three man HIMARS crew utilizes the on board fire control system to execute digitally passed fire missions from the vehicle's manrated cab. Mission timelines are enhanced by a GPS-based position determining system and a semi-automated ammunition reload system.
- **FOREIGN COUNTERPART:** There are numerous wheeled multiple launch rocket systems on the international market. These systems are typically short range, low fidelity targeting system, limited lethality systems. No foreign systems offer the unique capabilities provided by combining the robust HIMARS launcher and the range and effectiveness of the MLRS munitions suite.

FOREIGN MILITARY SALES: No foreign military sales.

- **PROGRAM STATUS:** HIMARS full function prototypes are being fabricated as a Technology Demonstration element of the Rapid Force Projection Initiative (RFPI) Advanced Concept Technology Demonstration (ACTD). The three-launcher HIMARS platoon will serve as a standoff killer in RFPI's system of systems large scale force on force free play exercise to be conducted in August 1998. Following the exercise the equipment will remain in the field for a 24 month user evaluation.
- **PROJECTED ACTIVITIES**:FY97-98: Fabrication and testing of precision aiming platform, manrated cab and munitions reload systems.
FY98: Unit training and RFPI field exercise participation.
FY98-00: Extended field evaluation.

PRIME CONTRACTOR: Lockheed Martin Vought Systems (Dallas, TX)



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DEM/VAL CONCEPT

EMD

OPERATIONS AND SUPPORT

- **MISSION:** The Multiple Launch Rocket System (MLRS) provides counterbattery fire and suppression of enemy air defenses, light materiel, and personnel targets.
- The MLRS is an artillery weapon system that supplements cannon artillery fires by delivering large volumes of firepower **CHARACTERISTICS:** in a short time against critical, time-sensitive targets. The basic warhead carries improved conventional submunitions, however, the MLRS is capable of supporting and delivering all of the MLRS Family of Munitions (MFOM) including the Army Tactical Missile System (Army TACMS) weapons. Growth programs are under way to extend the range of the rocket system and to upgrade the fire control and launcher mechanical systems.

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

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

FOREIGN MILITARY SALES: Bahrain, Denmark, France, Germany, Greece, Israel, Italy, Japan, Netherlands, Norway, Turkey, United Kingdom.

- **PROGRAM STATUS:** The U.S. initial operational capability for MLRS was achieved in 1983. Starting in FY89, MLRS has been coproduced by the United States, Germany, France, Italy and the United Kingdom. As of September 1996, a total of 857 launchers have been procured for the United States, 772 for the active Army and 185 for the National Guard. Current plans for improvement of the system include the M270A1 upgrade starting in FY98. This upgrade consists of the Improved Fire Control System (IFCS) and the Improved Launcher Mechanical System (ILMS) modifications. The IFCS will mitigate electronic obsolescence in the fire control system, accommodate the needs of the MLRS Family of Munitions (MFOM) systems under development, and provide growth for future weapon systems. The ILMS will provide rapid responses to time-sensitive targets by reducing the aiming time by 70% and reducing the reload time by 50%. The Extended Range Rocket (ER-MLRS) will extend the current range of the basic rocket from 31.8 km to a new range of approximately 50 km. The IECS and the ILMS are in the Engineering and Manufacturing Development Phase.
- M270A1 operational testing 2QFY99. **PROJECTED ACTIVITIES:** M270A1 first unit equipped - 4QFY00.

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



	A DOTAL OF	Promision man
CIENCE .	AND	FECHNOLOGY

PRODUCTION AND DEPLOYMENT

MISSION:	Sense and Destroy Armor (SADAI	RM) will provide an autonomous	s, counterbattery capability	to indirect fire units.
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CHARACTERISTICS: SADARM is a fire-and-forget, multi-sensor, smart munition designed to detect and destroy counter-measured armored vehicles, primarily self-propelled artillery. It is effective in all weather and terrain. SADARM is delivered to the target area by 155 mm artillery projectiles. Each projectile carries two SADARM highly sophisticated submunitions. Once dispensed from its carrier, the intelligent submunition detects appropriate targets using dual-mode millimeter wave and infrared sensors. Because of the multimode sensor suite, the submunition is equally effective against desert background and winter snow. It fires a highly lethal explosively formed penetrator through the top of the target. SADARM is a gun-hardened submunition with the capability to be dispensed from a variety of carriers.

Caliber:5.8 inWeight:26.2 lbRange:22.5 km (From M109A6 howitzer)Number of submunitions: 2/rd

EMD

FOREIGN COUNTERPART: No known foreign counterpart.

CONCEPT

- FOREIGN MILITARY SALES: No foreign military sales.
- **PROGRAM STATUS:**SADARM successfully completed the Engineering and Manufacturing Development phase in April 1996, and entered low-
rate production in August 1996. A performance enhancing product improvement program was initiated in October 1996.
- **PROJECTED ACTIVITIES:** Full rate production will begin in 1999.
 - **PRIME CONTRACTOR**: GENCORP Inc. (Aerojet) (Azusa, CA)
 - * See appendix for list of subcontractors.



CIENCE AND TECHNOLOGY	Dem/Val	EMD	Production and Deployment	OPERATIONS AND SUPPORT
Cor	NCEPT			
MISSION:	vehicle (MAE UAV) with a operational ranges. High a user. The Synthetic Apera sensor, signal processing a	continuous all w quality, one foot ture Radar Targe and operational c	re Radar (TESAR) provides the medium alter eather coverage of worldwide targets for lon resolution imagery is downlinked, analyzed t Recognition and Location System (STARL concepts. Utilizing new and emerging system cation against mobile, time-critical ground ta	g endurance missions at significant l and distributed to the appropriate .OS) provides for the integration of ms, it demonstrates reduced sensor
CHARACTERISTICS:		· · · ·	e Army for the OSD sponsored MAE UA	

dvanced Concept Technology Development (ACTD) program. This ACTD quickly satisfied the military need of long dwell coverage and reconnaissance of small, mobile or fixed targets and to develop concepts of operation for endurance UAVs. The TESAR sensor is a lightweight (165 lb) high resolution (1 ft) payload that performs image formation processing in the air; and downlinks continuous high quality strip map imagery that is normally 800 m wide. Collected data is stored in the ground station, and selected images are disseminated via satellite link to various intelligence nodes. An additional moving target indicator (MTI) mode is being developed and will be on the MAE UAV. The TESAR output will be interfaced to STARLOS equipment to demonstrate the significant value-added identification capability of automatic target cueing/recognition of high priority ground targets at deep and extended ranges.

STARLOS is an advanced technology demonstration of the feasibility of locating and identifying high value targets from an aerial platform such as an unmanned aerial vehicle. STARLOS is meant to operate on an Army designated aerial platform. Targets are identified and located by means of a high resolution synthetic aperture radar (SAR) sensor coupled with very high speed signal processors to perform rapid automatic target recognition or automatic target cueing. The program has become a major component of the Joint Precision Strike Demonstration Program (JPSD), and was the impetus for the development by industry of a high resolution SAR payload for the JCS medium altitude endurance class of unmanned aerial vehicles. The system is designed to support operational commanders in world-wide contingency operations, and supports the direct, real-time sensor-to-shooter architecture, DoD deep precision strike, and battlefield visualization concepts.

No known foreign counterpart. **FOREIGN COUNTERPART:**

FOREIGN MILITARY SALES: No foreign military sales.

PROGRAM STATUS: TESAR: Currently deployed 3 SAR payloads, 1 ground control station and spares to Operation Joint Endeavor; balance of ACTD SARs being integrated on MAE UAV aircraft.

TESAR: Transition of ACTD program into Acquisition Cycle. **PROJECTED ACTIVITIES:** STARLOS: Transition processor to industry. Deliver and leave behind for the JPSD sponsored Counter Multiple Rocket Launcher ACTD.

TESAR: Northrup Grumman (Baltimore, MD) PRIME CONTRACTOR: STARLOS: TBD

The Joint Precision Strike The Joint Precision Strike Demonstration (JPSD) Program is developing and demonstrating an all-weather, day/night, end-**Demonstration** (JPSD) to-end, sensor-to-shooter precision strike capability to defeat critical targets at extended ranges. Initiated in FY92 as part of **Program:** the Office of the Secretary of Defense's Precision Strike Thrust II, the program's early focus had been centered on Army programs, but has expanded into a Joint environment. Although the program originally derived from the difficulties in locating and destroying Scuds during DESERT STORM, JPSD is presently exploring and demonstrating ways to counter any high value, time critical target, especially those at extended ranges.

> To optimize the Land Component Commander's precision strike capabilities, the program has four strategic objectives. The first is to identify and establish a timeline for the Army's current precision strike baseline. The second is to reduce precision strike timelines from the current capability, measured in hours, to a future capability, measured in minutes. The third is to achieve a measurable improvement in target location and identification, weapons effectiveness and damage assessment. The final objective is to advance precision strike concepts of employment including real-time sensor to weapon cueing, near-real-time data dissemination of seamless sensor-to shooter node communications, and dynamic re-targeting.

> To support JPSD's building block demonstrations in a realistic and doctrinally correct environment and to provide a mechanism to collect, organize, analyze and display data, a JPSD Integration and Evaluation Center (IEC) has been developed at the U.S. Army Topographic Engineering Center (TEC), Alexandria, VA. The IEC has an extensive set of connectivities, both classified and unclassified, to allow the integration of live inputs, simulations, prerecorded data and scripted events. The IEC has already proven itself to be an extremely useful capability to a variety of-users (system developers, trainers and warfighters).

> JPSD's accomplishments to date include: First Light and Rapid Strike Demonstration conducted early in the program; beyond Line-of-Sight Unmanned Aerial Vehicle (UAV) demonstration in Nov. 93; the FY94 surface-to-surface demonstration which highlighted the U.S. Army's Extended Range Army Tactical Missile System (ER ATACMS) in precision strike missions against time-critical, deep targets and the FY95 - 98 Precision/Rapid Counter 240mm MRL (P/RC-MRL) Advanced Concept Technology Demonstration (ACTD). This ACTD included demonstrations with large numbers of troops (including support from the sister services) connecting multiple facilities within the continental U.S. and in Korea. The JPSD demonstrations bring together as a team the warfighter, the scientist and the engineer providing them experience of handson utilization of new technologies and concepts and assessment of the impact of new capabilities on doctrine.

> JPSD is planning a follow-on effort to the P/RC-MRL to address remaining shortfalls in the CINC's precision strike capabilities. Also the Rapid Battlefield Visualization (RBV) ACTD will demonstrate rapid generation of high resolution digital terrain data, combined with situation awareness information and embedded wargaming, and rapidly disseminated to provide commanders with a view of the battlespace.

Guided Multiple Launch The Guided MLRS ATD will design, develop and flight test a low-cost guidance and control system for the extended-range Rocket System (MLRS) MLRS free-flight rocket, thereby substantially improving its delivery accuracy, reducing the number of rockets required to Advanced Technology defeat the target, reducing the logistics burden and expanding the set of MLRS targets to include precision targets. The guid-**Demonstration (ATD)** ance system will make use of inertial and global positioning system low-cost component technologies and will have appli-(94-98): cation for bomblet, precision guided submunition, mine and unitary/earth penetrator warheads. The Guided MLRS ATD is being simulated as an advanced concept in the Rapid Force Projection Initiative ACTD and the Joint Precision Strike Demonstration Precision/Rapid Counter Multiple Rocket Launcher ACTD, as well as the mobile strike force advanced warfighting experiment. The Guided MLRS technology is scheduled to begin Engineering and Manufacturing Development (EMD) in FY98.
Indirect Precision Fire The goal of the Indirect Precision Fire ATD is to demonstrate an order of magnitude accuracy improvement in an afford-Advanced Technology able, modular guidance package, compatible with a NATO standard fuze well for existing and future artillery projectiles. To Demonstration (ATD): do so, the ATD will develop an auto-registration and a guided competent munition. The auto-registration concept utilizes GPS technology integrated with a ballistic computer on the platform to generate automated firing corrections. The guided competent munition concept utilizes gun-hardened GPS/INS guidance and a canard control system. The guided competent munition effort leverages a substantial Navy investment.

Counter-Multiple Rocket During a conversation with the Deputy Assistant Secretary of the Army (Research and Technology) in the Fall of 1993, the Launcher (C-MRL) Commander-in-Chief, United Nations Command/Combined Forces Command/United States Forces Korea (CINC Advanced Concept Technology UNC/CFC/USFK) said he could use help in defeating the North Korean 240mm Multiple Rocket Launcher (MRL) threat. Demonstration (ACTD): Subsequently the Joint Precision Strike Demonstration Project Office (JPSDPO) began a planning and staffing effort that resulted in the Deputy Under Secretary of Defense for Advanced Technology approving the Precision/Rapid Counter MRL Advanced Concept Technology Demonstration (C-MRL ACTD) in December 1994. The C-MRL ACTD, the first OSD approved ACTD, spans FY95 through FY98. It leverages current capabilities and integrates emerging technologies to provide the CINC a significantly enhanced capability to defeat the 240mm MRL's near the Korean Demilitarized Zone. To accomplish this task JPSDPO has developed a number of enhanced capabilities and new operational concepts, and has conducted a large distributed exercise in September and October 1995 to demonstrate and evaluate the capabilities and concepts. The exercise included activity at numerous locations: Army III Corps elements at Fort Hood, TX; III Corps Artillery elements and the Depth and Simultaneous Attack Battle Lab at Fort Sill, OK; III Corps Aviation elements and the Aviation Battle Lab Support Group at Fort Rucker, AL; Air Force and Navy simulation centers in the Washington, D.C. area; and JPSD's Integration and Evaluation Center in Alexandria, VA. JPSDPO will conduct a second and final exercise in Korea in September and October 1996 to demonstrate refined operational concepts and more advanced capabilities. It will be a large, joint exercise involving: the USFK staff; the 2nd Infantry Division; 7th Air Force; Arizona Air National Guard; 7th Fleet; the Air Force's Theater Battle Arena simulation center in the Pentagon; and several Navy simulation centers along the East Coast. Enhanced capabilities will be "left behind" in Korea following the exercise as decided by USFK. JPSDPO will provide maintenance and training support for the "leave behinds" through FY98, after which time support responsibility transitions to the Theater, system project offices and Service commodity commands.





Tomorrow's Army will be a smaller force, but with just as many, if not more, crises to respond to on behalf of the nation. As a result, Army forces will need improved firepower, improved mobility and greater situational aware-

ness if they are to maintain their effectiveness. The Army of the future must be able to dominate the maneuver battlefield, despite and because of its smaller size. The smaller size means the Army of the future will have less margin for error and so must maximize the combat power of each soldier. The Army must pursue weapon systems with greater ranges, greater accuracy and greater firepower. The Army must also acquire systems that will extend the all-weather/night fighting capabilities of its forces.

Army modernization efforts to Dominate the Maneuver Battle fall into two categories: upgrades and new systems. The first category covers Army programs to greatly enhance the capabilities of its existing systems. The upgrades to the Abrams tank and the Bradley Fighting Vehicle System (BFVS) will improve the communications and data processing systems, the night-fighting capabilities and the survivability of the vehicles. The Driver's Vision Enhancer (DVE) and the 2nd Generation Forward Looking Infrared (2nd Gen FLIR) are two examples of these upgrades. The Apache Longbow program will vastly improve the ability the Apache attack helicopter to track and engage a large number of air and ground targets. The Apache will also add the 2nd Gen FLIR. Digitization upgrades to all platforms will allow them to operate more efficiently as part of an integrated whole.

The Army is also acquiring several new systems that will greatly improve the ability of its forces to prosecute a ground war. The Crusader is a revolutionary artillery system, using a Regenerative Liquid Propellant Gun and an automated loading system. Crusader also requires 3 fewer crewmen than previous self-propelled artillery systems. The new Command and Control Vehicle (C2V) will allow C2 "on the move" from an armored vehicle that can keep pace with Bradley and Abrams. To improve its mobility, the Army is also enhancing its combat engineering capabilities with the acquisition of the Grizzly breaching vehicle and the Wolverine heavy assault bridge vehicle.

This combination of improved firepower, improved mobility and improved situational awareness will make tomorrow's Army maneuver forces a very powerful tool. By maintaining a tremendous technological advantage over potential adversaries, the Army will retain its ability to Dominate the Maneuver Battle and will continue to be a strong deterrent to would be aggressors.



HENCE AND TECHNOLOGY	Concept	Dem/Val	EMD	Produ	CTION AND DEPLOYM	MENT OPERATIONS AND SUPPORT	
Direct Fire Lethalay Enhanced Fiber Optic Guided Missile ((FCCM) ATD Hunter Sensor State ATD Hunter Sensor State ATD Line of Sight Annunk (LOSAT) Milhary Operations in Urban Terrain Multifunction Staring Sensor State ATD National Automotive Center National Automotive Center National Rotocraft Technology Center (NRTC) Objective Individual Combat Weapon ATD Rotocraft Pilot's Associate (RPA) ATD Program Scout Vehicle Target Acquiretien ATD	Vehicle Teleoperation Capability (VTC)	Advanced Tank Armament System (ATAS) Airborne Standoff Minefield Detection System (ASTAMIDS) Crusader Grizzly	Apache Longbow Bradley Fire Support Team (BFIST) Vehicle Close Combat Tactical Trainer (CCTT) Hornet Multi-Purpose Individual Munition/Short Range Assault Weapon (MPIM/SRAW) Second Gen FLIR TOW Improved Target Acquisition System (ITAS) Wolverine		Command and Control Vehicle (C2V) Driver's Vision Enhancer (DVE) Hercules HYDRA 70 Rocket System Javelin Laser HELLFIRE Longbow HELLFIRE Longbow HELLFIRE Might Vision (NV) Image Intensification (12) Small Arms Tank Main Gun Ammunition Thermal Weapon Sight (TWS) TOW Missile Volcano	Abrams Bradley M2 Infantry/M3 Cavalry Fighting Vehicle. Kiowa Warrior M113 Family of Vehicles. Mortar (120 mm). Balatin	T



FORE

FOREIG

EMD

OPERATIONS AND SUPPORT

MISSION:

SION: The Abrams tank provides heavy armor superiority on the battlefield.

CHARACTERISTICS:

The Abrams tank closes with and destroys enemy forces on the integrated battlefield using mobility, firepower, and shock effect. The 105 mm main gun on the M1 and IPM1 and the 120 mm main gun on the M1A1 and M1A2, combined with the powerful 1,500 hp turbine engine and special armor, make the Abrams tank particularly suitable for attacking or defending against large concentrations of heavy armor forces 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 program builds on the M1A1 to provide an Abrams tank with the necessary improvements in lethality, survivability, and fightability required to defeat advanced threats. The M1A2 includes a Commander's Independent Thermal Viewer, an Improved Commander's Weapon Station, position navigation equipment, a distributed data and power architecture, embedded diagnostic system, improved fire control system, and a radio interface unit that allows, through the SINCGARS radio, rapid transfer of digital situational data and overlays to compatible systems on the digital battlefield.

		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:	45.0/41.5 mph	41.5 mph	41.5 mph	
	Weight:	61.4/62.8 tons	67.6 tons	68.4 tons	
	Armament:	105 mm	120 mm	120 mm	
	Crew:	4	4	4	
IGN COUNTERPART:	France: LeC	Clerc	Germany: Leopard 2		
	Italy: Cl Ar	iete	Russia: T-64, T-72, and	nd T-80 United Kingdom: Challenger 2	
GN MILITARY SALES:	Egypt - 555	M1A1 Kits	Kuwait - 218 M1A2s	Saudia Arabia - 315 M1A2s	

PROGRAM STATUS:Production of new Abrams for the U.S. Army and current Foreign Military Sales cases is complete (except for M1A1 tanks kits
for Egypt). In lieu of new production, the Army is upgrading approximately 1,000 older M1 tanks to the M1A2 configuration.
A multiyear procurement for 600 M1A2 upgrades was awarded in July 96. Further M1A2 improvements, called the System
Enhancement Program, (SEP), are underway to enhance the tanks digital command and control capabilities and to add second
generation forward looking infrared sensors to the thermal sights to improve the tank's fightability and lethality.

PROJECTED ACTIVITIES: The initial M1A2 fielding to the First Cavalry Division, Ft. Hood, TX is underway with completion scheduled for 2QFY98. The first M1A2 SEP tanks are scheduled to begin fielding in 3QFY00.

PRIME CONTRACTOR:Allison Transmission (Indianapolis, IN)
General Dynamics (Land Systems Division) (Sterling Heights, MI; Warren, MI; Lima, OH;)
LITCO (Idaho Falls, ID)
Texas Instruments (Dallas, TX)





- **MISSION:** The Advanced Tank Armament System (ATAS) Program provides next generation armament system technologies for application to the M1 Abrams production main battle tank. These technologies are designed to increase the lethality and accuracy of the Abrams tank system at extended ranges while also reducing target engagement times. They allow the tank crew to engage enemy targets further, faster and more accurately than currently fielded systems.
- CHARACTERISTICS: ATAS provides three main improvements to the Abrams tank a long barrel, 120 mm XM291 cannon, a compact 120 mm autoloader, and extended range fire control system improvements. The long barrel XM291 cannon gives all current Abrams tank ammunition the ability to kill enemy targets one kilometer further out in range than is currently possible. This is due to the higher muzzle velocity generated by the XM291 gun at shot exit. This translates into greater penetration, range and killing power for the tank. The magazine of the compact 120 mm automatic ammunition loader (autoloader) fits into the existing Abrams tank bustle ammunition storage area, operates at a sustained 12 rounds per minute firing rate, and provides inter-round fratricide protection. Automatic target detection and tracking software decrease the time necessary for the tank crew to acquire and engage enemy targets. Tank firing accuracy is greatly enhanced by the addition of a continuous muzzle reference system, advanced fire control solutions, state of the art lead predictors and improved gun servos and actuators. Together, these improvements allow the tank crew to quickly and accurately kill enemy targets at extended ranges.
- **FOREIGN COUNTERPART:** Several countries in the world include ATAS components in their tank fleets. The French LeClerc has a long barrel 120 mm cannon and autoloader. Russian T72 and T80 series tanks all have autoloaders. Finally, the Israeli Merkeva tank uses auto target trackers to improve gun accuracy.
- **FOREIGN MILITARY SALES:** The US continues to be involved in the Quadripartite Future Tank Main Armament agreement between the US, Germany, France and the United Kingdom. The goal of this agreement is to develop a common large caliber cannon and bullet.
 - **PROGRAM STATUS:** ATAS is a two phased program that is on track through FY03. Phase I will conclude with the testing of a Bradley Fighting Vehicle Autotracker on an M1A2 in FY97. Phase two involves the integration and testing of advanced fire control components in an M1A2 System Enhancement Program tank in FY98. The XM291 and autoloader will be added to this demonstrator and tested in FY99. This will be followed by Engineering and Manufacturing development of the XM291 gun leading to its type classification in FY03.

PROJECTED ACTIVITIES: Testing of an M1A2 with Auto Target Tracker in FY97.

PRIME CONTRACTOR:

Vehicle Integration: Firecontrol System: Autoloader: General Dynamics (Land Systems) (Sterling Heights, MI) Texas Instruments (Plano, TX) Western Howen Design (Irvine, CA)



ENCE AND TECHNOLOGY	CONCEPT		EMD	PRODUCTION AND DEPLOYMENT	OPERATIONS AND SUPPORT			
		Dem/Val.						
MIS				on System (ASTAMIDS) provides a near real in all conflict levels of air land operations.	time stand-off minefield detection			
CHARACTERIS	gra fie	ASTAMIDS consists of an imaging sensor mounted on an Unmanned Aerial Vehicle (UAV) and a processor/algorithm inte- grated into the UAV Ground Control Station (GCS). The sensor will be controlled by the UAV GCS, transmitting mine- field imagery to the GCS, and then processed in near real time. Minefield data will be displayed and disseminated to using units similar to other Reconnaissance, Intelligence, Surveillance, and Target Acquisition data.						
FOREIGN COUNTER	PART: No	o known foreign counter	rparts.					
FOREIGN MILITARY S	ALES: No	o foreign military sales.						
PROGRAM ST		The ASTAMIDS program is currently in the Demonstration and Validation phase of development. Milestone II is sche uled for 4QFY97; Milestone III is scheduled for 4QFY00.						
PROJECTED ACTIV	ITIES: Te	Technical Testing and Early User Test and Experimentation will be completed 3QFY97.						
PRIME CONTRAC	Ra	vo competing systems w aytheon (Tewksbury, MA destinghouse (Baltimore,	L)	ownselect at MSII:				
	*	See appendix for list of s	subcontractors.					



OPERATIONS AND SUPPORT

EMD

MISSION:

CONCEPT

The mission of the attack helicopter is to conduct rear, close, and deep operations; deep precision strike; and provide armed reconnaissance and security when required in day, night and adverse weather conditions.

CHARACTERISTICS: 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, a radar frequency interferometer, and a radar frequency fireand-forget HELLFIRE missile onto the Apache. Longbow's digitized target acquisition system provides automated detection, location, classification, prioritization, and target handover. The AH-64D cockpit is redesigned to digitize and multiplex all systems. The MANPRINT crew stations have multifunction displays to reduce pilot work load and increase effectiveness. The modernized Apache heavy attack team now will be able to provide a truly "coordinated" rapid-fire (16 separate targets within 1 minute) capability to the maneuver force commander on a 24-hour basis in day, night, and adverse weather conditions.

No known foreign counterpart. **FOREIGN COUNTERPART:**

FOREIGN MILITARY SALES: Netherlands and United Kingdom

> **PROGRAM STATUS:** The Apache Longbow 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 initial Operational Test and Evaluation, conducted from January through March 1995, proved the Apache Longbow to be an operationally effective and suitable weapon system. As expected, the Apache Longbow (AH-64D) — with its capability to engage targets in weather and obscurant conditions which preclude the employment of laser-guided weapons - was far more effective in defeating threat armored vehicles and more survivable in the threat air defense environment than the AH64A. The Apache Longbow received Milestone III production approval in October 1995. Single year contracts for the airframe and fire control radar were awarded in December 1995 and March 1996 respectively. A five year multiyear contract for the airframe was signed on 16 August 1996. The current program objective calls for 227 Longbow fire control radar mission kits capable of being installed on the Apache's modernized fleet (758 minus attrition) being upgraded to the new AH-64D baseline configuration. The Apache Longbow will add significant warfighting capability to the combined arms team through increased survivability, lethality, and versatility, as well as through long-term reliability improvements.

First production delivery: March 1997. **PROJECTED ACTIVITIES:** First Unit Equipped: July 1998.

Joint Venture: Lockheed Martin (Orlando, FL) and Northrup Grumman (Baltimore, MD) **PRIME CONTRACTOR:** McDonnell Douglas (Mesa, AZ)



SCIENCE AND TECHNOLOGY	Concept	Dem/Val		PRODUCTION AND DEPLOYMENT	O PERATIONS AND SUPPORT	
			EMD			
M	comp rate ir A3 va	any fire support team idirect fires. Plans fo riants. h:	s and battalion/b r BFIST producti 30.96 ft	ehicle provides an integrated Bradley-based rigade fire support officers to plan, coordina on include both Bradley A2 Operation Des armor tiles; 15.48 ft with armor skirts	ate, execute, and direct timely, accu-	
	Heigh Weigl Powe Cruis Road Crew Vehic Distri	it: nt: r Train: ing Range: Speed:	14.04 ft 60,000 lbs co 600 hp Cum hydromechar 250 mi 38 mph 4 25 mm Bush Armor/Infant Artillery Batta	mbat loaded nins V093T diesel engine with GM-Allison nical automatic transmission master cannon; 7.62 mm, M240C machine ry Brigades-Battalions; Cavalry Regiments-S	gun	
FOREIGN COUNT	ERPART: Franc FV-43		AMX VTT/LT; F	Russia: BMP PRP-3, BMP PRP-4; United K	ingdom: MCV-80 Warrior MAOV;	
FOREIGN MILITAR	Y SALES: No fo	oreign military sales.				
PROGRAM	opme	nt. The Bradley Prog 1 in 1QFY96 and 20	gram Office cond	Storm (ODS) BFIST (XM7) remained in engucted preliminary and critical design review ely. The first Bradley A2 ODS BFIST prep	s for the A2 ODS BFIST were com-	
PROJECTED ACT		97, the XM7 preproc Rate Initial Productic	1 / 1	e will undergo contractor and government pected in 4QFY97.	production qualification testing. A	
PRIME CONTI	RACTOR: FMC	(United Defense, LP) (San Jose, CA)			
	* See	appendix for list of s	subcontractors.			



and Technology	CONCEPT	Dem/Val	EMD	PRODUCTION AND DEPLOYMENT				
					OPERATIONS AND SUPPORT			
MISSIC	ital con		l capabilities, sigr	ing Vehicle (IFV/CFV) provides infantry an nificantly increased situational awareness, e ility.				
CHARACTERISTI	Width Height Weigh Power Cruisin Road S Crew: Vehicle Distric	Length:30.96 ftWidth:17.04 ft with armor tiles; 15.48 ft with armor skirtsHeight:14.04 ftWeight:67,000 lbs combat loadedPower Train:600 hp Cummins V093T diesel engine with GM-Allison HMPT-500-3 hydromechanical automatic transmissionCruising Range:250 miRoad Speed:38 mph						
FOREIGN COUNTERPA		: Type 90, WZ-503 80 Warrior, FV-432		0P, AMX VCI; Germany: Marder 1; Russia	a: BMP 1, 2, & 3; United Kingdom:			
FOREIGN MILITARY SAI	L ES: Saudi	Arabia (Bradley A2)					
PROGRAM STAT	upgrad Opera	de of Bradley Als (tion Desert Storm (to the A2 configu (ODS) configurati	complete upgrade of selected Bradley AOs tration, and begin conversion and fielding ion (first unit equipped in 1QFY97). The t Bradley A3 preproduction prototype was	g of selected Bradley A2s to the A2 Bradley A3 remains in engineering			
PROJECTED ACTIVIT	and ta		nited user testing	ypes will undergo contractor and governme A Low Rate Initial Production (LRIP) de				
PRIME CONTRACT	OR: FMC	(United Defense, Ll	P) (San Jose, CA)					
	* See a	appendix for list of	subcontractors.					



SCIENCE AND TECHNOLOGY	CONCEPT	Dem/Val		PRODUCTION AND DEPLOYMENT	OPERATIONS AND SUPPORT
			EMD		

- **MISSION:** The Close Combat Tactical Trainer (CCTT) provides realistic individual and collective training for armor and mechanized vehicle crews on a simulated battlefield.
- **CHARACTERISTICS:** The CCTT's function is to train active and reserve component M1 Tank and M2/3 Bradley crews on mission training planbased collective (crew through battalion task force) tasks and skills in command, control, communications, and maneuver on a simulated, fully interactive, real-time battlefield. The 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 is fully distributed interactive simulation (DIS) compliant and is capable of conducting joint/coalition combined arms training with other CCTT interoperable training systems. 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.

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. The mobile version is capable of deploying with the unit during contingency operations.

FOREIGN COUNTERPART: No known foreign counterparts.

FOREIGN MILITARY SALES: No foreign military sales.

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

PROJECTED ACTIVITIES: Milestone III Procurement Decision.

PRIME CONTRACTOR: Lockheed-Martin (Orlando, FL)



OPERATIONS AND SUPPORT		EMD	DEM/VAL	Concep	d Technology	
	PRODUCTION AND DEPLOYMENT					
ligence systems for operational plan-	V093T diesel engine with GM-Allison 1 of 9)	re command, contro ough corps battle st 35.4 ft 14.04 ft 12.72 ft 56,000-66,000 lbs 600 hp Cummins transmission 275 miles 40 mph variable (maximur 7.62mm, M240 set Corps-Battalion	g current and futu use by battalion thr h: t: t: t: Train: hatic ng Range: Speed:	hơ ni I STICS: Le W H W Pơ au C A C A D	MIS	
	France: AMX-10PC, AMX VTT/PC; Gen Kingdom: MCV-80 Warrior CV, FV-432C		7 A .		OREIGN COUNTE	
			reign military sales	SALES: N	DREIGN MILITARY	
lergoing contractor and government C2V preproduction prototypes were	nd manufacturing development with the otypes. These vehicles are currently unde otype C2Vs known as FCCVs and initial C T); LUT was completed in 3QFY96. C2V duled to begin LRIP in 1QFY97.	preproduction prote testing. Early prote ed user testing (LU	ation of four C2V action qualification during phased limi	fa P u	PROGRAM S	
	nd related Force XXI experiments.	ne Task Force XXI a	will participate in t	VITIES: C	PROJECTED ACTIV	
FMC (United Defense, LP) (San Jose, CA)						
* See appendix for list of subcontractors.						



CONCEPT

EMD

DEM/VAL

forces on the future battlefield

CHARACTERISTICS:

MISSION:

The Self Propelled Howitzer (SPH) is a 155 mm self-propelled howitzer system that will provide a significant increase in artillery survivability, lethality, mobility, and operational capability and effectiveness through use and integration of advanced technology in its subsystems and combat components. The SPH will deliver unprecedented firepower capabilities at extended ranges. Some of the SPH critical technologies and capabilities include the XM297 inter mid wall cooled cannon, Modular Artillery Charge System (MACS), autosettable multioption fuze, automated ammunition-handling system, enhanced survivability, and improved mobility. The armored Resupply Vehicle (RSV) will provide the foundation for resupply of ammunition and fuel for the SPH. Inserting high-payoff technologies in robotics, automation, expert systems, vetronics, and improved ammunition propulsion into the resupply process, the RSV will provide the necessary ammunition to meet the expected firing rates; meet the goals for autonomous operations; and capitalize on cost and operational advantages of component commonality. RSV critical technologies and capabilities include a teleoperated docking arm, automated ammunition resupply system, automated fuel transfer system, and improved mobility. These systems, when fielded, will displace the M109A6 Paladin self-propelled howitzer and M992A2 field artillery ammunition supply vehicle in rapidly deployable and forward-deployed forces.

Crusader will be the indirect fire support "system of systems," providing direct and general support fires to maneuver

SPH

Range:	40+ km (assisted)
Rate of fire:	10-12 rd/min
Aultiple round,	
simultaneous impact	: 4 rd (1 SPH)
Ammo storage:	60 fuzed rd
Crew:	3 (operable by 1)

No known foreign counterpart.

No foreign military sales.

RSV

Automated rearm: Automated refuel: Range: Speed: Ammo storage: Crew: 12 rd/min 132-190 L/min 450 km 48 mph highway; 30 mph cross country 130-200 fuzed rd 3

FOREIGN COUNTERPART: FOREIGN MILITARY SALES: PROGRAM STATUS:

In 1992, the Army successfully demonstrated fuze and projectile compatibility and successfully demonstrated the firing of a multi-option Fuze for Artillery. In 1993/1994, the Army fabricated/assembled a hardstand cannon and autoloader which demonstrated 12 rounds per minute automated ammunition handling, azimuth and elevation slew rates, pointing accuracy and integrated technical and tactical fire control; fabricated and assembled an Automotive Test Rig with an LV100, 1500 horsepower engine, electric drive and self-cleaning air filter; fabricated and assembled a four-man reconfigurable crew module which demonstrated man machine interface, full audio, video and data collection capabilities; and demonstrated ammunition transfer rates of 12 rounds per minute. In 1996 the Army selected the XM296 and MACS as the armament system for Crusader. Currently, Crusader is in the Demonstration and Validation (DEM/VAL) phase of development.

PROJECTED ACTIVITIES: PEO, Field Artille

PEO, Field Artillery Systems/Commandant, FA School; in-process review scheduled for 3QFY97.

PRIME CONTRACTOR: FMC (United Defense, LP) (Minneapolis, MN)



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ACE AND TECHNOLOGY	CONCEPT	DEM/VAL	EMD		OPERATIONS AND SUPPORT			
			1	PRODUCTION AND DEPLOYMENT				
MI	flexibil		or night operations dur	provides the drivers of combat and tact ring periods of severely degraded visua	-			
CHARACTER	when o provid	This thermal viewing system increases vehicle mobility under very poor driving conditions. DVE's cost is also very low when compared to other FLIRs. The DVE provides mobility under the same conditions as the target engagement sensors providing a critical Go vs. No Go capability. DVE provides situational awareness, and ambush detection and vehicle tracking. For the first time, combat service support will be able to keep up with the Warfighter.						
	of a hi video	gh quality commerc	ial flat-panel display an e distributed to other v	eneration Forward Looking Infrared (1 d control module. The system is "Driv ehicle crew members. The DVE also	ver Friendly" and easy to use. DVE			
		VE can be easily ad technology integra		future US or NATO combat and tactic	al wheeled vehicle due to its "hor-			
		Bradley M2A2 OD Abrams M1A2 and M58 Smoke Vehic Wolverine Command & Con USMC Light Armo Grizzly USMC Amphibiou	l USMC M1A1 le trol Vehicle ored Vehicle	Heavy Expanded Mobilit High Mobility Multipurp Heavy Equipment Transp Palletized Loading Syster Family of Medium Tactic Hercules Paladin USMC Armored Vehicle	ose Wheeled Vehicle-HMMWV porter System-HETS n - PLS al Vehicles - FMTV			
FOREIGN COUNTR	E RPART: No kn	own foreign counte	erpart.					
FOREIGN MILITARY		No foreign military sales. However, DVE has considerable potential as a Driver's Aid for NATO countries interest Rationalization, Standardization and Integration.						
PROGRAM S	STATUS: Limite	d procurement con	tract awarded 30 Augu	st 1995.				
PROJECTED ACTI	VITIES: Milest	one III decision FY	97.					
PRIME CONTR	ACTOR: Texas	Instruments (Dallas	5, TX)					
	*See a	ppendix for list of s	subcontractors.					



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AND TECHNOLOGY	Concei	т	EMD	PRODUCTION AND DEPLOYMENT	OPERATIONS AND SUPPORT				
		Dem/Val.							
MISS	SION: T	he Grizzly provides an in	-stride capabilit	y to overcome simple and complex linear of	ostacles				
MISSION: CHARACTERISTICS:		The Grizzly provides an in-stride capability to overcome simple and complex linear 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. The Grizzly will be fielded in Division and selected Corps Engineer Battalions.							
	e	xcavating arm. While but	toned up, the cr	ed system equipped with a full-width mine ew of two will be able to operate all systems. ic architecture and provisions for digital batt	The vehicle contains electric drive,				
FOREIGN COUNTERE	PART: G	ermany: Pionierpanzer 2	2 Israel: N	AIKI Russia: IMR-2					
FOREIGN MILITARY SA	ALES: N	lo foreign military sales.							
PROGRAM STA	le v v	everaged the work condu- vas awarded to United De vere delivered in 4QFY99	cted under an A efense, LP (forn 5. Early User E	792 as a result of lessons reinforced during C dvanced Technology Transition Demonstrate nerly BMY) in September 1992 for Demonst periments were conducted in February 199 . Blade performance testing using Automatic	ration and Validation. Prototypes 96, and the system prototypes are				
PROJECTED ACTIVI	ITIES: N	/lilestone II in FY97.							
PRIME CONTRAC	CTOR: F	FMC (United Defense, LP) (York, PA)							
	*	See appendix for list of s	subcontractors.						



GENCE AND TECHNOLOGY	Concept	DEM/VAL	EMD			OPERATIONS AND SUPPORT	
				Produ	CTION AND DEPLOYM	IENT	He
MI CHARACTERJ	tlefi I STICS: The imp	eld recovery operati Hercules will be t roves towing, winc	ons and evacuation ype classified as th hing, lifting, and b future heavy system	of heavy tar e M88A2. T raking chara	nks and other tracked The Hercules uses th acteristics. The Hercu	ing, and hoisting operations supporting bat- combat vehicles. The existing M88A1 chassis but significantly ales is the primary recovery support to the e, and heavy self-propelled artillery.	tercules
	Len	-	339 in		Power train:	12 cylinder, 1,050 hp air-cooled diesel engine with 3-speed automatic transmission	
	Spe		144 in 123 in 70 ton 29 mph 20 mph One .50 caliber m	achine gun	Cruising range: Draw bar pull: Boom capacity: Winch Capacity: Aux. Winch Capaci	200 mi 70 ton 35 ton 70 ton / 300 ft ty: 3 ton / 670 ft	
FOREIGN COUNTE	Her	There is no foreign counterpart that provides the combined weight, towing, winch, and hoist-capacities d Hercules. However, many foreign nations do incorporate recovery systems on existing recovery chassis or r chassis.					
FOREIGN MILITARY	SALES: Kuy	Kuwait (1994)					
PROGRAM S		The Hercules is undergoing low rate initial production testing that includes 9,000 miles of RAM, performance and user evaluations. Initial fielding is planned for early FY97. PQT/IOTE was conducted 2–4QFY96.					
PROJECTED ACTI		estone III is schedul st Unit Equipped is s	ed for 1QFY97. scheduled for 2QFY	97.			
PRIME CONTRA	ACTOR: FM	C (United Defense,	LP) (York, PA)				
	* Se	ee appendix for list	of subcontractors.				



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EMD

- **MISSION:** The mission of the Hornet is to counter the enemy's mobility. It will delay, disrupt and canalize enemy vehicle movement in the close battle. Hornet is planned for immediate use today with early entry forces such as the 82nd Airborne. It will provide survivability for small isolated forces to minimize casualties and protect against armored vehicle attacks.
- **CHARACTERISTICS:** The Hornet is the Army's first generation of a smart, autonomous top attack munition. It employs seismic and acoustic sensors to detect, classify and track a target. Once the target is validated by internal control electronics and within the 100 meter lethal radius, the munition determines the optimum firing point and launches a smart submunition over the target. The sublet acquires the target by infrared sensor and fires a tantalum Explosively Formed Penetrator (EFP) at the top of the target vehicle.

FOREIGN COUNTERPARTS: No known foreign counterpart.

CONCEPT

DEM/VAL

MENCE AND TECHNOLOGY

FOREIGN MILITARY SALES: No foreign military sales.

PROGRAM STATUS: The Hornet is currently in Low Rate Production. The Hornet Product Improvement Program (PIP) is currently in EMD.

PROJECTED ACTIVITIES: Basic Hornet type classification is scheduled for 4QFY97. Hornet PIP type classification is scheduled for 4QFY99

PRIME CONTRACTOR: Textron (Wilmington, MA)

* See appendix for list of subcontractors.

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ENCE AND TECHNOLOGY	CONCEPT	Dem/Val	EMD		OPERATIONS AND SUPPORT		
				PRODUCTION AND DEPLOYMENT			
for anti-materiel, anti-personnel, and su nation, and training warheads. HYDRA and are used from other platforms by S CHARACTERISTICS: The warheads fall into three categories: (1) Unitary warheads with impact-deto			sonnel, and suppr eads. HYDRA roc blatforms by Speci ree categories: h impact-detonati	a variety of functions. The war reserve us ession missions. The family of rockets also kets are fired from Apache, Cobra, and Kiov al Operations Forces, the Marine Corps, th ng fuzes or remote-set multioption fuzes	o includes smoke screening, illumi- wa Warrior helicopters by the Army ne Navy, and the Air Force.		
FOREIGN COUNTER	(3) Tra	 (2) Cargo warheads with airburst-range, setable fuzes using the "wall-in-space" concept or fixed standoff for (3) Training rounds S: Although there is no known foreign counterpart, many countries have expressed an interest in coproduction 					
FOREIGN MILITARY	SALES: Bahrai	Bahrain, Colombia, Egypt, Greece, Japan, Jordan, Korea, Kuwait, Netherlands, Pakist Tunisia, United Arab Emirates					
PROGRAM S	TATUS: New a	ward in 1QFY96.	Production contin	uing through FY96.			
PROJECTED ACTIV	PROJECTED ACTIVITIES: Performance Specification Contract Award			in 2QFY97.			
PRIME CONTRA	CTOR: Lockh	Lockheed Martin (Camden, AR)					
	* See a	appendix for list of	subcontractors.				



SCIENCE .	AND TECHNOLOGY	CONCEPT	DEM/VAL	EMD		OPERATIONS AND SUPPORT	
					PRODUCTION AND DEPLOYMENT		
	M	ISSION: Javelin	provides a man-p	ortable, medium a	nti-tank capability to the infantry, scouts, a	nd combat engineers.	
	CHARACTER	against Comm grated	Javelin is a man-portable, anti-tank system developed for the U.S. Army and U.S. Marine Corps. The system is highly lethal against tanks with conventional and reactive armor. Javelin comprises two major tactical components: a reusable Command Launch Unit (CLU) and a missile sealed in a disposable Launch Tube Assembly. The CLU incorporates an integrated day/night sight and provides target engagement capability in adverse weather and countermeasure environments. The CLU may also be used in the stand-alone mode for battlefield surveillance and target detection.				
		ture is cial fea dem w	the use of fire-and atures are the top a varhead, imaging in	l-forget technology ttack and/or direct hfrared seeker, targ	and has a maximum range in excess of 2, which allows the gunner to fire and imme fire modes (for targets under cover), integra et lock-on before launch, and soft launch (Javelin replaces the Dragon.	ediately take cover. Additional spe- ated day/night sight, advanced tan-	
	FOREIGN COUNTR	mediu	m range systems o		Spike and Gil are being promoted as havir r in development, include the Russian AT- RIGAT.		
	FOREIGN MILITARY		Recent approval of the Javelin export version opens the door for Foreign Military Sales. Production capacity is expected to be available for foreign customers in FY98.				
	PROGRAM STATUS:		After a 54-month Engineering and Manufacturing Development phase, the Javelin went into Low Rate Initial Production (LRIP) in FY94. Fielding of the system began in June 1996.				
	PROJECTED ACT		The system will have a Milestone III full rate production decision in April 1997. A three year multiyear full rate pro- duction contract is planned for May 1997.				
	PRIME CONTR	Lockh	Venture: Texas Ins need Martin (Orlan Instruments (Lew	do, FL)	l Martin (Orlando, FL)		
		* See a	appendix for list of	subcontractors.			



FOREIGN

FOREIGN N

PROJECT

PR

OPERATIONS AND SUPPORT

MISSION:

ON: The Kiowa Warrior fills the armed reconnaissance role for attack helicopter and air cavalry units.

CHARACTERISTICS:

The Kiowa Warrior currently is the only practical armed reconnaissance aircraft in the Army inventory until RAH-66 fielding begins 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 casualty evacuation) 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 remote designation 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.

	Max gross weight: Max speed: Crew: Armament:	5,500 lb 118 kt—clean; 113 kt—armed 2 ATAS, (2 round launcher) .50 caliber machine gun, HYDRA 70 (2.75 in) rockets (7-shot pod), HELLFIRE missiles (2 round launcher). Choice of one system per side.			
COUNTERPART:	France: Germany: Russia:	Gazelle, Alloutte BO-105 HINDs, HIPs, Hoplites			
IILITARY SALES:	Taiwan: 26 Kiowa Warriors. Deliveries complete.				
OGRAM STATUS:	The OH-58D is in the 13th year of production. AHIPs began retrofit/remanufacture in FY93 for the Armed Kiowa Warrior version. There have been 267 aircraft fielded through September 1996. 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 398, with a total Army requirement of 507 aircraft. Deliveries of current contracts will end in September 1998.				
TED ACTIVITIES:	22 Kiowa Warriors are in the manufacturing process.				
CONTRACTORS:	Allison Engines (Indian Honeywell (Albuquerqu McDonnell Douglas (M Textron Inc. (Bell Helico	ae, NM)			


CE AND TECHNOLOGY CONC	EPT DEM/VAL	EMD		OPERATIONS AND SUPPORT
			PRODUCTION AND DEPLOYMENT	
CHARACTERISTICS:	Laser Hellfire is used as Cobra attack helicopter spot that can be project to be employed in a var	the main armament s. It is also used on ed from ground obse iety of modes; autono	nd surgical strike capability for attack heli of the U.S. Army's AH-64 Apache and the the OH-58D Kiowa Warrior helicopter. rvers, other aircraft, or the launching airc pmous, air or ground, direct or indirect, s	e U.S. Marine Corps' AH-1W Super The laser missile homes on a laser craft itself. This enables the system ingle shot, rapid, or ripple fire.
	Basic Hellfire: Semi-act Interim Hellfire: Similar Hellfire II: This missile backscatter improvement reacquisition capability,	tive laser seeker miss ar to basic Hellfire bu incorporates many in nts. Other improver an advanced warhead to changing threats at	missile in various stages of the life cycle: sile system. at adds a precursor warhead to defeat reac mprovements over the previous models of ments include electro-optical countermea d capable of defeating all projected armor nd mission requirement, shipboard comp	tive armor. Hellfire, including laser obscurant/ asures, hardening, improved target threats into the 21st century, repro-
	Version:BasDiameter:7 inWeight:100Length:64	n 7 in 0 lb 107 lb	HF II 7 in 100 lb 64 in	
FOREIGN COUNTERPART:		ve one or more wire.	radio, or laser homing anti-armor missile	es of varying accuracy and lethality.
FOREIGN MILITARY SALES:			le), Saudi Arabia, Sweden, Taiwan, Unite	, , , , ,
PROGRAM STATUS:	Basic HELLFIRE: Sem 1982. All deliveries have	ii-active laser seeker, i e been completed. Final deliveries were o	IRE missile in various stages of the life cy 31,616 produced by both Lockheed Marti completed in January 1994, with 8,807 m 995.	n and Rockwell International since
PROJECTED ACTIVITIES:	Final production buy in	FY97 for 1,800 miss	siles. Deliveries of HELLFIRE II will cont	inue through 1999.
PRIME CONTRACTOR:	Hellfire Systems Limited			



ENCE	AND	TECHNOLOG	

PRODUCTION AND DEPLOYMENT

OPERATIONS AND SUPPORT

MISSION: The Line-of-Sight Anti-Tank (LOSAT) will provide a high volume of extremely lethal, accurate missile fire, effective against heavy armor systems at ranges exceeding tank main gun ranges.

CHARACTERISTICS:

The LOSAT weapon system consists of kinetic energy missiles (KEM) and a second generation forward looking infrared (FLIR)/TV acquisition sensor mounted on an air mobile Heavy High Mobility Mult-Purpose Wheeled Vehicle (HMMWV) combat vehicle chassis in order to help remedy the early entry force lethality shortfall against heavy armor. The key attractions of the LOSAT are the tremendous overmatch lethality of the KEM (defeats all predicted future armored combat vehicles) and its deployability, which is compatible with the early entry forces. The LOSAT also will provide increased survivability and countermeasure effectiveness. The 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 and night, adverse weather, and obscured battlefield conditions. The current program provides for the conduct of a demonstration of the HMMWV platform and will involve flight tests and early soldier evaluations of the system. The demonstration program is a cost-effective means to assess the utility of LOSAT to the early entry force as part of the rapid force projection initiative (RFPI). This project will develop improved technologies for KE missile defeat of robust armor targets and evaluate integration of the LOSAT capability into an air mobile configuration. Project objectives are to position the technology for future acquisition decisions, demonstrate subsystem capabilities in flight tests and dirty battlefield environment, evaluate the utility for the LOSAT technology for the early forces, demonstrate an integrated HMMWV-based LOSAT system in flight test and advanced warfighting experiments, and evaluate affordability issues.

W

KEM			
Weight:	177 lb	Length:	112 in
Diameter:	6.4 in	Range:	Greater than TOV
Crew:	2		

FOREIGN COUNTERPART: FOREIGN MILITARY SALES: PROGRAM STATUS:

No foreign military sales.

No know foreign counterparts.

- The LOSAT program began a Technology Demonstration phase of development in 4QFY92. The demonstration has completed priority risk reduction tasks to the fire control system (FCS), the demonstration of the FCS upgrades in dirty battlefield and flight tests. The early entry force (EEF) demonstration includes the design, fabrication, and integration of a LOSAT system into a heavy HMMWV chassis, a missile flight test program from the HMMWV-based LOSAT fire unit, and advanced warfighting experiments (AWE) user testing.
- Perform system engineering requirements analyses for application of the LOSAT system on the HMMWV configuration. **PROJECTED ACTIVITIES:** Conduct technical analyses to establish system error, power, weight, space and timing budgets for the HMMWV configuration. Establish chassis and crew environment during missile firings including noise, pressure, recoil, exhaust products, and temperature. Update the LOSAT system simulation for change associated with the HMMWV configuration. Support distributed interactive simulation crew station simulation (DISCSS) related to RFPI analysis simulation effort and in antiarmor advanced technology demonstration (A2ATD) experiments.

Lockheed Martin Vought Systems (Dallas, TX) **PRIME CONTRACTOR:**



SCIENCE AND TECHNOLOGY	CONCEPT	DEM/VAL	EMD	OPERATIONS AND SUPPORT
				PRODUCTION AND DEPLOYMENT
MISS	Longbo TICS: Longbo	ow Apache attack ow HELLFIRE is a	helicopter. 1 fire-and-forget ve:	rse weather, fire-and-forget, heavy anti-armor capability for the Army's AH-64D ersion of the HELLFIRE missile. The Longbow program also includes develop-
	FCR w oped for radar s capabil forget g fire; an to adap bility a	vill locate, classify, or integration onto seeker on a HELLF lity (rain, snow, fo guidance, which a n advanced warhea pt to changing thro and HELLFIRE II's	and prioritize targ o the Apache and FIRE II aft section l og, smoke, and bat llows the Apache of d capable of defea eats and mission r precision guidance	rese weather, fire-and-forget, heavy anti-armor capability for the Army's AH-64D ersion of the HELLFIRE missile. The Longbow program also includes develop- ar (FCR) and numerous modifications to the Apache helicopter. The Longbow gets for the Longbow HELLFIRE missile. The Longbow system is being devel- Comanche helicopters. Longbow HELLFIRE incorporates a millimeter wave bus. The primary advantages of the Longbow missile include adverse weather ttlefield obscurants); millimeter wave countermeasures survivability; fire-and- to launch and then immediately remask, thus minimizing exposure to enemy ating all projected armor threats into the 21st century; and reprogrammability requirements. The combination of Longbow HELLFIRE's fire-and-forget capa- be will provide the battlefield commander with flexibility across a wide range of ld response and high mobility not afforded by other anti-armor weapons.
	Diame Weigh Length	.t:	7 in 108 lb 68 in	
FOREIGN COUNTER	RPART: No kn	own foreign count	terpart.	
FOREIGN MILITARY S	ALES: United	l Kingdom (direct	commercial sale).	
PROGRAM ST				13 October 1995 with the successful completion of the Milestone III Defense al production (LRIP) contract was awarded in December 1995 for 352 missiles.
PROJECTED ACTIV	TTIES: The se	cond LRIP contrac	ct is scheduled for	award in FY97. First Unit Equipped (FUE) in July 1998.
PRIME CONTRAC	CTOR: Longb	ow Hellfire Limited	d Liability Compar	ny (Lockheed Martin, Orlando, FL and Northrop Grumman, Los Angeles, CA).



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(FOV)

GENCE AND	TECHNOLOGY	LONCE	PT DEM/V	il.	EMD	PRODUCTION AND DEPLOYMENT	
							OPERATIONS AND SUPPORT
	MIS	;	able to maintain pa	ce witł	n Ab <mark>r</mark> ams and Bra	rides a highly mobile, survivable, and relia dley-equipped units and is adaptable to a v ecialized mission modules.	
	CHARACTERI		Length: Width: Height: Weight: Power Train: Cruising Range: Road Speed: Crew: Armament: Distribution: Current Models:		300 mi 41 mph variable (maximu 50 caliber, M2A2 Corps-Company M58 Smoke Ger Improved TOW	nt loaded etroit Diesel engine with Allison X200-4A h nm of 13) heavy machine gun herator Carrier, M548 Cargo Carrier, M5 Vehicle, M981 Fire Support Team Vehicle Carrier, M1068 Standard Integrated Comm	77 Command Post Carrier, M901 , M1059 Smoke Generator Carrier,
FC	REIGN COUNTE	RPART:	China: Type 577,	Туре Ү	W-534; France: A	AMX VCI; Russia: BTR-50P, MTLB; United	l Kingdom: FV-432, FV-4333
FOF	REIGN MILITARY	SALES:	Argentina, Botswar	na, Egy	pt, Greece, Israel	, Lebanon, Norway, Portugal, Saudi Arabia	Spain
	PROGRAM S		In FY96, the M113 ed M113 platform	<u> </u>	0	Office continued procurement of A3 upgra n.	le kits and the conversion of select-
Р	ROJECTED ACT	VITIES:	Selected M113s an	d M11	3 variants will co	ntinue to undergo conversion to the A3 co	nfiguration.
	PRIME CONTRA	ACTOR:	Anniston Army De FMC (United Defe	-		, AL)	



OPERATIONS AND SUPPORT

The 120 mm mortar system provides organic indirect fire support capability to the maneuver unit commander.

MISSION:

CHARACTERISTICS: The 120 mm mortar system is a conventional smoothbore, muzzle-loaded mortar system that provides increased range, lethality, and safety compared to the WWII-vintage 4.2 in heavy mortar system it replaces in mechanized infantry, motorized, armored, and cavalry units. It is employed in both towed and carrier-mounted versions and fires a family of enhanced ammunition being produced in the United States.

Range:	7,240 m
Weight:	319 lb
Rate of fire:	16 rd/min for the first minute; 4 rd/min, sustained
Crew:	4 - carrier mounted (M1064); 5 - ground-mounted (M120)
Ammunition:	High-Explosive, Smoke, Illumination, Full-Range Trainer

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

No foreign military sales. FOREIGN MILITARY SALES:

- **PROGRAM STATUS:** The 120 mm mortar is produced at Watervliet Arsenal, NY. The towed system, M120, was fielded in September 1991. Fielding of the carrier-mounted system, M1064, is currently in progress and will be complete in 1998. The Army plans to replace all of the fielded 4.2-inch mortars with 120 mm mortar systems. The family of 120 mm enhanced mortar ammunition is currently being produced by Lockheed Martin Ordnance Systems. The M933/934 High Explosive, and M929 Smoke rounds have been type classified for production. Incorporation of the new M734A1 multioption fuze significantly improves lethality, reliability, and electronic countermeasure protection of these rounds. The current M23 Mortar Ballistic Computer will be replaced on a 1-for-1 basis with the M30 Improved Mortar Ballistic Computer in 1997. The M30 was developed from commercial hardware and will allow direct digital communications with the maneuver force via Advanced Field Artillery Tactical Data System protocols. The M303 subcaliber tube insert has been type classified and will allow mortar crews to perform live fire training with stockpiled 81 mm ammunition.
- A Full Range Training Round XM931, and an Infrared Illumination Round, XM983, are under development. The 120 **PROJECTED ACTIVITIES:** mm mortar system's tremendous growth potential is being exploited through an Advanced Technology Demonstration (ATD) exploring the potential of Precision Guided Mortar Munitions (PGMM) at ranges between 12-15 km. Additionally, technology leading to an extended range DPICM munition that includes a self-destruct capability is being evaluated.

KDI (Cincinnati, OH); Lockheed Martin Ordnance Systems (Burlington, VT); Milan Army Ammunition Plant (Milan, TN); **PRIME CONTRACTORS:** Pine Bluff Arsenal, AK; Red River Army Depot (Texarkana, TX); Watervliet Arsenal (Watervliet, NY)



RENCE AND TECHNOLOGY	CONCEPT	DEM/VAL	PRODUCTION AND DEPLOYMENT	OPERATIONS AND SUPPORT
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- **MISSION:** The Multi-Purpose Individual Munition/Short Range Assault Weapon (MPIM/SRAW) provides a one-man, light-weight, shoulder fired, fire-and-forget, multiple purpose munition capable of defeating enemy forces in buildings, reinforced structures, bunkers and future light-weight armored vehicles.
- **CHARACTERISTICS:** The MPIM/SRAW will consist of a disposable launcher/carry case equipped with a 2.5X telescopic sight that is compatible with current and future night vision devices. The shoulder launched missile will consist of a two stage, soft launch propulsion system with inertial guidance and an explosively formed penetrator with follow-through grenade warhead. The missile will be capable of being fired quickly from its carrying configuration and safely fired from enclosures.

Weight:Less than 20 lbRange:20 - 500 m (target dependent)Crew:1Lethality:Capable of incapacitating personnel in bunkers and reinforced concrete/brick buildings,
along with defeating modern and light armor.

FOREIGN COUNTERPART: No known foreign counterpart.

FOREIGN MILITARY SALES: No foreign military sales.

- **PROGRAM STATUS:** The MPIM/SRAW program completed its Technology Demonstration program in September 1996. On 2 October 1996, Lockheed Martin Aeronutronic, Rancho Santa Margarita, California, was awarded a contract for Phase I of the MPIM/SRAW Engineering and Manufacturing Development (EMD) program. This is an 18-month risk reduction effort. Phase II is an option for a follow-on, 47-month hardware qualification and initial operational test and evaluation phase.
- **PROJECTED ACTIVITIES:**Warhead Trade Studies and Wind Tunnel test plan complete: 2QFY97.
Warhead Interface Control Document (ICD) complete: 3QFY97.
Vibration Characterization & System ICD complete: 4QFY97.

PRIME CONTRACTOR: Lockheed Martin (Rancho Santa Margarita, CA)



PRODUCTION AND DEPLOYMENT

MISSION:

Night Vision (NV) Image Intensification (12), Laser, and Multi Sensor technologies provide today's soldier with the capability to operate more effectively and safely by day or night and under degraded battlefield conditions.

CHARACTERISTICS:

The AN/AVS-6 Aviator's Night Vision Imaging System (ANVIS) is a lightweight, helmet-mounted, self-contained binocular system. The ANVIS provides image intensification for helicopter crew members to conduct night missions under minimal ambient light conditions. It is powered using existing aircraft power or a helmet-mounted battery pack. The AN/AVS-7 Aviator's Night Vision Imaging System Heads-Up Display (ANVIS/HUD) is designed to provide aviators with critical flight information superimposed on the visual image of the ANVIS. The system is electro-optical and provides both the pilot and copilot critical, real-time, high-resolution flight and navigational information. Its primary purpose is to enhance flight safety, ease the crew workload and heighten the crew members' situational awareness outside the cockpit. Future enhancement with a Flight Data Recorder is planned. The AN/PVS-7D Night-Vision Goggle is a light-weight, binocular goggle used by individual soldiers. The AN/PVS-7D uses a single passive third-generation image intensifier tube. It is used in combat, combat support and combat service support operations. Ancillary equipment include a helmet, protective eyecup, lens cover, compass and 3x magnifying lens. The AN/PVS-14 Monocular Night Vision Device is a third generation image intensification system designed to provide leaders of combat infantry units with a lightweight night vision device for use in observation and command & control. Interfaces with AN/PVS-7D head and helmet mount and 3x magnifier. Can also be mounted to small arms rail using TWS rail grabber. The AN/PVS-10 Night Vision Sniperscope is an integrated day/night sight for the M24 sniper rifle. The AN/PVS-10 provides the sniper the capability to acquire and engage targets during low and high ambient light conditions. The system utilizes third-generation I2 technology, mounts on the existing rail of the M24 and uses the same mil-dot reticle as the existing Leupold day scope. The magnification for day and night operation is 8.5X, and the system's maximum weight is 4.9 pounds. The Lightweight Video Reconnaissance System (LVRS) consists of a manportable Out Station and a vehicle mounted Base Station. The Out Station is used by surveillance or reconnaissance teams to capture, compress and transmit still frame images over military radios to the Base Station located at a higher echelon. The Lightweight Laser Designator/Rangefinder(LLDR) is an integrated vehicle mounted or manportable designator/rangefinder with day/night target location capability. It will replace older and heavier vehicle mounted systems and eliminate the need for separate systems performing the same target designation and rangefinding tasks. The AN/PVS-6, Mini Eyesafe Laser Infrared Observation Set(MELIOS) is a manportable, eyesafe laser rangefinder that accurately measures and displays range and vertical angle measurement data to selected targets. The Target Location and Observation System (TLOS) is a light-weight, self-contained, image intensified day/night sight that employs a near infrared low energy laser to actively acquire direct view and electro-optic targets.

FOREIGN COUNTERPARTS: FOREIGN MILITARY SALES:

I2, Laser, and Thermal devices are produced in many countries.

AVS-6(V)1&2: Bahrain, Colombia, Greece, Jordan, Mexico, Saudi Arabia, Taiwan, Thailand, United Arab Emirates, PVS-6: Baltic States (Latvia), Saudi Arabia; PVS-7: Italy, Kuwait, Mexico, Portugal, Saudi Arabia, Taiwan

PROGRAM STATUS:

PROJECTED ACTIVITIES: PRIME CONTRACTORS:

Two multiyear contracts are in place (FY93-97) for AN/AVS-6, AN/PVS-7B, AN/PVS-7D and associated spare parts. ANVIS/HUD production deliveries began in FY95.

FY97 single award of a multi-year contract for AN/AVS-6, AN/PVS-7D, AN/PVS-14 and tubes.

ITT (Roanoke, VA)	Litton Industries (Garland, TX, Tempe, AZ & Orlando, FL)
Texas Instruments (McKinney, TX)	TRACOR Aerospace, Inc. (Austin, TX)
*See appendix for list of subcontractors.	

Vight Vision (NV) Image Intensification (I2)



M15510IN:

MISSION: The Paladin provides the primary indirect fire support to heavy divisions and armored cavalry regiments.

CHARACTERISTICS: I

CS: Like the earlier M109 models, the Paladin is a fully tracked, armored vehicle with a 155 mm howitzer. The Paladin 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 compared to the earlier M109s.

	Range:	30 km (with rocket-assisted projectile) 24 km (with unassisted projectile)
	Response time:	Less than 60 seconds
	Rate of fire	
	Maximum:	4 rd/min for 3 min
	Sustained:	1 rd/min
	Main armament:	M284 155 mm cannon
	Secondary armament:	.50 caliber machine gun
	Weight:	32 ton (combat loaded)
RT:	France:	155 GCT
	Germany:	PzH 2000
	Israel:	Slammer
	United Kingdom:	AS90
ES:	No foreign military sa	les.
J S:	•	began in September 1991 and achieved a in April 1993. 307 howitzers have been

FOREIGN COUNTERPART:

FOREIGN MILITARY SALE

PROGRAM STATUS: Low-rate production began in September 1991 and achieved a First Unit Equipped in April 1993. A full-rate production contract was awarded in April 1993. 307 howitzers have been delivered to date, all at least two months ahead of schedule. The Army will acquire 914 Paladins as a product improvement of the current M109A2/A3 howitzer. A portion of the remaining M109 howitzer fleet will receive the M109A5 upgrade, which includes some automotive and crew nuclear-biological-chemical protection improvements and Paladin's M284 cannon and M182 gun mount.

PROJECTED ACTIVITIES: Production will continue during 1997 and through 1998.

PRIME CONTRACTOR: FMC Corp. (United Defense, LP) (Chambersburg, PA; York, PA)



- **MISSION:** Second Generation Forward Looking Infrared (FLIR) will provide the Abrams Main Battle Tank, Bradley Fighting Vehicle, and Long Range Advanced Scout Surveillance system with a leap ahead target acquisition capability during all atmospheric and obscurant conditions, and permit them to "see the same battlespace." One goal of this program is to develop and produce a common FLIR to maximize economies of scale during production, and minimize life cycle costs.
- **CHARACTERISTICS:** This new "common use" FLIR is the Army's first major Horizontal Technology Integration (HTI) program. One of the Army's key objectives in its quest to "Own The Night" is the Horizontal Technology Integration of Second-Generation FLIR technology in a number of new and existing platforms.

The concept is elegant in its simplicity. By using a common thermal sensor known as a B Kit that can be integrated into any candidate platform, the user community will be able to "see the same battlespace" and have a broad overmatch to potential adversary capabilities. The linkage between the B Kit and the perspective sights will be system specific platform links called A Kits.

The program, which entered engineering and manufacturing development in July 1994, will initially upgrade two candidate platforms selected by Army leadership, the M1A2 and M2A3. The current platform sight applications are: M1A2 Gunner's Primary Sight, M1A2 Commander's Independent Thermal Viewer, M2A3 Improved Bradley Acquisition system and Commander's 1 Independent Viewer, and the Long Range Advanced Scout Surveillance System (LRAS3). Potential exists for other Army programs such as Apache, Comanche, and future armored vehicles to benefit from HTI.

The present system concept will allow adaptation of this common sensor to any new platform application desired by Army leadership. In addition, this system will provide a battlespace observation edge for U.S. forces well into the next century. Commonality of FLIRs in multiple platforms facilitates development and fielding of future upgrades such as image fusion, automatic target recognizers, and target trackers.

FOREIGN COUNTERPART: No known foreign counterparts.

FOREIGN MILITARY SALES: No foreign military sales. However SGF has potential for applications in many NATO aircraft and ground tactical and combat vehicles.

PROGRAM STATUS: Cost plus award fee, Engineering and Manufacturing Development contract for the HTI SGF was awarded 7 July 1994.

PROJECTED ACTIVITIES: M2A3 & M1A2 LRIP Award - 2QFY97.

PRIME CONTRACTOR: Texas Instruments (McKinney, TX)



OPERATIONS AND SUPPORT

PRODUCTION AND DEPLOYMENT

MISSION: Small Arms reassure, deter, and if necessary, compel adversaries by providing a capability for individuals and small units to engage targets with accurate, lethal, direct fire.

CHARACTERISTICS:

M4 Carbine: The M4 is a more compact version of the M16A2 rifle with a collapsible stock. It provides the individual soldier operating in close quarters the capability to engage targets at extended range with accurate, lethal fire. It achieves over 85% commonality with the M16A2 Rifle and will replace all .45 caliber M3 submachine guns and selected M9 pistols and M16 series rifles.

M16A2 Rifle: The M16A2 is a lightweight, air-cooled, gas-operated, low-impulse rifle. An improved version of the M16A1 it is replacing, the M16A2 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.

M249 Squad Automatic Weapon (SAW): The M249 is a lightweight, gas-operated, one-man-portable automatic weapon capable of delivering a large volume of effective fire at ranges up to 800 meters. The basis of issue is one per soldier designated to fire in the automatic rifle role in all types of units. It is scheduled to replace the M60 7.62 mm medium machine gun in certain units.

M240B Medium Machine Gun: The M240B is a ground mounted, gas-operated, crew served machine gun. This highly reliable, 7.62 mm machine gun delivers more energy to the target than the smaller caliber M249 SAW. It will be issued to infantry, armor, and combat engineer units that require medium support fires and will replace the ground-mounted M60 series machine guns currently in use.

MK19-3 40 mm Grenade Machine Gun: A self-powered, air-cooled, belt-fed, blowback operated weapon, the MK19-3 is designed to deliver accurate, intense, and decisive firepower against enemy personnel and lightly armored vehicles. It is scheduled to replace selected M2 Heavy machine guns in selected units and will be the primary suppressive weapon for combat support and combat service support units. The MK19-3 is mounted on the HMMWV, M113 FOV, 5-ton trucks, and selected M88A1 recovery vehicles.

	M4	M16A2	M249	M240B	MK19-3
Caliber:	5.56 mm	5.56 mm	5.56 mm	7.62 mm	40 mm
Weight:	5.65 lb	8.9 lb	16.3 lb	27.6 lb	72.5 lb
Max effective range:	500 m	550 m	800 m	1,100 m	2,200 m (area target)

FOREIGN MILITARY SALES: Numerous foreign countries purchase US small arms.

PROGRAM STATUS:

PRIME CONTRACTORS:

M4 Carbine:TBDM16A2 Rifle:FN Manufacturing Inc. (Columbia, SC); Colt's Manufacturing Inc. (Hartford, CT)M249 Squad Automatic Weapon:FN Manufacturing Inc. (Columbia, SC)M240B Medium Machine Gun:FN Manufacturing Inc. (Columbia, SC)MK19-3 Grenade Machine Gun:Saco Defense Inc. (Saco, ME)

* See appendix for list of subcontractors.

All are currently in series production and fielding.



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SCIENCE AND TECHNOLOGY	Concept	DEM/VAL	EMD		OPERATIONS AND SUPPORT		
				PRODUCTION AND DEPLOYMENT			
	tridge t High E and-Fo Prograt M830A	ypes: Kinetic En xplosive Anti-Tan rget (XM943) an m (AEI) provides A, STAFF - XM94	ergy (KE), Armor k (HEAT-T - M83 d Tank Extended a family of ammu 43 and TERM-KE	fired from the M256 cannon on the M1A1/ Piercing, Fin Stabilized, Discarding Sabot 0); Multi-purpose Anti-Tank (MPAT - M8 Range Munition-Kinetic Energy (XM100 nition designed to defeat future threats. T -XM1007 all fall under the AEI umbrella.	t-Tracer (APFSDS-T - M829 series); 30A1); Smart Target Activated Fire-)7). The Armament Enhancement The M829 series rounds, the MPAT -		
CHARACTERIS	M829A HEAT- MPAT: with R STAFF attack o TERM nally g	 A2, M829E3. T: Shaped charge Shaped charge was F proximity senso F: Smart Target A defeat of armor ta -KE: Tank Externation -KE: Tank Externation 	warhead, combus arhead, combustib r for self-defense a ctivated Fire-and- urgets in defilade. nded Range Munit rgy munition for a	n penetrator, combustible cartridge case, o stible cartridge case - M830 le cartridge case. Saboted projectile with m anti-helicopter capability—M830A1. Forget (XM943) munition with explosive stion (XM1007)(previously called X-ROD), anti-armor frontal defeat in line-of-sight engoving/maneuvering targets.	anually selectable air/ground switch ly formed penetrator (EFP) for top soft-launch, rocket-boosted, termi-		
FOREIGN COUNTER	terpart	- · ·		mmunition, however, the MPAT, STAFF ar gned tanks fire KE, high explosive fragme			
FOREIGN MILITARY S		nmunition is strict udi Arabia	ly controlled for U	JS Army use only. The only exception is M	M829 which has been sold to Egypt		
PROGRAM ST	M830A XM943	The following rounds have been fielded to the Army: M829, M829A1, M829A2, M830, and M830A1. The M829A2, a M830A1 are in production now. A four year, sole source multi-year contract for the M829A2 was awarded in FY95. TXM943, STAFF cartridge is in the Engineering and Manufacturing Development phase, while the M829E3 and XM1007 TERM-KE are in the initial stages of development.					
PROJECTED ACTIV		MI1007 TERM-KE are in the initial stages of development. Multi-year production contracts for M829A2 will continue through FY98, as will continued development of STAFF, M829E3. FY97 is also the last planned production buy for the M830A1.					
PRIME CONTRA	XM100 M829A)7:	Alliant Techsyster Olin Corp. (St. Pe	ms (Brooklyn Park, MN) ns (Clearwater, FL) etersburg, FL)			





Dominate the Maneuver Battle Dominate dea Ma

TRACK OF

	CONCEPT	Dem/Val. E	CMD		OPERATIONS AND SUPPORT
			Productio	ON AND DEPLOYMENT	
MISS	night opera weapon gui TICS: The TWS a trates obscu ly in use for ible, and pr a rangefind	tions during degraded nners will truly "own llows the soldier to se arants, day or night. A r small arms. The TW ovides a standard vide	d visual conditions caused the night" with this unpara e deep into his battlefield, The Thermal Weapon Sight VS is a second generation Fe eo output for training, imag	by smoke, fog or dust. alleled capability. increases surveillance an family will replace the i orward Looking Infrared ge transfer, or remote vie	fighter the ability to continue day or These individual- and crew- served ad target acquisition range, and pene- mage intensifier night sights current- l (FLIR), is digital battlefield compat- wing. The P3I TWS will incorporate for ballistic solution. TWS is present-
		Range (in meters)	Weight (in pounds)	Field of View (in degrees)	Weapons Supported
	Light Wpn:	s TWS: 550	4.3	15	M16, M4,M203, M136
	0 1				
		pns TWS: 1100	4.5	9 & 15	above plus M249, M60
		•	4.5 5.0	9 & 15 3 & 9	above plus M249, M60 M2, MK19, M24
FOREIGN COUNTERE	Medium W Heavy Wpr	•			*
FOREIGN COUNTERE FOREIGN MILITARY SA	Medium W Heavy Wpr PART: No known ALES: No foreigr	ns TWS: 2200 foreign counterparts.	5.0 owever, TWS has conside	3 & 9	*
	Medium W Heavy Wpr PART: No known ALES: No foreigr Rationaliza	ns TWS: 2200 foreign counterparts. n military sales. Ho tion, Standardization a	5.0 owever, TWS has conside	3 & 9 rable potential for use	M2, MK19, M24
FOREIGN MILITARY SA	Medium W Heavy Wpr PART: No known ALES: No foreigr Rationaliza ATUS: Currently i	ns TWS: 2200 foreign counterparts. n military sales. Ho tion, Standardization a	5.0 owever, TWS has conside and Integration. Type Classification Standa	3 & 9 rable potential for use	M2, MK19, M24
FOREIGN MILITARY SA	Medium W Heavy Wpr PART: No known ALES: No foreigr Rationaliza ATUS: Currently i ITIES: Initial field	ns TWS: 2200 foreign counterparts. n military sales. Ho tion, Standardization a n limited production. ling scheduled for 2Q	5.0 owever, TWS has conside and Integration. Type Classification Standa	3 & 9 rable potential for use rd in 2QF97.	M2, MK19, M24



- **MISSION:** The TOW Improved Target Acquisition System (ITAS) is a material change to the current ground TOW 2 weapon system for first-to-deploy light forces. ITAS will increase target acquisition ranges and have the ability to fire all configurations of TOW missiles while allowing room for growth for follow-on missiles.
- **CHARACTERISTICS:** The ITAS will be fielded at battalion level, replacing TOW 2 in light infantry units. The ITAS modification kit consists of an integrated (Day/Night Sight with Laser Rangefinder) Target Acquisition Subsystem, Fire Control Subsystem, Battery Power Source, and modified Traversing Unit. The ITAS will operate from the High Mobility Multi-Purpose Wheeled Vehicle (HMMWV) and the dismount tripod platform.
- **FOREIGN COUNTERPART:** No known direct foreign counterpart. Hughes Aircraft Company (HAC) Spanish-assembled Light Weight Launcher is a somewhat similar but less capable system.
- FOREIGN MILITARY SALES: Based on the number of fielded TOW systems, foreign military sales potential is high.
 - **PROGRAM STATUS:** ITAS, after recently completing qualification and operational testing (4QFY96), is currently conducting a reliability growth program which has extended the EMD period of performance in accordance with Milestone IIIA Army Decision Memorandum. ITAS LRIP contract was awarded 30 September 1996 with a production quantity of 25 units.
 - **PROJECTED ACTIVITIES:** Reliability growth effort directed during the LRIP Decision is currently being conducted. LRIP is underway and will include Production Qualification Test.
 - **PRIME CONTRACTOR:** Texas Instruments (McKinney, TX)



SCIENCE	AND	TECHNOLOGY

- **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 other targets, such as field fortifications.
- **CHARACTERISTICS:** The TOW is found at battalion level and is mounted on the Bradley Fighting Vehicle System (BFVS), the Improved TOW Vehicle (ITV), the High Mobility Multi-purpose Wheeled Vehicle (HMMWV), and the AH-1S Cobra Helicopter. The system consists of a tripod, traversing unit, missile guidance set, launch tube, optical sight, 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.

	MISSILE				
	TOW 2A	TOW 2B			
1issile weight	47.1 lb	49.8 lb			
lissile length	46.1 in	46.1 in			
eliability:	96%	98%			
lin range:	65 m	200 m			
lax range:	3750 m	3750 m			

FOREIGN COUNTERPART:

N

France/Germany	HOT 2
France/Germany	MISSION
Russia	AT-4/5/6
Sweden	BOFORS BILL
United Kingdom	MILAN 2

FOREIGN MILITARY SALES: The TOW is currently in use by more than 46 other nations as their primary heavy anti-armor weapon system.

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.

PROJECTED ACTIVITIES: Continue TOW 2B missile production to complete Army buys, TOW 2A and 2B Foreign Military Sales.

PRIME CONTRACTOR: General Motors (Hughes Missile Systems Company) (Tucson, AZ)



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NCE AND TECHNOLOGY	Dem/Val	EMD	PRODUCTION AND DEPLOYMENT	OPERATIONS AND SUPPORT		
Con	CEPT					
MISSION: CHARACTERISTICS:	ed vehicle systems to oper The VTC will be a kit whi load. Once installed, the k mander additional options ity will be required to red stration programs on D7C HMMWVs for mine deter	rate in extremely ch can be easily kit will allow easy s when conduction luce program	() will provide a capability to easily transfor hazardous situations to reduce loss of life a installed on existing vehicles to enable teleo y transition between manned and unmanned ng operations in extremely hazardous situat ocurement and support costs. Prototype k eachhead mine clearing, M1 chassis for obs ermeasures through the use of acoustic, se	and increase vehicle survivability. operation of the vehicle and its pay- d configurations, allowing the com- tions. A high degree of commonal- tits have been installed for demon- stacle and minefield breaching, and		
FOREIGN COUNTERPART:	decoys to smart mines. No known foreign counte	erpart.				
FOREIGN MILITARY SALES:	No foreign military sales.	X				
PROGRAM STATUS:	The VTC is currently in a combined Concept Exploration/ Program Definition and Risk Reduction phase of development. The Standardized Teleoperation System—the core teleoperation capability for VTC programs—is currently installed on seven turret-less M-60 chassis (Panther) and is being used for countermine operations in Bosnia.					
PROJECTED ACTIVITIES:	Technical testing will be i with Terrain Dominance H		97. Milestone I/II is scheduled for 4QFY97 ned for late FY97.	7. Robotics Battle Lab Experiment		
PRIME CONTRACTOR:	Omnitech Robotics (Engl	ewood, CO)				



 vehicles. Treinforce fr CHARACTERISTICS: The deliver launcher ratem is capa FOREIGN COUNTERPARTS: France: Germany: Italy: U.K.: FOREIGN MILITARY SALES: No foreign PROGRAM STATUS: The 5-ton ration of the last Volcand PROJECTED ACTIVITIES: Deliveries of the last Volcand 	The system can riendly fires. ry system consi ack is capable c able of deployin Minotaur Skorpion Istrice VLSMS n military sales. truck delivery	n be employed off ists of a dispenser of holding 40 min ng 960 mines in la r	nine system that fensively and def control unit, on ne canisters with less than 30 seco	efensively to delay er ne to four launcher r h a 5:1 mix of anti-ta	rom a UH-6 enemy mov racks and u	0 helicopter and a host of ground ement, isolate the battlefield and unique mounting hardware. Each nti-personnel mines. The air sys-
Vehicles. Treinforce frCHARACTERISTICS:The deliver launcher ra tem is capaFOREIGN COUNTERPARTS:France: Germany: Italy: U.K.:FOREIGN MILITARY SALES:No foreignPROGRAM STATUS:The 5-ton r 1991 and th NET of the last VolcandPROJECTED ACTIVITIES:Deliveries of	The system can riendly fires. ry system consi ack is capable c able of deployin Minotaur Skorpion Istrice VLSMS n military sales. truck delivery	n be employed off ists of a dispenser of holding 40 min ng 960 mines in la r	fensively and def control unit, on ne canisters with less than 30 seco	efensively to delay er ne to four launcher r h a 5:1 mix of anti-ta	enemy mov racks and u	ement, isolate the battlefield and inique mounting hardware. Each
FOREIGN COUNTERPARTS:Iauncher ra tem is capaFOREIGN COUNTERPARTS:France: Germany: Italy: U.K.:FOREIGN MILITARY SALES:No foreignPROGRAM STATUS:The 5-ton ra 1991 and th NET of the last VolcandPROJECTED ACTIVITIES:Deliveries of	ack is capable of able of deployin Minotaur Skorpion Istrice VLSMS n military sales. truck delivery	of holding 40 min ng 960 mines in la r	ne canisters with less than 30 seco	h a 5:1 mix of anti-ta		
Germany: Italy: U.K.:FOREIGN MILITARY SALES:No foreignPROGRAM STATUS:The 5-ton f 1991 and th NET of the last VolcandPROJECTED ACTIVITIES:Deliveries of	Skorpion Istrice VLSMS n military sales. truck delivery		classified in Janu			
PROGRAM STATUS: The 5-ton in 1991 and the NET of the last Volcand PROJECTED ACTIVITIES: Deliveries of	truck delivery		classified in Janu			
1991 and the NET of the last Volcand PROJECTED ACTIVITIES: Deliveries of		system was type	classified in Janu			
	e air system stai		l in June 1991. T new improved ar	Troop NET of the 5-	5-ton and th	on was type classified in October e M548A1 are ongoing and troop luded in the FY94 mine buy. The
Deliveries	of the M548 m of the air system		es will occur betw eted by March 19			
	chsystems (Edir (Deland, FL)	na, MN)				
* See apper	endix for list of	subcontractors.				



	A REAL PROPERTY AND		
THE NUMBER OF	AND D	202 CONTRACT	OLOGY
TE NGE			OLOBAY

MISSION:	The Wo	lverine provid	es assaul	t bridging	support	for forward	, heavy-maneuver	forces.
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CHARACTERISTICS:

5: The Wolverine launcher is mounted on an M1A2 Abrams System Enhancement Program (SEP) chassis and is operated by a two-man crew. The bridge is 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 less than 10 minutes.

The Wolverine will increase maneuver force mobility by allowing units to transit such gaps as tank ditches, road craters, and partially damaged bridge sections. The current Armored Vehicle Launched Bridge (AVLB) only supports Abrams tank units using a caution crossing at reduced gap length (15 meters) and reduced crossing speed.

FOREIGN COUNTERPART:

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

FOREIGN MILITARY SALES: No foreign military sales.

PROGRAM STATUS:The program is currently in Engineering and Manufacturing Development (EMD). The contract for Phase II of EMD was
awarded in January 1994. Phase II includes the design, fabrication, and integration of the bridge system onto the Abrams
chassis. Full-up system testing began 3QFY96. Prototype delivery occurred in June and July 1996 to support Production
Qualification Testing and Logistics Demonstration.

PROJECTED ACTIVITIES: A Low-Rate Initial Production decision is planned for 2QFY97.

PRIME CONTRACTOR: General Dynamics (Land Systems Division) (Sterling Heights, MI)

Ojective Individual The objective individual combat weapon ATD will demonstrate a potential Combat Weapon replacement for the 5.56-mm M16 family of rifles and the 40-mm M203 (OICW) grenade launcher. Its goal is to dramatically improve the probability of hit, Advanced Technology lethality and versatility in all operational environments. Weapons concepts Demonstration (ATD) being pursued by two competing contractors, AAI Corp. and Alliant (1998-1999): Techsystems, both feature a revolutionary, ergonomically designed and integrated weapon system, coupling the firepower of 20-mm air bursting and 5.56mm kinetic energy projectiles. These concepts have become feasible because of recent advances in miniaturized fuzing and modular, opto-electronic fire control systems. The bursting munition capability allows a soldier to attack personnel who are in defilade, such as those in or behind structures that one might encounter in urban combat.

Application of controlled air-bursting munitions will provide decisive target



effects, providing a new, currently unavailable capability to our troops for peacekeeping, peace enforcement, counterterrorism and surgical strike missions. The 5.56-mm kinetic energy weapon provides direct fire and

suppressive fire capabilities. The OICW is featured as the individual weapon for the future land warrior. In 1999, a battle lab experiment at Ft. Benning, GA, will include safety-certified weapons and live fire demonstrations.

Rapid Force Projection Initiative The RFPI ACTD will provide early entry forces with advanced technologies and systems to make them more survivable when (**RFPI**) encountering a heavy force. The purpose of RFPI is to address the operational capability requirements, developed by Advanced Concept TRADOC, for lethality and survivability of light forces while maintaining the inherent strategic deployability of these forces. Technology Demonstration RFPI is based on a "system of systems" concept of Hunters and Standoff Killers and will demonstrate technology solutions (ACTD) which greatly expand the battlespace of light forces. The operational capability enhancements offered by RFPI will enable (1994-2000): the light force commander to mass precision fires on threat forces, including armor, at ranges beyond which they can respond. This capability will greatly increase the survivability of early entry forces. The expansion of the light force battlespace is accomplished through the employment of a suite of sensors (Hunters) which will detect threat forces before they can engage the friendly force. The Hunters will provide near-real time digital information through a Light Digital Tactical Operations Center (LDTOC) element, which will match the target with an appropriate weapon, dramatically reducing sensor-to-shooter timelines and providing the commander with the ability to synchronize massed fires on enemy forces. Ground and aerial Hunter systems are equipped with advanced sensor packages capable of detecting targets well forward of friendly forces. Near-real time target information is relayed from the Hunters through a battlefield computer network to the Standoff Killers. These standoff systems are designed to engage and kill enemy armor forces with long-range precision munitions. RFPI ACTD simulation activities will identify the combat worth of each ATD/TD through evaluations performed in the context of the performance of existing fielded and evolving systems in simulated rapid deployment scenarios. Through the integration of field demonstrations including Distributed Interactive Simulation (DIS) connectivity, ATDs/TDs will be scrutinized at a

level heretofore not possible. The RFPI ACTD will integrate simulation and the novel technologies produced by individual ATDs/TDs into a large-scale field experiment in full coordination with TRADOC, Battle Labs, and other Users. The ACTD is a tool for the supporting User elements to explore emerging warfighting concepts and doctrine through planning, conduct of, and participation in the ACTD large scale field experiment. The ACTD provides an opportunity for extensive User interaction with the new RFPI Hunter Standoff Killer (HSOK) concept and its emerging technologies while encouraging User exploration of a variety of excursions to current (baseline) procedures. The U.S. Army Forces Command (FORSCOM) has selected an element of the XVIII Airborne Corps to serve as the RFPI ACTD Experiment Force. This unit will retain selected experiment materiel (residuals) for at least two years to perform an extended User evaluation and to allow arrangements for long-term retention which may potentially result in acquisition decisions for selected high-payoff systems. The enhancements to the operational capability requirements of early entry and 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.

Hunter Sensor Suite This ATD will develop and demonstrate advanced sensor suite technology on a hunter/scout vehicle to provide on-the-Advanced Technology move, long range target acquisition and precision target location information with reduced targeting hand-off timelines to **Demonstration (ATD)** standoff killers. The long range acquisition capability will be accomplished by using a stabilized, mast mounted second (1994-1997): generation FLIR, day TV, and vehicle mounted acoustic cueing sensors. Precision targeting will be through an eyesafe laser rangefinder, GPS, north-seeking module and precision gimbals. Aided target recognition will be employed to reduce the operator's time to detect. Pacing technologies include: second generation focal plane arrays, advanced signal processing hardware, image compression/transfer techniques, ground-based aided target recognition/tracking algorithms, acoustic sensors, and long range optics. Additionally, the ATD will provide a C4I interface for transmission of voice and digital messages, as well as imagery. The Hunger Sensor Suite will be integrated on a hunter vehicle for use in the RFPI Advanced Concept Technology Demonstration (ACTD). Supports: Early Entry Light Forces.



Enhanced Fiber Optic Guided The Enhanced Fiber Optic Guided Missile Missile (EFOGM) (EFOGM) is the primary "killer" within the Advanced Technology "hunter/standoff killer" concept of the Rapid **Demonstration (ATD)** Force Projection Initiative and the OSD-approved (94-01): RFPI ACTD. The EFOGM system is a multi-purpose, precision kill weapon system. The primary mission of the EFOGM is to engage and defeat threat armored combat vehicles, other high value ground targets, and hovering or moving rotary wing aircraft that may be masked from line of sight direct fire weapon systems. In addition, the system can be used to surgically strike with minimal collateral damage. EFOGM is a day/night, adverse weather capable system that allows the maneuver commander to extend the battle space beyond line of sight to ranges up to 15 kilometers. The system consists of a gunner's station, a tactical missile, and a fiber optic data link. The missile can navigate to the target area, and the gunner can intervene at any time to lock on and engage any



detected targets. The gunner views the flightpath and target via a seeker on the missile linked to the gunner's video console. The missile to be demonstrated will incorporate an IR imaging seeker, a variety of advanced targeting functionalities and a global positioning system (GPS)-based inertial measurement unit for accurate targeting. Beginning 4QFY98, EFOGM will participate in the RFPI ACTD at Fort Benning, GA. In a deployable demonstration, EFOGM will undergo a two-year Extended User Evaluation (EUE) with the XVIII Airborne Corps beginning in FY99 during which an EFOGM Company deployed with a Company Command and Control Element, 3 Platoon Leader's Vehicle, and 12 EFOGM launchers to support an Infantry Brigade Task Force.

Target Aquisition Advanced Technology Demonstration (ATD) (94-98):



The Target Acquisition ATD will demonstrate a combat vehicle, multi-sensor suite to provide automated wide area search, acquisition, identification and prioritization of targets. These technologies will allow reduced crew workload and decreased target acquisition timelines, in support of lethal, deployable combat vehicles. The sensor suite consists of two sensor gimbals. A standard second generation FLIR, multifunction laser, and TV camera are housed on one platform. A second sensor platform contains a Moving Target Indicator (MTI) millimeter radar. The two gimbals search independently and provide target cues to the operator or to the other sensor platform. The multifunction laser will have three operating modes: rangefinding, designating, and a non-imaging ladar. The ladar data is fed directly into the aided target recognition processor to allow for FLIR/ladar fusion and synergistically improve performance. Supports: Future Scout/Cavalry Vehicle, M1A2 SEP, Future Combat System.
Program (1993-1999):

Rotorcraft Pilot's The RPA ATD program objective is to establish revolutionary improvements in combat helicopter mission effectiveness Association (RPA) through the application of artificial intelligence for cognitive decision aiding and integration of advanced pilotage sensors, Advanced Technology target acquisition, armament and fire control; communications, cockpit controls and displays; navigation; survivability; and Demonstration (ATD) flight control technologies.

> The goal of the RPA ATD is to significantly increase the mission effectiveness of our combat aviation systems. Revolutionary mission equipment package technologies will be integrated with high-speed data fusion processing and cognitive decisionaiding expert systems to achieve maximum effectiveness and survivability for our combat helicopter forces.

> The RPA will expand aviations freedom of operation, improve response time for quick reaction and mission redirect events, increase the precision strike capability for high-value, short-dwell-time targets and increase day/night, all-weather operational capability. It will contribute greatly to the pilot's ability to "see and comprehend the battlefield" in all conditions; to rapidly collect, synthesize and disseminate battlefield information; and to take immediate and effective actions.

> The RPA ATD will demonstrate the following quantitative measures of performance beyond RAH-66 performance during 24-hour, all-weather battlefield conditions: a 30 to 60 percent reduction in mission losses, a 50 to 150 percent increase in targets destroyed and a 20 to 30 percent reduction in mission timelines. Supports: RAH-66 Comanche, AH-64 Apache improvements and has dual-use potential.

National Automotive Center The National Automotive Center (NAC) leverages

(NAC): commercial industry's large investment in automotive technology research and development and initiates shared technology programs that are focused on benefiting military ground vehicle systems. The NAC, located at the Tank Automotive and Armaments Command (TACOM) is part of the Tank-Automotive Research, Development and Engineering Center (TARDEC). The NAC serves as the catalyst linking industry, academia and government agencies as a clearinghouse for the development and exchange of automotive technologies. The NAC executes collaborative research and development (R&D) contracts and other initiatives to capitalize on commercial industry's investment in well-defined, high return-on investment areas tied to key Army science and technology objectives related to advanced land combat. The NAC focuses collaborative R&D contracts on key military automotive technology thrust areas to include: mobility, electronics,



logistics, safety and environmental protection with the goal of (a) improving the performance and endurance of ground vehicle fleets, and (b) reducing ground vehicle design, manufacturing, production, and operating and sustainment costs. Two-way industry/government technology transfer is pursued under the Cooperative Research and Development Agreements (CRADAs). The activities of the NAC are supported by other Government agencies via a linkage created under Memoranda of Agreement. These linkages permit the NAC to consolidate the collective expertise of federal government departments such as Energy, Transportation and Commerce and other DoD agencies.

The NAC sponsored a Collision Warning Safety Convoy in the fall of 1995 to demonstrate the use of commercial electronic equipment on military vehicles. The convoy visited Army and National Guard facilities to expose active troops to the technology. The convoy also went to Capital Hill to show law makers the benefits of dual need technology developments.

National Rotocraft The National Rotocraft Technology Technology Center Center (NRTC) is a timely, low-over-(NRTC): head catalyst for facilitating collaborative rotocraft research and development between NASA, DoD/Army and Navy, FAA, industry and academia. It will serve as the "modem" to cooperatively develop and implement a rotocraft technology plan and national strategy that can effectively address civil and military rotocraft needs. The effort will establish an aggressive and clearly focused approach to strengthening the U.S. rotocraft industry's ability to compete in the global market, creating new market opportunities for commercial rotocraft and ensuring the continued supremacy of this technology that is so critical to modern warfare.



The NRTC adds an innovative approach to include U.S. industry and academia as partners through their focal point, the Rotocraft Industry Technology Association (RITA), a nonprofit corporation formed for this purpose. The focus of this innovative partnership will be the development of rotocraft design, engineering and manufacturing technologies and the sharing of the technology among RITA members.

U.S. industry will have a proactive role in defining the technology tasks to be undertaken. Initial strategic thrusts of the NRTC will address the following five critical path civil/military rotocraft issues: critical dual-use technologies, passenger and community (environmental/safety) acceptance, product and process development, aviation infrastructure, and civil and military standards.

Research project costs will be shared by government funding of \$12 to \$15 million per year and will be matched or exceeded by industry's participation. The initial participating organizations in the NRTC are as follows: NASA, DoD/Army/Navy, FAA, Bell Helicopter, Boeing Helicopters Division, McDonnell Douglas Helicopter, Sikorsky Aircraft, Pennsylvania State University, University of Maryland, Georgia Institute of Technology and the Naval Post-graduate School. The government office of the NRTC is located at Ames Research Center, Moffett Field, Calif., and will have a staff of seven people.

Direct Fire Lethality The Direct Fire Lethality Program will enhance tank kinetic energy penetrator lethality, particularly against explosively reac-Advanced Technology tive armor applique arrays, through use of a precursor defeat mechanism. The program will demonstrate range and lethal-**Demonstration (ATD)** ity enhancements for tank munitions and demonstrate the emerging technologies needed to defeat the active protection sys-(1998-02): tem threat. In the near term, this project demonstrates advanced warhead concepts for Smart Target Activated Fire and Forget utilizing novel dual liner explosively formed penetrators (EFP) warhead to form an ultra-long EFP. In FY99, it will demonstrate a Smart Barrel Actuator active damping control of an M256 120mm gun tube in non-firing, dynamic tests. In FY01, the ATD will demonstrate improved probability of hit over the current M1A2 using Smart Barrel Actuators, fully integrated Gearless Turret/Gun Direct Drives, and Modern Digital Servo Control.

Military Operations in Urban The Military Operations in Urban Terrain (MOUT) (1998-02): Terrain joint (MOUT)-proposed

(Army/Marine Corps) Advanced Concept and Technology Demon- A SYSTEM OF SYSTEMS stration (ACTD) encompasses a breadth of technologies ranging from an advanced soldier system, advanced individual precision weapons, combat identification, counter-sniper, non-lethal weapons, advanced sensors, situational awareness and personal protection. The core capability that will be generated via the ACTD is a linkage of a series of advanced systems/components into a MOUT "System of Systems" whereby the components are interfaced, integrated or linked in an architecture to ensure their effective interoperability and functionality in the challenging MOUT environment. The integrated MOUT System of



Systems will provide a robust and enhanced, joint operational capability encompassing the areas of urban command, control, communications, computers, and intelligence (C4I), Engagement and Force Protection.

Scout Vehicle The army has a requirement to replace High Mobility Multipurpose Wheeled Vehicles and Cavalry Fighting Vehicles in Advanced Technology cavalry and scout ground units. The ATD responds to the User's requirements, and is coordinated via the Future Scout Demonstration (ATD) and Cavalry System (FSCS) Integrated Concept Team. The ATD will demonstrate the technical feasibility and operational (97-01): potential of an affordable system optimized for the scout role. The demonstration phase will be conducted competitively, and it will be sufficiently robust so that the traditional demonstration and validation phase can be omitted, saving time and dollars. The ATD will also permit the user to refine the FSCS requirements prior to entering the engineering and manufacturing development phase.

Multifunction Staring This ATD will demonstrate a modular, reconfigurable Multifunction Staring Sensor Suite (MFS3) that integrates multiple Sensor Suite advanced sensor components including staring infrared imager, a multifunction laser, and acoustic arrays. The MFS3 will Advanced Technology provide ground vehicles, amphibious assault vehicles, and surface ships with a compact, affordable sensor suite for long **Demonstration (ATD)** range noncooperative target identification, mortar/sniper fire location, and air defense against low signature targets. The (98-01): infrared imaging system will be configured to accommodate either visible to mid infrared or far infrared focal plane arrays. As single focal planes capable of operating across the full optical spectrum mature, these may be inserted into the assembly. The staring infrared sensor will operate at high field rates to allow sniper and mortar detection in addition to the conventional target acquisition functions. Integration of a multifunction, multiwavelength laser system will incorporate ranging, range mapping, target profiling, and laser designation to support target location, target target cueing, aided target identification, and target designation. The acoustic array will provide target cueing, location, and assist in automated targeting functions. Supports: Future Scout Vehicle, Future Infantry Vehicle, Future Combat System.



System Contractors with \geq 5% of total program value for FY97 are listed

Abrams

Allison Transmission: Indianapolis, IN; General Dynamics: Lima, OH; Warren/Sterling Heights, MI;

LITCO: Idaho Falls, ID; Texas Instruments: Dallas, TX

Advanced Field Artillery Tactical Data System (AFATDS) GTE : Taunton, MA; Hughes: Fort Wayne, IN; MILTOPE Corp.: Hope Hull, AL; SAIC: San Diego, CA

Advanced Tank Armament System (ATAS) General Dynamics: Sterling Heights, MI; Texas Instruments: Plano, TX; Western Howen Design: Irvine, CA

Advanced Quick Fix (AQF) Lockheed Martin: Owego, NY

Aerostat Hughes Raytheon: Bedford, MA; Lockheed Martin: Akron, OH; Northrop Grumman: Baltimore, MD

Air Defense Artillery (ADA) Tactical Operations Centers (TOCs) *TRW*: Huntsville, AL

Airborne Reconnaissance Low (ARL) California Microwave: Belcamp, MD; TRW: Sunnyvale, CA

Airborne Standoff Minefield Detection System (ASTAMIDS) Raytheon: Tewksbury, MA; Westinghouse: Baltimore, MD

All Source Analysis System (ASAS) BDM: McLean, VA; California Microwave: Woodland Hills, CA; Electronic Warfare Associates: Herndon, VA; Jet Propulsion Laboratory: Pasadena, CA; *Lockheed Martin*: San Jose, CA;

Littleton, CO; Pittsfield, MA; Logicon: Arlington, VA; Magnavox: Fort Wayne, IN; MANTECH: Killeen, TX; MITRE: McLean, VA; Mystech: Falls Church, VA; SAIC: San Diego, CA; Sytex: McLean, VA

Apache Longbow

Allied Signal: Teterboro, NJ; Lockheed Martin: Orlando, FL; McDonnell Douglas: Mesa, AZ; Northrup Grumman: Linthicum, MD Armored Security Vehicle (ASV) Textron: (Marine and Land Systems Division) New Orleans, LA

Army Data Distribution System (ADDS) Bowmar Instrument: Fort Wayne, IN; *GEC-Marconi:* San Marcos, CA; Totowa, NJ; *General Motors:* (Hughes Electronics) El Segundo, CA; Forrest, MS; *HAC/Magnavox:* Fort Wayne, IN; *ITT:* Fort Wayne, IN; *Rockwell:* Cedar Rapids, IA; White Technology: Phoenix, AZ

Army Global Command and Control System (AGCCS) Lockheed Martin: Springfield, VA

Army Tactical Missile System (Army TACMS) Atlantic Research: Camden, AR; Gainesville, VA; Honeywell: Clearwater, FL; Minneapolis, MN; KDI: Cincinnati, OH; Lockheed Martin Vought Systems: Camden, AR; Dallas, TX; Horizon City, TX; Simmonds Precision: Cedar Knolls, NJ; Spincraft: New Berlin, WI; Teledyne: Hollister, CA; Los Angeles, CA;

Automatic Chemical Agent Detector/ Alarm (ACADA) Graseby Dynamics: Watford, Herts, U.K.

Battlefield Combat Identification System (BCIS) FMC: (United Defense, LP) San Jose, CA; General Dynamics: Sterling Heights, MI; Hughes: Fort Wayne, IN; TRW: Redondo Beach, CA

Biological Integrated Detection System (BIDS) Barry Controls: Brighton, MA; Battelle: Columbus, OH; Bio Road: Hercules, CA; Booz Allen & Hamilton: McLean, VA; Brucker Instruments: Billerica, MA; Environmental Technology Group: Baltimore, MD; Harris Corporation: Rochester, NY; Kaman Sciences: Alexandria, VA; Power & Engine Manufacturing: Minneapolis, MN; Systems Research Corporation: Burlington, MA; Thermal Systems: St. Paul, MN

Black Hawk DOW-UT: Tallassee, AL; General Electric: Lynn, MA; *United Technologies*: Stratford, CT

Bradley Fire Support Team (BFIST) Vehicle FMC: (United Defense Limited Partnership) San Jose, CA:

Systems Electronics: St. Louis, MO

Bradley M2 Infantry/M3 Cavalry Fighting Vehicle (IFV/CFV) HAC: LaGrange, GA; Lockheed Martin: Pittsfield, MA; MLS: San Jose, CA; Texas Instruments: McKinney, TX; FMC: (United Defense Limited Partnership) San Jose, CA; York, PA

Brilliant Anti-Armor Submunition (BAT)

Alliant Signal: Teterboro, NJ; Alliant Techsystem: Hopkins, MN; Honeywell: Minneapolis, MN; Lockheed Martin Vought Systems: Grand Prairie, TX; Baltimore, MD; Northrop Grumman: Huntsville, AL; Hawthorne, CA; Baltimore, MD; Olin: Redmond, WA; Raytheon: Sudbury, MA; Talley Defense: Mesa, AZ

CH-47 Chinook/Improved Cargo Helicopter (ICH) Allied Signal: Phoenix, AZ; Boeing Helicopters: Philadelphia, PA

Chemical Agent Monitor (CAM) Intellitec Division: (Technical Products Group) DeLand, FL

Circuit Switch/Message Switch California Microwave: Woodland Hills, CA; GTE: Taunton, MA; Laguna Industries: Albuquerque, NM; LITTON: Van Nuys, CA

Close Combat Tactical Trainer (CCTT) ECC International: Orlando, FL; Evans & Sutherland: Salt Lake City, UT; *Lockheed Martin*: Orlando, FL; Pulau Electronics: Orlando, FL;

Comanche AlliedSignal: Phoenix, AZ; Boeing: Philadelphia, PA; Lockheed Martin: Orlando, FL; Rolls Royce/Allison Engine: Indianapolis, IN; *Sikorsky*: Stratford, CT; TRW: San Diego, CA

Combat Service Support Control System (CSSCS) GTE: Taunton, MA; *LMC*: Springfield, VA; *TRW Inc.*: Carson, CA

Command and Control Vehicle (C2V) Airflow: Fredericktown, MD; Brunswick: DeLand, FL; Cummins Engine: Columbus, IN; Lockheed Martin: San Jose, CA; FMC: (United Defense Limited Partnership) San Jose, CA; York, PA

Common Hardware/Software (CHS) Carlyle Partners: (BDM International Inc.) Huntsville, AL; GTE: Taunton, MA; Hewlett Packard: Palo Alto, CA; Magnavox: Fort Wayne, IN; MILTOPE: Hope Hull, AL; Melville, NY; SAIC: San Diego, CA; Sun Microsystems: Mountain View, CA

Crusader EDS: Herndon, VA; FMC: (United Defense, LP) Minneapolis, MN; General Dynamics: Sterling Heights, MI; Lockheed Martin: Burlington, VT; PRC: McLean, VA

Deployable Medical Systems (DEPMEDS) Airtacs: Red Lion, PA; BIOCHEM International: Waukesha, WI; Brunswick: Marion, VA; Eastman Kodak: Rochester, NY; Engineered Systems: Trappe, PA; Ohmeda Medical: Pleasanton, CA; Outdoor Venture: Stearns, KY; Picker: Cleveland, OH

Digital Transmission Assemblages Aydin: San Jose, CA; Centrair: Birmingham, AL; Gichner Systems Group: Dallastown, PA; Group Technologies: Tampa, FL; Harris Corp.: Melbourne, FL; *Laguna Industries*: Laguna Pueblo, NM; Raytheon : Marlboro, MA; Tobyhanna Army Depot: Tobyhanna, PA; Transistor Devices: Cedar Knolls, NJ

Driver's Vision Enhancer (DVE) Outsource Solution: McKinney, TX; SAIC: San Diego, CA; *Texas Instruments*: Dallas, TX Enhanced Trackwolf (ET) Engineering Research Associates: Vienna, VA

Extended Range Multiple Launch Rocket System (ER-MLRS) KDI: Cincinnati, OH; Lockheed Martin Vought Systems: Camden, AR; Dallas, TX; Raytheon: Tewksbury, MA

Family Of Medium Tactical Vehicles (FMTV) Allison: Indianapolis, IN; Caterpillar: Peoria, IL; McLaughlin: Moline, IL; Michelin: Greenville, SC; Rockwell International: Newark, OH; Scott Manufacturing: Lubbock, TX; Stewart & Stevenson Services: Houston, TX

Force Projection Tactical Operations Center (FP TOC) Brown International: Huntsville, AL; TRW: Dominguez Hills, CA

Force Provider (FP) Dynamics Corp. of America: Bridgeport, CT; EASI: St. Louis, MO; IME: Duva, IL; Microphor: Willits, CA; Outdoor Venture: Stearns, KY; Sierra Army Depot: Sierra, CA; Teledyne: Huntsville, AL

Forward Area Air Defense Command and Control (FAADC²) TRW: Redondo Beach, CA

Grizzly FMC: (United Defense, LP) York, PA;

Ground-Based Common Sensor (GBCS) FMC: (United Defense, LP) Santa Clara, CA; IBM: Owego, NY; Lockheed Martin: (Lockheed-Sanders Corp. JV w/AEL) Hudson, NH; Lockheed Martin: Owego, NY; Magnavox: Fort Wayne, IN; Motorola: Scottsdale, AZ;

Guardrail/ Common Sensor (GR/CS) ESCO: St. Louis, MO; IBM: Owego, NY; Raytheon: (Beech Aircraft) Wichita, KS; TRW: (TRW Inc.) Sunnyvale, CA; UNISYS: Salt Lake City, UT Heavy Equipment Transporter System (HETS) Oshkosh Truck: Oshkosh, WI; Systems and Electronics: St. Louis, MO

Hercules FMC: (United Defense, LP) York, PA;

High Mobility Artillery Rocket System (HIMARS) Lockheed Martin Vought Systems: Camden, AR; Dallas, TX

High Mobility Multipurpose Wheeled Vehicle (HMMWV) *AM General*: South Bend, IN; Livonia, MI; O'Gara, Hess and Eisenhardt: Fairfield, OH

Hornet *Textron*: Wilmington, MA

Hydra 70 Rocket System Lockheed Martin: Camden, AR; Hercules: Radford, VA; Radford Army Ammunition Plant: Radford, VA; Thiokol: Brigham City, UT

Integrated Family of Test Equipment (IFTE) *MILTOPE*: Hope Hull, AL; *Northrop-Grumman*: Great River, NY; *SAIC*: San Diego, CA

Integrated Meteorological System (IMETS) *Logicon*: Arlington, VA; Tacoma, WA; *Sytex*: McLean, VA

Integrated System Control (ISYSCON) ACSI: Burlington, MA; BBN Systems and Technologies: Cambridge, MA; GTE: Taunton, MA; Raleigh, NC; TRW: Carson, CA

Javelin ECC International: Orlando, FL; Lockheed Martin: Orlando, FL; Texas Instruments: Lewisville, TX

Joint Service Lightweight Integrated Suit Technology (JSLIST) Battelle: Stafford, VA

Joint Surveillance Target Attack Radar (Joint STARS) Ground Station Module (GSM) *Motorola*: Scottsdale, AZ;

Joint Tactical Ground Station (JTAGS) Datron: Simi Valley, CA; *GenCorp*: (Aerojet) Azusa, CA; Colorado Springs, CO; Gichner Systems Group: Dallastown, PA; Lockheed Martin: Boulder, CO; MEVATECH: Huntsville, AL; Response Service and Innovation: Austin, TX; Silicon Graphics: Irvine, CA

Joint Tactical Terminal (JTT) *E-Systems*: St. Petersburg, FL *Hughes*: Fort Wayne, IN

Kiowa Warrior Allison Engine: Indianapolis, IN; Textron: Fort Worth, TX; Honeywell: Albuquerque, NM; McDonnell Douglas: Monrovia, CA

Laser HELLFIRE Lockheed Martin: Ocala, FL; Orlando, FL; Rockwell: Duluth, GA

Line-of-Sight Antitank (LOSAT) Allied Signal: Cheshire, CT; Lockheed Martin Vought Systems: Orlando, FL; Cambridge, MA; Dallas, TX; Bellevue, WA; Texas Instruments: Dallas, TX;

Longbow Hellfire Missile GEC-Marconi: Wayne, NJ; Lockheed Martin: Orlando, FL; Northrop Grumman: Baltimore, MD; Huntsville, AL; TRW: Redondo Beach, CA

M113 Family of Vehicles (FOV) Allison Transmission: Indianapolis, IN; Detroit Diesel: Detroit, MI; FMC: (United Defense, LP) Texarkana, TX;

Maneuver Control System (MCS) CSC: Eatontown, NJ; GTE: Taunton, MA; (Telos) Shrewsbury, NJ; Lockheed Martin: Tinton Falls, NJ; Mitre: Eatontown, NJ; Telos: Shrewsbury, NJ

Medium Extended Air Defense System (MEADS) There are two international contractor teams competing during the PD-V Phase. *MEADS Inc.:* [(Hughes Raytheon con sortium: Bedford, MA; Huntsville, AL; Tucson, AZ; El Segundo, CA); (Alenia: Italy); (Deutsch Aerospace: Germany); (Siemens: Germany)]; *MEADS International Inc.*: [(Lockheed

MEADS International Inc.: [(Lockheed Martin: Orlando, FL; Huntsville,

AL; Aquora Hills, CA); (Alenia, Italy); (Deutsch Aerospace: Germany); (Siemens: Germany)]

Medium Truck Remanufacture Accutek: Walnut, CA; Allison Transmissions: Indianapolis, IN; AM General: South Bend, IN; Caterpillar: Mossville, IN; Hayes Wheels International: Romulus, MI; Michelin Tire: Troy, MI

Milstar (Army) CommQuest: Enchinitas, CA; Harris: Melbourne, FL; Lockheed Martin: Camden, NJ; Rantee Microwave & Electronics: Calabasas, CA; Raytheon: Marlboro, MA; Rockwell: Richardson, TX; Titan (Linkabit): San Diego, CA; TRW: Redondo Beach, CA

Mobile Subscriber Equipment (MSE) AM General: Livonia, MI; Ericsson Radio Systems AB: Molndal, Sweden; FN Manufacturing: Columbia, SC; Gould: El Monte, CA; GTE: Taunton, MA; KECO Industries: Florence, KY; Magnavox: Philadelphia, PA; Raytheon: Marlboro, MA; Telex Communications: Lincoln, NE; Thomson CSF: Laval, Cholet & Toulouse, France

Mortar (120 mm)

Accudyne: Janesville, WI; ARMTEC: Coachella, CA; Brockway Standard: Homerville, GA; Duchossois Industries: Scranton, PA; Fermont: Bridgeport, CT; FMS: Los Angeles, CA; Hercules Inc.: Radford, VA; KDI: Cincinnati, OH; Lockheed Martin Vought Systems: Burlington, VT: Lockheed Martin: Archibald, PA; MMOS Milan Army Ammunition Plant: Milan, TN; Olin: East Alton, IL; Pine Bluff Arsenal: Pine Bluff, AR; Radford Army Ammunition Plant: Radford, VA; Red River Army Depot: Texarkana, TX; Scranton Army Ammunition Plant: Scranton, PA;

United Ammunition Container: Milan, TN; Watervliet Arsenal: Watervliet, NY

Multi-Purpose Individual Munition/ Short Range Assault Weapon (MPIM/SRAW) GenCorp: (Aerojet) Sacramento, CA; Lockheed Martin: Ranch Santa Margarita, CA

Multiple Launch Rocket System (MLRS) Allied Signal: Teterboro, NJ; Atlantic Research: Camden, AR; Day & Zimm: Texarkana, TX; Lockheed Martin Vought Systems: Camden, AR; Dallas TX; FMC: (United Defense Limited Partnership) York, PA

National Missile Defense (NMD) Hughes: El Segundo, CA; Tucson, AZ; Lockheed Martin: Sunnyvale, CA; Raytheon: Bedford, MA; Rockwell: Downey, CA; Teledyne Brown: Huntsville, AL

NAVSTAR Global Positioning System (GPS) Rockwell: Cedar Rapids, IA; Trumble Navigation: Sunnyvale, CA

Night Vision (NV) Image Intensification (12) Elbit: Haifa, Israel; General Motors: (Hughes Electronics) El Segundo, CA; ITT: Roanoke, VA; Litton: Tempe, AZ; Lockheed Martin: Orlando, FL; Nashua, NH; Phototelesis: San Antonio, TX; Texas Instruments: McKinney, TX; TRACOR Aerospace: Austin, TX

Nuclear, Biological, and Chemical Reconnaissance System (NBCRS) - Fox *General Dynamics*: (Land Systems Division) Warren, MI; Anniston Army Depot: Anniston, AL; Thyssen Henschel: (Germany)

Paladin

FMC: (United Defense, LP) Chambersburg, PA; Honeywell: St. Petersburg, FL; Letterkenny Army Depot: Chambersburg, PA; Sechan Electronics: Littiz, PA; Watervliet Arsenal: Watervliet, NY Palletized Load System (PLS) Allison: Indianapolis, IN; Detroit Diesel: Detroit, MI; Grove Crane: Shady Grove, PA; Oshkosh Truck: Oshkosh, WI; OTC Trailer: Bradenton, FL; Rockwell: Troy, MI; Steeltech: Milwaukee, WI

Patriot

Atlantic Research: Camden, AR; Gainesville, VA: GTE: Taunton, MA; Honevwell: Clearwater, FL: Minneapolis, MN; Hughes: Torrance, CA: J.L. Rust: Albuquerque, NM; LITTON: Williamsport, PA; Lockheed Martin Vought Systems: Grand Prairie, TX; Lockheed/Sanders: Merrimack, NH; Mountaingale: Reno, NV; Parsvant: Melbourne, FL: Raytheon: Bedford, MA; Rockwell: Duluth, GA; SCI Systems: Huntsville, AL

Protective Mask Family (M40 Series) ILC Dover: Dover, DE; Mine Safety Appliance: Pittsburgh, PA; TSI: St. Paul, MN

Radiac Nuclear Research Corp.: Dover, NJ

Remote Sensing Chemical Agent Detection (M21) Intellitec: DeLand. FL

Satellite Communications (SATCOM) Cincinnati Electronics: Cincinnati, OH; GTE: Taunton, MA; Harris: Melbourne, FL; Lockheed Martin: Bethesda, MD; Magnavox: Torrance, CA; Fort Wayne, IN; Motorola: Scottsdale, AZ; Raytheon: Marlborough, MA; Stanford Electronics: Colorado Springs, CO; Titan: San Diego, CA;

Second Generation Foward Looking Infrared (2d Gen FLIR) General Motors: (Hughes Aircraft) El Segundo, CA; Pentastar: Huntsville, AL; *Texas Instruments*: McKinney, TX

Sense and Destroy Armor (SADARM) Alliant Techsystems: Hopkins, MN; Alpha Industries: Woburn, MA; *GenCorp* (*Aerojet*): Azusa, CA; LITTON: Tempe, AZ; Teledyne: Los Angeles, CA

Sentinel

Brunswick: Marion, VA; Electro-Tech: Blacksburg, VA; *Hughes*: El Segundo, CA; Forrest, MS; Torrance, CA; KINTEC: Dallas, TX; LITTON: San Carlos, CA; Lockheed Martin: Clearwater, FL; Lucas Systems: Palo Alto, CA; MA/COM: Burlington, MA; NC Systems: Signal Hill, CA; SAIC: San Diego, CA; SoRa Electronics: Torrance, CA; TMS: Polson, MT; Varian: Beverly, MA; Watkins Johnson: Palo Alto, CA;

Single Channel Ground and Airborne Radio System (SINCGARS) *General Dynamics*: Tallahassee, FL; *ITT*: Fort Wayne, IN; Talla-Comm: Tallahassee, FL

Small Arms (M16A2 Rifle) Colt's Manufacturing: Hartford, CT; FN Manufacturing: Columbia, SC

Small Arms (M249 Squad Automatic Weapon) FN Manufacturing: Columbia, SC

Small Arms (M4 Carbine) Colt's Manufacturing.: Hartford, CT

Small Arms (MK-19-3 40 mm Automatic Grenade Launcher) Duchossois Industries: (Saco Defense) Saco, ME

Smoke Generator (M56) Robotic Systems Technology: Westminster, MD

Smoke Generator (M58) Anniston Army Depot: Anniston, AL Robotic Systems Technology: Westminster, MD

Soldier System Aimpoint Inc: Herndon, VA; Alliant Tech Systems: Hopkins, MN; DECILOG: Melville, NY Hughes: El Segundo, CA; Motorola: Scottsdale, AZ; OLIN: East Alton, IL SARCO: Sterling, NJ; Texas Instruments: San Antonio, TX; Standard Army Management Information Systems (STAMIS) *Computer Sciences*: Moorestown, NJ; *Lockheed Martin*: Bethesda, MD; *PRC*.: McLean, VA

Standardized Integrated Command Post System (SICPS) Brunswick: Marion, VA; *Camel*: Knoxville, TN; *FMC*: (United Defense, LP) San Jose, CA; Gichner Systems Group: Hunt Valley, MD; Letterkenny Army Depot: Letterkenny, PA; *Tobyhanna Army Depot*: Tobyhanna, PA

Stinger Atlantic Research: Gainesville, VA; CHIP Supply, Inc.: Orlando, FL; Hughes: Tucson, AZ; Farmington, NM; Honeywell: Minneapolis, MN

Tactical Endurance Synthetic Aperture Radar (TESAR) Northrup Grumman: Baltimore, MD

Tactical High Energy Laser (THEL) TRW: Redondo Beach, CA

Tactical Quiet Generators (TQG) Dewey Electronics: Oakton, NJ; Fermont: Bridgeport, CT; Goodman Ball: Menlo Park, CA; KECO Industries: Florence, KY; MCII: Dallas, TX; T and J Manufacturing: Oshkosh, WI

Tactical Unmanned Aerial Vehicle (TUAV) Alliant Techsystems: Clearwater, FL; Hopkins, MN; Cirrus Design: Duluth, MN; GS Engineering: Incline Village, NV

Tactical Unmanned Vehicle (TUV) TBD

Tank Main Gun Ammunition Alliant-Ferralmatic Operations: Totowa, NJ; Alliant-Radford: Radford, VA; Alliant Technology: Clearwater, FL; Alliant TechSystems: Brooklyn Park, MN; ARMTEC: Coachella, CA; Bulova: Lancaster, PA; GenCorp: (Aerojet) Jonesboro, TN; Hercules: Clearwater, FL; Radford, VA; Rocket City, WV; Hexcel: Livermore, CA; Mason and Hangar: Middletown, IA; Motorola: Scottsdale, AZ; Nuclear Metals: Concord, MA; Olin: St. Petersburg, FL; Olin-Flinchbaugh: Red Lion, PA; Radford Army Ammunition Plant: Radford, VA

Task Force XXI Tactical Operations Centers (TOCS) BIC: Huntsville, AL; *TRW*: Huntsville, AL

Theater High Altitude Area Defense (THAAD) System CRC: Huntsville, AL; LITTON: Agoura Hills, CA; Lockheed Martin: Huntsville, AL; Sunnyvale, CA; Lexington, MA; White Sands, NM; Raytheon: Bedford, MA; Waltham, MA; TRW: Redondo Beach, CA

Thermal Weapon Sight (TWS) Aeroflex Laboratories: Plainview, NY; General Motors: (Hughes Electronics) El Segundo, CA; (Hughes Georgia Inc.) LaGrange, GA; (Hughes Elcan Optical Technologies) Ontario, Canada; (Hughes Microelectronics Division) Newport Beach, CA; (Packard Hughes Interconnects) Irvine, CA; Santa Barbara Research Center: Santa Barbara, CA; Zeis Eltro Optronics: Germany

TOW Improved Target Acquisition System (ITAS) Cercon: Hillsboro, TX; DY4 Systems: Ontario, Canada; IMO (VARO): Garland, TX; Keltec: Ft Walton Beach, FL; Lockheed Martin: Syosset, NY; OMI: Melbourne, FL; Santa Barbara Research Center: Goleta, CA; *Texas Instruments*: McKinney, TX

TOW Missle Alliant Techsystems: VA; Allied Signal: Cheshire, CT; American Steel & Wire: Cleveland, OH; Cabot: PA; Eagle Picher: Joplin, MO; GenCorp: Azusa, CA; General Motors: (Hughes Electronics) Tucson, AZ; Goleta, CA; Kaiser Aluminum: Erie, PA;

Lockheed Martin: Archibald, PA; Mason and Hanger: Middletown, IA; Texas Instruments: Dallas, TX Vehicle Teleoperation Capability (VTC) Omnitech Robotics: Englewood, CO

Volcano Alliant Tech Systems: Edina, MN; Brunswick: Deland, FL; Intellitech: Deland, FL; Nomura Enterprise: Rock Island, IL; S & K Electronics: Roman, MT

Wolverine General Dynamics: Lima, OH; Sterling Heights, MI; MAN GHH: Dusseldorf, Germany

System Contractors with \geq 5% of total program value for FY97 are listed

ALABAMA

Advanced Field Artillery Tactical Data System (AFATDS) MILTOPE: Hope Hull, AL

Air Defense Artillery (ADA) Tactical Operations Centers (TOCs) TRW: Huntsville, AL

Black Hawk DOW-UT: Tallassee, AL

Common Hardware/Software (CHS) Carlyle Partners (BDM International): Huntsville, AL; MILTOPE: Hope Hull, AL

Digital Transmission Assemblages Centrair: Birmingham, AL

Force Projection Tactical Operations Center (FP TOC) Brown International: Huntsville, AL

Force Provider (FP) Teledyne: Huntsville, AL

Integrated Family of Test Equipment MILTOPE: Hope Hull, AL

Joint Tactical Ground Stations (JTAGS) MEVATECH: Huntsville, AL

Longbow Hellfire Missile Northrup Grumman: Huntsville, AL

Medium Extended Air Defense System (MEADS) MEADS Inc. (Hughes Raytheon consor tium): Huntsville, AL;

MEADS International Inc. (Lockheed Martin): Huntsville, AL

National Missile Defense (NMD) Teledyne Brown: Huntsville, AL

Nuclear, Biological, and Chemical Reconnaissance System (NBCRS)-Fox Anniston Army Depot: Anniston, AL

Patriot SCI Systems: Huntsville, AL

Second Generation Forward Looking Infrared (2d Gen FLIR) Pentastar: Huntsville, AL

Smoke Generator (M58) Anniston Army Depot: Anniston, AL

Task Force XXI Tactical Operations Centers (TOCs) BIC: Huntsville, AL *TRW*: Huntsville, AL Theater High Altitude Area Defense (THAAD) System CRC: Huntsville, AL; Lockheed Martin: Huntsville, AL

ARIZONA

Apache Longbow McDonnell Douglas: Mesa, AZ

Army Data Distribution System (ADDS)

White Technology: Phoenix, AZ Brilliant Anti-Armor Submunition (BAT) Talley Defense: Mesa, AZ

CH-47 Chinook/Improved Cargo Helicopter (ICH) Allied Signals: Phoenix, AZ

Comanche Allied Signal: Phoenix, AZ

Ground-Based Common Sensor (GBCS) Motorola: Scottsdale, AZ

Joint Surveillance Target Radar (Joint STARS) Ground Station Module (GSM) *Motorola*: Scottsdale, AZ

Medium Extended Air Defense System (MEADS) MEADS Inc. (Hughes Raytheon consortium): Tucson, AZ

National Missile Defense Hughes: Tucson, AZ

Night Vision (NV) Image Intensification (I2) *Litton:* Tempe, AZ

Satellite Communications (SATCOM) Motorola : Scottsdale, AZ

Sense and Destroy Armor (SADARM) Litton: Tempe, AZ

Soldier System Motorola: Scottsdale, AZ

Stinger Hughes: Tucson, AZ

Tank Main Gun Ammunition Motorola: Scottsdale, AZ

TOW Missile General Motors (Hughes Electronics): Tucson, AZ

ARKANSAS

Army Tactical Missile System (Army TACMS) Atlantic Research: Camden, AR; Lockheed Martin Vought Systems: Camden, AR

Extended Range Multiple Launch Rocket System (ER-MLRS) Lockheed Martin Vought Systems: Camden, AR

High Mobility Artillery System (HIMARS) Lockheed Martin Vought Systems: Camden, AR

Hydra 70 Rocket System Lockheed Martin: Camden, AR

Mortar (120 mm) Pine Bluff Arsenal: Pine Bluff, AR

Multiple Launch Rocket System (MLRS) Atlantic Research: Camden, AR; Lockheed Martin Vought Systems: Camden, AR

Patriot Atlantic Research Corp.: Camden, AR

CALIFORNIA

Advanced Field Artillery Tactical Data Systems (AFATDS) SAIC: San Diego, CA

Advanced Tank Armament System (ATAS) Western Howen Design: Irvine, CA

Airborne Reconnaissance Low (ARL) TRW: Sunnyvale, CA

All Source Analysis (ASAS) California Microwave: Woodland Hills, CA; Jet Propulsion Laboratory: Pasadena, CA; Lockheed Martin: San Jose, CA; SAIC: San Diego, CA

Army Data Distribution System (ADDS) GEC-Marconi: San Marcos, CA; General Motors (Hughes Electronics): El Segundo, CA

Army Tactical Missile System (Army TACMS) Teledyne: Hollister, CA; Los Angeles, CA

Battlefield Combat Identification System (BCIS) FMC (United Defense LP): San Jose, CA; *TRW*: Redondo Beach, CA

Biological Integrated Detection System (BIDS) Bio Road: Hercules, CA

Bradley M2 Infantry/M3 Cavalry Fighting Vehicle (IFV/CFV) FMC (United Defense LP): San Jose, CA; MLS: San Jose, CA

Bradley Fire Support Team (BFIST) Vehicle FMC (United Defense LP): San Jose, CA

Brilliant Anti-Armor Submunition (BAT) Northrop Grumman: Hawthorne, CA

Circuit Switch/Message Switch California Microwave: Woodland Hills, CA; Litton: Van Nuys, CA

Comanche TRW: San Diego, CA

Combat Service Support Control System (CSSCS) TRW: Carson, CA

Command and Control Vehicle (C2V) FMC (United Defense LP): San Jose, CA; Lockheed Martin: San Jose, CA

Common Hardware/Software (CHS) Hewlett Packard: Palo Alto, CA; *SAIC*: San Diego, CA; Sun Microsystems: Mountain View, CA

Deployable Medical Systems (DEPMEDS) Ohmeda Medical: Pleasanton, CA

Digital Transmission Assemblages Aydin: San Jose, CA

Driver's Vision Enhancer (DVE) SAIC: San Diego, CA

Force Projection Tactical Operations Center (FP TOC) *TRW*: Dominguez Hills, CA

Force Provider (FP) Microphor: Willits, CA; Sierra Army Depot: Sierra, CA

Forward Area Air Defense Command and Control (FAADC²) *TRW*: Redondo Beach, CA Ground-Based Common Sensor (GBCS) FMC (United Defense LP): Santa Clara, CA

Guardrail/Common Sensor (GR/CS) TRW: Sunnyvale, CA

Integrated Family of Test Equipment (IFTE) SAIC: San Diego, CA

Integrated System Control (ISYSCON) TRW: Carson, CA

Joint Tactical Ground Station (JTAGS) Datron: Simi Valley, CA; *GenCorp* (*Aerojet*): Azusa, CA; Silicon Graphics: Irvine, CA

Kiowa Warrior McDonnell Douglas: Monrovia, CA

Longbow Hellfire Missile TRW: Redondo Beach, CA

Medium Extended Air Defense (MEADS) MEADS Inc. (Hughes Raytheon consortium): El Segundo, CA; MEADS International Inc. (Lockheed Martin): Aquora Hills, CA

Medium Truck Remanufacture Accutek: Walnut, CA

Milstar CommQuest: Enchinitas, CA; Rantee Microwave & Electronics: Calabasas, CA; Titan (Linkabit): San Diego, CA; TRW: Redondo Beach, CA

Mobile Subscriber Equipment (MSE) Gould: El Monte, CA

Mortar (120 mm) ARMTEC: Coachella, CA; FMS: Los Angeles, CA

Multi-Purpose Individual Munition/Short Range Assault Weapon (MPIM/SRAW) GenCorp (Aerojet): Sacramento, CA; Lockheed Martin: Ranch Santa Margarita, CA

National Missile Defense Hughes: El Segundo, CA; Lockheed Martin: Sunnyvale, CA; Rockwell: Downey, CA

NAVSTAR Global Positioning System (GPS) Trumble Navigation: Sunnyvale, CA Night Vision (NV) Image Intensification (I2) General Motors (Hughes Electronics): El Segundo, CA

Patriot Hughes: Torrance, CA

Satellite Communications (SATCOM) Magnavox: Torrance, CA; Titan: San Diego, CA;

Second Generation Forward Looking Infrared (2d Gen FLIR) General Motors (Hughes Aircraft): El Segundo, CA

Sense and Destroy Armor (SADARM) GenCorp (Aerojet): Azusa, CA; Teledyne: Los Angeles, CA

Sentinel Hughes: El Segundo, CA; Torrance, CA; Litton: San Carlos, CA; Lucas Systems: Palo Alto, CA; NC Systems: Signal Hill, CA; SAIC: San Diego, CA; SoRa Electronics: Torrance, CA; Watkins Johnson: Palo Alto, CA

Soldier System Hughes: El Segundo, CA

Standardized Integrated Command Post System (SICPS) FMC (United Defense LP): San Jose, CA

Tactical High Energy Laser (THEL) TRW (Space and Technology Division): Redondo Beach, CA

Tactical Quiet Generators (TQG) Goodman Ball: Menlo Park, CA

Tank Main Gun Ammunition ARMTEC: Coachella, CA; Hexcel: Livermore, CA

Theater High Altitude Area Defense (THAAD) System Litton Data Systems: Agoura Hills, CA; *Lockheed Martin*: Sunnyvale, CA; TRW: Redondo Beach, CA

Thermal Weapon Sight (TWS) General Motors: (Hughes Electronics) El Segundo, CA; (Hughes Microelectronics Division) Newport Beach, CA; (Packard Hughes Interconnects) Irvine, CA; Santa Barbara Research Center: Santa Barbara, CA TOW Improved Target Acquisition System (ITAS) Santa Barbara Research Center: Goleta, CA

TOW Missile GenCorp: Azusa, CA; General Motors (Hughes Electronics): Goleta, CA

COLORADO

All Source Analysis System (ASAS) Lockheed Martin: Littleton, CO

Joint Tactical Ground Station (JTAGS) GenCorp (Aerojet): Colorado Springs, CO; Lockheed Martin Federal Systems: Boulder, CO

Satellite Communications (SATCOM) Stanford Electronics: Colorado Springs, CO

Vehicle Teleoperation Capability (VTC) Omnitech Robotics: Englewood, CO

CONNECTICUT

Black Hawk United Technologies: Stratford, CT

Comanche Sikorsky: Stratford, CT

Force Provider (FP) Dyamics Corp. of America: Bridgeport, CT

Line-of-Sight Antitank (LOSAT) Allied Signal: Cheshire, CT

Mortar (120 mm) Fermont: Bridgeport, CT

Small Arms (M16A2 Rifle) Colt's Manufacturing: Hartford, CT

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

Tactical Quiet Generators (TQG) Fermont: Bridgeport, CT

TOW Missile Allied Signal: Cheshire, CT

DELAWARE

Protective Mask Family (M 40 Series) ILC Dover: Dover, DE

FLORIDA

Apache Longbow Lockheed Martin: Orlando, FL Army Tactical Missile System (Army TACMS) Honeywell: Clearwater, FL

Chemical Agent Monitor (CAM) Intellitec Division (Technical Products Group): DeLand, FL

Close Combat Tactical Trainer (CCTT) ECC International: Orlando, FL; *Lockheed Martin*: Orlando, FL; Pulau Electronics: Orlando, FL

Comanche Lockheed Martin: Orlando, FL

Command and Control Vehicle (C2V) Brunswick: DeLand, FL

Digital Transmission Assemblages Group Technologies: Tampa, FL; Harris Corp.: Melbourne, FL

Javelin ECC International: Orlando, FL; Lockheed Martin: Orlando, FL

Joint Tactical Terminal (JTT) E-Systems: St. Petersburg, FL

Laser HELLFIRE Lockheed Martin: Ocala, FL; Orlando, FL

Line-of-Sight Antitank (LOSAT) Lockheed Martin Vought Systems: Orlando, FL

Longbow Hellfire Missile Lockheed Martin: Orlando, FL

Medium Extended Air Defense System (MEADS) MEADS International Inc. (Lockheed Martin Integrated Systems): Orlando, FL

Milstar Harris: Melbourne, FL

Night Vision (NV) Image Intensification (12) Lockheed Martin: Orlando, FL

Paladin Honeywell: St. Petersburg, FL

Palletized Load System (PLS) OTC Trailer: Bradenton, FL

Patriot Honeywell: Clearwater, FL; Parsvant: Melbourne, FL Remote Sensing Chemical Agent Detection (M21) Intellitec: DeLand, FL

Satellite Communications (SATCOM) Harris: Melbourne, FL

Sentinel Lockheed Martin: Clearwater, FL

Single Channel Ground and Airborne Radio System (SINCGARS) General Dynamics: Tallahassee, FL; Talla-Comm: Tallahassee, FL

Stinger CHIP Supply: Orlando, FL

Tactical Unmanned Aerial Vehicle (TUAV) Alliant Techsystems: Clearwater, FL

Tank Main Gun Ammunition Alliant Technology: Clearwater, FL; Hercules: Clearwater, FL; *Olin:* St. Petersburg, FL

TOW Improved Target Acquisition System (ITAS) Keltec: Ft. Walton Beach, FL; OMI: Melbourne, FL

Volcano Brunswick: DeLand, FL; Intellitech: DeLand, FL

GEORGIA

Bradley M2 Infantry/M3 Cavalry Fighting Vehicle (IFV/CFV) HAC: LaGrange, GA

Laser HELLFIRE Rockwell: Duluth, GA

Mortar (120 mm) Brockway Standard: Homerville, GA

Patriot Rockwell: Duluth, GA

Thermal Weapon Sight (TWS) General Motors (Hughes Georgia Inc.): LaGrange, GA

IDAHO

Abrams Tank LITCO: Idaho Falls, ID

ILLINOIS

Family of Medium Tactical Vehicles (FMTV) Caterpillar: Peoria, IL; McLaughlin: Moline, IL Force Provider (FP)

IME: Duva, IL

Mortar (120 mm) Olin: East Alton, IL

Volcano Nomura Enterprise: Rock Island, IL

INDIANA

Abrams Tank Allison Transmission: Indianapolis, IN

Advanced Field Artillery Tactical Data System (AFATDS) Hughes: Fort Wayne, IN

All Source Analysis (ASAS) Magnavox: Fort Wayne, IN

Army Data Distribution System (ADDS) Bowmar Instrument: Fort Wayne, IN; HAC/Magnavox: Fort Wayne, IN; ITT: Fort Wayne, IN

Battlefield Combat Identification System (BCIS) Magnavox: Fort Wayne, IN

Comanche Rolls Royce/Allison Engine: Indianapolis, IN

Command and Control Vehicle (C2V) Cummins Engine: Columbus, IN

Common Hardware/Software (CHS) Magnavox: Fort Wayne, IN

Family of Medium Tactical Vehicles (FMTV) Allison Engines: Indianapolis, IN

Ground-Based Common Sensor (GBCS) Magnavox: Fort Wayne, IN

High Mobility Multipurpose Wheeled Vehicle (HMMWV) AM General: South Bend, IN

Joint Tactical Terminal (JTT) Hughes: Fort Wayne, IN

Kiowa Warrior Allsion Engines: Indianapolis, IN

M113 Family of Vehicles (FOV) Allison Transmission: Indianapolis, IN

Medium Truck Remanufacture Allison Transmissions: Indianapolis, IN; AM General Corporation: South Bend, IN; Caterpillar, Inc.: Mossville, IN

Palletized Load System (PLS) Allison: Indianapolis, IN

Satellite Communications (SATCOM) Magnavox: Fort Wayne, IN

Single Channel Ground and Airborne Radio System (SINCGARS) *ITT*: Fort Wayne, IN

IOWA

Army Data Distribution System (ADDS) Rockwell (Defense Electronics Division): Cedar Rapids, IA

NAVSTAR Global Positioning System (GPS) Rockwell: Cedar Rapids, IA

Tank Main Gun Ammunition Mason and Hangar: Middletown, IA

TOW Missile Mason and Hangar: Middletown, IA

KANSAS

Guardrail/Common Sensor (GR/CS) Raytheon (Beech Aircraft): Wichita, KS

KENTUCKY

Deployable Medical Systems (DEPMEDS) Outdoor Venture: Stearns, KY

Force Provider (FP) Outdoor Venture: Stearns, KY

Mobile Subscriber Equipment (MSE) KECO Industries: Florence, KY

Tactical Quiet Generators (TQG) KECO Industries: Florence, KY

LOUISIANA

Armored Security Vehicle (ASV) Textron (Marine and Land Systems Division): New Orleans, LA

MAINE

Small Arms (MK-19-3 40 mm Automatic Grenade Launcher) Duchossois Industries (Saco Defense): Saco, ME

MARYLAND

Aerostat

Northrop Grumman: Baltimore, MD

Airborne Reconnaissance Low (ARL) California Microwave: Belcamp, MD

Airborne Standoff Minefield Detection System (ASTAMIDS) Westinghouse: Baltimore, MD

Apache Longbow Northrop Grumman: Linthicum, MD

Biological Integrated Detection System (BIDS) Environmental Technology Group:

Baltimore, MD

Brilliant Anti-Armor Submunition (BAT) NG Electronic Sensors & Systems Division: Baltimore, MD

Command and Control Vehicle (C2V) Airflow: Fredericktown, MD

Longbow Hellfire Missile Northrop Grumman: Baltimore, MD

Satellite Communications (SATCOM) Lockheed Martin: Bethesda, MD

Smoke Generator (M56) Robotic Systems Technology: Westminster, MD

Smoke Generator (M58) Robotic Systems Technology: Westminster, MD

Standard Army Management Information Systems (STAMIS) Lockheed Martin: Bethesda, MD

Standardized Integrated Command Post System (SICPS) Gichner Systems Group: Hunt Valley, MD

Tactical Endurance Synthetic Aperture Radar (TESAR) Northrop Grumman: Baltimore, MD

MASSACHUSETTS

Advanced Field Artillery Tactical Data System (AFATDS) GTE: Taunton, MA

Aerostat Hughes Raytheon: Bedford, MA

Airborne Standoff Minefield Detection System (ASTAMIDS) Raytheon: Tewksbury, MA

All Source Analysis System (ASAS) Lockheed Martin: Pittsfield, MA Biological Integrated Detection System (BIDS) Barry Controls: Brighton, MA; Brucker Instruments: Billerica, MA; Systems Research Corporation: Burlington, MA

Black Hawk General Electric: Lynn, MA

Bradley M2 Infantry/M3 Cavalry Fighting Vehicle (IFV/CFV) Lockheed Martin: Pittsfield, MA

Brilliant Anti-Armor Submunition (BAT) Raytheon: Sudbury, MA

Circuit Switch/Message Switch *GTE*: Taunton, MA

Combat Service Support Control System (CSSCS) GTE: Taunton, MA

Common Hardware/Software (CHS) GTE: Taunton, MA

Digital Transmission Assemblages Raytheon: Marlboro, MA

Extended Range Multiple Lauch Rocket System (ER-MLRS) Raytheon: Tewksbury, MA

Hornet Textron (Textron Defense Systems): Wilmington, MA

Integrated System Control (ISYSCON) ACSI: Burlington, MA; BBN Systems and Technologies: Cambridge, MA; GTE: Taunton, MA

Line of Sight Antitank (LOSAT) Lockheed Martin Vought Systems: Cambridge, MA

Maneuver Control System (MCS) GTE: Taunton, MA

Medium Extended Air Defense System (MEADS) MEADS Inc. (Hughes Raytheon consor tium): Bedford, MA

Milstar Raytheon: Marlboro, MA

Mobile Subscriber Equipment (MSE) GTE: Taunton, MA; Raytheon: Marlboro, MA National Missile Defense Raytheon: Bedford, MA

Patriot GTE: Taunton, MA; Raytheon: Bedford, MA

Satellite Communications (SATCOM) GTE: Taunton, MA; Raytheon: Marlborough, MA

Sense and Destroy Armor (SADARM) Alpha Industries: Woburn, MA

Sentinel MA/COM: Burlington, MA; Varian: Beverly, MA

Tank Main Gun Ammunition Nuclear Metals: Concord, MA

Theater High Altitude Area Defense (THAAD) System Lockheed Martin IRS: Lexington, MA; *Raytheon*: Bedford, MA; Waltham, MA

MICHIGAN

Abrams Tank General Dynamics: Sterling Heights, MI

Advanced Tank Armament System (ATAS)

General Dynamics: Sterling Heights, MI

Battlefield Combat Identification System (BCIS) General Dynamics: Sterling Heights, MI

Crusader General Dynamics: Sterling Heights, MI

High Mobility Multipurpose Wheeled Vehicle (HMMWV) *AM General*: Livonia, MI

M113 Family of Vehicles (FOV) Detroit Diesel: Detroit, MI

Medium Truck Remanufacture Hayes Wheels: Romulus, MI; Michelin Tire: Troy, MI

Mobile Subscriber Equipment (MSE) AM General: Livonia, MI

Nuclear, Biological, and Chemical Reconnaissance System (NBCRS)-Fox General Dynamics: Warren, MI

Palletized Load System (PLS) Detroit Diesel: Detroit, MI; Rockwell: Troy, MI

Wolverine General Dynamics: Sterling Heights, MI **MINNESOTA**

Army Tactical Missile System (Army TACMS) Honeywell: Minneapolis, MN

Biological Integrated Detection System (BIDS) Power & Engine Manufacturing: Minneapolis, MN; Thermal Systems: St. Paul, MN

Brilliant Anti-Armor Submunition (BAT) Alliant Techsystem: Hopkins, MN Honeywell: Minneapolis, MN

Crusader FMC (United Defense LP): Minneapolis, MN

Patriot Honeywell: Minneapolis, MN

Protective Mask Family TSI: St. Paul, MN

Sense and Destroy Armor (SADARM) Alliant Techsystems: Hopkins, MN

Soldier System Honeywell: Minneapolis, MN

Stinger Honeywell: Minneapolis, MN

Tactical Unmanned Aerial Vehicle (TUAV) *Alliant Techsystems*: Hopkins, MN; Cirrus Design: Duluth, MN

Tank Main Gun Ammunition Alliant TechSystems: Brooklyn Park, MN

Volcano Alliant TechSystems: Edina, MN

MISSISSIPPI

Army Data Distribution System (ADDS) General Motors (Hughes Electronics): Forrest, MS

Sentinel Hughes: Forrest, MS

MISSOURI

Bradley Fire Support Team (BFIST) Vehicle Systems Electronics Corp.: St. Louis, MO

Force Provider (FP) EASI: St. Louis, MO Guardrail/Common Sensor (GR/CS) ESCO: St. Louis, MO

Heavy Equipment Transporter System (HETS) Systems and Electronics: St. Louis, MO

TOW Missile Eagle Picher: Joplin, MO

MONTANA

Sentinel TMS: Polson, MT

Volcano S & K Electronics: Roman, MT

NEBRASKA

Mobile Subscriber Equipment (MSE) Telex Communications: Lincoln, NE

NEVADA

Patriot Mountaingale: Reno, NV

Tactical Unmanned Aerial Vehicle (TUAV) GS Engineering: Incline Village, NV

NEW HAMPSHIRE

Ground-Based Common Sensor (GBCS) Lockheed Martin: Hudson, NH

Night Vision (NV) Image Intensification (I2) Lockheed Martin (Lockheed Sanders Corp.): Nashua, NH

Patriot Lockheed/Sanders: Merrimack, NH

NEW JERSEY

Apache Longbow Allied Signal: Teterboro, NJ

Army Data Distribution System (ADDS) GEC-Marconi: Totowa, NJ

Army Tactical Missile System (Army TACMS) Simmonds Precision: Cedar Knolls, NJ

Brilliant Anti-Armor Submunition (BAT) Alliant Signal: Teterboro, NJ Digital Transmission Assemblages Transistor Devices: Cedar Knolls, NJ

Longbow Hellfire Missile GEC-Marconi: Wayne, NJ

Maneuver Control System (MCS) CSC: Eatontown, NJ; GTE (Telos): Shrewsbury, NJ; Lockheed Martin: Tinton Falls, NJ; MITRE: Eatontown, NJ; Telos: Shrewsbury, NJ

Milstar Lockheed Martin: Camden, NJ

Multiple Launch Rocket System (MLRS) Allied Signal: Teterboro, NJ

Radiac Nuclear Research: Dover, NJ

Standard Army Management Information Systems (STAMIS) Computer Sciences: Moorestown, NJ

Tactical Quiet Generators (TQG) Dewey Electronics: Oakton, NJ

Tank Main Gun Ammunition Alliant-Ferralmatic Operations: Totowa, NJ

NEW MEXICO

Circuit Switch/Message Switch Laguna Industries: Albuquerque, NM

Digital Transmission Assemblages Laguna Industries: Laguna Pueblo, NM

Kiowa Warrior Honeywell: Albuquerque, NM

Patriot J.L. Rust: Albuquerque, NM

Stinger Hughes: Farmington, NM

Theater High Altitude Area Defense (THAAD) System Lockheed Martin: White Sands, NM

NEW YORK

Advanced Quick Fix (AQF) Lockheed Martin: Owego, NY

Biological Integrated Detection System (BIDS) Harris: Rochester, NY

Common Hardware/Software (CHS) Stonebrook Group (MILTOPE): Melville, NY Deployable Medical Systems (DEPMEDS) Eastman Kodak: Rochester, NY

Ground-Based Common Sensor (GBCS) Lockheed Martin: Owego, NY; IBM: Owego, NY

Guardrail/Common Sensor (GR/CS) IBM: Owego, NY

Integrated Family of Test Equipment (IFTE)

Northrop-Grumman: Great River, NY

Mortar (120 mm) Watervliet Arsenal: Watervliet, NY

Paladin Watervliet Arsenal: Watervliet, NY

Thermal Weapon Sight (TWS) Aeroflex Laboratories: Plainview, NY

TOW Improved Target Acquisition System (ITAS) Lockheed Martin: Syosset, NY

NORTH CAROLINA

Integrated System Control (ISYSCON) GTE: Raleigh, NC

OHIO

Abrams Tank General Dynamics: Lima, OH

Aerostat Lockheed Martin: Akron, OH

Army Tactical Missile System (Army TACMS) KDI: Cincinnati, OH

Biological Integrated Detection System (BIDS) Battelle: Columbus, OH

Deployable Medical Systems (DEPMEDS) Picker: Cleveland, OH

Extended Range Multiple Launch Rocket System (ER-MLRS) KDI: Cincinnati, OH

Family of Medium Tactical Vehicles (FMTV) Rockwell International: Newark, OH

High Mobility Multipurpose Wheeled Vehicle (HMMWV) O'Gara, Hess and Eisenhardt: Fairfield, OH Mortar (120 mm) KDI: Cincinnati, OH

Satellite Communications (SATCOM) Cincinnati Electronics: Cincinnati, OH

TOW Missile American Steel & Wire: Cleveland, OH

Wolverine General Dynamics: Lima, OH

PENNSYLVANIA

Bradley M2 Infantry/M3 Cavalry Fighting Vehicle (IFV/CFV) FMC (United Defense LP): York, PA

CH-47 Chinook/Improved Cargo Helicopter (ICH) Boeing: Philadelphia, PA

Comanche Boeing: Philadelphia, PA

Command and Control Vehicle (C2V) FMC (United Defense LP): York, PA

Deployable Medical Systems (DEPMEDS) Airtacs: Red Lion, PA; Engineered Systems: Trappe, PA

Digital Transmission Assemblages Gichner Systems Group: Dallastown, PA; Tobyhanna Army Depot: Tobyhanna, PA

Grizzly FMC (United Defense LP): York, PA

Hercules FMC (United Defense LP): York, PA

Joint Tactical Ground Station (JTAGS) Gichner Systems Group: Dallastown, PA

Mobile Subscriber Equipment (MSE) Magnavox: Philadelphia, PA

Mortar (120 mm) Duchossois Industries: Scranton, PA; Lockheed Martin: Archibald, PA; Scranton Army Ammunition Plant: Scranton, PA

Multiple Launch Rocket System (MLRS) FMC (United Defense LP): York, PA

Paladin FMC (United Defense LP): Chambersburg, PA; Letterkenny Army Depot: Chambersburg, PA; Sechan Electronics: Littiz, PA Palletized Load System (PLS) Grove Crane: Shady Grove, PA

Patriot Litton: Williamsport, PA

Protective Mask Family (M40 Series) Mine Safety Appliance: Pittsburg, PA

Soldier System GENTEX: Carbondale, PA

Standardized Integrated Command Post System (SICPS) Letterkenny Army Depot: Letterkenny, PA; Tobyhanna Army Depot: Tobyhanna, PA

Tank Main Gun Ammunition Bulova: Lancaster, PA; Olin-Flinchbaugh: Red Lion, PA

TOW Missile Cabot: PA; Kaiser Aluminum: Erie, PA; Lockheed Martin: Archibald, PA

SOUTH CAROLINA

Family of Medium Tactical Vehicles (FMTV) Michelin: Greenville, SC

Mobile Subscriber Equipment (MSE) FN Manufacturing: Columbia, SC

Small Arms (M16A2 Rifle) FN Manufacturing: Columbia, SC

Small Arms (M249 Squad Automatic Weapon) *FN Manufacturing*: Columbia, SC

TENNESSEE

Mortar (120 mm) MMOS Milan Army Ammunition Plant: Milan, TN; United Ammunition Container: Milan, TN

Standardized Integrated Command Post System (SICPS) Camel: Knoxville, TN

Tank Main Gun Ammunition GenCorp (Aerojet): Jonesboro, TN

TEXAS

Abrams Tank Texas Instruments: Dallas, TX

Advanced Tank Armament System (ATAS) Texas Instruments: Plano, TX All Source Analysis (ASAS) MANTECH: Killeen, TX

Army Tactical Missile System (Army TACMS) Lockheed Martin Vought Systems: Dallas, TX; Horizon City, TX

Bradley M2 Infantry/M3 Cavalry Fighting Vehicle (IFV/CFV) Texas Instruments: McKinney, TX

Brilliant Anti-Armor Submunition (BAT) Lockheed Martin Vought Systems:

Grand Prairie, TX

Driver's Vision Enhancer (DVE) Outsource Solution: McKinney, TX; Texas Instruments: Dallas, TX

Extended Range Multiple Launch Rocket System (ER-MLRS) Lockheed Martin Vought Systems: Dallas, TX

Family of Medium Tactical Vehicles (FMTV) Scott Manufacturing: Lubbock, TX; Stewart & Stevenson Services: Houston, TX

High Mobility Artillery Rocket System (HIMARS) Lockheed Martin Vought Systems: Dallas, TX

Javelin Texas Instruments: Lewisville, TX

Joint Tactical Ground Station (JTAGS) Response Service and Innovation: Austin, TX

Kiowa Warrior Bell Helicopter Textron: Fort Worth, TX

Line-of-Sight Antitank (LOSAT) Lockheed Martin Vought Systems: Dallas, TX; Texas Instruments: Dallas, TX

M113 Family of Vehicles (FOV) FMC (United Defense LP): Texarkana, TX

Milstar Rockwell: Richardson, TX

Mortar (120 mm) Red River Army Depot: Texarkana, TX

Multiple Launch Rocket System (MLRS) Day & Zimm: Texarkana, TX; Lockheed Martin Vought Systems: Dallas, TX

Night Vision (NV) Image Intensification (I2) Phototelesis: San Antonio, TX; Texas Instruments: McKinney, TX; TRACOR Aersospace: Austin, TX

Patriot Lockheed Martin Vought Systems: Grand Prairie, TX

Second Generation Forward Looking Infrared (2d Gen FLIR) Texas Instruments: McKinney, TX

Sentinel KINTEC: Dallas, TX

Tactical Quiet Generators (TQG) MCII: Dallas, TX

TOW Improved Target Acquisition System (ITAS) Cercon: Hillsboro, TX; IMO (VARO): Garland, TX; *Texas Instruments:* McKinney, TX

TOW Missile Texas Instruments: Dallas, TX

UTAH

Close Combat Tactical Trainer (CCTT) Evans & Sutherland: Salt Lake City, UT

Guardrail/Common Sensor (GR/CS) UNISYS: Salt Lake City, UT

Hydra 70 Rocket System Thiokol: Brigham City, UT

VERMONT

Crusader Lockheed Martin: Burlington, VT

Mortar (120 mm) Lockheed Martin Vought Systems: Burlington, VT

VIRGINIA

All Source Analysis System (ASAS) BDM: McLean, VA; Electronic Warfare Associates: Herndon, VA; Logicon: Arlington, VA; MITRE: McLean, VA; Mystech: Falls Church, VA; Sytex: McLean, VA

Army Global Command and Control System (AGCCS) Lockheed Martin: Springfield, VA

Army Tactical Missile System (Army TACMS) Atlantic Research: Gainesville, VA Biological Integrated Detection System (BIDS) Booz Allen & Hamilton: McLean, VA; Kaman Sciences: Alexandria, VA

Combat Service Support Control System (CSSCS) LMC: Springfield, VA

Crusader EDS: Herndon, VA; PRC: McLean, VA

Deployable Medical Systems (DEPMEDS) Brunswick: Marion, VA

Enhanced Trackwolf (ET) Engineering Research Associates: Vienna, VA

Hydra 70 Rocket System Hercules: Radford, VA; Radford Army Ammunition Plant: Radford, VA

Integrated Meteorological System (IMETS) Logicon: Arlington, VA; Sytex: McLean, VA

Joint Service Lightweight Integrated Suit Technology (JSLIST) Battelle: Stafford, VA

Mortar (120 mm) Hercules: Radford, VA; Radford Army Ammunition Plant: Radford, VA

Night Vision (NV) Image Intensification (I2) *ITT*: Roanoke, VA

Patriot Atlantic Research: Gaineville, VA

Sentinel Brunswick: Marion, VA; Electro-Tech: Blacksburg, VA

Standard Army Management Information Systems (STAMIS) PRC: McLean, VA

Standardized Integrated Command Post System (SICPS) Brunswick: Marion, VA

Stinger Atlantic Research: Gainesville, VA

Tank Main Gun Ammunition Alliant-Radford: Radford, VA; Hercules: Radford, VA; Radford Army Ammunition Plant: Radford, VA TOW Missile Alliant Techsystems: VA

WASHINGTON

Brilliant Anti-Armor Submunition (BAT) Olin: Redmond, WA

Integrated Meteorological System (IMETS) Logicon: Tacoma, WA

Line-of-Sight Antitank (LOSAT) Lockheed Martin Vought Systems: Bellevue, WA

WEST VIRGINIA

Tank Main Gun Ammunition Hercules: Rocket City, WV

WISCONSIN

Army Tactical Missile System (Army TACMS) Spincraft: New Berlin, WI

Deployable Medical Systems (DEPMEDS) BIOCHEM International: Waukesha, WI

Heavy Equipment Transporter System (HETS) Oshkosh Truck: Oshkosh, WI

Mortar (120 mm) Accudyne: Janesville, WI

Palletized Load System (PLS) Oshkosh Truck: Oshkosh, W1; Steeltech: Milwaukee, W1

Tactical Quiet Generators (TQG) T and J Manufacturing: Oshkosh, WI

OTHER COUNTRIES

CANADA

Thermal Weapon Sight (TWS) General Motors (Hughes Elcan Optical Technologies): Ontario, Canada

TOW Improved Target Acquisition System (ITAS) DY4 Systems: Ontario, Canada

FRANCE

Mobile Subscriber Equipment (MSE) Thomson CSF: Laval, Cholet & Toulouse, France

GERMANY

Medium Extended Air Defense System (MEADS) Deutsch Aerospace: Germany; Siemens: Germany

Nuclear, Biological, and Chemical Reconnaissance System (NBCRS)-Fox Thyssen Henschel: Germany

Thermal Weapon Sight (TWS) Zeis Eltro Optronics: Germany

Wolverine MAN GHH: Dusseldorf: Germany

ISRAEL

Night Vision (NV) Image Intensification (I2) Elbit Ltd: Haifa, Israel

ITALY

Medium Extended Air Defense System (MEADS) Alenia: Italy

SWEDEN

Mobile Subscriber Equipment (MSE) Ericsson Radio Systems AB: Molndal, Sweden

UNITED KINGDOM

Automatic Chemical Agent Detector/Alarm (ACADA) *Graseby Dynamics:* Watford, Herts, U.K.



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

Advanced Field Artillery Tactical Data System (AFATDS): Product Manager AFATDS ATTN: SFAE-C3S-FS Ft. Monmouth, NJ 07703

Advanced Tank Armament System (ATAS): Project Manager Tank Main Armament Systems (PM-TMAS) ATTN: SFAE-AR-TMA Picatinny Arsenal, NJ 07806-5000

Advanced Quick Fix (AQF): Project Manager Signals Warfare ATTN: SFAE-IEW-SG Vint Hill Farms Station Warrenton, VA 22186-5116

Aerostat: Project Manager U.S. Army Space and Strategic Defense Command PO. Box 1500 Huntsville, AL 35807

Air Defense Artillery (ADA) Brigade Tactical Operations Centers (TOCs) Project Manager U.S. Army Missile Command ATTN: SFAE-C3S-AD Redstone Arsenal, AL 35898-5600

Airborne Reconnaissance Low (ARL): Project Manager Signals Warfare AITN: SFAE-IEW-SG Vint Hill Farms Station Warrenton, VA 22186-5116

Airborne Standoff Minefield Detection System (ASTAMIDS): Project Manager Mines, Countermine, and Demolitions Building 162N Picatinny Arsenal, NJ 07806-5000 All Source Analysis System (ASAS): Project Manager All Source Analysis System 1616 Anderson Rd. McLean, VA 22102-1616

Apache Longbow: Product Manager Longbow Apache ATTN: SFAE-AV-LB 4300 Goodfellow Boulevard. St. Louis, MO 63120-1795

Armored Security Vehicle (ASV): Program Executive Officer Tactical Wheeled Vehicles ATTN: SFAE-TWV-LTV Warren, Ml 48397-5000

Army Data Distribution System (ADDS): Project Manager TRCS ATTN: SFAE-C3S-TRC Ft. Monmouth, NJ 07703

Army Global Command and Control System (AGCCS): Program Executive Office Command, Control and Communications Project Manager, STCCS 6052 Meade Road, Suite 101 Ft. Belvoir, VA 22060-5260

Army Tactical Missile System (Army TACMS): Project Manager Army TACMS ATTN: SFAE-MSL-AT Redstone Arsenal, AL 35898-5650

Automatic Chemical Agent Detector/Alarm (ACADA) Project Manager NBC Defense Systems ATTN: AMCPM-NN Aberdeen Proving Ground, MD 21010-5423

Office of Program Director NBC Defense ATTN: AMSCB-BD Aberdeen Proving Ground, MD 21010-5423 Joint Program Office for Biological Defense Systems ATTN: SFAE-BD/Skyline #3 5201 Leesburg Pike Falls Church, VA 22041-3203

Battlefield Combat Identification System (BCIS): Project Manager Combat Identification ATTN: SFAE-IEW-CI-BCIS Ft. Monmouth, NJ 07703

Project Manager Combat Identification Skyline 6, Suite 309 Falls Church, VA 22041

Biological Integrated Detection System (BIDS): Project Manager NBC Defense Systems ATTN: AMCPM-NN Aberdeen Proving Ground, MD 21010-5423

Office of Program Director NBC Defense ATTN: AMSCB-BD Aberdeen Proving Ground, MD 21010-5423

Joint Program Office for Biological Defense Systems ATTN: SFAE-BD/Skyline #3 5201 Leesburg Pike Falls Church, VA 22041-3203

Black Hawk: Project Manager Utility Helicopters ATTN: SFAE-AV-BH 4300 Goodfellow Boulevard St. Louis, MO 63120-1798

Bradley Fire Support Team (BFIST) Vehicle: Product Manager Bradley Fighting Vehicle System ATTN: SFAE-ASM-BV Warren, MI 48397-5000

Bradley M2 Infantry/ M3 Cavalry Fighting Vehicle (IFV/CFV): Program Manager Bradley Fighting Vehicle System ATTN: SFAE-ASM-BV Warren, MI 48397-5000 Brilliant Anti-Armor Submunition (BAT): Project Manager Army TACMS-BAT ATTN: SFAE-MSL-AB Redstone Arsenal, AL 35898-7998

CH-47D Chinook/Improved Cargo Helicopter (ICH) Project Manager Cargo Helicopters ATTN: SFAE-AV-CH 4300 Goodfellow Blvd St. Louis, MO 63120-1795

Chemical Agent Monitor (CAM): Project Manager NBC Defense Systems ATTN: AMCPM-NN Aberdeen Proving Ground, MD 21010-5423

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Joint Program Office for Biological Defense Systems ATTN: SFAE-BD/Skyline #3 5201 Leesburg Pike Falls Church, VA 22041-3203

Circuit Switch And Message Switch: Project Manager JTACS ATTN: SFAE-C3S-JTC Ft. Monmouth, NJ 07703

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

Close Combat Tactical Trainer (CCTT): Product Manager Central Florida Research Park ATTN: AMCPM-CCTT 12350 Research Parkway Orlando, FL 32826-3276

Army Materiel Command (AMC) 5001 Eisenhower Avenue ATTN: AMCRD-S Alexandria, VA 22333-0001 Comanche: Project Manager Comanche ATTN: SFAE-AV-RAH (Bldg. 105) 4300 Goodfellow Boulevard St. Louis, MO 63120-1795

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Command and Control Vehicle (C2V): Product Manager Command and Control Vehicle ATTN: SFAE-ASM-BV Warren, MI 48397-5000

Common Hardware/Software (CHS): Project Manager Common Hardware/ Software ATTN: SFAE-C3S-CHS Ft. Monmouth, NJ 07703-5402

Crusader:

Project Manager Crusader ATTN: SFAE-FAS-CR Picatinny Arsenal, NJ 07806-5000

Deployable Medical Systems (DEPMEDS): Commander U.S. Army Medical Material Agency ATTN: MCMR-MM-R Frederick, MD 21702-5001

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Digital Transmission Assemblages: Project Manager JTACS (P) ATTN: SFAE-CM-MSC-CTS Ft. Monmouth, NJ 07703

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Enhanced Trackwolf (ET): Project Manager Signals Warfare ATTN: SFAE-IEW-SG Vint Hill Farms Station Warrenton, VA 22186-5116

Extended Range Multiple Launch Rocket System (ER-MLRS): Project Manager Multiple Launch Rocket System ATTN: SFAE-MSL-ML-PGM Redstone Arsenal, AL 35898-5650

Family of Medium Tactical Vehicles (FMTV): Project Manager FMTV ATTN: SFAE-TWV-FMTV Warren, MI 48397-5000

Force Projection Tactical Operations Center (FP TOC): Product Manager ADCCS Project Office ATTN: SFAE-C3S-AD-CP Redstone Arsenal, AL 35898

Force Provider (FP): Product Manager HQ, U.S. Army Aviation and Troop Command ATTN: AMCPM-FP 4300 Goodfellow Boulevard St. Louis, MO 63120-1798

Forward Area Air Defense Command and Control (FAADC²): Product Manager ADCCS Project Office ATTN: SFAE-C3S-AD Redstone Arsenal, AL 35898

Grizzly: Project Manager Combat Mobility Systems ATTN: SFAE-ASM-CV-B Warren, MI 48397-5000 Ground Based Common Sensor (GBCS): Project Manager Signals Warfare ATTN: SFAE-IEW-SG Vint Hill Farms Station Warrenton, VA 22186-5116

Guardrail/ Common Sensor (GR/CS): Program Manager Signals Warfare ATTN: SFAE-IEW-SG Vint Hill Farms Station Warrenton, VA 22186-5116

Heavy Equipment Transporter System (HETS): Program Executive Officer Combat Support ATTN: SFAE-CS Warren, MI 48397-5000

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

Hercules: Project Manager, Combat Mobility Systems ATTN: SFAE-ASM-CV-R Warren, MI 48397-5000

High Mobility Artillery Rocket System (HIMARS): Project Manager MLRS ATTN: SFAE-MSL-ML-SP Redstone Arsenal, AL 35896

High Mobility Multipurpose Wheeled Vehicle (HMMWV): Program Executive Officer Tactical Wheeled Vehicles ATTN: SFAE-TWV Warren, MI 48397-5000

Project Manager Tactical Vehicle Special Programs ATTN: SFAE-CS-TVSP Warren, MI 48397-5000

Hornet:

Project Manager Mines, Countermine, and Demolitions ATTN: SFAE-ASM-MCD Picatinny Arsenal, NJ 07806-5000 HYDRA 70 Rocket System: Chief, Hydra-70/2.75 Inch Rocket Management Office ATTN: AMSMC-ASH Rock Island, IL 61299-6000

Integrated Family of Test Equipment (IFTE): Product Manager Automatic Test Support Systems ATTN: PM-ATSS Redstone Arsenal, AL 35898-5400

Integrated Meteorological System (IMETS) Project Manager White Sands Missile Range ATTN: AMSAL-IS-EW White Sands, NM 88002-5501

Integrated System Control (ISYSCON): Project Manager JTACS CECOM ATTN: SFAE-C3S-JTC (Product Manager, CMS) Ft. Monmouth, NJ 07703

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

Joint Service Lightweight Integrated Suit Technology (JSLIST): Project Manager JSLIST 10401 Totten Road, Suite 121 Fort Belvoir, VA 22060

Joint Surveillance Target Attack Radar System (Joint STARS) Ground Station Module (GSM): Army Project Manager Joint STARS ATTN: SFAE-IEW-JS Ft. Monmouth, NJ 07703-5304

Joint Tactical Ground Station (JTAGS): Program Executive Office Missile Defense ATTN: SFAE-GPL-TMD-SS-P P.O. Box 1500 Huntsville, AL 35807-3801 Joint Tactical Terminal (JTT): Project Manager Joint STARS ATTN: SFAE-IEW-JS Ft. Monmouth, NJ 07703-5304

Kiowa Warrior: Project Manager Kiowa Warrior ATTN: SFAE-AV-ASH-T 4300 Goodfellow Boulevard St. Louis, MO 63120-1798

Laser HELLFIRE: Project Manager Air-to-Ground Missile Systems ATTN: SFAE-MSL-HD Redstone Arsenal, AL 35898-5610

Line-of-Sight Antitank (LOSAT): Project Manager LOSAT ATTN: SFAE-ASM-LS Redstone Arsenal, AL 35898-8051

Longbow HELLFIRE: Product Manager Air-to-Ground Missile Systems ATTN: SFAE-MSL-HD Redstone Arsenal, AL 35898-5610

M113 Family of Vehicles (FOV): Product Manager U.S. Army Tank and Automotive Command AMCPM-M113 Warren, MI 48397-5000

Maneuver Control System (MCS): Project Manager Operations Tactical Data Systems ATTN: SFAE-CC-MVR Ft. Monmouth, NJ 07703-5405 Medium Extended Air Defense System (MEADS): Project Manager MEADS ATTN: SFAE-MD-SM Redstone Arsenal, AL 35898-5797

Medium Truck Remanufacture: Program Executive Officer Tactical Wheeled Vehicles ATTN: SFAE-TWV-M Warren, MI 48397-5000 Milstar (Army): Program Manager Milstar (Army) ATTN: SFAE-C3S-MSA Ft. Monmouth, NJ 07703

Mobile Subscriber Equipment (MSE): Project Manager JTACS ATTN: SFAE-C3S-JTC Ft. Monmouth, NJ 07703-5210

Mortar (120 mm): Product Manager U.S. Armament Research, Development, and Engineering Center ATTN: AMCPM-MO Picatinny Arsenal, NJ 07806-5000

Multiple Launch Rocket System (MLRS): Project Manager MLRS ATTN: SFAE-MSL-ML Redstone Arsenal, AL 35896

Multi-Purpose Individual Munition/ Short Range Assault Weapon (MPIM/SRAW): Product Manager MPIM/SRAW ATTN: G31, Naval Surface Warfare Center 17320 Dahlgren Road Dahlgren, VA 22448-5100

National Missile Defense (NMD): Program Executive Office ATTN: SFAE-MD-NMD P.O. Box 1500 Redstone Arsenal, AL 358087-5801

NAVSTAR Global Positioning System (GPS): Project Manager GPS ATTN: SFAE-C3-GPS Ft. Monmouth, NJ 07703

Night Vision/ Reconnaissance, Surveillance & Target Acquisition (NV/RSTA): Project Manager NV/RSTA 10221 Burbeck Road, Suite 430 Ft. Belvoir, VA 22060-5806 NBC Reconnaissance System (NBCRS) Fox: Project Manager ATTN: AMCPM-NN Aberdeen Proving Ground, MD 21010

Paladin: Product Manager Paladin/FAASV ATTN: SFAE-FAS-PAL Picatinny Arsenal, NJ 07806-5000

Palletized Load System (PLS): Program Executive Officer Tactical Wheeled Vehicles ATTN: SFAE-TWV Warren, MI 48397-5000

Program Manager Palletized Load System ATTN: SFAE-CS-PLS Warren, MI 48397-5000

Patriot: Product Manager ATTN: SFAE-MD-PA P.O. Box 1500 Huntsville, AL 35807-3801

Protective Mask (M40 Series): Project Manager NBC Defense ATTN: AMCPM-NN Aberdeen Proving Ground, MD 21010

Radiac: Project Manager NBC Defense Systems ATTN: AMCPM-NN Aberdeen Proving Ground, MD 21010-5423

Office of Program Director NBC Defense ATTN: AMSCB-BD Aberdeen Proving Ground, MD 21010-5423

Joint Program Office for Biological Defense Systems ATTN: SFAE-BD/Skyline #3 5201 Leesburg Pike Falls Church, VA 22041-3203 Remote Sensing Chemical Agent Detection (M21): Project Manager NBC Defense Systems ATTN: AMCPM-NN Aberdeen Proving Ground, MD 21010-5423

Office of Program Director NBC Defense ATTN: AMSCB-BD Aberdeen Proving Ground, MD 21010-5423

Joint Program Office for Biological Defense Systems ATTN: SFAE-BD/Skyline #3 5201 Leesburg Pike Falls Church, VA 22041-3203

Satellite Communications (SATCOM): Project Manager SATCOM ATTN: SFAE-C3S-SC Ft. Monmouth, NJ 07703

Program Manager Milstar (Army) ATTN: SFAE-C3-MSA Ft. Monmouth, NJ 07703

Second Generation Forward Looking Infrared (FLIR): Product Manager GEN II FLIR 10221 Burbeck Road, Suite 430 Ft. Belvoir, VA 22060-5806

Sense and Destroy Armor (SADARM): Project Manager Sense and Destroy Armor ATTN: SFAE-FAS-SD Picatinny Arsenal, NJ 07806-5000

Sentinel: Product Manager FAAD Sensor ATTN: SFAE-IEW-GSI Redstone Arsenal, AL 35898-5796

Single Channel Ground and Airborne Radio System (SINCGARS): Product Manager TRCS ATTN: SFAE-C3S-TRC Ft. Monmouth, NJ 07703 Small Arms (M4 Carbine, M16A2 Rifle, MK19-3 40mm Automatic Grenade Launcher, M249 Squad Automatic Weapon): Product Manager Small Arms U.S. Army Armament Research, Development, and Engineering Center ATTN: AMCPM-SA Picatinny Arsenal, NJ 07806-5000

Smoke Generator (M56): Product Manager Smoke/Obscurants ATTN: AMCPM-SM Aberdeen Proving Ground, MD 21010-5423

Smoke Generator (M58): Product Manager Smoke/Obscurants ATTN: AMCPM-SM Aberdeen Proving Ground, MD 21010-5423

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AMCCOM ATTN: AMSMC-RT Rock Island, IL 61299

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

Standard Army Management Information Systems (STAMIS): Program Executive Office STAMIS ATTN: SFAE-PS

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Standardized Integrated Command Post

System (SICPS): Project Manager, Common Hardware/Software Product Manager, SICPS Ft. Monmouth, NJ 07703 Stinger: FAAD Project Office ATTN: SFAE-MSL-FAD Redstone Arsenal, AL 35898-5630

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Tactical High Energy Laser (THEL): Project Manager U.S. Army Space and Strategic Defense Command P.O. Box 1500 Huntsville, AL 35807

Tactical Quiet Generators (TQG): DoD Project Manager–Mobile Power Mobile Electric Power 7500 Backlick Road Springfield, VA 22150-3107

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Tactical Unmanned Vehicle (TUV): Product Manager-TUV Unmanned Ground Vehicles/Systems JPO Attn: AMCPM-UG-TUV Redstone Arsenal, AL 31898-8060

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

Task Force XXI Tactical Operations Centers (TOCs) Project Manager U.S. Army Missile Command ATTN: SFAE-C3S-AD Redstone Arsenal, AL 35898-5600 Theater High Altitude Area Defense (THAAD) System: Project Manager ATTN: SFAE-MD-THA PO. Box 1500 Huntsville, AL 35807-3801

Thermal Weapon Sight (TWS): Project Manager NV/RSTA 10221 Burbeck Road, Suite 430 Ft. Belvoir, VA 22060-5806

TOW Improved Target Acquisition System (ITAS): Product Manager ITAS ATTN: SFAE-MSL-CC Redstone Arsenal, AL 35898-5710

TOW Missile: Project Manager Close Combat Anti-Armor Weapon Systems ATTN: SFAE-MSL-CC Redstone Arsenal, AL 35898-5710

Vehicle Teleoperation Capability (VTC): Product Manager-VTC Unmanned Ground Vehicles/Systems JPO Attn: AMCPM-UG-VTC Redstone Arsenal, AL 35898-8060

Volcano: Project Manager Mines, Countermine, and Demolitions ATTN: SFAE-ASM-MCD Picatinny Arsenal, NJ 07806-5000

Wolverine: Project Manager Combat Mobility Systems ATTN: SFAE-ASM-CV-H Warren, MI 48397-5000 Abrams 173

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